Fairfax Water

8570 EXECUTIVE PARK AVENUE
FAIRFAX, VIRGINIA 22031

INVITATION FOR BIDS NO. 22-029
STEP II
PRE-QUALIFIED BIDDERS ONLY

WATER MAIN INSTALLATION AND SERVICE CONTRACT

May 26, 2022

IFB 22-029

WATER MAIN INSTALLATION AND SERVICE CONTRACT

FOR PRE-QUALIFIED CONTRACTORS ONLY

OWNER
Fairfax County Water Authority
d/b/a: Fairfax Water
8570 Executive Park Avenue
Fairfax, Virginia 22031
Tel. (703) 289-6255
Fax (703) 289-6262

Issue Date:	**May 26, 2022**
Virtual Pre-Bid Meeting:	**June 7, 2022 @ 10:00 A.M.** Microsoft Teams meeting Click here to join the meeting Or call in (audio only) +1 571-348-5786 Phone Conference ID: 741 164 817#
Deadline for Questions:	**June 20, 2022 @ 5:00 P.M.**
Addendum 1 Issued:	**June 23, 2022**
Bid Submittal Deadline:	**PRIOR to 2:00 PM EST, June 30, 2022**
Bids to Be Delivered to:	**Procurement Department** **Fairfax Water** **8570 Executive Park Avenue** **Fairfax, Virginia 22031**
Procurement Contact:	**Torry Huff, VCCO, CPPO, CPPB** **Telephone: 703-289-6263** **Facsimile: 703-289-6262** **E-Mail: thuff@fairfaxwater.org**

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FAIRFAX WATER

IFB 22-029
STEP II

Water Main Installation and Service Contract

SECTION 00100
NOTICE TO BIDDERS

PART 1 - GENERAL

1.01 The Fairfax County Water Authority (d/b/a: Fairfax Water) hereby invites bids as Step II from previously Pre-qualified Contractors (REF: RFQ 22-013 Step I) properly licensed in the Commonwealth of Virginia to perform construction services and related modifications to be conducted at various times during the contract period. Typical projects may include the installation of new ductile iron pipe (DIP) water mains for pipe ranging from 4 inches through 48 inches in diameter, installation of commercial or domestic water services, and the replacement or repair of existing water system facilities and other work as described herein. The proposed water main installation work will largely take place in residential neighborhoods. Work on existing water mains may include work on pipe up to and including 84 inches in diameter.

1.02 Bids will be accepted in the Office of Procurement prior to 2:00 p.m., June 30, 2022 from those Firms previously Pre-Qualified per Step I of RFQ 22-13. Bids must be clearly identified as being for this particular Invitation for Bid (IFB). Fairfax Water shall not be responsible for the inadvertent opening or failure to receive a bid not properly labeled or identified by the Bidder. Any bid, or modification thereto, received in the Office of Procurement after the exact time and date specified for receipt will not be considered regardless of the circumstances related to its lateness or degree of lateness. Bids may be withdrawn by written notice prior to the date and time of receipt in accordance with provisions outlined in the bid documents.

1.03 Bids will be publicly opened and read aloud virtually via Microsoft Teams on June 30, 2022 immediately following the bid submittal deadline. Interested parties may view the Bid Opening at the following link:

Microsoft Teams meeting

Join on your computer or mobile app

Click here to join the meeting

Or call in (audio only)

+1 571-348-5786

Phone Conference ID: 247 741 657#

1.04 All respondents to this IFB must submit their bid to the following address, either by hand delivery or by US Postal Service (facsimile transmissions will not be accepted):

Hand delivery and US Postal Service:

FAIRFAX WATER
8570 EXECUTIVE PARK AVENUE
OFFICE OF PROCUREMENT
FAIRFAX, VIRGINIA 22031
ATTN: TORRY HUFF, CPPB, CPPO, VCCO

1.05 In order for a bid to be eligible for consideration, the bidder must be properly licensed as a contractor in the Commonwealth of Virginia in accordance with the requirements of the Virginia Code.

1.06 Bids may be withdrawn by written notice to Fairfax Water prior to the due date and time established for bid submissions herein in the manner prescribed in the Instructions to Bidders. Except as expressly set forth in the Instructions to Bidders, no bid may be withdrawn after the date and time established herein for the submission of bids.

1.07 Persons interested in examining and/or obtaining copies of the Contract Documents for information purposes only may contact Fairfax Water's Office of Procurement at (703) 289-6255, Monday through Friday, between the hours of 8:00 AM and 4:00 PM. Partial copies of the Contract Documents will not be distributed.

1.08 Bid security in the type and amount stated in the Instructions to Bidders shall accompany the Bid. Subject to the limitations set forth in the Instructions to Bidders, the Bid security shall be retained by the Owner if the successful Bidder fails to execute the Agreement and provide the required contract security and evidence of insurance within 10 days after Notice of Award is received by the Bidder. Contract security of the type and amount set forth in the Instructions to Bidders will be required from the successful bidder.

1.09 Each bidder shall bear and be responsible for all costs, fees and expenses associated with its preparation and submission of a bid in response to this IFB. In no event shall any bidder be reimbursed by Fairfax Water for any such costs, fees or expenses

1.10 A non-mandatory virtual pre-bid conference will be held at 10:00 a.m. local prevailing time on June 7, 2022.

Microsoft Teams meeting

Join on your computer or mobile app
Click here to join the meeting
Or call in (audio only)
+1 571-348-5786
Phone Conference ID: 741 164 817#

SECTION 00200
INSTRUCTIONS TO BIDDERS

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FAIRFAX WATER

SECTION 00200

INSTRUCTIONS TO BIDDERS

1.01 BID PACKAGE

A. The bid package must include the following items.

1. A completed Bid Form, Section 00400 of this IFB, including all requested: (i) unit prices for performing the complete scope of work, as required under Part A; and (ii) information regarding proposed pipe laying crews and subcontractors, as required under Part B.

2. A bid bond, a certified check upon a solvent bank or trust company, made payable to the order of Fairfax Water, or a cash escrow in an amount of 5 percent of the total bid price submitted.

3. Any additional information required by Fairfax Water.

1.02 FORM, PREPARATION AND PRESENTATION OF BIDS

A. Bidders shall complete and submit the entire Bid Form on the enclosed separate stapled set. The bidder shall retain a copy of the completed bid package for its records. The enclosed set is identical with the set bound with the Contract Documents. Blank spaces provided for Bid Prices on the Bid Form must clearly indicate unit price, total price, or lump sum (as the case may be) and must be filled in accordingly. All portions of the Bid Form must be completed in their entirety and either typewritten or printed legibly in ink. If a Bid contains any omissions, erasures, illegible text, alterations, additions, or items not called for in the itemized Bid, or contains irregularities or unbalancing of any kind; such circumstance may constitute sufficient cause for rejection of such Bid. In case of any discrepancy between printed numbers and written words proposed for any item in the Bid, the amount expressed in written words will govern. In the event of a discrepancy between unit prices and extended totals, the unit pricing will govern and the total will be adjusted accordingly.

B. The Bid shall be completed as set forth above, signed by an authorized representative of the bidder, and delivered to Fairfax Water in a sealed envelope on or before the submission due date and time and at the place stated in the Notice to Bidders. The envelope must be must be addressed to Fairfax Water at the address given in the Notice to Bidders and clearly labeled on the outside left lower corner as follows:

SEALED BID - DO NOT OPEN
BID NO. IFB 22-029
TITLE: Water Main Installation and Service Contract
BID SUBMITTAL DEADLINE: PRIOR to 2:00 PM EST, June 30, 2022,

CONTRACTOR VIRGINIA REGISTRATION NUMBER _____,

EXPIRATION DATE _____

C. It is the Bidder's responsibility to ascertain that time of delivery for mailed bids is recorded by Fairfax Water personnel.

E. Bids sent via express delivery service must be sealed in an envelope inside the express container.

F. Bids transmitted directly to Fairfax Water via facsimile or electronic transmission will not be accepted.

G. Fairfax Water is not responsible for the premature opening of a bid not properly addressed and identified. Bids which are opened prior to the official time as a result of improper identification may be rejected.

H. Any bid, information or materials relating to the IFB, which are submitted by the bidder and are received after the date and time set for receipt of bids, will not be opened and will not be considered regardless of the circumstances related to its lateness or degree of lateness.

I. Section 00500 (Agreement) is included in the Bid Documents in order to familiarize Bidder with its contents. In no case is the Agreement Form to be filled out or signed by Bidder.

1.03 CONTRACTORS REGISTRATION LAW

A. Bidders shall comply with all applicable laws, rules and regulations relating to the practice of General Contracting in the Commonwealth of Virginia. Bidder shall be required to be licensed in accordance with the requirements of Chapter 11, Title 54.1 of the Virginia Code, as amended, before such Bidder's bid may be received and considered hereunder.

1. For joint ventures, Bidders may provide either Contractor Registration Numbers for each party or a Contractor Registration Number for the joint venture.

B. Each bidder shall list the Contractor Registration Number on the outside of the envelope containing his Bid and on his Bid Form in the space provided.

C. Contractor's registration requirements shall apply to all subcontractors.

D. A contractor operating as a partnership or under an assumed or fictitious name shall file a certificate as provided by Chapter 5 Title 59.1 of the Code of Virginia of 1950, as amended.

1.04 PREVAILING LAW AND POLICY

A. Any contract resulting from this IFB shall be governed in all respects, whether as to validity, construction, capacity, performance or otherwise by the laws of the Commonwealth of Virginia.

1.05 LAWS AND REGULATIONS

A. Contractors will be required to comply with all applicable federal, state and local laws, rules, ordinances and regulations.

1.06 SPECIFICATION FAMILIARITY

A. It is the Bidder's responsibility to examine this entire IFB carefully. If a question arises as to the meaning or intent of these documents, inquiry must be made in writing to the Procurement Contact, in accordance with paragraph 1.12.A.

B. The submission of a bid shall indicate that the Bidder thoroughly understands the terms of the IFB.

1.07 CONTRACT DOCUMENTS

A. Bidders are advised that Fairfax Water does not sign standard contract forms that may be used by the bidder. The Bid Form contains a signature line for the bidder that must be signed prior to submission of the bid by a representative of the bidder who is duly authorized to execute the Bid Form and to bind the bidder to the terms and conditions of the IFB.

1.08 QUANTITIES ESTIMATED ONLY

A. Quantities for the various items of Work, equipment and materials, which may be set forth in the Bid Form, are considered to be approximations only and are given for the sole purpose of providing a uniform basis for the comparison of Bids. They have been estimated in an attempt to reflect the amount of work to be performed on approximately 40 projects in the first year of this contract. The quantities actually required to complete the Work may be more or less than so estimated.

B. The actual contract value may vary as dictated by the requirements of Fairfax Water.

1.09 BID SECURITY

A. Each bid shall be accompanied by a bid bond in an amount of five percent (5%) of the amount of the bid on the form prescribed herein. The bid bond shall be issued by a surety company licensed to conduct business as a surety in the Commonwealth of Virginia and otherwise satisfying any further requirements with respect to sureties set forth in the General Conditions. In lieu of a bid bond, a bidder may submit a certified check or cash escrow in the face amount required for the bond. Such bid security shall be given as a guarantee that the bidder will enter into a contract and provide the required contract security and insurance if awarded the work.

B. The bid security of the unsuccessful bidders will be returned within 5 days after the execution of the Contract or, if no such Contract has been executed, within 90 days after the date of opening Bids. The bid security of the successful bidder will be returned only after such bidder has duly executed the Agreement and furnished the contract security and evidence of insurance.

C. Bids shall be firm and irrevocable for 90 days after the date fixed for opening the Bids.

D. If the bidder to whom the Contract is awarded refuses or neglects to execute the Agreement or fails to furnish the required contract security and evidence of insurance within 10 days after receipt of the notice, the amount of his bid security shall be forfeited and shall be retained by Fairfax Water as liquidated damages, and not as a penalty, since said sum is a fair estimate of the amount of damages that Fairfax Water will sustain in case said bidder fails to enter into a Contract and furnish the required Performance and Payment Bonds and Insurance. Notwithstanding the foregoing, no forfeiture under a

bid bond shall exceed the lesser of: (i) the difference between the bid for which the bond was written and the next low bid; or (ii) the face amount of the bid bond. If the bidder to whom the Contract is awarded refuses or neglects to execute it or fails to furnish the required Performance and Payment Bonds and Insurance as herein provided, the award of the Contract may be annulled and the Contract awarded to the next best bidder and such bidder shall fulfill every stipulation of these documents as if he were the original party to whom it was made; or Fairfax Water may reject all of the Bids as its interest may require. Except as provided herein with regard to withdrawal of bids, no plea of mistake in the Bid shall be available to the bidder for the recovery of his bid security or as a defense to any action based upon the neglect or refusal to execute a contract.

1.10 CONTRACT SECURITY

A. The bidder whose Bid is accepted shall enter into a written contract for the performance of the Work and furnish within 10 days after written notice of award by Fairfax Water has been delivered to such bidder at the address given on his Bid Form the following: (1) a performance bond in an amount equal to 100 percent of the contract sum conditioned on the faithful performance of the contract in strict conformity with the plans, specifications and conditions of the contract, (2) a payment bond in an amount equal to 100 percent of the contract sum, conditioned upon the prompt and faithful payment of all persons and entities who have and fulfill contracts which are directly with the contractor for performing labor or furnishing materials in the prosecution of the work provided for in the contract, and (3) one or more certificates of insurance evidencing the types and amounts of insurance coverage required to be maintained by the contractor under the Contract Documents.

B. Any performance or payment bond required hereunder shall be in the form included in these Contract Documents and shall be executed by a surety company legally authorized to do business as a surety in the Commonwealth of Virginia and meeting the requirements stated in Article 12 of the General Conditions. In lieu of a payment or performance bond, the successful bidder may furnish a cash escrow or certified check payable to the order of Fairfax Water in the face amount required for such bonds.

1.11 EXCEPTIONS

A. Exceptions to any portion of this IFB will not be considered and, if offered, may result in rejection of the bid.

1.12 ADDENDA AND INTERPRETATIONS

A. No interpretation of the meaning of these documents will be made to any bidder orally. Any request for an interpretation must be in writing and submitted; (1) by mail or parcel delivery addressed to Fairfax Water, 8570 Executive Park Avenue, Fairfax, VA 22031, Attention: Procurement Contact, (2) by fax to the Office of Procurement, directed to the fax number and purchasing contact listed on the cover of this IFB, or (3) by e-mail to thuff@fairfaxwater.org. To be given consideration, requests must be received no later than the time listed on the cover sheet. Any and all such interpretations and any supplemental instructions will be returned in writing to the prospective bidder requesting such interpretations, or will be in the form of written addenda which, if issued, will be sent to all prospective bidders, at the respective addresses furnished for such purpose, not later than three (business) days prior to the date fixed for the submission of Bids. Notwithstanding any provision to the contrary, the failure of any bidder to receive any such addenda or interpretations shall neither constitute grounds for withdrawal of a bid

nor relieve such bidder from any obligation under his Bid as submitted. All addenda so issued shall become part of the Contract Documents.

1.13 BIDDER QUALIFICATIONS

A. The bidder shall be qualified by experience, financing, organization and planning ability, and shall have equipment to perform the work called for in the Contract Documents. The bidder shall have been prequalified in accordance with RFQ 22-13. Fairfax Water reserves the right to be the sole judge of the qualifications of the bidder in performing work.

B. Applicant Misrepresentation. Any knowing misrepresentation in submitting information to Fairfax Water may constitute sufficient grounds for rescinding the bidder's pre-qualification, rejecting a bid under this IFB, or rescinding an award of the contract or canceling the contract. Any such misrepresentation may also result in debarment of the applicant by Fairfax Water.

1.14 WITHDRAWAL OF BID

A. A bidder may withdraw its Bid before the time fixed for receiving Bids without prejudice by communicating its desire to withdraw in writing to the Procurement Manager of Fairfax Water prior to such date and time. When the bidder's communication is received, the unopened Bid will be returned to the bidder's authorized agent by means determined by Fairfax Water.

B. Except as set forth below, no bid may be withdrawn after the date and time fixed for the submission of bids, except by written request submitted in the manner prescribed herein. A bidder may withdraw its bid from consideration if the price bid was substantially lower than the other bids due solely to a mistake therein, provided the bid was submitted in good faith, and the mistake was a clerical mistake as opposed to a judgment mistake, and was actually due to an unintentional arithmetic error or an unintentional omission of a quantity of work, labor or material made directly in the compilation of the bid, which unintentional arithmetic error or unintentional omission can be clearly shown by the objective evidence drawn from inspection of original work papers, documents and materials used in the preparation of the bid sought to be withdrawn.

C. If a bid contains both clerical and judgment mistakes, a bidder may withdraw his bid from consideration if the price bid would have been substantially lower than the other bids due solely to the clerical mistake, that was an unintentional arithmetic error or an unintentional omission of a quantity of work, labor or material made directly in the compilation of a bid that shall be clearly shown by objective evidence drawn from inspection of original work papers, documents and materials used in the preparation of the bid sought to be withdrawn.

D. The procedure for bid withdrawal is as follows:

The bidder shall submit to Fairfax Water the original work papers, documents, and materials used in the preparation of the bid within one day after the date fixed for submission of bids. The work papers shall be delivered by the bidder in person or by registered mail at or prior to the time fixed for opening of bids. Thereafter, the bidder shall have two hours after the opening of bids within which to claim in writing any mistake as defined herein and withdraw his bid. The contract shall not be awarded by Fairfax Water until the two-hour period has elapsed. Such mistake shall be

proved only from the original work papers, documents and materials delivered as required herein.

E. No bid may be withdrawn when the result would be the awarding of the contract on another bid of the same bidder or of another bidder in which the ownership of the withdrawing bidder is more than five percent.

F. If a bid is withdrawn under the authority of this Section, the lowest remaining bid shall be deemed to be the low bid. No bidder who is permitted to withdraw a bid shall, for compensation, supply any material or labor to or perform any subcontract or other work agreement for the person or firm to whom the contract is awarded or otherwise benefit, directly or indirectly, from the performance of the work outlined in these Contract Documents.

G. If Fairfax Water denies the withdrawal of a bid under the provisions of this section, it shall notify the bidder in writing stating the reasons for its decision and award the contract to such bidder at the bid price, provided such bidder is the lowest responsible and responsive bidder hereunder.

1.15 ACCEPTANCE OR REJECTION OF BIDS

A. After all bids have been examined, Fairfax Water reserves the right to reject any and all bids, if by doing so, it is deemed to be in the best interests of Fairfax Water. Fairfax Water also reserves the right to be the sole judge of the qualifications of the bidder in performing under the terms as specified in the contract.

B. Notwithstanding the prequalification process conducted during Step I of this procurement process, Fairfax Water reserves the right to reject any bid if investigation of such bidder fails to satisfy Fairfax Water that such bidder is properly qualified to carry out the obligations and to complete the Work contemplated therein in strict accordance with the Contract Documents. Any or all bids will be rejected if there is reason to believe that collusion exists among the bidders.

C. Bids will be considered irregular and may be rejected if they show serious omissions, alterations in form, additions not called for, conditions, unauthorized alternates, illegible text or irregularities of any kind. Fairfax Water reserves the right to waive such informalities as may be deemed to be in the best interests of Fairfax Water.

D. A bidder’s attempt to modify the Contract Documents in any respect, including, but not limited to the bidder’s insertion of price escalation clauses, delivery costs, disclaimers, limitations of liability, or other terms and conditions of any nature which are not expressly allowed in this IFB, may constitute grounds for rejection of the bid.

1.16 BASIS OF AWARD

A. The Contract will be awarded, if at all, under the terms and conditions of the Contract Documents to the lowest responsive and responsible bidder for the Computed Total Amount bid, as determined by Fairfax Water with due consideration given to the ability of the Contractor to respond, coordinate, schedule, staff, equip, and complete the Work within the prescribed timeframes and to provide Qualified Water Main Installation Crews and in accordance with the requirements of the Contract Documents.

1.17 VIRTUAL BID OPENING

Microsoft Teams meeting

Join on your computer or mobile app
Click here to join the meeting
Or call in (audio only)
+1 571-348-5786
Phone Conference ID: 247 741 657#

A. Bids received in response to this IFB will be publicly opened at the date and time specified herein. Prices and other pertinent information contained in the bid will be read aloud. No decisions regarding the award of a contract will be made at the opening.

B. Attendance is not required at the bid opening; however, bidders are encouraged to attend.

C. In the event that only one Bid is received by Fairfax Water in response to this IFB, Fairfax Water may, in its discretion, decline to open such bid and may return the unopened envelope to the bidder.

1.18 NOTICE OF AWARD

A. Bidders may view the bid results on Fairfax Water's website at www.fairfaxwater.org following formal approval by Fairfax Water. All requests relating to bid results should be made in writing and shall be directed to Fairfax Water's Procurement Contact. Fairfax Water will not report bid results by telephone.

B. The successful bidder will be notified by letter communicating Notice of Award of the Contract.

1.19 NOTICE TO PROCEED

A. The successful bidder shall be notified by letter, giving Notice to Proceed, when work may begin under the Contract Documents. Such Notice will be issued as determined by Fairfax Water but not before receipt and acceptance of the successful bidder's Payment and Performance Bonds, Certificate of Insurance, and a fully executed Agreement.

1.20 TIME FOR COMPLETION

A. The time for completion referred to in Article 8 of the General Conditions with respect to the individual Project assignments issued to the successful Contractor under the Water Main Installation and Service Contract shall be referred to as the "Project Duration" and shall be calculated as follows:

1. Time for Beneficial Use – Project Duration. The time for Beneficial Use of the Work referred to Section 00500 – Agreement shall be determined by adding (a) through (g) below:

a. Determine the total length of all sizes of water main within the Project Assignment (other than water main associated with highway crossings) and divide as follows:

(i) For Water Mains greater than 1000 feet in length, divide total length by 100

(ii) For Water Mains 100 to 1000 feet in length, divide total length by 50

(iii) For Water Mains less than 100 feet in length, divide total length by 35

b. Hydrant Installations: Add 2 days for each individual Hydrant Installation.

c. Trenchless Crossings (if applicable) – Add the number of days obtained by dividing the length of the trenchless crossing by 10

d. Service Connections (Tie-ins to existing system)– 1 Day Per Connection

e. Service Re-Taps – Number of re-taps divided by 5

f. For Saw Cutting – Divide by 500 if both sides of trench are saw cut and divide by 1000 if only one side of the trench is cut.

g. For test pitting, add 2 days for projects under 1000 feet, add 3 days for projects >1000 feet and under 5000 feet and add 5 for projects over 5,000 feet.

h. Add 5 additional days for pressure testing and chlorination and disinfection

i. Add two days for mobilization and demobilization

2. Beneficial Use means that the facilities are completed to the point that water can be provided to the water transmission/distribution system in the quantity and quality satisfactory to the Owner. All water system pipelines and appurtenances shall be installed, tested, and operational or temporary arrangements satisfactory to Owner shall have been made, hydrostatic testing, disinfection and flushing shall be completed prior to the date of Beneficial Use in accordance with the Specifications herein. Final copies of any operational or maintenance manuals, if required, shall be submitted 30 days prior to the date of Beneficial Use in accordance with Section 01770, Closeout Procedures.

3. Time for Final Completion – Project Duration. The time for final completion of the Work referred to in Article 8 of the General Conditions shall be the number of days described above plus;

a. Restoration – 30 additional days

b. Note: Final Mill and Overlay shall commence immediately after base paving but start no later than 30 days after base paving is completed. The requirement above does not apply in the event of weather limitations as specified in Section 314.03 of the VDOT Road and Bridge Specifications.

B. The Project Duration for Work other than emergency repairs shall be computed from the date that the Notice to Proceed is given for each individual project. Notice to Proceed may be delayed until all necessary easements and permits are obtained. The Project Duration for Work constituting emergency repairs shall be computed from receipt of

request from the Owner. The Project Duration includes all lead time on the part of the Contractor for obtaining the necessary material and equipment.

1.21 ESCROW AGREEMENT

A. In accordance with Section 2.2-4334 of the Virginia Code, as amended, the successful bidder will have fifteen calendar days after Notice of Award is issued by Fairfax Water in which to execute and submit to Fairfax Water the attached escrow agreement. If the escrow agreement form is not submitted within the fifteen day period, the successful bidder will be deemed to have forfeited its right to the use of the escrow account procedure. A copy of the escrow agreement is included in these Contract Documents (Section 00850).

1.22 PRE-BID CONFERENCE

A. A non-mandatory virtual pre-bid conference will be held at 10:00 a.m. on June 7, 2022. The purpose of the pre-bid conference is to afford the bidders an opportunity to raise questions pertaining to the construction of the Project and for the Owner or his representatives to clarify those points. In addition, other important specific features of the Project, which may develop during the course of the pre-bid conference, will be brought to the attention of the Bidders.

Microsoft Teams meeting

Join on your computer or mobile app

Click here to join the meeting

Or call in (audio only)

+1 571-348-5786

Phone Conference ID: 741 164 817#

B. Nothing discussed during the pre-bid conference will be construed to alter in any respect the meaning or intent of the Bid Documents. No modification or revision to any portion of the Contract Documents which may arise from or which may be discussed at the pre-bid conference will become effective unless issued in an Addendum.

1.23 CONTRACT TERM AND RENEWAL

A. The term of this Contract will be for a 12-month period beginning with issuance of Notice to Proceed by Fairfax Water (the “Original Period”), unless extended in the manner provided herein. The term of this Contract may be extended at the sole and absolute discretion of Fairfax Water for up to two additional, consecutive 12-month terms (each such 12-month extension to be referred to as a “Renewal Period”). Fairfax Water will notify the Contractor in writing of its decision to extend the term of this Contract on or before the expiration of the Original Period or any Renewal Period, as the case may be. The Original Period and each Renewal Period, if any, shall be collectively referred to herein as the “Contract Period”.

B. Fairfax Water will provide an economic price adjustment to the Contractor no more than once annually during the Contract Period and it shall apply prospectively to the following 12-month contract term if extended by Fairfax Water.

C. Economic price adjustments shall be based upon and limited to the increase specified below:

1) A Base Year Index shall be calculated by averaging the twelve (12) month Construction Cost Indices (CCI) for the U.S. Twenty City Average published in the Engineering News Record (ENR) for the twelve (12) months preceding the date of the Contract Award.

2) A Current Year Index shall be calculated by averaging the twelve (12) month CCI for the twelve months (12) contract renewal date.

3) The Economic Price Adjustment shall be calculated by dividing the Current Year index by the Base Year Index and rounded up to one (1) decimal place). The adjustment will be effective for the next twelve (12) months of the option term.

4) In the event that the above-referenced index reflects a negative number, the Contractor shall reduce unit prices by the corresponding amount for new contract year.

D. The contract awarded as a result of this solicitation will result in a term contract. Please refer to the Specifications Section 01110, Summary of Work, Part 1.03 Progress of the Work for the Term of Contract and Contract Renewal.

1.24 LIQUID ASPHALT PRICE ADJUSTMENT

A. Price adjustments (Increases and Decreases) for asphalt cement products provided under the Contract will be only provided for Bid Items 6a through 6d (Asphalt Concrete Base Course) and 8a through 8c (Asphalt Concrete Surface Course Pavement Overlay). Current VDOT cost per ton for liquid asphalt PG-64-22 is Price/Ton recorded June 2022. This cost will become the Base Index for determining any future price adjustments. The Price Adjustment Indices for Asphalt for liquid asphalt PG-64-22 and PG-76-22 are posted on the VDOT website (www.virginiadot.org/business/const/indices-asphalt.asp) under Price and Fuel Adjustment indexes.

B. The difference between the index of June 2022 (Time of Bid Submission) and the current index (current being – monthly index published by VDOT at the time each individual project purchase order issued by Fairfax Water) will determine the amount of the adjustment increase/decrease). However, price adjustments will not be made for any item in which the difference between the base and current indexes is less than five percent (5%). The quantity of asphalt cement in the performance grade mix to which the adjustment will be applied will be the quantity utilized in the price adjustment items based on the percent of asphalt in the performance grade mix shown on the appropriate approved job mix formula. The determination as to the amount of any cost adjustment shall be made by Fairfax Water Construction Manager. Disputes shall be resolved by Fairfax Water Procurement Manager.

C. See Section 00800-1.03E for Economic Project Adjustment Information.

END OF SECTION 00200

FAIRFAX WATER
FAIRFAX, VIRGINIA

SECTION 00400
BID FORM

IFB No. 22-029
WATER MAIN INSTALLATION AND SERVICE CONTRACT
OCTOBER 1, 2022 THROUGH SEPTEMBER 30, 2023

To Fairfax Water, 8570 Executive Park Avenue, Fairfax, Virginia, 22031:

Submitted by:

Name of Bidder: _____
(Legal Name of partnership, corporation or other form of entity)

Bidder's Mailing Address for Notices: _____
_____
_____

Bidder's Principal Office Address
(if different from above): _____
_____
_____

Form of Entity: _____

State of Organization: _____

Telephone No.: _____

Fax No.: _____

Bidder's Designated Contact Person: _____

The above-named Bidder affirms and declares:

1. This Bid is made without any understanding, agreement or connection with any other individual, partnership, corporation or other entity making a bid for the same purpose and is in all respects fair and without collusion or fraud.

2. The Bidder is not in arrears to Fairfax Water or Fairfax County upon debt or contract, and is not in default, as surety or otherwise, upon any obligation to Fairfax Water or Fairfax County.

3. No officer or employee whose salary is payable in whole or in part by Fairfax Water is presently nor shall become interested, directly or indirectly, as a contracting party, partner, stockholder, surety or otherwise, in this Bid, or in the performance of the Contract, or in the supplies, materials, or equipment and work or labor to which it relates, or in any portion of the profits thereof.

4. All proposed goods and services shall satisfy fully the requirements of the Contract Documents.

5. The Bidder is financially solvent and sufficiently experienced and competent to perform the Work.

6. The Bidder has carefully examined the site of the Work and, from his own investigations, is satisfied as to the nature and location of the Work; the character, quality and quantity of existing materials and all conditions likely to be encountered; the kind and extent of equipment and other facilities needed for the performance of the Work; the general and local conditions; and all other items which reasonably may be expected to affect the Work or its performance.

7. The undersigned bidder hereby represents and warrants to Fairfax Water that the bidder: (a) has reviewed and thoroughly understands the scope, terms and conditions set forth in this IFB; (b) has made due inquiry of Fairfax Water as to the existence of any addenda issued in connection with this IFB; (c) is satisfied that it has received any and all such addenda and the bidder has taken the contents thereof into consideration when preparing and submitting this Bid; and (d) accepts full and complete responsibility for the receipt of any and all such addenda and waives any claim of mistake or error in its Bid based upon its failure, in fact, to have reviewed all applicable addenda.

8. The undersigned bidder also declares that it has carefully examined and fully understands all the component parts of the Contract Documents and agrees, if awarded the Contract, to execute the Agreement and furnish the required contract security and evidence of insurance required by the Contract Documents, and to perform all of the Work in strict accordance with the terms of the Contract Documents for the prices set forth on the following page(s).

PART A--UNIT PRICES

INSTRUCTIONS: The Bidder shall fill in all blanks providing the following: The Bidder's proposed Unit Price in words; the Bidder's proposed Unit Price in figures; and the Bidder's proposed computed total price in figures, for each Contract Item described below. (The computed total price is obtained by multiplying the Estimated Quantity by the Bidder's proposed Unit Price.) Written amounts shall govern in case of discrepancy between the amounts stated in writing and the amounts stated in figures. In case of discrepancy between unit prices and totals, unit prices will prevail.

All blanks shall be filled in.

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
1	Rock Excavation _____ _____Dollars and _____Cents Per Cubic Yard	400 C.Y.	$_____	$_____
2a	Flowable Fill of Abandoned Water Mains _____ _____Dollars and _____Cents Per Cubic Yard	100 C.Y.	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
2b	Flowable Fill Backfill _____ _____Dollars and _____Cents Per Cubic Yard	100 C.Y.	$_____	$_____
3	Class C Concrete _____ _____Dollars and _____Cents Per Cubic Yard	100 C.Y.	$_____	$_____
4	2-inch Asphalt Concrete Trail Surface Course Pavement Removal and Replacement _____ _____Dollars and _____Cents Per Square Yard	500 S.Y.	$_____	$_____
5a	2-inch Temporary Pavement Asphalt – Hot Mix (SM-9.5) _____ _____Dollars and _____Cents Per Square Yard	10,000 S.Y.	$_____	$_____
5b	3-inch Temporary Pavement Asphalt – Hot Mix (SM-9.5) _____ _____Dollars and _____Cents Per Square Yard	5,000 S.Y.	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
6a	7.5-inch Asphalt Concrete Base Course (BM-25) Pavement Less than 50 Square Yards _____ _____Dollars and _____Cents Per Square Yard	200 S.Y.	$_____	$_____
6b	7.5-inch Asphalt Concrete Base Course (BM-25) Pavement 50 Square Yards to 450 Square Yards _____ _____Dollars and _____Cents Per Square Yard	4,000 S.Y.	$_____	$_____
6c	7.5-inch Asphalt Concrete Base Course (BM-25) Pavement Greater than 450 Square Yards _____ _____Dollars and _____Cents Per Square Yard	35,000 S.Y.	$_____	$_____
6d	Additional Asphalt Concrete Base Course (BM-25) Pavement Placement in Areas Greater than 7.5-inches in Thickness _____ _____Dollars and _____Cents Per Square Yard per Inch	10,000 S.Y./In.	$_____	$_____
7a	6-inch Asphalt Concrete Base Course (BM-25) Pavement Less than 50 Square Yards _____ _____Dollars and _____Cents Per Square Yard	200 S.Y.	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
7b	6-inch Asphalt Concrete Base Course (BM-25) Pavement 50 Square Yards to 450 Square Yards _____ _____Dollars and _____Cents Per Square Yard	4,000 S.Y.	$_____	$_____
7c	6-inch Asphalt Concrete Base Course (BM-25) Pavement Greater than 450 Square Yards _____ _____Dollars and _____Cents Per Square Yard	35,000 S.Y.	$_____	$_____
8a	1.5-inch Pavement Milling of Existing Surfaces (Less than 150 Square Yards per Project) _____ _____Dollars and _____Cents Per Square Yard	500 S.Y.	$_____	$_____
8b	1.5-inch Pavement Milling of Existing Surfaces (150 Square Yards to 1,500 Square Yards per Project) _____ _____Dollars and _____Cents Per Square Yard	25,000 S.Y.	$_____	$_____
8c	1.5-inch Pavement Milling of Existing Surfaces (Greater than 1,500 Square Yards per Project) _____ _____Dollars and _____Cents Per Square Yard	110,000 S.Y.	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
9a	1.5-inch Asphalt Concrete Surface Course (SM-9.5A) Pavement Overlay (Less than 15 Tons per Project) _____ _____Dollars and _____Cents Per Ton	100 Tons	$_____	$_____
9b	1.5-inch Asphalt Concrete Surface Course (SM-9.5A) Pavement Overlay (15 Tons to 120 Tons per Project) _____ _____Dollars and _____Cents Per Ton	1,000 Tons	$_____	$_____
9c	1.5-inch Asphalt Concrete Surface Course (SM-9.5A) Pavement Overlay (Greater than 120 Tons per Project) _____ _____Dollars and _____Cents Per Ton	15,000 Tons	$_____	$_____
9d	Speed Bumps, Speed Humps, and Speed Tables _____ _____Dollars and _____Cents Per Each	50 EA	$_____	$_____
10	Aggregate Surfaces _____ _____Dollars and _____Cents Per Cubic Yard	100 C.Y.	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
11	Sodding; includes 3" Topsoil _____ _____Dollars and _____Cents Per Square Yard	500 S.Y.	$_____	$_____
12	Seeding and Fertilizing; includes 4" Topsoil _____ _____Dollars and _____Cents Per Square Yard	10,000 S.Y.	$_____	$_____
13a	Concrete Sidewalk Replacement _____ _____Dollars and _____Cents Per Square Yard	300 S.Y.	$_____	$_____
13b	Concrete Driveway and Valley Gutter Replacement _____ _____Dollars and _____Cents Per Square Yard	250 S.Y.	$_____	$_____
13c	Concrete Curb Cut Ramp (CG-12) Replacement _____ _____Dollars and _____Cents Per Square Yard	250 S.Y.	$_____	$_____
14	Concrete Curb and Gutter Replacement _____ _____Dollars and _____Cents Per Linear Foot	2,500 L.F.	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
15	Silt Fence _____ _____Dollars and _____Cents Per Linear Foot	2,000 L.F.	$_____	$_____
16	Inlet Protection _____ _____Dollars and _____Cents Per Each	200 EA	$_____	$_____
17	Standard Hydrant Installations _____ _____Dollars and _____Cents Per Each	120 EA	$_____	$_____
18	Hydrant Installations on Existing Mains _____ _____Dollars and _____Cents Per Each	5 EA	$_____	$_____
19	Hydrant Removal _____ _____Dollars and _____Cents Per Each	110 EA	$_____	$_____
20a	4-inch, 6-inch, and 8-inch Ductile Iron Pipe Water Main Installations Less than 100 feet in Length _____ _____Dollars and _____Cents Per Linear Foot	300 L.F.	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
20b	4-inch, 6-inch, and 8-inch Ductile Iron Pipe Water Main Installations 100 to 1,000 feet in Length _____ _____Dollars and _____Cents Per Linear Foot.	10,000 L.F.	$_____	$_____
20c	4-inch, 6-inch, and 8-inch Ductile Iron Pipe Water Main Installations Greater than 1,000 feet in Length _____ _____Dollars and _____Cents Per Linear Foot	55,000 L.F.	$_____	$_____
21a	12-inch Ductile Iron Pipe Water Main Installations Less than 100 feet in Length _____ _____Dollars and _____Cents Per Linear Foot	100 L.F.	$_____	$_____
21b	12-inch Ductile Iron Pipe Water Main Installations 100 to 1,000 feet in Length _____ _____Dollars and _____Cents Per Linear Foot	750 L.F.	$_____	$_____
21c	12-inch Ductile Iron Pipe Water Main Installations Greater than 1,000 Feet in Length _____ _____Dollars and _____Cents Per Linear Foot	10,000 L.F.	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
22a	16-inch Ductile Iron Pipe Water Main Installations Less than 100 feet in Length _____ _____Dollars and _____Cents Per Linear Foot	100 L.F.	$_____	$_____
22b	16-inch Ductile Iron Pipe Water Main Installations 100 to 1,000 feet in Length _____ _____Dollars and _____Cents Per Linear Foot	750 L.F.	$_____	$_____
22c	16-inch Ductile Iron Pipe Water Main Installations Greater than 1,000 feet in Length _____ _____Dollars and _____Cents Per Linear Foot	4,000 L.F.	$_____	$_____
23a	24-inch Ductile Iron Pipe Water Main Installations Less than 100 feet in Length _____ _____Dollars and _____Cents Per Linear Foot	100 L.F.	$_____	$_____
23b	24-inch Ductile Iron Pipe Water Main Installations 100 to 1,000 feet in Length _____ _____Dollars and _____Cents Per Linear Foot	500 L.F.	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
23c	24-inch Ductile Iron Pipe Water Main Installations Greater than 1,000 feet in Length _____ _____Dollars and _____Cents Per Linear Foot	1,500 L.F.	$_____	$_____
24	30-inch Ductile Iron Pipe Water Main _____ _____Dollars and _____Cents Per Linear Foot	100 L.F.	$_____	$_____
25	36-inch Ductile Iron Pipe Water Main _____ _____Dollars and _____Cents Per Linear Foot	100 L.F.	$_____	$_____
26a	4-inch, 6-inch, and 8-inch MJ Gate Valves _____ _____Dollars and _____Cents Per Each	380 EA	$_____	$_____
26b	12-inch MJ Gate Valves _____ _____Dollars and _____Cents Per Each	60 EA	$_____	$_____
26c	16-inch MJ Butterfly Valves _____ _____Dollars and _____Cents Per Each	10 EA	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
26d	24-inch MJ Butterfly Valves _____ _____Dollars and _____Cents Per Each	10 EA	$_____	$_____
26e	30-inch MJ Butterfly Valves _____ _____Dollars and _____Cents Per Each	5 EA	$_____	$_____
26f	36-inch MJ Butterfly Valves _____ _____Dollars and _____Cents Per Each	5 EA	$_____	$_____
27a	4-inch, 6-inch, and 8-inch Ductile Iron Fittings _____ _____Dollars and _____Cents Per Each	825 EA	$_____	$_____
27b	12-inch Ductile Iron Fittings _____ _____Dollars and _____Cents Per Each	200 EA	$_____	$_____
27c	16-inch Ductile Iron Fittings _____ _____Dollars and _____Cents Per Each	35 EA	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
27d	24-inch Ductile Iron Fittings _____ _____Dollars and _____Cents Per Each	20 EA	$_____	$_____
27e	30-inch Ductile Iron Fittings _____ _____Dollars and _____Cents Per Each	10 EA	$_____	$_____
27f	36-inch Ductile Iron Fittings _____ _____Dollars and _____Cents Per Each	10 EA	$_____	$_____
28a	2 through 14-inch Standard Connection Type I _____ _____Dollars and _____Cents Per Each	10 EA	$_____	$_____
28b	16 through 24-inch Standard Connection Type I _____ _____Dollars and _____Cents Per Each	5 EA	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
28c	30 through 36-inch Standard Connection Type I _____ _____Dollars and _____Cents Per Each	2 EA	$_____	$_____
28d	2 through 14-inch Standard Connection Type II _____ _____Dollars and _____Cents Per Each	200 EA	$_____	$_____
28e	16 through 24-inch Standard Connection Type II _____ _____Dollars and _____Cents Per Each	5 EA	$_____	$_____
28f	30 through 36-inch Standard Connection Type II _____ _____Dollars and _____Cents Per Each	5 EA	$_____	$_____
28g	Standard Connection Type III _____ _____Dollars and _____Cents Per Each	10 EA	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
29a	Type I Abandonment _____ _____Dollars and _____Cents Per Each	100 EA	$_____	$_____
29b	Type II Abandonment - 2 through 14-inch _____ _____Dollars and _____Cents Per Each	200 EA	$_____	$_____
29c	Type II Abandonment - 16 through 24-inch _____ _____Dollars and _____Cents Per Each	20 EA	$_____	$_____
29d	Type II Abandonment - 30 through 36-inch _____ _____Dollars and _____Cents Per Each	10 EA	$_____	$_____
29e	Type III Abandonment - 2 through 14-inch _____ _____Dollars and _____Cents Per Each	50 EA	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
29f	Type III Abandonment - 16 through 24-inch _____ _____Dollars and _____Cents Per Each	10 EA	$_____	$_____
29g	Type III Abandonment - 30 through 36-inch _____ _____Dollars and _____Cents Per Each	5 EA	$_____	$_____
30	Heavy Clearing _____ _____Dollars and _____Cents Per Square Yard	500 SY	$_____	$_____
31	2-inch Air Release Connection _____ _____Dollars and _____Cents Per Each	20 EA	$_____	$_____
32	2-inch Blow-Off Connection _____ _____Dollars and _____Cents Per Each	30 EA	$_____	$_____
33	Driveway Culverts _____ _____Dollars and _____Cents Per Linear Foot	60 L.F.	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
34	Bonded Joints _____ _____Dollars and _____Cents Per Each	25 EA	$_____	$_____
35a	Test Stations _____ _____Dollars and _____Cents Per Each	10 EA	$_____	$_____
35b	Magnesium Anodes _____ _____Dollars and _____Cents Per Each	40 EA	$_____	$_____
36a	1-inch Service Taps with 10 feet of Copper Pipe or Less in Length _____ _____Dollars and _____Cents Per Each	1,400 EA	$_____	$_____
36b	Additional 1-inch Copper Pipe Installation _____ _____Dollars and _____Cents Per Linear Foot	1,000 L.F.	$_____	$_____
36c	Additional Cost for Bored Installation: 1-inch Copper Service Pipe _____ _____Dollars and _____Cents Per Linear Foot	500 L.F.	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
36d	2-inch Service Taps with 10 feet of Copper Pipe or Less in Length _____ _____Dollars and _____Cents Per Each	20 EA	$_____	$_____
36e	Additional 2-inch Copper Pipe Installation _____ _____Dollars and _____Cents Per Linear Foot	100 L.F.	$_____	$_____
36f	Additional Cost for Bored Installation: 2-inch Copper Service Pipe _____ _____Dollars and _____Cents Per Linear Foot	100 L.F.	$_____	$_____
37a	5/8-inch and 1-inch Water Meter and Box Removal and Replacement _____ _____Dollars and _____Cents Per Each	25 EA	$_____	$_____
37b	1 1/2-inch Water Meter and Box Removal and Replacement _____ _____Dollars and _____Cents Per Each	5 EA	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
37c	2-inch Water Meter and Box Removal and Replacement _____ _____Dollars and _____Cents Per Each	5 EA	$_____	$_____
38	Select Fill – Trench Backfill (VDOT 21A) _____ _____Dollars and _____Cents Per Cubic Yard	30,000 C.Y.	$_____	$_____
39	Test Holes _____ _____Dollars and _____Cents Per Each	200 EA	$_____	$_____
40	Additional Trench Excavation for Pipe Sizes 4-inches through 16-inches in Diameter _____ _____Dollars and _____Cents Per Vertical Foot per Linear Foot of Trench	10,000 V.F./L.F.	$_____	$_____
41	Additional Trench Excavation for Pipe Sizes 24-inches through 36-inches in Diameter _____ _____Dollars and _____Cents Per Vertical Foot per Linear Foot of Trench	1,500 V.F./L.F.	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
42a	4-inch Thermoplastic Pavement Striping Less than 250 feet in length _____ _____Dollars and _____Cents Per Linear Foot	1,500 L.F.	$_____	$_____
42b	4-inch Thermoplastic Pavement Striping greater than or equal to 250 feet in length _____ _____Dollars and _____Cents Per Linear Foot	10,000 L.F.	$_____	$_____
42c	6-inch Thermoplastic Pavement Striping Less than 250 feet in length _____ _____Dollars and _____Cents Per Linear Foot	500 L.F.	$_____	$_____
42d	6-inch Thermoplastic Pavement Striping 250 feet or Greater in Length _____ _____Dollars and _____Cents Per Linear Foot	500 L.F.	$_____	$_____
42e	12-inch Thermoplastic Pavement Striping Less than 250 feet in Length _____ _____Dollars and _____Cents Per Linear Foot	500 L.F.	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
42f	12-inch Thermoplastic Pavement Striping 250 feet or Greater in Length _____ _____Dollars and _____Cents Per Linear Foot	1,500 L.F.	$_____	$_____
42g	4-inch Type A Paint Pavement Striping Less than 250 feet in Length _____ _____Dollars and _____Cents Per Linear Foot	750 L.F.	$_____	$_____
42h	4-inch Type A Paint Pavement Striping 250 feet or Greater in Length _____ _____Dollars and _____Cents Per Linear Foot	250 L.F.	$_____	$_____
42i	Thermoplastic Arrow Less than 10 feet in Length _____ _____Dollars and _____Cents Per Single Arrow	5 EA	$_____	$_____
43	Miscellaneous Electrical Work (Bid Allowance) _____ Fifty Thousand_____Dollars and _Zero_____Cents	N/A	$__N/A__	$__50,000__

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
44a	Miscellaneous Trenchless Crossing Work - Jack-and-Bore Tunneling Trenchless Crossing (Bid Allowance) _____ One Hundred Thousand Dollars and Zero Cents	N/A	$ N/A	$ 100,000
44b	Miscellaneous Trenchless Crossing Work - Horizontal Directional Drill Trenchless Crossing (Bid Allowance) _____ Two Hundred and Fifty Thousand Dollars and Zero Cents	N/A	$ N/A	$ 250,000
45	Miscellaneous Vault Work (Bid Allowance) _____ Two Hundred Thousand Dollars and Zero Cents	N/A	$ N/A	$ 200,000
46	Miscellaneous Traffic Control Work (Bid Allowance) _____ Fifty Thousand Dollars and Zero Cents	N/A	$ N/A	$ 50,000
EMERGENCY WORK DIRECT LABOR RATES				
47	Foreman _____ _____Dollars and _____Cents Per Man Hour	100 MAN HRS	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
48	Skilled Labor _____ _____Dollars and _____Cents Per Man Hour	300 MAN HRS	$_____	$_____
49	Truck Driver _____ _____Dollars and _____Cents Per Man Hour	100 MAN HRS	$_____	$_____
50	Equipment Operator _____ _____Dollars and _____Cents Per Man Hour	100 MAN HRS	$_____	$_____
51	Flagman _____ _____Dollars and _____Cents Per Man Hour	200 MAN HRS	$_____	$_____
EMERGENCY WORK EQUIPMENT RATES				
52	Foreman's Pickup Truck _____ _____Dollars and _____Cents Per Truck Per Hour	100 HRS	$_____	$_____
53	Air Compressor With Tools _____ _____Dollars and _____Cents Per Compressor Per Hour	100 HRS	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
54	Compactor _____ _____Dollars and _____Cents Per Compactor Per Hour	100 HRS	$_____	$_____
55	Standard/Full-Size Crawler Excavators (10 – 90 metric tons; or 22,046 – 198,416 pounds) _____ _____Dollars and _____Cents Per Excavator Per Hour	500 HRS	$_____	$_____
56	Backhoe (6 – 10 metric tons; or 13,227 – 22,046 pounds) _____ _____Dollars and _____Cents Per Excavator Per Hour	500 HRS	$_____	$_____
57	Mini (0 – 6 metric tons; or <13,227 pounds) _____ _____Dollars and _____Cents Per Excavator Per Hour	250 HRS	$_____	$_____
58	Excavator Hoe-Ram Attachment _____ _____Dollars and _____Cents Per Hoe-Ram Per Hour	50 HRS	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
59	Dozer _____ _____Dollars and _____Cents Per Dozer Per Hour	100 HRS	$_____	$_____
60	Skid Steer with 40-inch Cold Planer/Broom Attachment _____ _____Dollars and _____Cents Per Skid Steer Per Hour	100 HRS	$_____	$_____
61	3,500-Watt Generator _____ _____Dollars and _____Cents Per Generator Per Hour	100 HRS	$_____	$_____
62	4-inch Pump with Hoses _____ _____Dollars and _____Cents Per Pump Per Hour	100 HRS	$_____	$_____
63	6-inch Pump with Hoses _____ _____Dollars and _____Cents Per Pump Per Hour	100 HRS	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
64	Non-Tilt Deck Utility Trailer (20 Ton) _____ _____Dollars and _____Cents Per Trailer Per Hour	100 HRS	$_____	$_____
65	Tandem-Axle Dump Truck (50,000 GVW) _____ _____Dollars and _____Cents Per Truck Per Hour	100 HRS	$_____	$_____
66	Jackhammer/Pavement Breaker _____ _____Dollars and _____Cents Per Jackhammer Per Hour	100 HRS	$_____	$_____
67	Loader (Track or Rubber Tire) _____ _____Dollars and _____Cents Per Loader Per Hour	100 HRS	$_____	$_____
68	Self-Powered Traffic Control Message Board _____ _____Dollars and _____Cents Per Board Per Hour	100 HRS	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
69	Shoring Box _____ _____Dollars and _____Cents Per Box Per Day	20 DAYS	$_____	$_____
70	Steel Plates _____ _____Dollars and _____Cents Per Plate Per Day	20 DAYS	$_____	$_____
71	Trailer-Mounted Light Tower _____ _____Dollars and _____Cents Per Tower Per Hour	100 HRS	$_____	$_____
72	Crash Barrier _____ _____Dollars and _____Cents Per Barrier Per Hour	100 HRS	$_____	$_____
73	Asphalt Roller _____ _____Dollars and _____Cents Per Roller Per Hour	100 HRS	$_____	$_____
74	Dump Truck Rental with Driver _____ _____Dollars and _____Cents Per Truck Per Hour	100 HRS	$_____	$_____

CONT. ITEM NO.	DESCRIPTION OF WORK PRICE IN WORDS	ESTIMATED QUANTITY	UNIT PRICE	COMPUTED TOTAL PRICE
75	Hydraulic Trench Shoring _____ _____Dollars and _____Cents Per Shoring Per Day	20 DAYS	$_____	$_____
76	Walk-Behind Concrete Saw _____ _____Dollars and _____Cents Per Saw Per Hour	100 HRS	$_____	$_____
Computed Total Amount for All Contract Items (Sum of Contract Items 1 through 76 above) _____ _____ _____Dollars and _____Cents				$ _____

SECTION 00430

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, _____ of _____ (hereinafter called the "Principal"), and _____, a corporation organized and existing under the laws of the State of _____, with its principal office in _____, and authorized to do business in the Commonwealth of Virginia as a surety (hereinafter called the "Surety"), are held and firmly bound unto FAIRFAX COUNTY WATER AUTHORITY (hereinafter called the "Obligee") in the full and just sum which is equal to 5% of the total amount of the Principal's Bid (as that term is defined below), as submitted to the Obligee (such total amount referred to herein as the "Total Bid"), in good and lawful money of the United States of America, to be paid upon demand of the Obligee, for the payment of such sum well and truly to be made, the Principal and the Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally and firmly by these presents. The Total Bid is the aggregate amount (including amounts set forth with respect to any and all Alternates) set forth on the Principal's Bid Form for performance of the work described below, as submitted to and maintained by the Obligee (such Bid Form referred to herein as the "Bid"). The Surety hereby acknowledges and agrees that the Bid shall be deemed to be incorporated by reference in this Bid Bond to the same extent as if set forth fully herein.

WHEREAS, the Principal intends to submit, or has submitted to the Obligee, a Bid for the Principal to perform work for the Obligee, designated as:

WATER MAIN INSTALLATION AND SERVICE CONTRACT

(hereinafter called the "Project") and,

WHEREAS, the Principal desires to provide this Bid Bond in lieu of a certified check or cash escrow otherwise required to accompany the Principal's Bid.

NOW THEREFORE, THE CONDITIONS OF THIS OBLIGATION ARE SUCH THAT, if the Bid be accepted by the Obligee, and if the Principal shall, within ten days after the date of receipt of a written Notice of Award from the Obligee or any agency or department thereof, (i) execute a Contract in accordance with the Bid and upon the terms, conditions and price set forth therein, in the form and manner required by the Obligee, (ii) execute a sufficient and satisfactory Performance Bond in the amount of 100% of the total Contract Sum and a sufficient and satisfactory Payment Bond in the amount of 100% of the total Contract Sum, each payable to the Obligee, in a form and with a surety satisfactory to the Obligee, and (iii) provide the Obligee with copies of all required insurance policies, then this obligation is to be void; otherwise this obligation shall be and remain in full force and in the event of the failure of any or all of the foregoing requirements to be satisfied within the time period specified above, the Principal immediately shall pay to the Obligee, upon demand, the lesser of: (a) the amount hereof and (b) the difference between the Bid and the next low bid for the Project, in each case in good and lawful money of the United States of America, not as a penalty, but as liquidated damages.

Based upon the Surety's present knowledge and information, the Surety knows of no reason why it would not issue payment and performance bonds on behalf of the Principal for the above-referenced Project. The foregoing statement shall not be construed as a commitment on the part of the Surety to issue either or both of such bonds on behalf of the Principal.

All notices, requests, demands and other communications which are provided hereunder, shall be in writing and shall be deemed to have been duly given upon the hand delivery thereof during business hours, or upon the earlier of receipt or three (3) days after posting by registered mail or certified mail,

return receipt requested, or on the next business day following delivery to a reliable overnight delivery service, if to the Principal or the Obligee, to the addresses set forth in the Bid, and if to the Surety, to the address set forth beneath its signature.

Unless the context otherwise requires, capitalized terms not otherwise defined in this Bond shall have the meanings assigned to them in the Contract Documents. This Bond shall be deemed to incorporate all provisions required by law to be set forth herein.

IN WITNESS WHEREOF, the Principal and Surety have caused this Bid Bond to be executed by their duly authorized officers effective as of the ___ day of _____, 2022.

(Seal)

_____
Principal

By: _____

Name: _____
Title: _____

(Seal)

_____
Surety

By: _____,
Attorney-in-Fact (Attach
Copy of Power of Attorney)

Name: _____
Title: _____

END OF BID BOND

SECTION 00500

AGREEMENT

CONTRACT NO._____

THIS AGREEMENT, made and entered into this _____ day of _____, in the year ____ between the Fairfax County Water Authority, hereinafter referred to as the Owner or Fairfax Water, and _____, hereinafter referred to as the Contractor, in consideration of the mutual covenants and agreements hereinafter set forth, provides as follows:

Article 1. THE PROJECT

The Project is designated as follows:

WATER MAIN INSTALLATION AND SERVICE CONTRACT

Article 2. WORK

2.1 Contractor shall provide all materials, tools, equipment, labor, and professional and non-professional services, and shall perform all acts necessary to fully complete the Work in strict accordance with the requirements of the Contract Documents. The Work is generally described as follows:

Refer to Section 01110, Summary of Work.

2.2 The Contractor shall provide and pay for all related facilities described in the Contract Documents, including Work expressly specified as well as Work which can be reasonably inferred as necessary to produce the results intended by the Contract Documents.

Article 3. ENGINEER

3.1 This Project has been designed by:

FAIRFAX WATER
8570 EXECUTIVE PARK AVENUE
FAIRFAX, VIRGINIA 22031

hereinafter referred to as the "Engineer" as defined in the General Conditions.

Article 4. CONTRACT SUM

4.1 Fairfax Water will pay the Contractor for Work completed in accordance with the Contract Documents, in U.S. currency, the Contract Sum _____, as such may be adjusted from time to time in accordance with the Contract Documents.

Article 5. CONTRACT PERIOD

5.1 The term of this Contract will be for a 12-month period beginning with issuance of Notice to Proceed by Fairfax Water (the “Original Period”), The term of this Contract may be extended at the sole and absolute discretion of Fairfax Water for up to two additional, consecutive 12-month terms (each such 12-month extension to be referred to as a “Renewal Period”). Refer to Section 00200 1.20 Time for Completion, for project durations for each individual project to be completed. Refer to Section 00200 1.23 for the basis for economic price adjustments at contract renewal.

Article 6. LIQUIDATED DAMAGES

6.1. The amount of liquidated damages referred to in Article 8 of the General Conditions shall be $500.00 per day, beyond the beneficial use completion date and $250.00 per day, beyond the final completion date for each project to be completed, as set forth in the Contract.

Article 7. PAYMENTS

7.1 Payment under this Contract shall be made in the manner provided in Article 10 of the General Conditions.

Article 8 AVAILABILITY OF FUNDS

8.1 It is understood and agreed between the parties herein that Fairfax Water 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 9. CONTRACT DOCUMENTS

9.1 The Contract Documents listed in Article 3, A.1 of the General Conditions, comprise the entire agreement between the Owner and the Contractor with respect to the Project.

Article 10. MISCELLANEOUS

10.1 Capitalized terms which are used and otherwise defined in this Agreement shall have the meanings given them in Article 1 of the General Conditions.

10.2 This Agreement may be executed in any number of counterparts, each of which shall be deemed an original and all of which together shall constitute one document.

10.3 This Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Virginia, without reference to conflict of law principles.

IN WITNESS THEREOF, the parties have caused their duly authorized representatives to execute this Agreement effective as of the date first written above.

FAIRFAX COUNTY WATER AUTHORITY

By: _____
Jamie Bain Hedges
General Manager

[CONTRACTOR]

By: _____
[Name]
[Title]

END OF AGREEMENT

NO TEXT THIS PAGE

SECTION 00610
PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we, _____ of _____ (hereinafter called the "Principal"), and _____, a corporation organized and existing under the laws of the State of _____, with its principal office in the City of_____, and authorized to transact business in the Commonwealth of Virginia as a surety (hereinafter called the "Surety") are held and firmly bound unto FAIRFAX COUNTY WATER AUTHORITY (hereinafter called the "Obligee") in the sum of _____ Dollars ($_____), lawful money of the United States of America, for the payment of which well and truly to be made, the Principal and the Surety hereby bind themselves and their successors and permitted assigns, jointly and severally and firmly by these presents, to perform all of the Work in accordance with the requirements of the Contract Documents for the Project.

WHEREAS, the Principal has entered into a certain written agreement with the Obligee, dated as of the ___ day of _____, 20__, (hereinafter called the "Contract"), for

WATER MAIN INSTALLATION AND SERVICE CONTRACT

which Contract is incorporated herein by reference;

WHEREAS, the Principal is obligated to furnish security with respect to its obligation to perform the work to be performed under the Contract; and

WHEREAS, the Principal desires to furnish this Performance Bond in lieu of a certified check or cash escrow otherwise required to be provided to the Obligee.

NOW, THEREFORE, THE CONDITIONS OF THE ABOVE OBLIGATIONS ARE SUCH THAT, if the Principal and Surety and its or their successors or assigns, or any of them shall:

Well and truly and in good sufficient and workmanlike manner perform or cause to be performed the Contract, and each and every of the covenants, promises, agreements, warranties, and provisions to be performed by the Principal set forth therein, in strict conformity with the plans and specifications, and complete the same within the time period specified therein, all as may be amended from time to time by the parties thereto, and fully indemnify and save harmless the Obligee from all costs and damages which it may suffer by reason of the Principal's failure to do so and fully reimburse and repay the Obligee all costs and expenses which it may incur in making good any such default, then these obligations shall be null and void, otherwise they shall remain in full force and effect.

The obligations evidenced hereby shall constitute the joint and several obligations of the Principal and the Surety and their successors, and permitted assigns.

PROVIDED, HOWEVER, that this bond is subject to the following conditions and limitations:

(a) In no event shall the Surety, or its successors or assigns be liable for a greater sum than the penalty of this bond.

(b) No action on this bond shall be brought unless within one year after (i) completion of the Contract, including the expiration of all warranties and guarantees, or (ii) discovery of the defect or breach of warranty, if the action be for such, in all other cases.

The Surety, for value received, on behalf of itself and its successors and assigns, hereby stipulates and agrees that the obligations of the Surety or its successors and assigns under this bond shall not in any manner be impaired or affected by (a) any extension of time, modification, omission, addition or amendment of or to the Contract or the work to be performed thereunder; (b) any payment thereunder before the time required therein; (c) any waiver of any provision thereof; or (d) any assignment, subletting or other transfer of all or of any part thereof or of any work to be performed or of any moneys due or to become due thereunder; and the Surety, for itself and its successors and assigns, does hereby waive any right to receive notice of any and all of such extensions, modifications, omissions, additions, amendments, payments, waivers, assignments, subcontracts and transfers.

The Surety hereby stipulates and agrees that in the event that the Obligee declares the Principal to be in default the Surety will promptly, at the Obligee's election: (a) perform and complete the work to be performed under the Contract in accordance with the terms, conditions and covenants set forth therein with a duly licensed and qualified contractor designated by Obligee; (b) obtain bids from duly licensed and qualified contractors for completing the work to be performed under the Contract in accordance with the terms, conditions and covenants set forth therein and, upon determination by the Obligee and the Surety of the lowest responsive and responsible bidder, (i) arrange for a contract between such bidder and the Obligee and (ii) make funds available to the Obligee to pay the costs of completion less the balance of the contract sum as such may have been adjusted by change order (such amount, including other costs and damages for which the Surety may be liable hereunder, not to exceed the penal sum set forth in the first paragraph hereof); or (c) remedy the default. The Surety further stipulates and agrees that, within 60 days after its receipt of written notice from the Obligee specifying the Obligee's election of (a), (b) or (c) above, the Surety shall have resumed performance of the Work or shall have caused the performance of the Work to have been resumed, in accordance with the Obligee's election. In the event the Surety fails to resume the Work within such 60 day period, the Obligee may elect to perform or arrange for the performance of the Work at the sole cost and expense of the Surety in addition to any other rights and remedies available to Obligee. As employed herein, the phrases (i) "balance of the contract sum" shall mean the total amount payable by the Obligee to the Principal under the Contract after all proper adjustments have been made, less the aggregate of all amounts previously paid by the Obligee to the Principal thereunder; and (ii) "resume the Work" shall mean the commencement and diligent performance of actual work activities at the site, as demonstrated by discernable daily progress at the rate contemplated by the Contract**.** All payments to be made by the Surety hereunder shall be paid within thirty (30) days after the Surety's receipt of a request or demand therefor.

The Surety shall not be liable to the Obligee or others for obligations of the Principal that are unrelated to the Contract, and the balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligation. No right of action shall accrue on this Bond to any person or entity other than the Obligee or its successors.

The Obligee's omission to call upon the Surety in any instance shall in no event release the Surety from any obligation hereunder.

All notices, requests, demands and other communications which are provided hereunder, shall be in writing and shall be deemed to have been duly given upon the hand delivery thereof during business hours, or upon the earlier of receipt or three (3) days after pre-paid posting by registered mail or certified mail, return receipt requested, or on the next business day following pre-paid delivery to a reliable overnight delivery service, if to the Principal or the Obligee, to the addresses set forth in the Contract, and if to the Surety, to the address set forth beneath its signature on this Bond.

The obligations evidenced hereby shall constitute the joint and several obligations of the Contractor, the Surety, and their successors and permitted assigns.

Unless the context otherwise requires, capitalized terms not otherwise defined in this Bond shall have the meanings assigned to them in the Contract Documents. This Bond shall be deemed to incorporate all provisions required by law to be set forth herein.

IN WITNESS WHEREOF, the Principal and Surety have caused this Performance Bond to be executed by their duly authorized officers effective as of the _____ day of _____, 20__.

Principal

(SEAL)

By: _____

Name: _____

Title: _____

_____

Surety

(Seal)

By: _____

Name: _____

Title: _____

Address of Surety: _____

_____

(If executed by Attorney-in-Fact, attach copy of Power of Attorney)

END OF PERFORMANCE BOND

NO TEXT THIS PAGE

SECTION 00611
PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, that we, _____ of _____ (hereinafter called the "Principal"), and the _____, a corporation created and existing under the laws of the State of and having its principal office in the City of _____, and authorized to transact business in the Commonwealth of Virginia as Surety (hereinafter called the "Surety") are held and firmly bound unto FAIRFAX COUNTY WATER AUTHORITY (hereinafter called the "Obligee") in the penal sum of _____ Dollars ($_____), lawful money of the United States of America, for the payment of which well and truly to be made, the said Principal and Surety hereby bind themselves and their successors and permitted assigns, all jointly and severally, firmly by these presents, to pay for all labor performed and material furnished in accordance with the Contract Documents for the Project.

WHEREAS, said Principal has entered into a certain written agreement with Obligee, dated as of the ____ day of _____, _____, (hereinafter called the "Contract"), for

WATER MAIN INSTALLATION AND SERVICE CONTRACT

which Contract is incorporated herein by reference.

WHEREAS, the Principal is obligated to furnish security with respect to its obligation to pay for all labor performed and material furnished pursuant to the Contract; and

WHEREAS, the Principal desires to furnish this Payment Bond in lieu of a certified check or cash escrow otherwise required to be provided to the Obligee.

NOW THEREFORE THE CONDITIONS OF THE ABOVE OBLIGATIONS ARE SUCH THAT, if the Principal, the Surety and its or their successors or permitted assigns, or any or either of them shall:

Pay or cause to be paid the wages and compensation for labor performed and services rendered of all persons engaged in the prosecution of the work provided for therein, whether such persons be agents, servants or employees of the Principal, and of its successors or assigns, or any subcontractor of any assignee thereof, including all persons so engaged who perform the work of laborers or of mechanics regardless of any contractual relationship between the Principal, or its assigns, or any subcontractor or any assignee thereof, and such laborers or mechanics but not including office employees not regularly stationed at the site of the work, and further, shall pay or cause to be paid all lawful claims of subcontractors and of material men and other third persons arising out of or in connection with said contract and the work, labor, services, supplies and materials furnished in and about the performance and completion thereof, then these obligations shall be null and void; otherwise they shall remain in full force and effect.

PROVIDED, however, that this bond is subject to the following conditions and limitations:

(a) All persons who have performed or rendered services, as aforesaid, all subcontractors, and all persons, firms, corporations, including materialmen and third persons, as aforesaid, furnishing work, labor, services, supplies and material under or in connection with the Contract or in or about the performance and completion thereof, shall have a direct right of action (subject to the prior right of the Obligee under any claim which it may assert against the Principal and its successors, and assigns and/or the Surety and its successors and assigns) against the Principal and its successors, and assigns and/or the Surety and its successors and assigns on this bond, which right of action shall be asserted in proceedings instituted in the State in which such work, labor, services, supplies or material

was performed, rendered or furnished, or where work, labor, services, supplies or material has been performed, rendered or furnished, as aforesaid, in more than one State, then in any such State. Insofar as permitted by the laws of such State, said right of action shall be asserted in a proceeding instituted in the name of the Obligee to the use and benefit of the person, firm or corporation instituting such action and of all other persons, firms and corporations having claims hereunder, and any other person, firm or corporation having a claim hereunder shall have the right to be made a party to such proceedings (but not later than one year after the performance of the Contract including the expiration of any warranty or guarantee) and to have such claim adjudicated in such action and judgment tendered thereof. Prior to the institution of such a proceeding by a person, firm or corporation in the name of the Obligee, as aforesaid, such person, firm or corporation shall furnish the Obligee with a bond of indemnity for costs, which bond shall be in an amount satisfactory to the Obligee.

(b) The Surety or its successors or assigns shall not be liable hereunder for any damages or compensation recoverable under any worker's compensation or employer's liability statute.

(c) In no event shall the Surety, or its successors or assigns be liable for a greater sum than the penalty of this bond, or subject to any suit, action or proceeding thereon that is instituted by any person, firm or corporation under the provisions of the above section(s), later than one year after such person last performed labor or last furnished or supplied materials.

The Principal, for itself and its successors and assigns, and the Surety, for itself and its successors and assigns, do hereby expressly waive any objection that might be interposed as to the right of the Obligee to require a bond containing the foregoing provision, and they do hereby further expressly waive any defense which they or either of them might interpose to an action brought hereon by any person, firm, or corporation, including subcontractors, materialmen and third persons, for work, labor services, supplies or material, performed, rendered or furnished as aforesaid, upon the ground that there is no law authorizing the said Obligee to require the foregoing provision to be placed in this bond.

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

Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Principal shall promptly furnish a copy of this Bond or shall permit a copy to be made on behalf of such potential beneficiary.

The obligations evidenced hereby shall constitute the joint and several obligations of the Contractor, the Surety, and their successors, and permitted assigns.

Unless the context otherwise requires, capitalized terms not otherwise defined in this Bond shall have the meanings assigned to them in the Contract Documents. This Bond shall be deemed to incorporate all provisions required by law to be set forth herein.

IN WITNESS WHEREOF, the Principal and Surety have caused this Bond to be executed by their duly-authorized representatives effective as of the ____ day of _____, _____.

Principal

By: _____

Name: _____

Title: _____

_____
Surety

By: _____

Name: _____

Title: _____

Address of Surety: _____

_____

(If executed by Attorney-in-Fact, attach copy of Power of Attorney)

END OF PAYMENT BOND

NO TEXT THIS PAGE

SECTION 00700

GENERAL CONDITIONS

ARTICLE 1	DEFINITIONS
ARTICLE 2	CONTRACTOR'S RESPONSIBILITY
ARTICLE 3	THE CONTRACT
ARTICLE 4	CONFORMANCE WITH CONTRACT DOCUMENTS
ARTICLE 5	ROYALTIES AND PATENTS
ARTICLE 6	PROTECTION OF PERSONS AND PROPERTY
ARTICLE 7	CHANGES IN THE WORK; RECORDS
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ARTICLE 10	PAYMENT
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ARTICLE 14	INDEMNIFICATION
ARTICLE 15	POWERS OF FAIRFAX WATER'S REPRESENTATIVES
ARTICLE 16	BOUNDARIES
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ARTICLE 18	APPLICABLE LAW
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ARTICLE 20	CONTRACTOR'S EMPLOYEES AND DRUG FREE WORKPLACE
ARTICLE 21	FREIGHT CLAIMS
ARTICLE 22	TAX EXEMPTION

ARTICLE 1 – DEFINITIONS

A. Definitions: The following words and terms, or pronouns used in their stead, shall, wherever they appear in these Contract Documents, be construed as follows, unless a different meaning is clear from the context:

"ADDENDUM" or "ADDENDA" shall mean additional contract provisions issued in writing by the OWNER prior to the due date for the submission of bids.

"ARCHITECT" shall mean the Architect or Engineers employed by Fairfax Water to act as such and designated to observe the performance of the Work of the Contractor and to consult with and advise Fairfax Water during construction, acting directly or through duly authorized representatives. The terms “Architect” and “Engineer” are used interchangeably in these Contract Documents.

"AUTHORIZED REPRESENTATIVE" shall mean a representative of the Owner or the Engineer acting within the scope of his duties.

"AWARD LETTER" shall mean a letter issued by Fairfax Water to the Contractor, providing notice of the award of the Contract.

"BID" or “BID FORM” shall mean the offer of a Bidder to provide specific goods and/or services in accordance with all terms, conditions and specifications indicated in a solicitation. The terms "Bid" and “BID FORM” are synonymous with the word "Proposal" and the two terms are used interchangeably in these Contract Documents.

“BIDDER” shall mean the corporation, limited liability company, partnership or other entity which submits a Bid to Fairfax Water for performance of the Work.

"CHANGE ORDER" shall mean a contractual modification recommended by the Engineer and signed by the Engineer, the Contractor and the Owner which orders any combination of an addition to, deletion or revision of the Work, an adjustment to the Contract Sum or an adjustment to the Contract Period. The form of Change Order is attached to these General Conditions as Exhibit 1.

"CONTRACT" or "CONTRACT DOCUMENTS" shall mean each and all of the various parts of the Contract referred to in Article 3.A.1 of these General Conditions. Such terms shall be used interchangeably in these Contract Documents.

"CONTRACT DRAWINGS" or "DRAWINGS" shall mean only those drawings specifically referred to as such in the Contract Documents.

"CONTRACT ITEM" shall mean a component of the Work required or described in the Contract Documents. The term "Item" as used in the Specifications (Section 01200, Price and Payment Procedures) shall have the same meaning and be used interchangeably with the term "Contract Item".

"CONTRACT PERIOD" shall mean the total number of days specified in the Instructions to Bidders for completion of the Work, as such period may be adjusted from time to time in accordance with the Contract Documents.

"CONTRACT SUM" shall mean the amount specified as such in the Award Letter and may be adjusted from time to time in accordance with the Contract Documents.

"CONTRACTOR" shall mean the corporation, limited liability company, partnership or other entity which contracts with Fairfax Water to perform the Work.

"DATE OF BENEFICIAL USE" shall be the date certified in writing by the Engineer when the construction of the Work or specified part thereof is sufficiently completed, in accordance with the Contract Documents, so that the Work can be utilized by the Owner for the purpose for which it was intended.

"DAY" shall mean calendar day.

"DEFECTIVE" shall mean that the Work is unsatisfactory, faulty, or deficient, in that it does not conform to the requirements of the Contract Documents, or does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents, or has been damaged prior to the determination of final completion of the Work (unless responsibility for the protection thereof shall have been assumed by Fairfax Water following the Date of Beneficial Use).

"DIVISION" shall mean a designated portion of the Project.

"ENGINEER" shall mean the Architect or Engineers employed by Fairfax Water to act as such and designated to observe the performance of the Work of the Contractor and to consult with and advise Fairfax Water during construction, acting directly or through duly authorized representatives. The terms “Engineer” and “Architect” may be used interchangeably in these Contract Documents.

"EXTRA WORK" shall mean work (other than that required either explicitly or implicitly by the Contract in its original form) which is authorized by Change Order or Work Order.

"FAIRFAX WATER" shall have the same meaning as "OWNER" and in either case shall refer to the Fairfax County Water Authority.

“FINAL COMPLETION” shall mean the point at which all of the Work has been completed in accordance with the requirements of the Contract Documents and final cleaning has been performed, all as determined and certified in writing by the Engineer in accordance with the provisions of Section 01770, Close-out Procedures.

“FURNISH” and “PROVIDE” shall mean to supply and equip in accordance with the requirements of the Contract Documents. Unless otherwise expressly specified, any item that is to be furnished or provided hereunder is required to be installed by the Contractor in accordance with all applicable requirements of the Contract Documents. The terms “furnish” and “provide” are used interchangeably in these Contract Documents.”

"GENERAL MANAGER" shall mean the General Manager of Fairfax Water, or his designee.

“INSTALL” shall mean put in place and ready for use in accordance with the requirements of the Contract Documents. Installation shall include but not be limited to: (a) the provision of all required spare parts, all operation and maintenance manuals, all maintenance summaries, all certificates of proper installation, and documentation of the satisfactory completion of all testing requirements; and (b) the completion of all other specified services, including but not limited to any staff training requirements.

"LAWS AND REGULATIONS" or "LAWS OR REGULATIONS" shall mean any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction, which are in effect at the time of the opening of Bids.

"MEMBERS" shall mean the members of the governing body of the Fairfax County Water Authority.

"NOTICE" shall mean written notice. Written notice shall be deemed to have been duly served on the Contractor if delivered by U.S. Mail, hand delivery, or facsimile transmission to the Contractor's office at the Project or to the business address or fax number of the Contractor as stated on its Bid Form; or if delivered in person to the Contractor, to the Contractor's foreman or superintendent for the Project, or any officer or director of the Contractor. Unless otherwise specified herein, Notice shall be deemed to have been duly served on the Owner if delivered by U.S. Mail, hand delivery, or facsimile transmission to the Director Planning & Engineering, Fairfax Water, 8570 Executive Park Avenue, Fairfax, Virginia 22031, fax number (703) 289-6262. Any Notice that is sent by fax to a party hereunder shall be effective, and shall be deemed to have been received, only

upon delivery of a duplicate copy by another means of delivery authorized herein. Either party may, by written notice delivered in the manner prescribed herein, change its address for receipt of Notices hereunder.

"NOTICE TO PROCEED" shall mean the Notice issued by Fairfax Water establishing the date of commencement of the Contract Period.

"OVERHEAD" shall mean the cost of administration, field office and home office costs (including extended costs), general superintendence, office engineering and estimating costs, other required insurance, materials used in temporary structures (not including form work), additional premiums on the performance and payment bonds of the Contractor, the use of small tools, scheduling costs, cumulative impact costs and all other costs incidental to the performance of a change in the Work or to the cost of doing business. Small tools are defined as any tool with a replacement value less than $1,000.

"OWNER" shall mean the Fairfax County Water Authority, a public body politic and corporate organized and existing under the laws of the Commonwealth of Virginia.

"PROJECT" shall mean the entire improvement which is the subject of the Contract.

"PROPOSAL" The offer of a bidder (or in the case of Competitive Negotiation, offeror) submitted on the prescribed bid form, to perform the Work and to furnish labor and materials at the prices quoted by the bidder. The word "proposal" is considered synonymous with the word "bid" and is used interchangeably in these documents.

“SAMPLES” the physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work shall be judged.

"SHOP DRAWINGS" shall mean all drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for the Contractor and submitted by the Contractor to illustrate some portion of the Work. Shop Drawings are not Contract Drawings as so defined.

"SITE" shall mean the area upon or in which the Contractor's operations are performed and such other areas adjacent thereto as may be designated as such by the Engineer.

"SPECIFICATIONS" shall mean all of the directions, requirements and standards of performance applying to the Work, hereinafter detailed and designated as such, or issued in an Addendum or in a Change Order.

"SUBCONTRACTOR" shall mean any person or entity, other than an employee of the Contractor, who contracts with the Contractor to furnish, or who actually furnishes labor, materials, services, or equipment or any combination of labor, materials, services and equipment to the Contractor or other subcontractors.

"SUPPLIER" shall mean a manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with the Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by the Contractor or any Subcontractor.

"SURETY" shall mean any person or entity that has executed as a surety the Contractor's Performance Bond, Payment Bond, or both, securing the Contractor's performance of this Contract and the payment of his obligations in connection herewith.

"WORK" shall mean everything explicitly or implicitly required to be furnished and done by the Contractor pursuant to the Contract Documents, including any Extra Work.

"WORK ORDER" shall mean a written directive to the Contractor issued on or after the Effective Date of the Agreement and signed by the Owner and recommended by the Engineer ordering an addition, deletion, or revision in the Work. A Work Order shall be issued on the form attached to the Contract Documents as Exhibit 2.

"DIRECTED," "PERMITTED," "ORDERED," "DESIGNATED," "PRESCRIBED" and words of like import when used shall mean the direction, requirement, permission, order, designation, or prescription of the Owner or the Engineer. "ACCEPTABLE," "SATISFACTORY," "IN THE JUDGMENT OF," and words of like import when used shall mean acceptable to, satisfactory to or in the judgment of the Owner or Engineer.

B. Number and Gender of Words: Whenever the context so admits or requires, all references to one number shall be deemed extended to and including the other number, whether singular or plural, and the use of any gender shall be applicable to all genders.

ARTICLE 2 - CONTRACTOR'S RESPONSIBILITY

A. Contractor's Responsibility:

1. The Contractor shall perform all of the Work and shall furnish, at his own cost and expense, all labor, materials, equipment, and other facilities, except as herein otherwise provided, as may be necessary and proper for performing and completing the Work. The Contractor shall be responsible for the entire Work until completed and finally accepted by Fairfax Water. Unless the specification text expressly states that another party will be responsible for performing certain activities or providing certain material, the Contractor shall be responsible for performing the Work. Among other things, the Contractor acknowledges its responsibilities with respect to shop drawings and the construction schedule as specified in the Contract Documents

2. Unless otherwise expressly provided, the Work must be performed in accordance with the best modern practice and with materials and workmanship of the highest quality, all as determined by, and entirely to the satisfaction of, Fairfax Water and the Engineer.

3. Unless otherwise expressly provided, the means and methods of construction shall be such as the Contractor may choose; provided, however, that the Contractor shall employ adequate and safe procedures, methods, structures and equipment. Neither Fairfax Water's approval nor its failure to exercise approval shall relieve the Contractor of its obligation to accomplish the result intended by the Contract, nor shall Fairfax Water's approval or failure to approve create a cause of action for damages. Notwithstanding the rights and remedies retained by Fairfax Water and the Engineer hereunder, including without limitation, Fairfax Water’s and the Engineer’s right to monitor the progress of the Work and to accept or retract acceptance of Subcontractors, the Contractor expressly acknowledges and agrees that it is in charge of and in control of the Work.

4. The Contractor understands that for all or some of the Contract Period there will be other contractors on the site which are working under their own contracts with Fairfax Water. The Contractor acknowledges that it is obligated to coordinate its activities and to cooperate with such contractors and also affirms that it has included in its bid price the full cost of doing so. The Contractor agrees that it will not make a claim against Fairfax Water for additional compensation as a result of unforeseen coordination costs arising from the activities of such other contractors except where such coordination results in an “unreasonable delay” as defined in Article 8 hereof.

5. The Contractor acknowledges that, during its performance of the Work, the Contractor may encounter physical and/or subsurface conditions at the Site which differ materially from those known to, or reasonably anticipated by, the parties at the time the Contractor submitted its bid for the Work. Notwithstanding the foregoing, the Contractor agrees that it shall bear full and complete responsibility for any and all additional costs incurred by the Contractor due to any conditions encountered at the Site which differ in any respect from those known to, or reasonably anticipated by, the parties at such time. Fairfax Water shall in no event be responsible for damage to the Contractor’s property or equipment which is caused by any such unknown or unanticipated conditions at the site. The Contractor

covenants and agrees that it shall not make any claim for additional compensation from Fairfax Water as a result of any such differing site conditions.

6. The Contractor shall in no event be or become entitled to receive additional compensation from the Owner based upon a claim following the submission of its bid, or following its execution of the Contract, in connection (i) with the imposition or increase of any tax or charge not previously anticipated nor (ii) with any escalation in the cost of materials, equipment, supplies, services, labor, permits, or any other items of expense associated with the Contractor's full and complete performance of the Work.

7. The Contractor hereby covenants and agrees that it does not, and shall not during the Contract Period, knowingly employ an unauthorized alien (as such term is defined in the federal Immigration Reform and Control Act of 1986).

B. Approval Requests: The Contractor shall submit to Fairfax Water in writing all items required to be brought to Fairfax Water's attention or to be submitted for approval. These items must be submitted sufficiently in advance of the date upon which the information or approval is actually required by the Contractor to allow Fairfax Water to take appropriate actions so as not to delay the Work. The Contractor shall not have any right to an extension of time due to delays caused by his failure to submit any item in a timely fashion.

ARTICLE 3 - THE CONTRACT

A. The Contract:

1. The following documents, except for such portions thereof as may be specifically excluded, and the titles, subtitles, headings, running headlines, and tables of contents contained therein constitute the Contract and are defined as the Contract Documents:

Instructions to Bidders
Contractor's Completed Bid Form
Award Letter
Notice to Proceed
Agreement
Performance and Payment Bonds
General Conditions
Specifications
Supplementary Conditions
Drawings
any Change Orders
any Work Orders
any Addenda, and
All provisions required by law to be included in this Contract, regardless of whether such provision is set forth herein or not.

Only printed or hard copies of the items listed above are Contract Documents. Electronic files shall not be considered Contract Documents.

The Contract Documents will in no event be deemed to include any soil, geotechnical or other reports, and surveys or analysis of any type which may be made available to the Contractor for review or information in connection with this Project.

2. The Contract Documents are intended to be complementary, and what is called for or required by any one part is as binding as if called for or required by all. The Contractor has a duty to thoroughly review the Contract Documents and to identify any conflicts, errors, or ambiguities therein. The Contractor must promptly report any conflict, error, ambiguity, or discrepancy in the Contract Documents to the attention of Fairfax Water's Project Manager,

Fairfax Water's Manager of Construction Department, and to the Engineer, in each case in writing, before proceeding with the Work affected thereby. Fairfax Water will resolve the matter in writing. Work performed by the Contractor after issuance of the Notice to Proceed and prior to written resolution thereof by Fairfax Water, shall be performed at the Contractor's own risk. In resolving such conflicts, errors, ambiguities and discrepancies, the Contract Documents shall be accorded the following order of precedence:

Work Orders
Change Orders
Notice to Proceed
Award Letter
Addenda
Supplementary Conditions
General Conditions
Agreement
Instructions to Bidders
Specifications
Contract Drawings
Contractor's Completed Bid Form

3. The drawings and specifications are divided into sections solely for purposes of convenience and clarity. The Contractor shall not construe such sections as a division of the Work into various subcontractor units. The Contractor is responsible for furnishing all Work as shown on the drawings and in the specifications.

4. Except as otherwise specifically stated in the Contract Documents or as may be provided by amendment or supplement thereto, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

   a. the provisions of any standard, specification, manual, code, or custom of any technical society, organization or association (whether or not specifically incorporated by reference in the Contract Documents); 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).

The Contractor shall immediately report any conflict, error, ambiguity, or discrepancy between the Contract Documents and any provision of any such Law or Regulation or of any such standard, specification, manual, code, or custom to Fairfax Water's Project Manager, Fairfax Water's Manager of Construction Department, and to the Engineer in writing, and shall not proceed with the Work affected thereby until Fairfax Water resolves the matter in writing; provided, however, that the Contractor shall not be liable for damages to Fairfax Water or the Engineer for failure to report any such conflict, error, ambiguity, or discrepancy unless Contractor knew or reasonably should have known thereof.

5. The Contractor and any Subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with Fairfax Water:

   a. shall not 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 the Engineer or Engineer's Consultant; and

   b. shall not reuse any of such Drawings, Specifications, other documents, or copies on extensions of the Project or any other project without written consent of Fairfax Water and Engineer and specific written verification or adaptation by the Engineer.

B. Entire Contract: This Contract constitutes the entire agreement between the parties with respect to its subject matter and supersedes all prior and contemporaneous agreements. This Contract may not be modified or amended except by written agreement signed by the Contractor and Fairfax Water or by a written directive issued by Fairfax Water in the manner prescribed herein. This requirement for any modifications to be in writing may not be orally modified.

C. Contractual Claims:

1. If the Contractor wishes to make a contractual claim, whether for extra compensation, damages or any other relief, he shall give Fairfax Water Notice in strict accordance with the provisions of paragraph 3.E.1 herein. The Contractor's failure to comply strictly with the requirements of paragraph 3.E.1 shall result in waiver of the claim.

2. Resolution of any outstanding claims, counterclaims, disputes and other matters in question arising out of or relating to the Contract Documents to the extent not resolved by the parties hereto, shall be decided by a court of competent jurisdiction in the Commonwealth of Virginia; provided, however, that nothing contained herein shall be construed to invalidate the finality of Fairfax Water's decisions. Fairfax Water and the Contractor hereby waive any right they may have to a jury trial in connection with the resolution of any such claim, counterclaim, dispute or other matter arising out of or in connection with the Contract Documents.

D. No Claims Against Individuals: No claim whatsoever shall be made by the Contractor against any officer, Member, Authorized Representative or employee of Fairfax Water or Engineer for, or on account of, anything done or omitted to be done in connection with this Contract, and the Contractor shall be strictly liable for all costs, attorneys' fees and expenses incurred by any individual or entity who is sued in violation of this section.

E. Disputes: In order to: (i) clearly identify the existence of a dispute between the parties and (ii) promote the prompt, efficient and fair resolution of each such dispute, the parties shall adhere strictly to the claims resolution procedure set forth below. Time is of the essence in meeting these requirements.

1. If the Contractor wishes to dispute any Work that is required, necessitated, or ordered by the Engineer or Fairfax Water, or otherwise to claim that any action required or ordered by the Engineer or Fairfax Water to be taken or not to be taken violates the terms and provisions of this Contract, then the Contractor shall proceed with such Work and/or comply with such requirement or order without delay and shall, within 5 days after the earlier of (a) commencing such Work, or (b) receiving notice of such requirement or order, notify Fairfax Water and the Engineer, in writing, of his claim with respect thereto and request a written determination thereof. In order to invoke the procedures of this section, the Contractor's request must: (i) refer specifically to this section by number; (ii) be submitted in writing to Fairfax Water's Project Manager and Fairfax Water's Manager of Construction Department; (iii) contain a full explanation of the basis of the Contractor's claim or dispute and the rationale for its request, including accurate copies of all supporting documentation; and (iv) detail the quantum of any relief requested by the Contractor and provide substantiation of all amounts. No request for a change order, request for change proposal, or other requested modification shall be sufficient, on its own or collectively, to satisfy, or to defer the commencement of, the notice requirements set forth in this Paragraph 3.E.1. Fairfax Water shall issue a written determination with regard to any such claim on or before the date that is 30 days after the date of its receipt of the Contractor's written request; provided, however, that in the event that Fairfax Water determines, based upon the size or complexity of the claim at issue, that additional time is required for the issuance of a response, Fairfax Water shall issue written notice of such finding to the Contractor within 30 days following the date of its receipt of the Contractor's written request and shall issue a written determination with regard to such claim on or before the date that is 45 days after the later of (i) the date of Fairfax Water's receipt of the Contractor's written request or (ii)

the Contractor's submission of all supplemental information requested by Fairfax Water. The Contractor's failure to submit promptly any supplemental information requested by Fairfax Water shall result in the waiver of the claim. In the event that the Contractor disagrees with Fairfax Water's written determination, then the Contractor may request a review and reconsideration of that decision by the General Manager by submitting a written request for review to the General Manager (with copies to Fairfax Water's Director of Planning and Engineering and Fairfax Water's Manager of Construction Department) within 5 days after the Contractor's receipt of Fairfax Water's initial written determination. In such event, the General Manager (or his authorized designee) shall issue a written final decision on behalf of Fairfax Water within 30 days after his receipt of the Contractor's request for review. In the event that Fairfax Water fails to issue a written determination within any of the time periods specified herein, such failure shall be deemed to constitute a denial of the claim by Fairfax Water, effective upon the last day of the applicable time period without further administrative review by Fairfax Water. In order to preserve his right to claim compensation for such Work, or damages resulting from any compliance required of the Contractor under the preceding paragraph, the Contractor shall, within 5 days after receiving notice of any determination and direction issued by or on behalf of Fairfax Water, notify Fairfax Water, in writing, that the Work is being performed or that the determination and direction is being complied with under protest. Failure of the Contractor to so notify Fairfax Water as provided herein shall constitute a waiver and release of the Contractor's right to claim compensation for any Work performed under protest or for any damages resulting from such compliance.

2. All monies owed and not in dispute will be made available to the Contractor in accordance with the Contract Documents. Any request for an extension of time in connection with disputed Work shall be governed by Article 8.

F. Benefit of Agreement: The Contract Documents shall be enforceable and binding upon, and shall inure to the benefit of, the parties hereto, their respective successors and permitted assigns. Nothing contained herein, express or implied, is intended to or shall confer upon any other person any rights, benefits or remedies of any nature whatsoever under or by reason of this Agreement.

ARTICLE 4 - CONFORMANCE WITH CONTRACT DOCUMENTS

A. No Estoppel: No action or failure to act by Fairfax Water (or its officers, agents or representatives) shall be construed at any time to estop Fairfax Water from: (a) demonstrating that its actions comply with the Contract Documents; (b) asserting that the Contractor has violated, or seeks relief that would violate, the terms of the Contract Documents; (c) showing the true and correct classification, amount, quality, or character of the Work performed, or that any determination, decision, acceptance, return certificate or payment is incorrect or was improperly made in any respect, or that the Work or any part thereof does not in fact conform to the requirements of the Contract Documents~~,~~; and/or (d) demanding and recovering from the Contractor any overpayment made to him or such damages as Fairfax Water may sustain by reason of the Contractor's failure to comply with the requirements of the Contract Documents.

B. No Waiver of Rights: Unless expressly provided otherwise in writing by the General Manager, Fairfax Water will not be deemed to have waived any rights or any provisions of the Contract Documents. By way of example, but without limitation, none of the following actions shall be construed as a waiver of any provisions of this Contract or of any powers provided herein:

1. Inspections conducted by Fairfax Water or the Engineer, any of its or their employees, officers or Authorized Representatives;

2. Orders for the payment of money; and

3. Payments for, or acceptance of, all or any part of the Work.

C. In no event shall any waiver on the part of Fairfax Water of any breach of this Contract by the Contractor constitute or be construed to be a waiver of any subsequent breach of this Contract by the Contractor. The terms of this Contract shall be in addition to, and not a limitation on, any and all rights and remedies which Fairfax Water has or may have at law or in equity. Fairfax Water will have the right to enjoin the Contractor against any breach of the terms of this Contract without any showing that such relief is necessary to avoid irreparable injury or that there is no adequate remedy at law.

ARTICLE 5 - ROYALTIES AND PATENTS

A. Patented Devices, Material and Processes: The Contract Sum includes all royalties and costs Contractor arising from any patents, trademarks and/or copyrights incorporated or otherwise involved in the Work. Whenever the Contractor uses any design, device, material or process covered by letters of patent or copyright, the Contractor shall indemnify and hold harmless Fairfax Water and the Engineer, their officers, Members, Authorized Representatives and employees from any and all claims for infringement by reason of the use of any such patented or copyright-protected design, device, tool, material, equipment, or process to be employed, supplied or performed under the Contract, and shall indemnify and hold harmless Fairfax Water and the Engineer, their officers, Members, Authorized Representatives, and employees for any costs, expenses and damages which may be incurred by reason of any such infringement at any time during the prosecution or after the completion of the Work. Notwithstanding the foregoing, the Contractor shall not have liability under this Article 5 to the extent that any infringement arises solely by virtue of a design or implementation supplied to the Contractor by Fairfax Water.

ARTICLE 6 - PROTECTION OF PERSONS AND PROPERTY

A. Safety and Protection:

1. The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. The Contractor shall comply with all applicable laws, rules, regulations and ordinances relating to safety and shall provide all necessary protection to prevent damage, injury, or loss to:

    a. Employees providing services in connection with the Work and other persons who may be affected thereby;

    b. The Work and all materials or equipment to be incorporated therein, whether in storage on or off the site; and

    c. Other property at the Site or adjacent thereto, including, but not limited to, trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

2. The Contractor's duties and responsibilities for the safety and protection of the Work shall continue until Final Completion of the Work, unless otherwise agreed upon in writing. The Contractor shall designate and assign a responsible member of his organization whose duty shall be the prevention of accidents and the security of the Site for the duration of the Project. The designated Health & Safety Officer shall be present at the Pre-construction Meeting and during Project start-up, and shall make regular visits to the Site no less frequently than once per month during performance of the Work. In addition to such regular, periodic visits, the designated Health & Safety Officer also shall visit the Site as follows: (a) whenever the nature of the Work or the stage of construction calls for the presence of the Health & Safety Officer in connection with the performance of high risk elements, as determined by the Contractor’s Health & Safety Plan; and (b) upon prior request by the Owner or the Engineer. The Health & Safety Officer shall have one of the following certification designations: Certified Safety Professional (CSP);

Associate Safety Professional (ASP); Occupational Health and Safety Technician (OHST); or Construction Health and Safety Technician (CHST)

3. The Contractor shall give notices and shall comply with all applicable laws, ordinances, rules and regulations bearing on the safety of persons or property or their protection from damage, injury or loss.

4. The Contractor shall provide and maintain at all times during performance of the Work all necessary and proper safeguards in and around the Work in order to protect all persons working, entering, or visiting in or near the Project from injury or loss, and to protect from theft and vandalism all Work, existing structures and facilities, materials, equipment, tools and personal property located at the Site or stored for use in connection with the Work.

5. The Contractor shall have a Company Safety and Health Program Manual that meets all Federal, State and local safety and health requirements. The Contractor shall provide to all employees a site safety orientation and training course that identifies the site safety rules, regulations, policies, and procedures. In addition, all Federal, State and local safety training that is required, may be performed during the site safety orientation and training course.

6. The Contractor shall maintain Material Safety Data Sheets on the site for all materials supplied by the Contractors and all Subcontractors. The Contractor shall be responsible for coordinating any exchange of 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. In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from Fairfax Water or Engineer, is obligated to act at his discretion and risk to prevent and/or minimize threatened damage, injury, or loss. The Contractor shall give Engineer prompt written notice if the Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If the Engineer determines that a change in the Contract Documents is required because of the action taken by the Contractor in response to such an emergency, a written directive will be issued to document the consequences of such action. All costs associated with any such directive are solely the responsibility of the Contractor.

B. Protection:

1. Until final acceptance of the Work by Fairfax Water, the Contractor shall be under an absolute obligation to protect the finished and unfinished Work against any damage, loss, or injury. The Contractor shall take proper precautions to protect the finished and unfinished Work from loss or damage, pending completion and final acceptance of all Work included in the Contract. Such precautions shall not relieve the Contractor from any and all liability and responsibility for loss or damage to the Work occurring before final acceptance by Fairfax Water. Such loss or damage shall be at the risk of and shall be borne by the Contractor, whether arising from acts or omissions of the Contractor or others and whether or not covered by any of the Contractor's insurance. In the event of any such loss or damage, the Contractor promptly shall repair, replace, and make good the Work without extension of time therefore, except as may be otherwise specified. The Contractor shall take special precaution throughout all his operations to guard against fire and shall reduce the amount of flammable materials stored at the Site to the minimum amount consistent with the proper handling and storing of such materials.

2. The provisions of this section shall not be deemed to create any right of action in favor of third parties against the Contractor, Fairfax Water, or the Engineer.

3. Nothing contained herein shall be construed to deny, restrict, or delay in any manner any access or observation on the part of Fairfax Water or the Engineer to any portion of the Work.

ARTICLE 7 - CHANGES IN THE WORK; RECORDS

A. Minor Changes:

1. Fairfax Water reserves the right to make such minor additions, deletions, or changes to the Work as may be necessary in its sole discretion to complete the Work; provided, however, that no such additions, deletions or changes will materially affect the substance hereof or materially change the Contract Sum. This Contract will in no way be invalidated by any such additions, deletions or changes. No claim by the Contractor shall be made for loss of anticipated profits resulting from any such addition, deletion or change to the Work.

2. Construction conditions may require minor changes in the Work and equipment to be furnished and other Work to be performed hereunder. The Contractor, when ordered by Fairfax Water or Engineer, shall make such adjustments and changes in the locations and Work as may be necessary without additional cost to Fairfax Water, provided such adjustments and changes do not materially alter the character and quantity of the Work as a whole, or the Contract Sum, and provided further that Drawings and Specifications showing such adjustments and changes are given to the Contractor by Fairfax Water within a reasonable time before work involving such adjustment and changes is begun. Fairfax Water will be the sole judge of what constitutes a minor change for which no additional compensation will be allowed.

3. The Contractor shall be entitled to an extension of time for such minor changes only for the number of days which Fairfax Water may determine to be necessary to complete such changes and only to the extent that such changes actually delay the completion of the Project, and then only if the Contractor shall have strictly complied with all the requirements of the Contract Documents, including without limitation Article 8, A, C, D, and Article 2, B hereof.

B. Extra Work:

1. Fairfax Water may, in its sole and absolute discretion, at any time by a Change Order or Work Order, require the performance of such Extra Work as it deems necessary or desirable. The Contractor hereby covenants and agrees to perform such Extra Work on the terms and conditions set forth in the applicable Work Order or Change Order, as the case may be, and hereby waives any claim, suit or cause of action of any nature based, in whole or in part, upon the allegation that any Extra Work ordered hereunder and/or any Work omitted pursuant to Article 7(C) hereof, individually or in the aggregate, constitute a cardinal change to, or other material deviation from, the Contract Documents and/or the Work contemplated thereby.

2. A Change Order or Work Order covering Extra Work will be valid only if issued in writing and signed by Fairfax Water's Authorized Representative, and the Extra Work so ordered must be performed by the Contractor. Any attempt by the Contractor to alter or modify a Change Order or to reserve a claim thereunder shall be void and of no legal effect. Each Change Order, when executed, shall constitute full and final compensation for all matters directly or indirectly related to or arising from the changes to the Work ordered thereby (the "Changed Work"), including, but not limited to, all Overhead and all other direct and indirect costs associated with the Changed Work and any and all adjustments (of whatever nature) to the Contract Sum or to the Contract Period attributable to the Changed Work.

3. The amount of compensation to be paid to the Contractor for any Extra Work so ordered will be determined as follows:

a. By such applicable unit prices, if any, as are set forth in the Contract; or

b. If no such unit prices are set forth, then by a lump sum or other prices mutually agreed upon by Fairfax Water and the Contractor; or

c. If no such unit prices are set forth in the Contract and if the parties cannot agree upon a lump sum or other unit prices, then by the actual and reasonable costs in accordance with the general requirements, as represented by the Technical Specifications of the work, as estimated or otherwise determined by the Engineer.

4. Regardless of the manner in which the adjustment to the Contract Sum on account of Extra Work is determined, such adjustment shall be deemed to include all amounts whether direct, indirect or consequential resulting from the performance of the Extra Work, including, but not limited to, all Overhead. The adjustment in the Contract Sum, if any, shall constitute full and mutual accord and satisfaction for all costs related to this change.

5. Whenever Extra Work is authorized in accordance with Article 7.B.3.c and is planned to be performed by the Contractor hereunder, the Contractor shall provide prior Notice to Fairfax Water and to the Engineer of the time and place for performance of all such Extra Work. Records of Extra Work performed hereunder, if any, must be submitted by the Contractor at the end of each day to Fairfax Water and to the Engineer. Duplicate copies of accepted records shall be made and signed by both the Contractor or his representative and Fairfax Water and Engineer, and one copy shall be retained by each. Failure of the Contractor to submit (and to obtain signed acknowledgments for) such extra Work records, as specified, shall constitute a waiver and release of the Contractor's right to claim compensation for such extra Work

6. Payment requests for approved and duly authorized Extra Work shall be submitted by the Contractor upon a certified statement supported by receipted bills. Such statements shall be submitted for payment by Fairfax Water within 30 days after such Extra Work was performed and in accordance with Article 10 hereof.

7. The Contractor shall be entitled to an extension of time for Extra Work duly authorized by Fairfax Water only for the number of days required, in the opinion of the Engineer, to complete such Extra Work, and then only if the Contractor has strictly complied with all the requirements of the Contract Documents, including without limitation Article 8, A, C, D, and Article 2, B hereof.

C. Omitted Work:

1. Fairfax Water may at any time by a written order require the omission of such Contract Work as it may find necessary or desirable in its sole and absolute discretion.

2. An order for omission of Work will be valid only if signed by Fairfax Water's representative and the Work so ordered must be omitted by the Contractor. The amount by which the Contract Sum will be reduced shall be determined in accordance with the General Requirements.

D. Audit: Fairfax Water and its Authorized Representatives will, until the expiration of three years from the date of final payment under this Contract, have the right to examine and copy those books, records, documents, papers and other supporting data in the possession or control of the Contractor which involve transactions related to this Contract or which otherwise permit adequate evaluation of the cost or pricing data submitted, along with the computations and projections used therein (the "Records"), and the Contractor hereby covenants to maintain the Records for such time and to deliver the Records to Fairfax Water within 7 days after its receipt of written request. The Contractor agrees that no claim for compensation shall be valid if the Contractor should fail to produce any supporting documentation requested by Fairfax Water under this section.

ARTICLE 8 - TIME PROVISIONS

A. Contract Period: The Contractor shall complete the Work within Contract Period.

1. The Contractor must commence Work within 10 days after the date stated as the date to proceed in the Notice to Proceed. Time being of the essence with respect to this Contract, the Contractor shall prosecute the Work diligently, using such means and methods of construction as will secure its full and final completion in strict accordance with the requirements of the Contract Documents, and will complete the Work within the Contract Period.

2. The actual date of Beneficial Use will be established after the required inspections have been conducted in accordance with the Contract Documents and all other contractually required submittals have been reviewed and approved by Fairfax Water and the Engineer.

   a. When the Contractor considers the Work ready for its intended use, Contractor shall notify Fairfax Water and Engineer in writing that the Work is complete for Beneficial Use.

   b. Within a reasonable time thereafter, Fairfax Water, the Contractor, and the Engineer shall perform an inspection of the Work to determine the status of completion. If the Engineer does not consider the Work complete for Beneficial Use, the Engineer will notify the Contractor in writing giving the reasons therefor. If the Engineer considers the Work complete for Beneficial Use, the Engineer will prepare and deliver to Fairfax Water and the Contractor a notice of completion for Beneficial Use which shall establish the date of Beneficial Use. There shall be attached to the notice a tentative list of items to be completed or corrected before final payment, as prepared by the Engineer.

   c. Fairfax Water will determine in its sole discretion whether Beneficial Use has been achieved within the applicable Contract Period milestone.

3. The actual date of Final Completion will be established after final inspections have been completed and all other requirements of the Contract Documents have been satisfied. Fairfax Water will determine in its sole discretion whether Final Completion has been achieved within the Contract Period.

B. Liquidated Damages:

1. Fairfax Water and the Contractor hereby acknowledge and agree that time is of the essence with respect to this Contract and that in the event the Contractor fails to complete the Work within the Contract Period, Fairfax Water will incur actual and considerable monetary damage.

   a. Fairfax Water and the Contractor hereby acknowledge and agree that the stipulated amount per day set forth in the Supplemental Conditions (Section 00800) is reasonably in proportion to the probable loss to Fairfax Water and that amount per day is hereby agreed upon as the liquidated damages for each and every day that the time consumed in completing the Work exceeds the time allowed.

2. This amount shall in no event be considered as a penalty or otherwise than as the liquidated and adjusted damages to Fairfax Water because of the delay, and the Contractor and his Surety hereby agree that the stated sum per day for each such day of delay shall be deducted and retained out of the monies which may become due hereunder and if not

so deducted, the Contractor and his Surety shall be liable therefore. The Contractor and his Surety hereby waive any defense as to the validity of any liquidated damages stated herein as they may appear on the grounds that such liquidated damages are void as penalties or are not reasonably related to actual damages.

C. Extension of Time:

1. The parties to this Contract wish to provide a framework for resolving issues in connection with any delays that may occur on this Project. No extension beyond the date of completion fixed by the terms of the Contract will be effective unless granted in writing, and signed by Fairfax Water. Notice of delay must be given in writing to Fairfax Water's Project Manager, Fairfax Water's Manager of Construction Department, and the Engineer within two days after the commencement of the delay and in strict accordance with the General Conditions. Each such notice shall: (i) be submitted in written, narrative form on the Contractor's letterhead; (ii) be identified as a "Notice of Delay;" (iii) shall describe, in reasonable detail, the nature of the delay encountered; and (iv) shall set forth the date of the commencement of the delay. Neither a schedule update nor meeting minutes shall in any event be deemed to be sufficient, on its own or collectively, to satisfy the notice of requirements set forth in this Paragraph 8.C.1. In case of a continuing cause of delay, only one notice shall be required. The Contractor's application for any extension of time shall be in writing and shall be addressed to Fairfax Water's Project Manager, Fairfax Water's Manager of Construction Department, and the Engineer not more than 20 days after the commencement of the delay. Any such application for extension of time shall: (i) be on the Contractor's letterhead; (ii) describe in reasonable detail the reasons for and causes of the delay; (iii) demonstrate in a clear and convincing fashion the extent to which, if any, the delay impacts the Critical Path for the Project; (iv) contain a justification for each additional day which is requested; and (v) be identified as an "Application for Extension of Time. If the delay should continue for longer than 20 days, the Contractor must submit the substantiation and support for such delay no less frequently than in 20 day increments.

2. If such an application is made, the Contractor shall be entitled to an extension of time for delay in completion of the Work if obstructed or delayed in the commencement, prosecution or completion of any part of the Work on the Critical Path by any act or delay of Fairfax Water, or by acts or omissions of other Contractors on the Project, or by riot, insurrection, war, pestilence, acts of public authorities, fire, earthquakes, or by strikes, or other causes, which causes of delay mentioned in this section, in the opinion of Fairfax Water, are entirely beyond the expectation and control of the Contractor.

3. The Contractor shall, however, be entitled to an extension of time for such causes only for the number of days of delay which Fairfax Water may determine to be due solely and exclusively to such causes and only to the extent that such occurrences actually and adversely impacted the Critical Path for the Project, and then only if the Contractor shall have strictly complied with all of the requirements of these Contract Documents.

4. The Contract Period will be adjusted to account for unusually severe weather conditions that prevent or inhibit the Contractor's performance of any part of the Work that is on the Critical Path indicated on the Schedule (such unusually severe weather conditions referred to herein as "Inclement Weather"). It is the intent of this provision to offset the impact of Inclement Weather with unusually favorable weather conditions that immediately precede and/or follow the occurrence of Inclement Weather. The Contractor shall notify Fairfax Water in writing of the occurrence of Inclement Weather within two days after the onset of such Inclement Weather and shall describe in reasonable detail the type of Inclement Weather encountered by the Contractor and the Critical Path activities of the Work thereby interfered with or interrupted. Such notice shall be submitted to Fairfax Water's Project Manager, Fairfax Water's Manager of Construction Department, and the Engineer in written, narrative form, and not in the form of a schedule update. The Engineer and Fairfax Water will determine the Contractor's entitlement to an extension of the Contract Period for

Inclement Weather by adding to the beginning and the end of the period of Inclement Weather a number of days equal to the total number of days of Inclement Weather (the "Inclement Period"), but in no event fewer than 15 days and comparing the Inclement Period with the identical period for the five years preceding the Inclement Period (the "Comparison Period") based upon the accumulated record monthly or daily mean values (the choice of monthly or daily values being made by the Engineer in his sole and absolute discretion) from climatological data compiled by the U.S. Department of Commerce National Oceanic and Atmospheric Administration for Washington-Dulles International Airport or Washington National Airport, whichever is closest to the Project; provided, however, that in no event shall the Inclement Period include days outside the Contract Period. The Contractor shall be entitled to an extension of the Contract Period only in the event and to the extent that the total number of days of Inclement Weather during the Inclement Period exceeds the total number of days of similar types of weather conditions during the Comparison Period.

5. In the event the Contractor is denied an extension of time hereunder, he may contest such decision by submitting written notice to Fairfax Water's Director of Planning and Engineering (with copies to Fairfax Water's Manager of Construction Department, Fairfax Water's Project Manager) and to the Engineer within five days after the issuance of such denial, stating in detail his reasons for disagreement and submitting all information referenced in clauses (iii) and (iv) of Paragraph 3.E.1. of these General Conditions. The Contractor shall provide the Engineer and Fairfax Water with all substantive information that supports the Contractor's claim for an extension of time, together with any supplemental information requested by the Engineer and/or Fairfax Water. The Contractor must address all elements of Fairfax Water's denial of such time extension. No claim for Extra Time under this provision will be valid (and will be deemed to have been waived) unless submitted in strict accordance with the requirements set forth herein.

6. Except as otherwise provided in paragraph 8.C.8, delays caused by the failure of the Contractor's materialmen, manufacturers, and dealers to furnish approved shop drawings, materials, fixtures, equipment, appliances, or other fittings on time or the failure of Subcontractors to perform their Work in conformity with the approved progress schedule shall not constitute a basis for extension of time.

7. Except as expressly set forth in paragraph 8.C.8. hereof, no claim for payment, compensation or adjustment of any kind (other than the extensions of time provided for herein) shall be made or asserted against the Owner by the Contractor for costs or damages caused by hindrances or delays from any cause, whether such hindrances or delays be avoidable or unavoidable, and the Contractor shall make no claim for damages by reason of any such hindrances or delays, and will accept in full satisfaction of such hindrances or delays an extension of time to complete performance of the Work as specified.

8. Notwithstanding the provisions of paragraph 8.C.7., nothing contained herein is intended to, or shall have the effect of, waiving, releasing or extinguishing any rights of the Contractor to recover costs or damages for an unreasonable delay in performing this Contract, either on its behalf or on behalf of a Subcontractor, if and to the extent that such delay is caused by acts or omissions of Fairfax Water, its agents or employees, and due to causes within their control (such a delay referred to herein as an "unreasonable delay"). In order to seek costs or damages in connection with any such unreasonable delay, the Contractor must comply fully with each of the requirements set forth in paragraph 8.C.1. hereof, and shall identify each notice of delay and application for extension of time submitted hereunder, respectively, as a "Notice of Delay and Additional Costs" and as an "Application for Extension of Time and Additional Costs." Each Notice of Delay and Additional Costs shall contain, in addition to the requirements set forth in paragraph 8.C.1.: (i) a description of the nature of the monetary loss or damage associated with the unreasonable delay; (ii) an explanation as to why the delay is deemed to be

"unreasonable;" and (iii) a clear demonstration of how such unreasonable delay was caused solely and exclusively by acts or omissions of Fairfax Water, its agents and employees, and due to causes within their control. In addition to the requirements set forth in paragraph 8.C.1., each Application for Extension of Time and Additional Costs shall demonstrate in a clear and convincing fashion: (i) that the delay was "unreasonable;" and (ii) the extent, if any, to which the delay was caused by acts or omissions of Fairfax Water, its agents or employees, and due to causes within their control. In the event it is determined that the Contractor (either on its behalf or on behalf of a Subcontractor) is entitled to costs or damages on account of such an Owner-caused unreasonable delay, the amount thereof shall be determined as set forth in paragraph 8.C.9.

9. The parties recognize the difficulty in calculating damages suffered by the Contractor as a result of an unreasonable delay. As such, the parties hereby agree that the amount set forth in the Supplemental Conditions (Section 00800) shall be the liquidated damages for each and every day that the Contractor (either on its behalf or on behalf of a Subcontractor) and/or any Subcontractor(s) incurs compensable costs or damages for unreasonable delays in performing this Contract as aforesaid, and that this figure represents a reasonably accurate forecast of the daily aggregate, anticipated actual damages in the event of an unreasonable delay. The parties hereby acknowledge and agree that the liquidated damages provided for hereunder represent full and final compensation for all losses, costs and damages incurred in the aggregate by the Contractor and its Subcontractors (if any) in connection with an unreasonable delay and that neither the Contractor nor any Subcontractor will in any event submit a claim or seek further or additional compensation in excess of the stated amount. The Contractor shall include in each of its subcontract agreements for the Project a liquidated damages provision similar to that set forth herein.

10. In the event that the Contractor makes a claim against Fairfax Water for costs or damages due to unreasonable delays caused by Fairfax Water, its agents and/or employees and such claim is determined to be false or to have no basis in law or otherwise is resolved in favor of Fairfax Water, in whole or in part, then the Contractor shall be liable to Fairfax Water for a percentage of all the costs Fairfax Water incurs in investigating, analyzing, negotiating, and litigating the claim. The percentage for which the Contractor shall be liable shall be equal to the percentage of the Contractor's total delay claim that is determined through litigation or administrative procedures to be false or to have no basis in law or otherwise resolved in favor of Fairfax Water.

11. Any claim by the Contractor (either on its behalf or that of any Subcontractor or both) arising from or in connection with a delay that is not first submitted in accordance with the requirements of Article 8 shall be null and void and deemed to have been waived by the claimant.

D. Progress Schedule: The Contractor shall comply with the Schedule requirements as outlined in the General Requirements.

ARTICLE 9 - CONTRACTOR'S DEFAULT AND TERMINATION

A. Default by Contractor:

1. In the event:

a. the Contractor fails to begin the Work when required to do so; or

b. at any time during the progress of the Work it shall appear that the Contractor is not prosecuting the Work with reasonable speed, or is delaying the Work unreasonably or unnecessarily; or

c. the force of workmen or quality or quantity of material furnished is not sufficient to insure completion of the Work within the specified time and in accordance with the Specifications; or

d. the Contractor fails to make prompt or proper payments for materials or labor or to Subcontractors for Work performed under the Contract; or

e. the Contractor fails in any manner of substance to observe the provisions of this Contract; or

f. any of the Work, or any of the machinery, supplies or equipment provided hereunder is defective and is not replaced as herein provided;

then Fairfax Water, without prejudice to any other rights or remedies it may have hereunder, will have the right to declare the Contractor in default in whole or in part. In the event that Fairfax Water elects to declare the Contractor in default, Fairfax Water shall notify the Contractor by written notice describing the nature of the default and providing the Contractor a right to cure such default within 3 days after the date of notice, or within such longer period as Fairfax Water, in its sole discretion, will determine. In the event the default is not cured within three days after the date of the notice, or within such longer time period specified by Fairfax Water, Fairfax Water will have the right to take any actions necessary to correct or complete the Work, as set forth in this Article 9.

B. Contractor's Duty upon Default:

1. Immediately, but no later than three days after receipt of notice that he is in default hereunder, the Contractor shall discontinue all further operations on the Project or specified part thereof, shall immediately vacate the Site or such part thereof, leaving untouched all plant, materials, equipment, tools, supplies and job site records, and shall cooperate fully with Fairfax Water by providing Fairfax Water with any keys or access devices used to gain entry to the Site.

C. Completion of Work after Default:

1. If the Contractor does not cure the default or comply with these provisions, Fairfax Water, three days after declaring the Contractor in default, may have the Work completed or the defective equipment or machinery replaced, or anything else done to complete the Work in accordance with the Contract Documents by such means and in such manner, by contract with or without public letting, or otherwise as it may deem advisable, utilizing for such purpose, without additional cost to Fairfax Water, such of the Contractor's plant, materials, equipment, tools and supplies remaining on the Site, and also such subcontractors as it may deem advisable and may take any or all of the following actions:

a. delete part or parts of the Work from the Contract and contract to have it performed by others;

b. supplement the Contractor's work force;

c. withhold payments due the Contractor and use such payments to satisfy any claims for monies owed by the Contractor in connection with the Project, in accordance with paragraph 10.C.2;

d. replace or repair any defective Work, machinery or equipment;

e. terminate the Contractor pursuant to Item 9.F.1.h.

2. The Contractor and his Surety shall bear all costs associated with completing or correcting the Work, including without limitation, the cost of re-letting, the amount of any liquidated damages, and any and all costs incurred in connection with the actions listed in this paragraph.

3. Any costs incurred in connection with completing or correcting the Work will be deducted from the amounts then or thereafter due the Contractor. In the event such amounts are not sufficient to cover the costs incurred in connection with completing or correcting the Work, the Contractor and his Surety shall pay to Fairfax Water the amount of any deficiency.

4. In the event the Contractor or the Surety fails to pay Fairfax Water the costs specified in this Article, the Contractor and the Surety shall be jointly and severally liable for all costs, expenses and attorney fees incurred by Fairfax Water in collecting the amounts due.

5. In the event of termination for default, Fairfax Water may direct that the Contractor, or one or more of its Subcontractors, or both, be barred from the Project Site and not be permitted to perform further Work. In fulfilling its obligations under the Performance Bond, the Surety shall accept and abide by such direction without additional cost to Fairfax Water.

D. Partial Default: In the event Fairfax Water declares the Contractor in default with respect to a part of the Work in accordance with the provisions of paragraph 9.A hereof, the Contractor shall discontinue such part of the Work declared in default, shall continue performing the remainder of the Work in strict conformity with the terms of the Contract, and shall not hinder or interfere with any other contractor or persons whom Fairfax Water may engage to complete the Work for which the Contractor was declared in default. The expense of such completion shall be paid by the Contractor and his Surety as hereinbefore stated.

E. Death or Incompetence of Contractor: In the event of the death or legal incompetence of a Contractor who shall be an individual or surviving member of a sole proprietor contracting firm, such death or adjudication of incompetence shall not terminate the Contract, but shall constitute a default hereunder to the effect provided in paragraph 9.A hereof, and the estate of the Contractor and his Surety shall remain liable hereunder to the same extent as though the Contractor had lived. Notice of default, as provided in paragraphs 9.A hereof, shall not be required to be given in the event of the death or adjudication of incompetence of a Contractor who is an individual or a sole proprietorship.

F. Fairfax Water's Right to Terminate for Cause:

1. In the event:

a. legal proceedings have been instituted by others than Fairfax Water in such manner as to interfere with the progress of the Work and to potentially subject Fairfax Water to the peril of litigation or outside claims; or

b. the Contractor is adjudicated bankrupt or makes an assignment for the benefit of creditors; or

c. in any proceeding instituted by or against the Contractor an order is made or entered granting an extension of the time of payment, composition, adjustment, modification, settlement or satisfaction of his debts or liabilities; or

d. a receiver or trustee is appointed for the Contractor or the Contractor's property; or

e. the Contract or any part hereof is sublet without the prior written consent of Fairfax Water or

f. this Contract or any rights, monies, or claims hereunder are assigned in whole or in part by the Contractor, otherwise than as herein specified; or

g. the Work to be performed under this Contract is abandoned;

h. the Contractor fails to cure any default declared pursuant to Article 9.A within the time period specified with respect thereto;

then Fairfax Water, without prejudice to any other rights or remedies of Fairfax Water, will have the right to terminate the Contractor for cause effective immediately upon Notice to the Contractor.

2. If, after issuance of a Notice of termination of the Contract under the provisions of this Section 9.F.1., it is determined for any reason that the Contractor was not in default under the provisions of paragraph 9.A.1.a through 9.A.1.f, or that cause for such termination otherwise did not exist under the provisions of paragraph 9.F.1.a through 9.F.1.h, then the rights and obligations of the parties shall be the same as if the Notice of termination had been delivered under the provisions of Section 9.G hereof; provided, however, that the Contractor in such event shall be deemed to have received seven days prior Notice of termination. Any compensation thereupon owing to the Contractor under Section 9.G shall be offset by the cost of remedying any defective Work by the Contractor. In no event shall the Contractor be entitled to recover consequential damages of any kind in connection with any termination under Article 9.

G. Fairfax Water's Right to Terminate for Convenience: Fairfax Water will have the right to terminate this Contract at its own convenience for any reason by giving seven days prior notice of termination to the Contractor. In such event, the Contractor shall be paid an amount equal to the lesser of: (1) the actual cost of any Work, labor or materials actually performed or in place and the actual cost of any labor, equipment or materials ordered in good faith which could not be canceled, less the salvage value thereof; or (2) the pro rata percentage of completion based upon the bid breakdown furnished by the Contractor, plus the actual cost of any labor, equipment, or materials ordered in good faith which could not be canceled, less the salvage value thereof. Each subcontract shall contain a similar termination provision for the benefit of the Contractor and Fairfax Water. Neither the Contractor nor any Subcontractor shall be entitled to receive anticipated profits on unperformed portions of the Work. Fairfax Water (or its Authorized Representative) will have the right to verify any amounts claimed by the Contractor to be due under this Section. The Contractor shall grant Fairfax Water (or its Authorized Representative) access, during normal business hours, to its books, records and contracts, insofar as they pertain to amounts claimed to be due hereunder.

ARTICLE 10 – PAYMENT

A. Prices:

1. For the Contractor's complete performance of the Work, Fairfax Water agrees to pay, and the Contractor agrees to accept, subject to the terms and conditions hereof, the lump sum prices or unit prices in the Contractor's bid and the award made thereon, taking into consideration any deductions based on award of a combination of Divisions, if applicable, plus the amount required to be paid for Extra Work ordered under Section 7.B hereof, less credit for any Work omitted pursuant to Section 7.C hereof.

2. Under unit price items, the number of units actually required to complete the Work under the Contract may be less or more than stated in the bid. The Contractor agrees that no claim will be made for any damages or for loss of profits or overhead because of a difference between the quantities of the various classes of Work assumed and stated in the bid as a basis for comparing bids and the quantities of Work actually performed.

3. The amount awarded as a unit price for any unit price Contract Item shall represent payment in full for all the material, equipment and labor necessary to complete, in conformity with the Contract Documents, each unit or item of Work shown, specified, or required under the said unit price Contract Item.

4. The sum awarded for any lump sum Contract or lump sum Contract Item shall represent payment in full for all Work, including material, equipment and labor necessary or required to complete, in conformity with the Contract Documents, the entire Work shown, indicated or specified under the lump sum Contract Item.

5. No payment other than the amount awarded will be made for any class of Work included in a lump sum Contract Item or a unit price Contract Item, unless specific provision is made therefore in the Contract Documents.

B. Submission of Bid Breakdown: Within 20 days after the execution of this Contract, the Contractor shall submit to the Engineer, in duplicate, a breakdown of the lump sums and unit prices proposed for Contract Items, indicating the various operations to be performed under the Contract, and the value of each of such operations; the total of such items to equal the Contract Sum. The Contractor also shall submit such other information relating to the bid prices and shall revise the bid breakdown to a form acceptable to the Engineer. Following acceptance of the bid breakdown, it may be used for checking the Contractor's applications for partial payments hereunder but shall not be binding upon Fairfax Water or the Engineer for any purpose whatsoever.

C. Partial Payments:

1. On or about the first of each month, the Contractor shall make and certify an estimate of the amount and the fair value of the Work performed and may apply for partial payment therefor. The Contractor shall include its federal employer identification number on each such application for payment. The Engineer may, in his discretion, revise the estimate to show the actual value of Work completed in accordance with the Engineer's observation of the Work. The Contractor agrees to be bound by Engineer's revisions to his applications for partial payment. Whenever the monthly estimate, after approval by the Engineer, shows that the value of the Work completed during the previous month exceeds $1,000, Fairfax Water will issue a certificate for such Work. Such certificate will authorize payment by Fairfax Water in an amount equal to the value of the Work completed less any sums retained or deducted by Fairfax Water under the terms of the Contract Documents, and less retainage of 5 percent of payments claimed. Fairfax Water may, in its own discretion, reduce the amount of retainage withheld, in the latter stages of the Project.

2. Fairfax Water may withhold payment to such extent as may be necessary in the opinion of the Engineer and Fairfax Water to protect Fairfax Water due to loss because of:

   a. defective Work not remedied,

   b. third party claims filed or reasonable evidence indicating probable filing of such claims,

   c. failure of the Contractor to make payments properly to subcontractors or for labor, materials or equipment,

   d. reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract price,

   e. damage to the Owner or another,

   f. reasonable evidence that the Work will not be completed within the time for completion,

g. failure to carry out the Work in accordance with, or to otherwise observe the requirements of, the Contract Documents, or

h. liability, damage, or loss due to injury to persons or damages to the Work or property of other Contractors, subcontractors of others, caused by the act or neglect of the Contractor of any of his Subcontractors.

3. No partial payment will be made for any materials or equipment supplied hereunder before they are incorporated in the Work in a permanent manner required by the Contract Documents, unless otherwise specified herein.

4. The cost of equipment and nonperishables delivered and stored at the Site of the Project and tested for adequacy may be included in the Contractor's application for partial payment; provided, however, that the Contractor shall furnish written evidence satisfactory to Fairfax Water that the Contractor is the owner of such materials or equipment at the time of payment therefore by Fairfax Water and that such equipment is being stored and maintained in accordance with the Contract Documents and the manufacturer's recommendations. The amount to be paid will be 95 percent of the invoice cost as set forth on the original invoice from the supplier or manufacturer. Such payment shall not relieve the Contractor of full responsibility for completion of the Work and for protection of materials and equipment until incorporated in the Work in a permanent manner as required by the Contract Documents.

5. Before any payment will be made under this Contract, the Contractor and every Subcontractor, if required, shall deliver to the Engineer a written, verified statement, in satisfactory form, showing in detail all amounts then due and unpaid by the Contractor and Subcontractor to all laborers, workmen, and mechanics, employed under the Contract for the performance of the Work at the Site of the Project, for daily or weekly wages, or to other persons for materials equipment, or supplies delivered at the Site of the Project during the period covered by the payment request.

6. Upon the request of Fairfax Water, as a prerequisite for payment pursuant to the terms of this Contract, the Contractor shall give Fairfax Water a statement that no employee of Fairfax Water, has received or has been promised, directly or indirectly, any financial benefit, by way of fee, commission, finder's fee or in any other manner, remuneration arising from or directly or indirectly related to this Contract. Fairfax Water will have the right, in its sole discretion, to withhold payment to the extent of any such fee, commission, etc. The Contractor shall not be entitled to interest and shall not have any claim on account of any payments being withheld under this paragraph 10.C.6.

7. In addition to any other remedy provided by the Contract Documents, Fairfax Water may withhold from the Contractor as much of any approved payments to him as may in the opinion of Fairfax Water be necessary to secure: (a) just claims of any persons supplying labor or materials to the Contractor or any of his Subcontractors for the Work then due and unpaid; (b) loss due to defective Work not remedied; or (c) liability, damage, or loss due to injury to persons or damages to the Work or property of other contractors, subcontractors or others, caused by the act or neglect of the Contractor or any of his Subcontractors. Fairfax Water will have the right, as authorized representative for the Contractor, to apply any such amounts so withheld in such manner as Fairfax Water may deem proper to satisfy such claims or to secure such protection. The application of these amounts shall be deemed payments for the account of the Contractor and will reduce Fairfax Water's indebtedness to the Contractor accordingly.

8. Fairfax Water may, at any time during the Contract Period and to include any warranty period thereafter**,** issue notice to the Contractor setting forth: (a) Fairfax Water's determination that: (i) the classification, amount, quality, or character of the Work performed by or on behalf of the Contractor shall have been incorrect in any respect; (ii)

any decision, acceptance, certificate or payment issued in connection with the Work shall have been incorrect or shall have been improperly made in any respect; and/or (iii) the Work or any part thereof does not in fact conform to the requirements of the Contract Documents; and (b) the amount of any overpayment made by Fairfax Water to the Contractor in connection therewith. The amount of such overpayment shall be deducted by Fairfax Water from amounts then or thereafter due the Contractor or, upon direction of Fairfax Water as set forth in the notice, shall be paid by the Contractor and/or the Surety to Fairfax Water within fifteen (15) days after the receipt of such notice. Any such overpayment which is not paid when due shall accrue interest at a rate of one percent per month until paid in full.

D. Final Payment:

1. Upon determination of Final Completion of the Work, the Contractor shall prepare and submit to Fairfax Water his final payment request.

2. The final payment request shall state that the Work has been completed and set forth the amount of any final payment remaining due to the Contractor. Upon Fairfax Water's acceptance that the Work is fully completed, Fairfax Water will, within 30 days after the Final Completion date (as defined in the Contract Documents), pay the Contractor the entire amount found due thereunder, after deduction of all previous payments and all percentages and amounts to be kept and retained under provisions of this Contract. All prior partial payments, being merely estimates made to enable the Contractor to prosecute the Work more advantageously, shall be subject to correction in the final estimate and payment. The Contractor understands that, before receiving final payment, he shall submit to Fairfax Water: (a) sworn payment affidavit and release in the form attached to these General Conditions certifying that all bills for labor, materials, services and benefits provided by or through the Contractor in connection with the Work performed pursuant to the Contract Documents have been paid and that there are no claims pending or threatened in connection with the Work done or labor and materials furnished under the Contract, and releasing Fairfax Water from any and all claims arising from or in connection with the Work performed pursuant to the Contract Documents; and (b) a consent of surety to final payment in the form attached to these General Conditions. In the event that one or more suits or causes of action is or are pending in connection with the Work, Fairfax Water, in its sole discretion, may permit the Contractor to execute a separate surety bond in a form satisfactory to Fairfax Water, or to submit an executed consent of the surety in a form satisfactory to Fairfax Water. Any such surety bond shall be in an amount equal to the aggregate amount of all such suits and causes of action.

E. Neither the final payment nor any part of the retained percentage will be paid until the Contractor, if required, furnishes Fairfax Water with a complete release and indemnity from any third party claims which might arise out of this Contract. If a third party claim remains unsatisfied after all payments are made, the Contractor or his Surety shall refund to Fairfax Water all monies which Fairfax Water may be compelled to pay in discharging such claim, including incidental costs and attorneys' fees.

F. Acceptance of Final Payment: The acceptance by the Contractor, or by anyone claiming by or through him, of the final payment shall be deemed to constitute a release to Fairfax Water and every officer and Authorized Representative thereof from any and all claims, disputes and liabilities to the Contractor for anything done or furnished in connection with the Work or the Project. However, no payment, final or otherwise, shall operate to release the Contractor or his Surety from any obligations under this Contract.

G. Payments to Subcontractors:

1. Within seven days after receipt of each payment from Fairfax Water, the Contractor shall:

a. Pay each Subcontractor an amount equal to the proportionate share of the total payment received from Fairfax Water attributable to Work performed by such Subcontractor (giving effect to the percentage of payments to be retained by Fairfax Water from amounts due the Contractor); or

b. Notify Fairfax Water, the Engineer and the Subcontractor in writing of the intention to withhold all or part of the amounts due the Subcontractor pursuant to paragraph 10.G.1.a above, and state the reason for such withholding.

2. Each subcontract entered into by the Contractor in connection with the Work shall: (a) obligate the Subcontractor to include its social security number or federal employer identification number, as the case may be, on all applications for payment; and (b) obligate each subcontractor to include or otherwise be subject to the same payment and interest requirements with respect to each lower-tier subcontractor as are required of the Contractor hereunder.

3. The Contractor shall pay interest on amounts owed to the Subcontractor which remain unpaid seven days after the Contractor's receipt of payment from Fairfax Water, provided, however, that amounts owed the Subcontractor which have been withheld properly, pursuant to Paragraph 10.G.1.b, shall not accrue interest. Interest on amounts due the Subcontractor and unpaid shall accrue at the rate of one percent per month; provided, however, that the Contractor's obligation to pay interest hereunder shall in no event be construed to be an obligation of Fairfax Water. A contract modification shall not be made for the purpose of providing reimbursement for the interest charge. A cost reimbursement claim shall not include any amount for reimbursement for such interest charge.

H. Payment Terms: Fairfax Water shall pay the Contractor amounts due within 45 days of approval hereunder. Past due amounts shall accrue interest at the rate of one percent per month.

ARTICLE 11 – INSURANCE

A. Contractor's Insurance:

1. During the term of this Contract, the Contractor shall procure and maintain, with solvent and responsible companies authorized to do business under the laws of the Commonwealth of Virginia and acceptable to Fairfax Water, the following types of insurance:

a. Commercial General Liability and Property Damage Insurance covering claims for damages, for bodily injury, including accidental death, personal injury, products and completed operations, as well as claims for property damage which may arise from operations under the Contract, whether such operations be performed by the Contractor or by any Subcontractor, or by anyone directly or indirectly employed by either of them. Such insurance includes coverages "X", "C" and "U" for explosion, collapse of other structures and underground utilities, and Contractual Liability Insurance covering the requirements outlined in the General Conditions. This insurance shall name Fairfax Water and the Engineer as additional insureds and shall protect Fairfax Water and the Engineer against similar claims. If endorsements to the Commercial General Liability insurance policies cannot be made, then separate policies providing such protection shall be purchased by the Contractor. Policy shall be subject to a $1,000,000 combined single limit per person/occurrence. This insurance shall include coverage for all of the following:

1) General aggregate limit applying on a per project basis;

2) Liability arising from premises and operation;

3) Liability arising from the actions of independent contractors;

4) Liability arising from products and completed operations with such coverage to be maintained for two years after completion of the Work;

5) Contractual liability including protection for the Contractor from bodily injury and property damage claims arising out of liability assumed under this Contract; and

6) Liability arising from the explosion, collapse, or underground (XCU) hazards.

b. The Contractor shall require each of his Subcontractors to procure and maintain during the term of his subcontract, subcontractor's commercial General Liability Insurance of the type specified in paragraph 11.A.1.a, in amounts satisfactory to the Contractor.

c. Worker's Compensation and Employer's Liability Insurance for the Contractor's employees engaged in the Work under this Contract, in accordance with the laws of the Commonwealth of Virginia. The Contractor shall require each of his Subcontractors to provide Worker's Compensation and Employer's Liability Insurance for all of the Subcontractor's employees engaged on such subcontracts. If any class of employees engaged on work under the Contract is not protected under the Worker's Compensation statute, the Contractor shall provide similar protection for these employees in amounts not less than the legal requirements. The amount of Employer's Liability Insurance for the Contractor and each of his Subcontractors shall be not less than $100,000 per employee for Bodily Injury. The Worker's Compensation and Employer's Liability Insurance policy shall include an "all states" or "other states" endorsement

d. Automobile Liability Insurance, including employee's ownership liability and hired automobile insurance, $1,000,000 combined single limit.

e. All risk insurance covering damage, loss or injury to the Work. The policy shall be payable to Fairfax Water, and the proceeds thereof, when paid, will be retained by Fairfax Water as security for the performance by the Contractor of his obligations under the terms and conditions of this Contract and, upon such performance, will be released to the Contractor. The policy shall be in an amount equal to the Contract Sum and shall apply to any and all Projects under construction during the term of this Contract.

2. Proof of insurance for each type of coverage listed herein shall be provided within 10 Days after issuance of the Award Letter for the Contract, and no Work shall proceed unless all such insurance is in effect. The Contractor shall not allow any Subcontractor to commence work on his subcontract until all such insurance of the Subcontractor has been so obtained and approved by the Contractor and found to be in accordance with the requirements set forth herein. The Contractor certifies by commencement of the Work that his insurance and that of Subcontractors is in effect and meets the requirements set forth herein.

3. The Contractor shall purchase and maintain required liability and all other insurance as is appropriate for the Work being performed and furnished. The insurance shall provide protection from claims set forth herein which may arise out of or result from Contractor's performance and furnishing of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed or furnished by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform or furnish any of the Work, or by anyone for whose acts any of them may be liable:

a. claims under worker's compensation, disability benefits, and other similar employee benefit acts;

b. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

c. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

d. claims for damages insured by personal injury liability coverage which are sustained: (1) by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor; or (2) by any other person for any other reason;

e. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

f. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle.

4. The insurance required to be purchased and maintained by the Contractor shall:

a. include completed operations insurance;

b. with respect to completed operations insurance and any other insurance coverage written on a claims-made basis, remain in effect for at least 2 years after final payment (and Contractor shall furnish Fairfax Water and Engineer evidence satisfactory to Fairfax Water of continuation of such insurance at final payment and 1 year thereafter);

c. contain a cross liability or severability of interest clause or endorsement. Insurance covering the specified additional insureds shall be primary insurance, and all other insurance carried by the additional insureds shall be excess insurance.

5. Each of the foregoing insurance policies must be endorsed to provide that the insurance company shall give 30 days written notice to Fairfax Water if the policies are to be terminated or if any changes are made during the Contract Period which will affect in any way the insurance requirements set forth herein. Before commencing the Work, the Contractor shall provide Fairfax Water with a copy of each policy which he and each of his Subcontractors shall carry in accordance herewith, together with receipted bills evidencing proof of premium payment.

6. If at any time Fairfax Water becomes dissatisfied with any insurance company which provides required insurance coverage on behalf of the Contractor, or if for any other reason such required insurance coverage shall cease to provide adequate protection to Fairfax Water, as determined by Fairfax Water in its sole discretion, then the Contractor shall, within ten days after receipt of written notice from Fairfax Water, substitute one or more acceptable insurance companies and or insurance policies as may be satisfactory to Fairfax Water. The premiums on such insurance shall be paid by the Contractor and shall be included in the Contract Sum. No further partial payments shall be deemed due or be made until the new insurance coverage shall have become effective.

B. Nothing contained herein shall effect, or shall be deemed to affect, a waiver of Fairfax Water's sovereign immunity under law.

ARTICLE 12 - CONTRACT SECURITY

A. Contract Security:

1. The Contractor shall execute and deliver to Fairfax Water Performance and Payment Bonds on the forms provided herein, each in an amount equal to the Contract Sum, and each accompanied by an appropriate Power of Attorney evidencing the authority of the Surety's representative to execute such Bond on behalf of the Surety. Each Performance and Payment Bond shall be issued by a solvent and responsible surety company that is authorized to conduct business in the Commonwealth of Virginia, named in the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Federal Register by the Audit Staff Bureau of Accounts, U.S. Treasury Department, and acceptable to Fairfax Water. The Performance and Payment Bonds shall serve as security for the faithful performance of this Contract, and for the payment of all persons performing labor and furnishing materials and services in connection with this Contract. The premiums on the Performance and Payment Bonds shall be paid by the Contractor and shall be included in the Contract Sum.

2. If at any time Fairfax Water becomes dissatisfied with any Surety or Sureties upon the Performance and Payment Bonds, or if for any other reason such bond shall cease to be adequate security for Fairfax Water, as determined by Fairfax Water in its sole discretion, the Contractor shall within five days after notification, substitute acceptable bonds in such form and sum and signed by such other sureties as may be satisfactory to Fairfax Water. The premiums on such Bonds shall be paid by the Contractor and shall be included in the Contract Sum. No further partial payments shall be deemed due or be made until the new sureties have qualified.

3. Notwithstanding any provisions in these Contract Documents to the contrary, the Contractor may furnish Fairfax Water with a certified check, cashier's check, or cash escrow in the amount of the Contract Sum in lieu of the payment bond, the performance bond, or both.

ARTICLE 13 - SUBCONTRACTS AND ASSIGNMENTS

A. Limitations and Consent:

1. The Contractor shall not assign, transfer, convey, sublet or otherwise dispose of this Contract or of his right, title, or interest therein, in whole or in part, or any claim allegedly arising herefrom and shall not assign any monies due or to become due hereunder to any other person, firm or corporation without first obtaining the written consent of Fairfax Water. Fairfax Water's consent to a particular subcontract or assignment will not constitute a waiver of Fairfax Water's right to consent to any further or other subcontracts or assignments.

2. Before making any subcontract, the Contractor must submit a written statement to the Engineer setting forth the name and address of the proposed Subcontractor and the portion of the Work and materials which the proposed Subcontractor shall perform or provide, as the case may be. The Contractor also must furnish with respect to each proposed Subcontractor an OSHA Form 300 [a list of citations for safety violations] and a completed "Subcontractor Qualification Form" attached to these General Conditions, all intended to demonstrate to Fairfax Water that the proposed Subcontractor has the necessary facilities, skill, integrity, safety record, past experience and financial resources to perform the Work in accordance with the terms and conditions of this Contract. A Subcontractor Qualification Form must be submitted for each subcontractor performing work valued greater than $100,000 and the OSHA Form 300 shall be submitted at the time the Subcontractor Qualification Forms are submitted. As to each proposed Subcontractor, the Contractor has the burden of demonstrating that the Subcontractor is qualified in all respects to perform the designated portion of the Work. Unless additional or trade-specific subcontractor

qualifications are required in the Contract Documents, the Contractor must, at a minimum, demonstrate to the satisfaction of Fairfax Water that the proposed Subcontractor has successfully performed similar work on a project which is similar in size, scope, and nature to the Project. The Engineer shall advise Fairfax Water of its opinion and recommendation with regard to each proposed Subcontractor.

3. If Fairfax Water finds in its sole discretion that the proposed Subcontractor meets the minimum qualifications acceptable to Fairfax Water, the Contractor will be notified in writing within 20 days, after Fairfax Water's receipt of all required information. Fairfax Water may retract its acceptance of any Subcontractor in the event such Subcontractor evidences an unwillingness or inability to perform his work in strict accordance with these Contract Documents. Notice of such retraction will be given in writing to the Contractor. Upon receipt of notification of such retraction, the Contractor shall, within 10 days, address all reasons stated in the retraction and furnish satisfactory evidence that immediate steps are being undertaken by the Subcontractor to correct any unwillingness or inability to perform which would have caused such retraction, or, submit a new Subcontractor for Fairfax Water's review at no additional cost.

4. Where the Specifications require the use of a specific manufacturer, supplier or installer, either by name or by identifying characteristic (by use of such term as "manufacturer-certified" or the like), the Contractor shall perform the designated portion of the Work through the specified entity, and no claim may be made for an increase in the Contract Sum, or for an extension of the Contract Period on the ground that the Contractor's bid included performance by another means or entity, or that the Contractor otherwise intended or applied to accomplish performance in another fashion. Nothing herein shall preclude Fairfax Water in its sole discretion from consenting to a substitute manufacturer, supplier or installer and, in such event, Fairfax Water's consent shall be in writing.

5. Upon request, the Contractor shall promptly file with Fairfax Water a conformed copy of any subcontract. The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind Subcontractors to the Contractor in accordance with the terms of these Contract Documents, insofar as applicable to the work of Subcontractors, and to give the Contractor the same power to terminate any subcontract that Fairfax Water may exercise over the Contractor under provisions of these Contract Documents.

B. Responsibility: Fairfax Water's review or acceptance of Subcontractors as described herein shall not relieve the Contractor of any of his responsibilities, duties and liabilities hereunder. The Contractor shall be solely responsible to Fairfax Water for the acts, defaults, or omissions of his Subcontractors and of his Subcontractors' officers, authorized representatives and employees. Nothing contained in the Contract Documents shall be construed to create any contractual relationship between any Subcontractor and Fairfax Water or the Engineer.

ARTICLE 14 – INDEMNIFICATION

A. Suits at Law: The Contractor hereby assumes all liability for and will indemnify and hold harmless Fairfax Water and the Engineer and its or their officers, Members, Authorized Representatives and employees (any one of which is an "Indemnified Party") against any and all claims, losses, costs, damages, penalties, liabilities and fees (including reasonable attorneys' fees) and expenses resulting from: (i) any material breach of the representations, warranties, agreements and covenants of the Contractor contained in the Contract Documents; (ii) any injuries to persons or property caused by the wrongful conduct or alleged wrongful conduct of the Contractor or his Subcontractors, employees, or authorized representatives; (iii) any claims filed by the Contractor which are adjudicated in favor of Fairfax Water; or (iv) in any other manner arising out of the performance of this Contract.

B. In the event that a claim is brought against an Indemnified Party by: (a) the Contractor or an employee of the Contractor; (b) any Subcontractor or supplier or any employee thereof; (c) any person or entity engaged by or through the Contractor or any Subcontractor or supplier to furnish or perform any portion of the Work; or (d) any person or entity for whom the Contractor or any Subcontractor or supplier may be vicariously liable, the indemnification obligations set forth in Paragraph 14.A. shall not be limited in any respect by any limitation on the type or amount of damages, compensation, benefits or other remuneration payable by or for the Contractor or any Subcontractor, supplier or other such person or entity under any laws, rules, regulations or plans of any nature governing workers' compensation, disability benefits or other employee benefits.

C. Claims on Behalf of Subcontractors: No claim of any nature shall be made against Fairfax Water by or on behalf of a Subcontractor unless the Contractor first shall have: (i) evaluated such claim thoroughly and determined it to be meritorious; (ii) issued a written notice to the Subcontractor finding the Subcontractor's claim to be meritorious and setting forth any additional compensation or additional days to be paid or granted to the Subcontractor on account of such claim; and (iii) paid the Subcontractor in full for such claim. In presenting such a claim, the Contractor shall provide Fairfax Water with a copy of the written notice to the Subcontractor and with evidence of payment in full of the Subcontractor's claim. No such claim shall exceed the amount actually paid to the Subcontractor by the Contractor.

D. Liability Unaffected: Nothing herein contained shall in any manner create any liability against Fairfax Water on account of any claim for labor, services, or materials, or of subcontractors, and nothing herein contained shall affect the liability of the Contractor or his Sureties to Fairfax Water or to any workmen or materialmen upon bonds given in connection with this Contract. The Contractor hereby acknowledges and agrees that, as between Fairfax Water and the Contractor, the Contractor shall bear full and complete responsibility for the performance of its Subcontractors, manufacturers and suppliers, regardless of whether any such Subcontractor, manufacturer or supplier was designated as "preapproved" by Fairfax Water.

ARTICLE 15 - POWERS OF FAIRFAX WATER'S REPRESENTATIVES

A. The Engineer:

1. The Engineer, in addition to those matters elsewhere herein expressly made subject to his determination, or approval, will have the power, subject to Fairfax Water's review.

    a. To review all submittals and provide technical assistance to the Owner during construction.

    b. To make visits to the Site at intervals appropriate to the various stages of construction to observe the progress and quality of the finished Work and to determine in general if the Work is proceeding in accordance with the Contract Documents.

    c. To issue with reasonable promptness such written clarifications or interpretations of the Contract Documents (in the form of Drawings or otherwise) as the Engineer may determine necessary; provided that such clarifications or interpretations will be consistent with or reasonably inferable from the overall intent of the Contract Documents.

    d. To disapprove or reject such Work as he believes to be defective, and also to require special inspections or testing of the Work, whether or not the Work is fabricated, installed or completed.

    e. To designate a Project Representative to assist Fairfax Water's Authorized Representative in observing performance of the Work.

f. To be an interpreter of the requirements of the Contract Documents and to judge the acceptability of the Work performed thereunder.

2. The power of the Engineer will not be limited to the foregoing enumerations. It is the intent of this Contract that all of the Work will be subject to the Engineer's review and acceptance, except where the reviews or approval of someone other than the Engineer is expressly called for herein and except where subject to review by Fairfax Water's Authorized Representative.

3. Neither the Engineer's authority to act hereunder nor any decision made by him in good faith to exercise or not to exercise such authority will give rise to any duty or responsibility of the Engineer to the Contractor, or to any Subcontractor, any materialman, fabricator, supplier or any of their authorized representatives or employees or any other person or entity performing any of the Work.

4. The Engineer will not be responsible for the acts or omissions of the Contractor, or any Subcontractors, or any of his or their representatives or employees or any other persons at the Site or otherwise performing the Work.

5. The Engineer will not be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto. Furthermore, the Engineer will not be responsible for the Contractor's failure to perform the Work in accordance with the Contract Documents.

6. Any requirement, direction, review, or judgment given by the Engineer is intended solely to evaluate the Work in order to determine compliance with the Contract Documents. Nothing contained in the Contract Documents and no act or omission on the part of Fairfax Water, the Engineer or their Authorized Representatives will imply that the Engineer has any authority or responsibility to supervise or direct the means and methods of the performance of the Work.

B. The General Manager:

1. The General Manager, in addition to those matters expressly made subject to his determination, direction or approval will have the power:

a. To decide any and all questions, claims and disputes in relation to this Contract and its performance, except as herein otherwise specifically provided.

b. To modify or change this Contract in accordance with Article 7, B.1. so as to require the performance of Extra Work, or the omission of Contract Work or both, whenever he deems it in the interest of Fairfax Water to do so.

c. To suspend the whole or any part of the Work whenever in his judgment, such suspension is required: (1) in interest of Fairfax Water generally, or (2) to coordinate the work of the various contractors engaged on the Project or (3) to expedite the completion of the Project, even though the completion of this particular Contract be thereby delayed, or (4) due to a delay caused by Fairfax Water, Engineer or its or their Authorized Representatives, without compensation to the Contractor for such suspension except for actual costs of demobilization and remobilization, as noted in the General Requirements and other than extending the time for completion of the Work, as much as it may have been, in the opinion of Fairfax Water, delayed by such a suspension.

d. To take over, use, occupy, or operate any part of the completed or partly completed Work if, before the final acceptance of the Work, the General Manager will deem it necessary.

C. Project Documents

1. Access to Documents: Fairfax Water and any of its Authorized Representatives shall have access to all records and documents in the possession, custody, control or ownership of the Contractor relating in any way to the Project (the "Project Documents"). The Project Documents shall include, but not be limited to, the following: bid worksheets, daily reports, invoices, sub-contracts, internal memoranda, notes and other data. Fairfax Water and its Authorized Representatives shall, at any time during the term of this Contract and until the expiration of 3 years from the date of final payment under this Contract, have the right to examine and copy the Project Documents, and the Contractor hereby covenants to maintain the Project Documents for such time and to deliver the Project Documents to Fairfax Water within 7 days after receipt of its request.

ARTICLE 16 – BOUNDARIES

A. Boundaries: The Contractor shall confine his equipment, apparatus, storage of materials, supplies and the apparatus of his workmen, and of his Subcontractors, to the Project boundaries indicated by applicable laws, ordinances, and permits or by direction of Fairfax Water, unless otherwise agreed to in writing.

ARTICLE 17 – WARRANTIES

A. Warranties

1. During the Warranty Period (as defined below), The Contractor warrants to the Owner as follows (collectively, the “Warranties”): (a) the Work shall be free of defects in workmanship, materials and/or equipment, (b) materials and equipment furnished under the Contract Documents shall be of good quality and new (unless otherwise specified in the Contract Documents), (c) the Work will be free of all shrinkage, settlement or other faults of any kind or nature which are attributable to defective workmanship, materials and/or equipment (d) the Work shall strictly conform to and meet all of the requirements of the Contract Documents; and (e) the Work shall be fit for use in accordance with its intended function.

2. The foregoing Warranties shall commence on the Date of Final Completion and, unless a different period of time is specified herein, shall remain in effect for a period of one year. If any of the Work fails to meet the standards set forth in this Article at any time within the applicable warranty period, then the Contractor shall correct such Work promptly after receipt of written notice from the Owner. The Contractor promptly shall correct such Work to meet the standards of this Article, and shall repair (to such standards) any damage to the Project or other property of the Owner caused by the failure of the Work to meet the standards set forth in this Article, even if the performance of such corrective work or repairs extends beyond the applicable warranty period. This obligation shall survive acceptance of the Work by the Owner and termination of the Contract Documents.

3. The Contractor shall provide Fairfax Water with a written extended warranty for any equipment, system, system component, or any other component of the Work that has not been shown to perform to the full satisfaction of the Owner or that has been the subject of repeated service calls or repairs during the applicable Warranty Period. Any such extended warranty shall be for a minimum of one year or such other length of time as deemed acceptable to Fairfax Water.

4. In order to make good the guarantee as herein required, the Contractor shall deposit with the Owner, before Final Payment or release of retainage, a Maintenance Bond issued by a surety licensed to do business in Virginia and otherwise acceptable to Fairfax Water, for the full and faithful performance of the Warranties. The Maintenance Bond shall be: (a) for a period of time equivalent to the applicable warranty period; (b) in the amount of five percent (5%) of

the final Contract Sum; and (c) in substantially the form attached as an exhibit to these General Conditions. Additional maintenance bonds may be required for any equipment, system, system component, or any other component of the Work that are subject to an extended warranty in accordance to Article 17.A.3.

5. Within three (3) Days after receipt by the Contractor of notice specifying a failure of any of the Work to satisfy the Contractor's Warranties, the Owner will consult with the Contractor to determine when and how the Contractor shall remedy such failure; provided, however, that in case of an emergency requiring immediate curative action, the Contractor shall implement such action as it deems necessary and shall notify the Owner of the urgency of an expedited decision by the close of the following Business Day. The Contractor and the Owner shall agree on such remedy as soon as reasonably practicable. If the Contractor does not use diligent efforts to proceed promptly to effectuate such remedy within the agreed time, or should no such agreement be reached within such 3-Day period (or immediately, in the case of emergency conditions), the Owner, after notice to the Contractor, shall have the right to perform or have performed by third parties the necessary remedy, and the costs thereof shall be borne by the Contractor. In the event the Owner performs or causes to be performed such corrections and repairs, then the Contractor shall reimburse the Owner for all costs associated therewith within 7 Days after written demand from the Owner.

6. The Contractor shall bear all costs of correcting any Work that fails to meet the standards set forth in this Article, including additional testing and inspections, and shall be responsible for all costs associated with the repair of any damage to the Project or to the property of the Owner or of Work performed by Separate Contractors caused by such failure.

7. The Contractor's Warranties shall apply to all corrected and/or repaired Work performed hereunder. The Warranties with respect to such Work shall remain in effect with respect to each corrected and/or repaired element of the Work until the later of: (a) one year after acceptance by the Owner of such corrected and/or repaired Work; or (b) expiration of the applicable Warranty period as set forth in Section A(2) above.

8. Nothing contained in this Article shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the one year Warranty period specified in Section A(2) above relates only to the specific obligation of the Contractor to correct the Work and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work if it provides for a longer warranty duration.

ARTICLE 18 - APPLICABLE LAW

A. Compliance with Laws: The Contractor shall comply with all local, state and federal laws, rules, ordinances and regulations applicable to this Contract and to the Work to be performed hereunder, and shall obtain at his own expense all permits, licenses or other authorizations necessary for the prosecution of the Work (except for Virginia Department of Transportation permits, Fairfax County street permits, building permit(s), easement agreements for the Project) and shall protect and indemnify Fairfax Water and the Engineer and their employees, Members, officers and Authorized Representatives against any claim or liability arising from or based on the violation of any such laws, rules, ordinances and regulations, whether by himself, his employees, or his Subcontractors.

B. Legal Provisions Deemed Included: Each and every provision of any law required by law to be inserted in this Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though it were included herein and if, through mistake or otherwise, any such provision is not inserted or is not correctly inserted, then upon application of either party the Contract shall forthwith be physically amended to make such insertion.

C. Governing Law and Policy: This Contract shall be governed by and construed in accordance with the laws of the Commonwealth of Virginia without reference to conflict of law principles.

ARTICLE 19 - NON-DISCRIMINATION

A. Employment Discrimination Prohibited:

1. During the performance of this Contract, the Contractor:

a. Shall not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin, except where religion, sex or national origin 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. Will state that he is an equal opportunity employer in all solicitations or advertisements for employees placed by or on behalf of the Contractor.

c. Accepts that all notices, advertisements and solicitations placed in accordance with federal laws, rules or regulations shall be deemed sufficient for the purpose of meeting the requirements of this section.

d. Fairfax Water does not discriminate against faith-based organizations on the basis of the organization's religious character, or impose conditions that (i) restrict the religious character of the faith-based organizations, except as provided by law, or (ii) impair, diminish or discourage the exercise of religious freedom by the recipients of goods, services or disbursements.

2. The Contractor shall include the provisions of the foregoing paragraphs 1.a, b, c and d in every subcontract or purchase order of over $10,000, in order that the provisions contained therein will be binding upon each such Subcontractor or vendor.

ARTICLE 20 - CONTRACTOR'S EMPLOYEES AND DRUG-FREE WORKPLACE

A. Character and Competency:

1. The Contractor represents that it is a duly organized and licensed entity which employs qualified and experienced personnel who specialize in performing the type of construction services required hereunder. The Contractor agrees to provide a sufficient number of personnel who are suitably qualified and experienced and who are in all respects acceptable to Fairfax Water to perform the Work in an efficient and timely manner. The Contractor represents that it is capable in all respects (including the possession of sufficient financial resources to provide fully for the payment of employees) of performing the Work and agrees to provide construction services of high quality. The Contractor agrees to diligently and conscientiously devote its resources to the performance of the Work. Fairfax Water, upon Notice to the Contractor, and in Fairfax Water's sole discretion, will have the right to direct the Contractor to remove an employee permanently from the site for any reason.

2. All personnel will present a neat appearance and will conduct work in a professional manner with minimum disturbance to Fairfax Water's normal operations. If any of the contractor's personnel are not satisfactory to Fairfax Water the contractor shall replace same with satisfactory personnel. All job-site personnel shall be United States Citizens, or aliens properly documented and permitted to work in accordance with Immigration and Naturalization Service regulations.

3. Alcoholic beverages, firearms and illegal drugs are prohibited on the Site.

B. Superintendence: The Contractor shall have a competent, experienced, and reliable foreman or superintendent, acceptable to Fairfax Water, who shall serve as the Contractor's authorized representative at the site and shall have authority to act on behalf of the Contractor (the "Superintendent"). The Superintendent shall have full authority to supply material and labor immediately. He shall keep on hand at all times copies of the Contract Documents. Notice or communication to the Superintendent shall be equivalent to notice or communication to the Contractor. The Superintendent shall follow without delay all instructions of Fairfax Water in the prosecution and completion of the Work.

C. Payroll Reports: At the request of Fairfax Water, the Contractor and each Subcontractor shall furnish a duly certified copy of his payroll records as well as any other information required to document the Contractor's compliance with the provisions of the law as to the hours of employment and rates of wages. Neither the Contractor nor his Subcontractors shall include on their payrolls persons not employed by them.

D. Contractor's Warranties: In consideration of and to induce the award of this Contract to him, the Contractor represents and warrants to Fairfax Water as follows:

1. He is not in arrears to Fairfax County or to Fairfax Water upon any debt or contract, and he is not in default, as surety, contractor, or otherwise;

2. He is financially solvent and sufficiently experienced and competent to perform the Work;

3. The Work can be performed as called for by the Contract Documents;

4. The facts stated in his Bid and the information given by him is true and correct in all respects;

5. He is fully informed regarding all the conditions affecting the Work to be performed and labor and materials to be furnished for the completion of this Contract; and that his information was secured by personal investigation and research.

E. Drug-Free Workplace Requirement: During the performance of the 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. For purposes hereof, a “drug-free workplace” shall mean the site for the performance of the Work.

ARTICLE 21 – FREIGHT CLAIMS

A. Fairfax Water shall not accept responsibility for the processing and/or filing of freight or other shipping claims, and shall not accept any charges relating thereto. Any Commodity that is damaged or lost during shipment shall be replaced promptly by Contractor at no additional cost to Fairfax Water.

ARTICLE 22 – TAX EXEMPTION

A. Although Fairfax Water is exempt from, and will not pay any, federal, state or local taxes which may be applicable to the transactions contemplated by these Contract Documents, including without limitation any Federal Excise Tax, Transportation Tax or Virginia Sales and Use Tax, nothing

contained herein shall be deemed to confer upon the Contractor any rights to or benefits of tax exempt status under federal or state law. The Contractor shall not claim entitlement to the benefits of tax exempt status based solely upon its contractual relationship with the Owner.

EXHIBITS TO THE GENERAL CONDITIONS

Payment Breakdown

Application and Certificate for Payment

Record of Minor Change

Clarification

Work Order

Request for Change Proposal (RCP)

Contract Change Order

Certificate of Beneficial Use

Certificate of Final Completion

Consent of Surety Company to Final Payment

Final Payment Affidavit and Release of Claims

Subcontractor Qualification Form

Change Order Proposal

Proposed Change Order

END OF SECTION 00700

SECTION 00800
SUPPLEMENTARY CONDITIONS

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Related Requirements

B. Supplements

1.02 RELATED REQUIREMENTS

A. The following supplements modify, delete from, or add to the General Conditions (Section 00700) of these contract documents.

B. Except as modified or amended by these Supplemental Conditions, the remaining provisions of the General Conditions remain in effect.

1.03 SUPPLEMENTS

A. General

1. All references in the General Conditions to Section 01200, Price and Payment Procedures shall be deemed to refer to "Section 01200, Measurement and Payment."

B. Definitions

1. The definition of "CONTRACT PERIOD" in Article 1 of the General Conditions is replaced with the following:

   "CONTRACT PERIOD" shall mean the period of time during which this Contract shall be in effect and shall consist of the Original Period and any one or more Renewal Periods, as defined in Section 00200 1.23 CONTRACT TERM AND RENEWAL.

2. The definition of "CONTRACT SUM" in Article 1 of the General Conditions is replaced with the following:

   "CONTRACT SUM" shall mean the amount payable to the Contractor as full and final compensation for Work assigned by Owner to the Contractor hereunder. A Contract Sum shall be established with respect to each individual task or project assigned hereunder and shall be calculated in the manner specified in these Contract Documents using the Unit Prices set forth in the Contractor's Bid Form. A Contract Sum may be adjusted in accordance with the Contract Documents.

3. The following new definition is added to Article 1 of the General Conditions:

   "PROJECT DURATION " shall mean the total number of days specified in the Instructions to Bidders for completion of an individual Project assigned by the Owner to the Contractor during the Contract Period. The Project Duration may be adjusted from time to time in accordance with Article 8 of the General Conditions.

4. References to the term "Contract Period" within the definitions of "CHANGE ORDER" and "NOTICE TO PROCEED" will be deemed to refer to "Project Term."

5. Insert the following text at the end of the definition of “WORK” in Article I of the General Conditions:

   The Owner and the Contractor recognize that all Work to be performed hereunder will be assigned by the Owner to the Contractor during the Contract Period as individual tasks or projects. As employed herein, the term “Work” generally refers to all Work associated with such an individual task or assignment.

C. Time Provisions

1. Each reference to the term “Contract Period” in Articles 7, 8, and 13 of the General Conditions will be deemed to refer to the Project Duration associated with a task assigned to the Contractor by the Owner under this Contract.

2. Replace the first sentence of Article 8, Paragraph A.1. of the General Conditions with the following:

   The Contractor must commence the Work (including Work associated with emergency repairs) within the timeframes set forth in the Contract Documents.

3. The time for completion set forth in the Instructions to Bidders includes provisions for weather delays associated with normal climatic conditions. The Contractor shall not be permitted any additional time, except as allowed under Article 8, part C of the General Conditions.

D. Termination

1. Insert the following additional clauses after Paragraph F.1.h of Article 9 of the General Conditions:

   a. The Contractor fails to mobilize and commence any Work within the timeframe required in the Contract Documents (including the timeframe required for responding to emergency repairs under Paragraph 1.02.A.4 of Section 01110, Summary of Work; or

   b. The Contractor fails to achieve beneficial use or final completion of any Work assigned hereunder in accordance with the timeframes established in accordance with Section 1.20 of the Instructions to Bidders;

END OF SECTION 00800

NO TEXT THIS PAGE

SECTION 00850
FAIRFAX COUNTY WATER AUTHORITY

ESCROW AGREEMENT

THIS AGREEMENT, made and entered into this ____ day of _____ 20___, by, between and among the **FAIRFAX COUNTY WATER AUTHORITY** ("FW"), _____ (the "Contractor"), and _____, a trust company,
(Name and Address of Bank)
bank, or savings institution with a principal office located in the Commonwealth of Virginia (the "Bank") and _____ (the "Surety") provides:

I. FW and the Contractor have entered into a contract with respect to a _____ (the "Contract"). This Agreement is pursuant to, but in no way amends or modifies the Contract. Payments made hereunder or the release of funds from escrow shall not be deemed approval or acceptance of performance by the Contractor.

II. In order to assure full and satisfactory performance by the Contractor of its obligations under the Contract, FW is required thereby to retain certain amounts otherwise due the Contractor. The Contractor has, with the approval of FW, elected to have these retained amounts held in escrow by the Bank. This agreement sets forth the terms of the escrow. The Bank shall not be deemed a party to, bound by, or required to inquire into the terms of, the Contract or any other instrument or agreement between FW and the Contractor.

III. FW shall, from time to time pursuant to the Contract, pay the Bank amounts retained by it under the Contract. Except as to amounts actually withdrawn from escrow by FW, the Contractor shall look solely to the Bank for the payment of funds retained under the Contract and paid by FW to the Bank.

The risk of loss by diminution of the principal of any funds invested under the terms of this Contract shall be solely upon the Contractor.

Funds and securities held by the Bank pursuant to this Escrow Agreement shall not be subject to levy, garnishment, attachment, lien or another process whatsoever. The Contractor agrees not to assign, pledge, discount, sell or otherwise transfer or dispose of his interest in the escrow account or any part thereof, except to the Surety with notice to FW.

IV. Upon receipt of checks or warrants drawn by FW and made payable to it as escrow agent, the Bank shall promptly notify the Contractor, negotiate the same, deposit or invest and reinvest the proceeds in approved securities in accordance with the written instructions of the Contractor. In no event shall the Bank invest the escrowed funds in any security not approved.

V. The following securities, and none other, are approved securities for all purposes of this Agreement:

(1) United States Treasury Bonds, United States Treasury Notes, United States Treasury Certificates of Indebtedness or United States Treasury Bills.
(2) Bonds, notes and other evidences of indebtedness unconditionally guaranteed as to the payment of principal and interest by the United States.
(3) Bonds or notes of the Commonwealth of Virginia.
(4) Bonds of any political subdivision of the Commonwealth of Virginia, if such bonds carried, at the time of purchase by the Bank or deposit by the Contractor, a Standard and Poor's or Moody's Investors Service rating of at least "A", and
(5) Certificates of deposit issued by commercial banks located within the Commonwealth of Virginia, including, but not limited to, those insured by the Bank and its affiliates.

(6) Any bonds, notes, or other evidences of indebtedness listed in Section V. (1) through (3) may be purchased pursuant to a repurchase agreement with a bank, within or without the Commonwealth of Virginia having a combined capital, surplus and undivided profit of not less than $25,000,000, provided the obligation of the Bank to repurchase is within the time limitations established for investments as set forth herein. The repurchase agreement shall be considered a purchase of such securities even if title, and/or possession of such securities is not transferred to the Escrow Agent, so long as the repurchase obligation of the Bank is collateralized by the securities themselves, and the securities have the date of the repurchase agreement at a fair market value equal to at least 100% of the amount of the repurchase obligation of the Bank, and the securities are held by a third party, and segregated from other securities owned by the Bank.

(7) No security is approved hereunder which matures more than five years after the date of its purchase by the Bank or deposit by the Contractor.

VI. The Contractor may from time to time withdraw the whole or any portion of the escrowed funds by depositing with the Bank approved securities in an amount equal to, or in excess of, the amount so withdrawn. Any securities so deposited or withdrawn shall be valued at such time of deposit or withdrawal at the lower of par or market value, the latter as determined by the Bank. Any securities so deposited shall thereupon become a part of the escrowed fund.

Upon receipt of a direction signed by the General Manager of FW, the Bank shall pay the principal of the fund, or any specified amount thereof, to FW.

VII. For its services hereunder the Bank shall be entitled to a reasonable fee in accordance with its published schedule of fees or as may be agreed upon by the Bank and the Contractor. Such fee and any other costs of administration of this Agreement shall be paid from the income earned upon the escrowed fund and, if such income is not sufficient to pay the same, by the Contractor.

VIII. The net income earned and received upon the principal of the escrowed fund shall be paid over to the Contractor in quarterly or more frequent installments. Until so paid or applied to pay the Bank's fee or any other costs of administration such income shall be deemed a part of the principal of the fund.

IX. The Surety undertakes no obligation hereby but joins in this Agreement for the sole purpose of acknowledging that its obligations as surety for the Contractor's performance of the Contract are not affected hereby.

[SIGNATURES ON FOLLOWING PAGE]

IN WITNESS WHEREOF, FW, the Contractor, the Bank and the Surety have caused their duly-authorized representatives to execute this Escrow Agreement as of the day and year first written above.

FAIRFAX WATER

By: _____
Jamie Bain Hedges
General Manager

_____
CONTRACTOR

By: _____
Name: _____
Title: _____

_____
BANK

By: _____
Name: _____
Title: _____

_____
SURETY

By: _____
Attorney-in-fact

NO TEXT THIS PAGE

SECTION 00900

ADDENDA

PART 1 - GENERAL

1.01 Addenda, if issued, shall be inserted following this page. Addendum No. 1 will begin on page 00910-1, Addendum No. 2 will begin on page 00920-1, etc.

END OF SECTION 00900

NO TEXT THIS PAGE

SECTION 01110

SUMMARY OF WORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Description of Work

B. Progress of the Work

C. Contractor Use of Site and Premises

D. Intent of Contract Documents

E. Copies of Contract Documents Furnished to Contractor

F. Supplemental Drawings

G. Coordination

1.02 DESCRIPTION OF WORK

A. Project Scope: The Work generally consists of the installation of new ductile iron pipe (DIP) potable water mains ranging from 4 inches through 16 inches in diameter, installation of commercial or domestic water services, and the replacement or repair of existing water system facilities and other work as described herein. The Work will largely take place in residential neighborhoods. Connections to existing water mains and scheduled or emergency replacement or repair of existing water mains may be required on pipe of various materials up to and including 84 inches in diameter. The Work included in this Contract will be authorized by the Owner under individual Purchase Orders for separately identified Projects at various times during the Contract Period.

1. Qualifications of Crew: The water main installation crew shall meet the experience requirements listed in Section 1.04(J) of Section 02510 and Section 00400, Part B Qualifications of Crews.

2. Quantity of Work; Required Crews: The actual quantity of Work to be performed will depend upon the actual requirements of the Owner during the Contract Period. The Owner will be the sole judge of Work to be awarded under this Contract. Since the volume of Work will vary, The Contractor shall be required to furnish six (6) complete, qualified pipelaying crews for the simultaneous performance of the Work at such times and for such duration as may be specified by Fairfax Water. During periods of maximum workload, the Owner may request, and the Contractor will be required to furnish, up to two (2) additional Qualified Water Main Installation Crews, for a total of eight (8) Qualified Water Main Installation Crews for performance of the Work at such times and for such durations as may be specified by the Owner. One of the Qualified Water Main Installation Crews shall have previous experience installing water main greater than 16 inches in diameter and a subcontractor may be used to meet this requirement. When required, the Contractor shall furnish a Qualified Water Main Installation Crew which is fully qualified and meets all regulatory requirements, including medical examinations, to work in areas with naturally-occurring asbestos or make emergency repairs or tie-ins to asbestos cement pipe at no additional cost. Contractor responsibility will remain in effect as called for under terms of this Contract. The Contractor shall accept all projects to a

maximum total workload which can be performed utilizing all of the qualified crews required above.

3. Emergency Repairs: The Work includes all emergency repairs required by the Owner during the Contract Period. The Contractor shall make available to the Owner, on a 24-hour basis during the Contract Period, such portion of his labor force, materials and equipment as may be required by the Owner for the purpose of making, or assisting in, repairs to water mains and other facilities owned and operated by the Owner. For emergency repairs, the Contractor shall furnish a Qualified Water Main Installation Crew. The Contractor shall mobilize and furnish all labor, materials and equipment with respect to emergency repairs and shall give highest priority and continuing attention to such Work until the repairs and improvements have been completed to the Owner's satisfaction. The Contractor shall respond and be mobilized on site within 4 hours upon notice from the Owner. The 4 hour requirement applies to any time during the day or night, seven days per week. Payment for Emergency Repairs will be at the Emergency Work unit prices established in the Bid Form.

4. Scheduled Repairs: Repairs which are scheduled to occur beyond the 4-hour response time required for Emergency Repairs, shall be paid for at the actual cost, plus applicable contract markups and not under the Emergency Work unit price.

5. Payment for Work: Payment for Work will be based on the types and quantities of Work performed for the Owner during the Contract Period, as authorized by the Owner. Payment for Work performed will be calculated in accordance with Section 01200 and the unit prices set forth in the Contractor's Bid Form (Section 00400). No separate payment will be made to the Contractor for crew availability.

B. Work included: The Contractor shall furnish all labor, superintendence, materials (except for materials provided by the Owner), plant, power, light, heat, fuel, water (except for initial pressure testing and disinfection), tools, appliances, equipment, supplies, and other means of construction necessary or proper for performing and completing the Work, including all emergency repairs. The Contractor shall obtain and pay for all required permits, except the VDOT, City of Fairfax and City of Falls Church permits, which will be obtained by the Owner. The Contractor shall protect the Work during construction. The Contractor shall perform and complete the Work consistent with safety of life and property and in strict accordance with the Contract Documents. The Contractor shall clean up the Work and shall maintain it during and after construction, and shall do all Work and pay all incidental costs during and after construction. The Contractor shall repair, restore and clean structures and property that may be damaged or disturbed during the performance of the Work, at no additional cost to the Owner. Contractor to comply with all Fairfax Water standard details and approved products, if applicable.

C. Contractor's Plant and Equipment: The Contractor shall be solely responsible for the adequacy of his plant and equipment.

1.03 PROGRESS OF THE WORK

A. Term of Contract and Contract Renewal: The Contract awarded as a result of this solicitation will be effective during the Original Period and will be subject to renewal as set forth herein. The Owner reserves the unilateral option to renew the term of the Contract for up to two additional Renewal Periods, subject to the terms and conditions specified herein. Notification of renewal shall be by the issuance of a renewal purchase order. Failure to renew by the expiration date of the then current contract year will not automatically cancel the Contract. The Owner may retroactively renew the contract at any time prior to the last day of the following contract year provided that the Owner has not formally canceled the contract(s).

B. Project Term: All Work shall be executed at such times and in or on such parts of the Project, and with such forces, material and equipment, as to assure the satisfactory completion of the Work within the Project Term established in accordance with the Contract

Documents. Additionally, the Contractor shall, at all times, schedule and direct his Work so that it provides an orderly progression of the Work to completion within the specified Project Term.

C. Start of Work: Except for Work involving emergency repairs, all Work on the individually assigned projects will begin within 10 days after the issuance of Notice to Proceed or as otherwise agreed to by Owner and in accordance with the project schedule developed in the scheduling and progress meetings with the Owner's personnel. Emergency repairs will commence within the timeframe set forth in Paragraph 1.02.A.3 of this Section.

1.04 CONTRACTOR'S USE OF SITE AND PREMISES

A. Unfavorable Construction Conditions: During unfavorable or inclement weather, wet ground, low visibility, or other unsuitable construction conditions, the Contractor shall stop work completely or if approved by the Fairfax Water inspector, shall confine his operations to Work which will not be adversely affected by such conditions while ensuring that no portion of the Work is constructed under conditions which would adversely affect the safety of the public or quality of work. The Contractor shall, however, maintain suitable all-weather access to all portions of the Work Site. Contractor is fully responsible for the safety of the project site and shall take all measures to eliminate hazards on site or as directed by the Owner.

B. Site Administration: The Contractor shall be responsible for all areas of the Site used by him and all subcontractors in the performance of the Work. He shall exert full control over the actions of all employees and other persons in the use and preservation of property and existing facilities except such controls as may be specifically reserved for the Owner or others. The Contractor may require all persons on the Site to observe the same regulations as he requires of his employees and representatives. Owner's employees, Authorized Representatives, Consultants, the Engineer and the Engineer's employees will not be subject to the provisions of this paragraph.

1.05 INTENT OF CONTRACT DOCUMENTS

A. Contract Documents Complementary: All Work called for in the Contract Documents applicable to this Contract, but not shown in the Drawings, or shown in the Drawings and not specifically called for in the Specifications, shall be of like effect as if shown or mentioned in both. Work not specified in either the Drawings or in the Specifications, but involved in carrying out their intent or in the complete and proper execution of the Work, is required, and shall be performed by the Contractor as though it were specifically delineated or described.

B. Omission or Silence of Contract Documents: The apparent silence of the Contract Documents as to any detail, or the apparent omission from them of a detailed description concerning any Work to be performed or materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only materials and Workmanship of the best quality are to be used and interpretation of these Specifications shall be made upon that basis.

1.06 COPIES OF DOCUMENTS FURNISHED TO CONTRACTOR

A. Number of Copies to be Furnished: The Contractor will be furnished, at no cost, up to 10 copies of the Contract Documents. Additional copies of Contract Documents when requested will be furnished to the Contractor at cost of reproduction.

B. Copies of Contract Documents for Subcontractors: The Contractor shall, without expense to the Owner, furnish each of the subcontractors, manufacturers, and materialmen such copies of the Contract Documents as may be required for his Work.

C. Record Copy of Contract Documents: The Contractor shall keep one record copy of all specifications, Drawings, Addenda, modifications, and shop drawings at the Contractor's office at the Site, if applicable, in good order and annotated to show all changes made during the construction process in accordance with Section 01780.

1.07 SUPPLEMENTAL DRAWINGS

A. Supplemental Drawings: When, in the opinion of the Owner, it becomes necessary to explain more fully the Work to be done, or to illustrate the Work further, or to show any changes which may be required, Drawings known as Supplemental Drawings with specifications pertaining thereto will be prepared by the Owner and up to 4 copies thereof will be given to the Contractor.

B. Clarification Procedure: The Contractor may request a clarification of the Drawings or Specifications from the Owner through the following procedure:

1. Forms: The standard clarification form shall be used. The upper portion of this form shall be completed and signed by the Contractor. The completed form shall be forwarded to the Owner for a response. The Contractor should indicate a preferred reply date.

a. The Owner will assign the clarification a sequential number.

b. The Owner will review the clarification with the appropriate parties if necessary.

c. The Owner will complete and sign the lower portion of the clarification.

d. A copy of the completed clarification will be returned to the Contractor.

e. The completed clarification distribution will be noted on the clarification form.

f. A copy of the completed clarification will be sent to the Owner.

2. Clarification Log: A clarification log will be maintained by the Owner and will be used to review the status of outstanding clarifications during each progress meeting.

1.08 COORDINATION

A. Contractor to Verify: The Contractor shall verify all dimensions, quantities and details shown on the Drawings and Supplemental Drawings, equipment, material, finishes, and other such listings or other data received from the Owner, and shall notify the Owner of all errors, omissions, conflicts and discrepancies. This shall not relieve the Contractor of full responsibility for unsatisfactory Work, faulty construction, or improper operation resulting therefrom, or from rectifying such conditions at his own expense. He shall not be allowed to take advantage of any errors or omissions. All equipment, materials, finishes, and other such listings are given for the convenience of the Owner and Contractor and are not guaranteed to be complete. The Contractor shall assume all responsibility for the making of estimates of the size, kind, and quality of materials and equipment included in Work to be done under the Contract.

1.09 COORDINATION WITH OTHER CONTRACTORS

A. The Owner has the right to employ other contractors at the Site of the any project authorized by the Owner hereunder. During the progress of the Work, separate contractors may be engaged in other work on the Project or on other projects at the site. In such event, the Contractor shall coordinate the Work to be done hereunder with the work of any separate contractors.

1.10 SATISFACTORY COMPLETION OF WORK

A. All Work, whether it be within a highway right-of-way, neighboring jurisdictions, or private easements, shall be completed to the satisfaction of the Owner. It is hereby understood that the Owner shall be the final approving body as to the acceptability of the Work, regardless of prior approval from other jurisdictions.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION 01110

SECTION 01140

LIMITATIONS ON SEQUENCE OF CONSTRUCTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Operation of Existing Facilities

B. Limitation of Sequence of Construction

1.02 RELATED SECTIONS

A. Section 01320 - Construction Schedule

1.03 OPERATION OF EXISTING FACILITIES

A. The work under this project shall be so conducted that the Owner's existing facilities will be maintained in full operation at all times except for operation interruptions provided for under this section.

B. The Contractor shall keep the Owner fully advised by prior written documentation as to his proposed plans for carrying out the work and obtain the Owner's prior approval for all phases of his operations as hereinafter specified.

C. Any temporary structures, connections, piping, and other work necessary to maintain service during the construction period shall be made as a part of the work.

D. All work shall be performed with care to avoid damage to existing structures and equipment. Before starting work on any modifications to existing facilities, the Contractor shall submit a plan to the Owner for approval, comprising a detailed sequence of operations for these modifications and complete details of temporary facilities which demonstrates that operation of these existing facilities will be maintained. All construction shall be in accordance with the schedule accepted per Section 01320. At no time shall the service performed by any operating pipeline, equipment or structures be interrupted without specific prior approval of the Owner.

E. Temporary facilities and equipment shall be provided as required and directed to maintain pipelines, equipment, systems, processes, auxiliaries, appurtenances and structures in service. Any temporary work not required after completion of the final work shall be promptly removed.

F. All costs associated with maintaining the existing facilities in operation shall be included and no separate payment will be made therefor.

G. The Contractor shall not operate or adjust the operation of any existing facility except under the specific direction of the Owner.

H. The Contractor shall at all times maintain Owner access to sample stations and areas that must be accessed for facility operations.

1.04 LIMITATIONS ON SEQUENCE OF CONSTRUCTION

A. In accordance with the requirements of Section 01320 – Construction Schedule, the Contractor shall prepare and submit a comprehensive schedule of his proposed sequence of construction of the various parts of the project for review by the Owner.

B. The Contractor is cautioned that his schedule for certain areas of the work may be affected by work included under other contracts.

C. The schedule shall identify and allow for all necessary coordination with such other contractor, as may be performing work in the proposed area of construction.

D. The work under this contract shall also be accomplished while the existing facility is maintained in operation. Any work which affects the existing facility must be carried out so that operation of the existing facility will not be jeopardized or materially reduced in efficiency as a result of the work.

E. The Contractor may be required to utilize two crews in order to complete interconnections and tie-ins simultaneously.

F. The Contractor shall submit, for approval by Owner, a detailed plan for all facility shutdowns and tie-ins of new work. Contractor shall notify the Owner at least 10 days in advance of an approved shutdown and/or tie-in.

G. Any temporary structures, connections, piping and other work necessary to maintain service during the construction period shall be provided and made as part of the work under and no separate payment will be made therefor.

H. Work on this Contract shall be coordinated with the operation of the facility. The Contractor shall notify the Owner of the Contractor's planned procedures for each specific alteration of existing facilities before the alteration begins. The Contractor shall not begin any alteration until specific permission has been granted by the Owner in each case and shall provide the Owner with sufficient advance notice as not to impact the Contractor's schedule. The making of connections to existing facilities or other operations that interfere with the operation of the existing equipment shall be completed within the time frames specified herein.

I. Authorized Owner personnel will perform all operations for the operational functions of the existing facilities identified as necessary to facilitate the Work of the Contractor and approved by the Owner.

J. If it is necessary for proper operation or maintenance of the existing facilities, the Contractor shall reschedule his operations, at no additional cost, so that his work will not conflict with necessary operation or maintenance of the facility. Such rescheduling shall not be cause for a time extension except as provided for in Article 8 of the General Conditions.

K. The Contractor shall maintain safe passage through all access roads to existing facilities and to all parts of existing facilities.

L. The Owner shall be the sole judge of when the Contractor's operations are causing interference with existing facility operations, and his orders and instructions shall be carried out without delay.

M. The Contractor is required to perform certain functions in an order which will allow the existing facilities to remain in operation and to allow other facilities to be completed on schedule. The requirements specified herein shall be incorporated into the Contractor's sequence of construction and shall apply at all times, except as may be modified in writing by the Owner.

END OF SECTION 01140

SECTION 01200

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Measurement Authority

B. Unit Quantities Specified

C. Schedule of Contract Items

D. Payment

E. Defect Assessment

F. Non-Payment for Rejected Work

1.02 MEASUREMENT AUTHORITY

A. Measurement: The Owner will take all measurements and compute quantities accordingly.

B. Assistance: Assistance to the Owner's Representative in the form of necessary equipment and qualified personnel shall be provided as required for taking measurements.

1.03 UNIT QUANTITIES SPECIFIED

A. Quantities: Quantities and measurements indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements supplied or placed in the Work and verified by the Owner's Representative and recorded in his daily report shall determine the payment.

B. Actual Work: If the actual Work requires more or fewer quantities than those quantities indicated, the required quantities shall be provided at the unit prices contracted.

C. Units of Work: The intention of the unit prices is to provide a complete, functioning unit which may include Work from several Specification Sections. All the Work which is required, or which can reasonably be inferred to be required in a unit price item to deliver a complete, functioning unit shall be included.

1.04 DEFINITION OF BID ITEMS

A. "Lump Sum": The price bid for each Lump Sum Contract Item shall include all costs in connection with the proper and successful completion of the Work, including furnishing all materials, equipment, supplies and appurtenances; providing all construction plant equipment and tools; and performing all necessary labor and supervision and training to fully complete the Work. All Work not specifically set forth as a Contract item in the Bid Form shall be considered a subsidiary obligation of the Contractor and all costs in connection therewith shall be included in the prices bid.

B. "Bid Allowance": Contract Items in the Bid Form that are designated "Bid Allowance" cover certain items of work that will be paid for separately from other Contract items. Payment will be made to the Contractor by the Owner for actual costs invoiced to the Contractor for services plus allowable contract mark-ups and other items selected by the Owner as defined herein and under each Bid Allowance item. A change order may be issued for the work associated with each Bid Allowance item to adjust the contract amount based on the difference between the

actual costs and the Bid Allowance amount. Contractor shall submit original invoices from suppliers to support requests for payment for all bid allowance items.

1.05a ALLOWANCE REQUIREMENTS

A. At the earliest feasible date after Contract Award, advise the Owner of the date when the final selection and purchase of each product or system described by an allowance must be completed in order to avoid delay in performance of the Work.

1. When requested by the Owner, obtain a minimum of three proposals for each allowance for use in making final selections; include recommendations that are relevant to performance of the Work.

2. Purchase products and systems as selected by the Owner from the designated supplier.

B. Submit proposals for purchase of products or systems included in allowances in the form specified for Change Order.

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

D. Inspect products covered by an allowance promptly upon delivery for damage or defects.

E. Coordinate materials and their installation for each allowance with related materials and installation to ensure that each allowance item is completely integrated and interfaced with related construction activities.

1.05b OWNER PROVIDED MATERIAL

A. See Section 02510 Water Main and Appurtenances

1.06 SCHEDULE OF UNIT PRICE

A. Item No. 1 – Rock Excavation
1. Work Includes: Excavating and disposing of rock, furnishing and installing select fill material for pipe bedding, in accordance with the requirements of Section 02315 Excavating, Backfilling and Compacting and when authorized by the Owner.
2. Unit of Measure: Cubic yards of rock removed based on the following criteria:
   a. Trench width in accordance with the requirements of Section 02315 for a given pipe size.
   b. Average rock depth per linear segment of trench to the nearest foot.
   c. Includes cement treated rock, soil cement and asphalt pavement in excess of 7.5-inches thick.
   d. Payment limited to the amount of rock required to be removed in accordance with Section 02315.

B. Item Nos. 2a and 2b – Flowable Fill
1. Item Description:
   a. No. 2a – Flowable Fill of Abandoned Water Mains
   b. No. 2b – Flowable Backfill
2. Work Includes:
   a. Furnish and install flowable fill concrete in accordance with the requirements of Section 02510 Water Main and Appurtenances, Section 03300 Cast in Place Concrete, the Drawings, and when authorized by the Owner.

b. Flowable Fill of Abandoned Water Mains, No. 2a includes equipment and materials necessary to pump flowable fill through abandoned pipeline and tapping existing water main for air release.
c. Excavation is included under Item Nos. 28d through 28f – Standard Connection Type II (No. 2a) and Item Nos. 20 through 25 – Water Main Installation (No. 2b).

3. Unit of Measure: Cubic yards of flowable fill concrete installed.

C. Item No. 3 – Class C Concrete

1. Work Includes: Furnish and install class C concrete in accordance with the requirements of Section 02510 Water Main and Appurtenances, Section 03300 Cast in Place Concrete, and the Drawings. Included are pipe cradles, sanitary sewer pipe supports, encasements, and additional class C concrete for special structures.
2. Unit of Measure: Cubic yards of class C concrete installed.
3. No payment will be made for concrete placed outside lines and grades shown, to fill unauthorized excavation, or for thrust anchors for fittings.

D. Item No. 4 – 2-inch Asphalt Concrete Trail Surface Course Removal and Replacement

1. Work Includes:
   a. Removal of existing asphalt trail and furnishing and installing 2 inches VDOT SM-2A Asphalt and 4 inches VDOT 21A Stone with geotextile liner.
   b. Saw cutting and removal and disposal of all required asphalt concrete surfaces.
2. Unit of Measure: Square yards of asphalt concrete placed.
   a. Pavement limits for payment are in accordance with the requirements of Section 02700 or as shown on the Drawings.
3. No payment will be made for pavement placed beyond the limits specified or shown.

E. Item Nos. 5a and 5b Temporary Asphalt Pavement – Hot Mix

1. Item Description:
   a. No. 5a – 2-inch thickness
   b. No. 5b – 3-inch thickness
2. Work Includes: Furnish and install temporary asphalt surface course (SM-9.5) in accordance with the requirements of Section 02700 Paving and Surfacing and as shown on the Drawings or directed by the Owner.
3. Unit of Measure: Square yards of temporary pavement installed.
   a. Pavement limits for payment are in accordance with the requirements of Section 02700 or as ordered by the Owner.
   b. For use on Secondary Roads, per VDOT Roads and Bridges Specification.
4. No payment will be made for temporary pavement installed beyond the limits specified.

F. Item Nos. 6a through 6d – Permanent Pavement, 7.5-inch Base Course

1. Item Description:
   a. No. 6a – 7.5-inch Asphalt Concrete Base Course Pavement on any Fairfax Water project less than 50 square yards
   b. No. 6b – 7.5-inch Asphalt Concrete Base Course Pavement on any Fairfax Water project 50 square yards to 450 square yards
   c. No. 6c – 7.5-inch Asphalt Concrete Base Course Pavement on any Fairfax Water project greater than 450 square yards
   d. No. 6d – Additional Asphalt Concrete Base Course Pavement Placement in Areas Greater than 7.5 inches in Thickness
2. Work Includes:
   a. Furnish and install the required base course pavement thickness in accordance with the requirements of Section 02700 Paving and Surfacing and as shown on the Drawings or directed by the Owner. Removal of base material and temporary pavement shall be considered incidental to the items noted above.

b. Saw cutting, removal, and disposal of all required asphalt is included in the Water Main Installation pay items.

3. Unit of Measure: Square yards of asphalt concrete placed for Items 6a through 6c. Square yards per inch of asphalt concrete placed for Item 6d.
   a. Pavement limits for payment are in accordance with the requirements of Section 02700 or as shown on the Drawings.
4. No payment will be made for pavement placed beyond the limits specified or shown.

G. Item Nos. 7a through 7c – Permanent Pavement, 6-inch Base Course

5. Item Description:
   e. No. 7a – 6-inch Asphalt Concrete Base Course Pavement on any Fairfax Water project less than 50 square yards
   f. No. 7b – 6-inch Asphalt Concrete Base Course Pavement on any Fairfax Water project 50 square yards to 450 square yards
   g. No. 7c – 6-inch Asphalt Concrete Base Course Pavement on any Fairfax Water project greater than 450 square yards
6. Work Includes:
   c. Furnish and install the required base course pavement thickness in accordance with the requirements of Section 02700 Paving and Surfacing and as shown on the Drawings or directed by the Owner. Removal of base material and temporary pavement shall be considered incidental to the items noted above.
   d. Saw cutting, removal, and disposal of all required asphalt is included in the Water Main Installation pay items.
7. Unit of Measure: Square yards of asphalt concrete placed for Items 7a through 7c.
   b. Pavement limits for payment are in accordance with the requirements of Section 02700 or as shown on the Drawings.
8. No payment will be made for pavement placed beyond the limits specified or shown.

H. Item Nos. 8a through 8c – 1.5-inch Pavement Milling of Existing Surfaces

1. Item Description:
   a. No. 8a – 1.5-inch Pavement Milling of Existing Surfaces on any Fairfax Water project less than 150 square yards.
   b. No. 8b – 1.5-inch Pavement Milling of Existing Surfaces on any Fairfax Water project 150 square yards to 1,500 square yards.
   c. No. 8c – 1.5-inch Pavement Milling of Existing Surfaces on any Fairfax Water project greater than 1,500 square yards.
2. Work Includes:
   a. Mobilization and related work in accordance with Section 01500.
   b. Pavement milling of existing surfaces in accordance with Section 02700 and where designated by the Owner.
3. Unit of Measure: Square yards of pavement milling.
4. No payment will be made for pavement milled beyond the limits ordered by the Owner

I. Item Nos. 9a through 9d – 1.5-inch Asphalt Concrete Surface Course Pavement Overlay and Speed Control Facilities

1. Item Description:
   a. No. 9a – 1.5-inch Asphalt Concrete Surface Course Pavement Overlay on any Fairfax Water project less than 15 tons.
   b. No. 9b – 1.5-inch Asphalt Concrete Surface Course Pavement Overlay on any Fairfax Water project 15 tons to 120 tons.
   c. No. 9c – 1.5-inch Asphalt Concrete Surface Course Pavement Overlay on any Fairfax Water project greater than 120 tons.
   d. No. 9d – Speed Bumps, Speed Humps, and Speed Tables
2. Work Includes:

a. Mobilization and related work in accordance with Section 01500.
b. Items 9a through 9c: Furnish, place, and compact pavement overlay in accordance with Section 02700 and where designated by the Owner.
c. Item 9d: All materials, equipment, and labor to replace in-kind an existing speed bump, speed hump, or speed table. Item 8d shall include all paint/striping pertaining to the speed control facility, including paint on the speed control facility and any striping (chevron pattern or otherwise) leading up to the speed control facility. Payment will be based on one lane width, up to 15 feet wide. Work shall follow VDOT Road and Bridge Standards.

3. Unit of Measure:
   a. Items 9a through 9c: Tons of pavement overlay.
   b. Item 9d: Per Each speed bump, speed hump, or speed table installed complete.
4. No payment will be made for pavement placed beyond the limits ordered by the Owner.

J. Item No. 10 – Aggregate Surfaces
1. Work Includes: Furnish and install aggregate in accordance with Section 02700, the Drawings, and where designated by the Owner to restore road shoulders, driveways and trails.
2. Unit of Measure: Cubic yards of aggregate installed in accordance with the requirements of Section 02700.
3. No payment will be made under this item for aggregate installed beyond the limits defined in Section 02700.

K. Item No. 11 – Sodding
1. Work Includes: Furnish and install sod in the areas designated by the Owner and where shown on the Drawings in accordance with Section 02920 Lawns and Grasses.
   a. All preparation, topsoil, fertilizer, watering and other requirements specified in Section 02920 shall be included in the unit price.
   b. All maintenance and watering required until acceptance by the Owner in accordance with the requirements of Section 02920 shall be included in the unit price.
2. Unit of Measure: Square yards of sod installed within the limits defined in Section 02920, as shown on the Drawings and as ordered in writing by the Owner, includes 3-inches of topsoil.
3. No payment will be made for sod installed beyond the limits defined in Section 02920 and above.

L Item No. 12 – Seeding and Fertilizing
1. Work Includes: Furnish and install seed, fertilizer and mulch in the areas designated by the Owner and where shown on the Drawings in accordance with the requirements of Section 02920.
   a. All preparation, topsoil, fertilizer, mulch, watering and other requirements specified in Section 02920 shall be included in the unit price.
   b. All protection, maintenance and watering required until acceptance by the Owner in accordance with the requirements of Section 02920 shall be included in the unit price.
2. Unit of Measure: Square yards of seed installed within the limits defined in Section 02920 and as ordered in writing by the Owner, includes 4-inches of topsoil.
3. No payment will be made for seed installed beyond the limits defined in Section 02920 and above.

M. Item Nos. 13a through 13c – Concrete Sidewalk, Driveway, Valley Gutter, and Curb Cut Ramp Replacement
1. Item Description:
   a. No. 13a – Concrete Sidewalk Replacement.
   b. No. 13b – Concrete Driveway and Valley Gutter Replacement.
   c. No. 13c – Concrete Curb Cut Ramp (CG-12) Replacement.
2. Work Includes:

a. Furnish and install concrete in accordance with the requirements of VDOT and Section 03300, Cast in Place Concrete.
b. Price includes removal and disposal of existing concrete sidewalk, driveway, valley gutter, and curb cut ramp where required.

3. Unit of Measure:
   a. Square yards to the limits specified in Section 03300 and as ordered in writing by the Owner.
4. No payment will be made for replacement of sidewalk, driveway, valley gutter, or curb cut ramp beyond the specified limits and as defined above.

N. Item No. 14 – Concrete Curb and Gutter Replacement

1. Work Includes: Furnish and install concrete curb and gutter to replace curb and gutter removed or damaged due to construction in accordance with the requirements of VDOT and Section 03300, Cast in Place Concrete. Price includes removal and disposal of existing concrete curb and gutter where required.
2. Unit of Measure: Linear feet of curb and gutter replaced, measured in place along the face of the curb to the limits specified in Section 03300 and as ordered in writing by the Owner.
3. No payment will be made for concrete curb and gutter replaced beyond the specified limits and as defined above.

O. Item No. 15 – Silt Fence

1. Work Includes: Furnish and install silt fence in accordance with the requirements of Section 02370 and the Drawings.
2. Unit of Measure: Linear feet of silt fence installed.

P. Item No. 16 – Inlet Protection

1. Work Includes: Furnish and install inlet protection in accordance with the requirements of Section 02370 and the Drawings.
2. Unit of Measure: Each inlet protection installed.

Q. Item No. 17 – Standard Hydrant Installations

1. Work Includes: Complete installation of hydrants up to 10 feet from the centerline of the water main including the following:
   a. Pick up, deliver to site and handle materials provided by the Owner as specified in Section 02510 Water Mains and Appurtenances.
   b. Excavating and backfilling in accordance with Section 02315 and the Standard Details including bedding and backfill material. No additional payment will be made for Type B select fill, from 6 inches below the pipe up to 6 inches above the top of pipe, and one layer of polyethylene encasement.
   c. Excavation support systems in accordance with Section 02260.
   d. Installation of hydrant, valves, 6-inch water main, fittings, and related items in accordance with Section 02510 and the Drawings.
   e. Testing in accordance with Section 2514 Leakage Tests.
   f. Disinfection in accordance with Section 02513 Disinfection of Water Distribution System.
   g. Thrust restraint systems in accordance with Section 02512 Thrust Restraints.
   h. Guard posts where required.
   i. Painting of hydrants and guard posts in accordance with Section 09900.
2. Unit of Measure: Each hydrant installed.
3. Payment for that Work which is beyond the scope of a standard hydrant installation shall be handled under the applicable unit prices.
   a. Payment for installation of main line fitting (tee) shall be under the applicable unit prices.

R. Item No. 18 – Hydrant Installations on Existing Mains

1. Work Includes: Complete installation of new or replacement hydrants up to 10 feet from the centerline of the existing water main.

a. Refer to the requirements of Standard Hydrant Installations, above, for a partial description of the Work included.
b. Includes wet tap or installation of a tee at the Owner's discretion. Includes disposal of existing hydrant.
c. Guard posts where required.
d. Painting of hydrants and guard posts in accordance with Section 09900.

2. Unit of Measure: Each hydrant installed.
3. Payment for that Work which is beyond the scope of a Hydrant Installation on an Existing Main shall be handled under the applicable unit prices.

S. Item No. 19 – Hydrant Removal

1. Work Includes: Complete removal and disposal of a fire hydrant, including removal of valve and capping of water main.
2. Unit of Measure: Each hydrant removed.

T. Item Nos. 20 through 25 – Water Main Installation (4-inch through 36-inch)

1. Item Descriptions:
   a. No. 20 – 4-inch, 6-inch, and 8-inch ductile iron pipe water main
   b. No. 21 – 12-inch ductile iron pipe water main
   c. No. 22 – 16-inch ductile iron pipe water main
   d. No. 23 – 24-inch ductile iron pipe water main
   e. No. 24 – 30-inch ductile iron pipe water main
   f. No. 25 – 36-inch ductile iron pipe water main
   g. Nos. 20a, 21a, 22a, and 23a – Water main installation on any project less than 100 feet in length
   h. Nos. 20b, 21b, 22b, and 23b – Water main installation on any project greater than or equal to 100 feet and less than or equal to 1,000 feet in length
   i. Nos. 20c, 21c, 22c, and 23c – Water main installation on any project greater than 1,000 feet in length
   j. Nos. 24 and 25 – Water main installation on any project
2. Work Includes: Installation of water main 4-inch through 36-inch:
   a. Mobilization to the site.
   b. Demobilization from the site.
   c. Material storage.
   d. The Owner supplies all the materials as listed in Paragraph 2.02 of Section 02510. Contractor shall furnish all materials not specified in Section 02510 DIP Water Main and Appurtenances.
   e. All labor, equipment and materials necessary for loading and unloading, handling and transporting pipe and accessories provided by the Owner to or from the Owner's property yards, or from one Project site to another in accordance with Section 02510.
   f. Survey, layout and measurement work in accordance with Section 01720 Field Engineering.
   g. Excavating, clearing, pavement saw cutting, pavement removal and disposal, backfilling, and related work in accordance with the requirements of Section 01500 and 02315 and the Standard Details, including bedding and backfill materials, and removal and disposal of excess and unsuitable materials. Fairfax Water's Standard Details may be found at www.fairfaxwater.org.
   h. Select Fill Material 21-A, from 6 inches below the pipe up to 6 inches above top of pipe
   i. Installation of 4-inch through 12-inch 11 ¼° bends.
   j. One layer of V-Bio polyethylene encasement on water mains.
   k. Excavation support systems in accordance with the requirements of Section 02260 Excavation Support Systems.
   l. Unloading, stringing, and handling pipe
   m. Installing pipe and connections to the existing system in accordance with Section 02510. Includes temporary plugs and blow-offs (to be provided by Contractor)

n. Testing in accordance with Section 02514 Leakage Tests and Disinfection in accordance with Section 02513 Disinfection of Water Distribution Systems.
o. Restoration in accordance with the requirements of Section 02315.
p. All labor, equipment, and materials required to saw cut asphalt pavement in order to install water main. .
q. Hand digging around existing utilities in accordance with Miss Utility Requirements.
r. LCAMS, VA Traffic and TOC Notifications and submissions.
s. VDOT 3' x 3' Project Sign (See Section 01410 Regulatory Requirements)
t. Collection of pipe coupon. The location and number of coupons will be as directed by the Owner. All pipe samples will be taken from pipe that is to be disposed. For pipe that is 8-inches or less in diameter a six-inch section of pipe will be required. For pipe that is greater than 8-inches in diameter a 2-inch wide by six-inch long sectional slice of pipe will be required and in accordance with Section 02510.

3. Unit of Measure: Linear feet of pipe installed including pipe.
4. Payment for the following Work units are not included under Items 20 through 25 and are paid under separate bid items:
   a. Hauling pipe to or from the Owner's property yards
   b. Wet Tap installations
   c. Heavy clearing
   d. Additional trench depth: cover in excess of 5 feet
   e. Concrete thrust anchors
   f. Installation of fittings and accessories
   g. Installation of valves and accessories
   h. Temporary and permanent pavement

U. Item Nos. 26a through 26f – Valve Installation
1. Item Descriptions:
   a. No. 26a – 4-inch, 6-inch, and 8-inch gate valves
   b. No. 26b – 12-inch gate valves
   c. No. 26c – 16-inch butterfly valves
   d. No. 26d – 24-inch butterfly valves
   e. No. 26e – 30-inch butterfly valves
   f. No. 26f – 36-inch butterfly valves
2. Work Includes: Installation of 4-inch through 12-inch gate valves and 16-inch through 36-inch butterfly valves:
   a. The Owner supplies all the valves as listed in Paragraph 2.02 of Section 02510.
   b. All labor and equipment required to install valve as shown on the plans or as directed by the Owner.
   c. Includes valve installation, valve box, extension, concrete pad, restraining glands, and other ancillary materials as required.
   d. Includes picking up and transporting valves and accessories in accordance with Section 02510
3. Unit of Measure: Each Valve installed.
4. Not Included: Items paid under Items 20 through 25.
5. No payment will be made for valves required under items 28a through 27g Standard Connections to Existing System

V. Item Nos. 27a through 27f – Fitting Installation
1. Item Descriptions:
   a. No. 27a – 4-inch, 6-inch, and 8-inch ductile iron fittings
   b. No. 27b – 12-inch ductile iron fittings
   c. No. 27c – 16-inch ductile iron fittings
   d. No. 27d – 24-inch ductile iron fittings
   e. No. 27e – 30-inch ductile iron fittings
   f. No. 27f – 36-inch ductile iron fittings

2. Work Includes: Installation of 4-inch through 36-inch fittings:
    a. The Owner supplies all the fittings as listed in Paragraph 2.02 of Section 02510.
    b. All labor and equipment required to install fittings as shown on the plans or as directed by the Owner.
    c. Fittings include bends, tees, crosses, reducers and sleeves (except as noted below).
    d. Includes restraining glands and gaskets, concrete thrust blocks, and other ancillary materials as required.
    e. Includes picking up and transporting fittings and accessories in accordance with Section 02510.
3. Unit of Measure: Each Fitting installed.
4. Not Included: Items paid under Items 20 through 25.
5. No payment will be made for fittings required under Items 28a through 28g Standard Connections to Existing System.
6. No payment will be made for sleeves unless specifically called for on the drawings.
7. Payment for 4-inch through 12-inch 11 ¼° bends will be included in Items 20 through 25.

W. Item Nos. 28a through 28g – Standard Connections to Existing System
1. Item Descriptions:
    a. No. 28a – 2 through 14-inch Standard Connection Type I
    b. No. 28b – 16 through 24-inch Standard Connection Type I
    c. No. 28c – 30 through 36-inch Standard Connection Type I
    d. No. 28d – 2 through 14-inch Standard Connection Type II
    e. No. 28e – 16 through 24-inch Standard Connection Type II
    f. No. 28f – 30 through 36-inch Standard Connection Type II
    g. No. 28g – Standard Connection Type III
2. Work Includes:
    a. Standard Connection Type I, Nos. 28a through 28c includes removal of blow-off, plug or cap and thrust restraints from existing and new water mains, and connecting the new main to the existing including installing in line valve and sleeves.
    b. Standard Connection Type II, Nos. 28d through 28f includes cutting into, and connecting to, the existing main; and shall include installation of the following fittings, as required: a tee, up to two bends, up to 3 valves, up to 3 sleeves, and a reducer. Also includes restraint of existing valve nearest to the cut in, if existing water main is not restrained, and bulkhead of existing, abandoned water main.
    c. Standard Connection Type III, No. 28g, 2-inch through 12-inch outlet wet taps on water main sizes through 36-inches utilizing tapping sleeves or tapping saddles as required.
    d. Furnishing all other materials required unless otherwise specified in Section 02510.
    e. Excavating and backfilling in accordance with Section 02315.
    f. Excavation support systems in accordance with Section 02260
    g. Restoration in accordance with Section 02315.
    h. Disposal of unsuitable backfill materials.
    i. Installation in accordance with Section 02510.
    j. Collection of pipe coupon.
    k. Concrete Thrust Anchors as required
3. Unit of Measure: Each standard connection made.
4. No payment will be made for valves and fittings under Items 26a through 26f and 27a through 27f for items required under this item.

X. Item Nos. 29a through 29d – Abandonments
1. Item Descriptions:
    a. No. 29a – 2 through 14-inch Type I Abandonment
    b. No. 29b – 2 through 14-inch Type II Abandonment
    c. No. 29c – 16 through 24-inch Type II Abandonment
    d. No. 29d – 30 through 36-inch Type II Abandonment
    e. No. 29e – 2 through 14-inch Type III Abandonment

f. No. 29f – 16 through 24-inch Type III Abandonment
g. No. 29g – 30 through 36-inch Type III Abandonment

2. Work Includes:
   a. Type I Abandonment includes breaking the valve box below grade and filling the remaining space with 57-stone.
   b. Type II Abandonment, Nos. 29b through 29d, includes removing a valve and either plugging a tee or placing a blind flange on tapping sleeve.
   c. Type III Abandonment, Nos. 28e through 28g, includes removing (cutting out) a tee and replacing with sleeve and, if necessary, a spool piece of pipe. Plugging or capping the water main is also included.
   d. Installation of caps, plugs and blind flanges
   e. Furnish all other materials required unless otherwise specified in Section 02510.
   f. Excavating and backfilling in accordance with Section 02315.
   g. Excavation support systems in accordance with Section 02260
   h. Restoration in accordance with Section 02315.
   i. Disposal of unsuitable backfill materials.
3. Unit of Measure: Each abandonment made.
4. No payment will be made for an abandonment which is included in Items 28a through 28g, Standard Connection to Existing System.

Y. Item No. 30 – Heavy Clearing

1. Work Includes: Heavy clearing includes providing all necessary labor and equipment to clear the Work area of trees, stumps, shrubs, undergrowth and debris, including removal and disposal, in excess of normal clearing in accordance with Section 02315.
2. Unit of Measure: Actual area cleared per square yard.
   a. Heavy clearing shall be limited to areas shown on the Drawings or as directed in writing by the Owner.
3. Where individual large trees (trunk diameter in excess of 20 inches or height in excess of 35 feet) not included under heavy clearing, require removal, this work shall be paid in accordance with the General Conditions and Section 01200.

Z. Item No. 31 – 2-inch Air Release Connection

1. Work Includes: Install 2-inch air release connection as shown on the Standard Details including the following:
   a. Excavating and backfilling in accordance with Section 02315.
   b. Excavation support in accordance with Section 02260.
   c. Picking up and handling materials provided by the Owner and furnishing other materials required for a complete connection in accordance with Section 02510.
   d. Tapping the water main or installing the tapped plug and installing all required copper tubing, gate valves, tapping saddles, miscellaneous fittings, valve boxes, meter boxes, and installing and painting guard posts (as required) in accordance with Sections 02510 and 09900.
   e. Disinfection in accordance with Section 02513.
2. Unit of Measure: Each air release connection made.
3. No payment will be made for temporary 2-inch Air Releases.

AA. Item No. 32 – 2-inch Blow-Off Connection

1. Work Includes: Install 2-inch blow-off connection as shown on the Standard Details including the following:
   a. Excavating and backfilling in accordance with Section 02315.
   b. Excavation support in accordance with Section 02260.
   c. Picking up and handling materials provided by the Owner and furnishing other materials required for a complete connection in accordance with Section 02510.
   d. Tapping the water main or installing the tapped plug and installing all required copper tubing, gate valves, tapping saddles, miscellaneous fittings, valve boxes, meter boxes,

and installing and painting guard posts (as required) in accordance with Sections 02510 and 09900.
e. Disinfection in accordance with Section 02513.
2. Unit of Measure: Each blow-off connection made.
3. No payment will be made for temporary 2-inch blow-offs.

AB. Item No. 33 – Driveway Culverts
1. Work Includes: Removal and disposal of driveway culverts regardless of type and size and providing and installing new driveway culverts where shown on the Drawings including the following:
a. Excavating and backfilling in accordance with Section 02315.
b. Excavation support in accordance with Section 02260.
c. Providing labor, equipment and materials required for a complete installation.
2. Unit of Measure: Linear feet of driveway culvert installed.

AC. Item No. 34 – Bonded Joints
1. Work Includes: Furnish and install bonded joints including post-backfill continuity testing in accordance with Section 13110, the Standard Details and the Drawings.
2. Unit of Measure: Each pipe joint. Payment made after test report and letter of compliance submitted and approved.

AD. Item Nos. 35a through 35b – Corrosion Control
1. Item Description:
a. No. 35a – Test Station
b. No. 35b – Magnesium Anodes
2. Work Includes:
a. Test Station: Furnish and install terminal box, terminal board, test wires including thermite-welded connections to water main, brass survey marker, and concrete pad in accordance with Section 13110, the Standard Details and the Drawings. Terminal boards may be specified to be installed in standard valve boxes if installed in pavement.
b. Magnesium Anodes: Furnish and install magnesium anodes, anode header cables, and anode lead wires, in accordance with Section 13110, the Standard Details, and the Drawings.
c. If an insulated flange, 4-inch steel guard post, or zinc ribbon anode is required, a price will be obtained from the Contractor through a change order request proposal to furnish and install the item.
d. PVC and HDPE inserts will be paid for under Items 20 through 25.
3. Unit of Measure: Each complete Test Station installed for Nos. 35a. Each magnesium anode installed under No. 35b.

AE. Item Nos. 36a through 36f – Service Connections
1. Item Description:
a. No. 36a – 1-inch Service Taps with 10 feet of Copper Pipe (new services, existing services, and 1-inch air release).
b. No. 36b – Additional 1-inch Copper Pipe Installation (new services, existing services, and 1-inch air release).
c. No. 36c – Additional Cost for Bored Installations: 1-inch Copper Service Pipe.
d. No. 36d – 2-inch Service Taps with 10 feet of Copper Pipe (new services, existing services, and 2-inch air release).
e. No. 36e – Additional 2-inch Copper Pipe Installation (new services, existing services, and 2-inch air release.
f. No. 36f – Additional Cost for Bored Installations: 2-inch Copper Service Pipe.
2. Work Includes:

a. Picking up, transporting and handling materials supplied by the Owner and providing and installing all other materials, in accordance with Section 02510, required for a complete installation.
b. Earth excavation and backfill in accordance with Section 02315.
c. Excavation support in accordance with Section 02260.
d. Bored road crossings when required. Additional cost for bored installations (Item Nos. 36c and 36f) to include cost of boring only. Associated connections to be paid under appropriate Item Nos. 36a or 36d.
e. Installing 1-inch and 2-inch connections, fittings, valves, nipples, curb boxes, meter boxes and meter assemblies in accordance with Section 02510.
f. Removal of all abandoned appurtenances including but not limited to meter boxes and meters.
g. Performing test holes as required.
h. Maintenance of Traffic per Section 01500, Paragraph 1.10.

3. Unit of Measure:
a. Nos. 36a and 36d: Each connection installed.
b. Nos. 36b and 36e: Linear feet of pipe installed, in excess of 10 feet for new services, existing services, and air releases.
c. Nos. 36c and 36f: Linear feet of pipe bored.

4. No payment will be made for connections installed for testing or flushing purposes.

AF. Item Nos. 37a through 37c – Water Meter and Box Removal and Replacement

1. Item Description:
a. No. 37a – 5/8-inch and 1-inch Water Meter and Box Removal and Replacement
b. No. 37b – 1 1/2-inch Water Meter and Box Removal and Replacement
c. No. 37c – 2-inch Water Meter and Box Removal and Replacement

2. Work Includes:
a. Picking up, transporting and handling materials supplied by the Owner and providing and installing all other materials, in accordance with the Fairfax Water Standard Details, required for a complete installation.
b. Earth excavation, dewatering, backfilling, and compaction in accordance with Section 02315.
c. Excavation support in accordance with Section 02260.
d. Disinfection in accordance with Section 02513.
e. Installing 5/8-inch, 1-inch, 1 1/2-inch, and 2-inch meter assemblies and meter boxes, couplings, connections, fittings, and valves, and all incidentals necessary to complete the work in accordance with the Fairfax Water Standard Details.
f. Removal of all abandoned appurtenances including but not limited to meter boxes and meters.

3. Unit of Measure:
a. Nos. 37a through 37c: Each water meter box and water meter assembly removed and replaced.

AG. Item No. 38 – Select Fill – Trench Backfill (VDOT 21A)

1. Work Includes:
a. Furnish and install select fill VDOT 21A material from 6 inches above pipe to subgrade, in accordance with the requirements of Section 02315, Standard Details, and where specified, shown on the Drawings or as ordered by the Owner.

2. Unit of Measure
a. Cubic yards of select fill VDOT 21A material installed.

3. No payment will be made for select fill used to fill voids resulting from unauthorized excavation or pipe bedding in rock excavations.

AH. Item No. 39 –Test Holes

1 Work Includes:

a. Excavating and backfilling in accordance with the requirements of Section 02315 to expose existing utilities.

2 Unit of Measure
   a. Each test hole performed.
   b. No payment will be made for test holes that are performed for line and grade for tie-ins and are incidental to other pay items including but not limited to Items No. 20 through 25 and Items 28a through 28g.
   c. Repair holes that are in the pavement with tamped cold mix asphalt.
   d. Maintain test pits by placing additional cold mix asphalt as necessary or as directed by the Owner at no additional cost.
   e. Excavating an unmarked utility will be paid for as a test hole.

AI. Item Nos. 40 and 41 – Additional Trench Excavation

1. Item Description:
   a. No. 40 – Additional Trench Excavation for Pipe Sizes 4-inches through 16-inches in Diameter (including service connections).
   b. No. 41 – Additional Trench Excavation for Pipe Sizes 24-inches through 36-inches in Diameter.
2. Work Includes: Work for Nos. 40 and 41 includes the following where the depth of cover above the top of the barrel of the pipe is in excess of 5 feet.
   a. Excavating and disposal for the portion in excess of 5 feet of cover in accordance with the requirements of Section 02315.
   b. Excavation support for the portion in excess of 5 feet of cover in accordance with the requirements of Section 02260.
3. Unit of Measure: Vertical foot per linear feet of additional trench excavation.
   a. Linear feet of trench measured along the centerline of the pipe, valves and fittings.
   b. Additional trench excavation shall be that portion in excess of 5 feet of cover measured vertically from the original grade to the top of the barrel of the pipe.
   c. Trench width in accordance with the requirements of Section 02315 for a given pipe diameter.
4. Standard depth of cover for all water main installation is 4 feet. Payment will not be made for additional trench excavation which is not shown on the Drawings or authorized by the Owner.

AJ. Item Nos. 42a through 42i – Pavement Markings

1. Item Description:
   a. No. 42a – 4-inch Thermoplastic Pavement Striping on any striping project less than 250 feet in length
   b. No. 42b – 4-inch Thermoplastic Pavement Striping on any striping project greater than or equal to 250 feet in length
   c. No. 42c – 6-inch Thermoplastic Pavement Striping on any striping project less than 250 feet in length
   d. No. 42d – 6-inch Thermoplastic Pavement Striping on any striping project greater than or equal to 250 feet in length
   e. No. 42e – 12-inch Thermoplastic Pavement Striping on any striping project less than 250 feet in length
   f. No. 42f – 12-inch Thermoplastic Pavement Striping on any striping project greater than or equal to 250 feet in length
   g. No. 42g – 4-inch Type A Paint Pavement Striping on any striping project less than 250 feet in length
   h. No. 42h – 4-inch Type A Paint Pavement Striping on any striping project greater than or equal to 250 feet in length
   i. No. 42i – Thermoplastic Arrow less than 10 feet in length
2. Work Includes: Furnish and apply thermoplastic and Type A paint pavement markings in accordance with Section 02700 and where designated by the Owner.
3. Unit of Measure

a. Nos. 42a through 42f – Linear feet of thermoplastic pavement striping applied.
b. Nos. 42g through 42h – Linear feet of Type A paint pavement striping applied.
c. No. 41i – Each thermoplastic arrow applied.

AK. Item No. 43 – Miscellaneous Electrical Work (Bid Allowance)

1. Work Includes: Electrical work including the replacement of existing loop detectors in accordance with Section 02700.
2. Unit of Measure: Not to exceed the allowance allocated in the Bid Form. Payment shall be based on actual costs plus applicable contract markup. Allowance shall not be exceeded unless approved by the Owner in writing.

AL. Item No. 44a and 44b – Miscellaneous Trenchless Crossing Work (Bid Allowance)

1. Item Description:
   a. No. 44a – Jack-and-Bore/Tunneling Trenchless Crossing
   b. No. 44b – Horizontal Directional Drill Trenchless Crossing
2. Work Includes: Complete installation of a Trenchless Crossing in the size shown on the Drawings or in the Standard Details including the following:
   a. Excavating and backfilling in accordance with Section 02315.
   b. Excavation support in accordance with Section 02260.
   c. Furnish and install liner plate or casing pipe, insulators, end seals, concrete, and all other materials, labor, and equipment required to accomplish the Work in accordance with Section 02400 Trenchless Crossings and the Drawings.
   d. Install water main in accordance with Section 02510 Water Mains and Appurtenances
   e. Performing test holes as required.
   f. Contractor to hire qualified subcontractor approved by the Owner to provide all labor, materials, equipment and incidentals required to complete the work.
2. Unit of Measure: Payment for Items 44a and 44b shall be based on actual costs plus applicable contract markup. Payment for pipe installation within the trenchless crossing will be included within this item. Allowance shall not be exceeded unless approved by the Owner in writing.

AM. Item No. 45 – Miscellaneous Vault Work (Bid Allowance)

1. Work Includes: Complete installation of a Vault in the size shown on the Drawings or in the Standard Details in accordance with Section 03400. Provide all labor, materials, equipment and incidentals required to complete the work. Furnish and install all electrical and communications equipment associated with vault in accordance with the Drawings.
2. Unit of Measure: Payment shall be based on actual costs plus applicable contract markup. Allowance shall not be exceeded unless approved by the Owner in writing.

AN. Item No. 46 – Miscellaneous Traffic Control (Bid Allowance)

1. Work Includes: Traffic control measures which are above and beyond the required labor and equipment necessary to execute VDOT Typical Traffic Controls 23.1 (Lane Closure on a Two-Lane Roadway Using Flaggers) and 28.1 (Lane Closure Operation in an Intersection). See Section 01500, Paragraph 1.11 Maintenance of Traffic for traffic control measures which are considered incidental to other bid items.
2. Unit of Measure: Payment shall be based on actual costs plus applicable contract markup. Allowance shall not be exceeded unless approved by the Owner in writing.

AO. Item Nos. 47 through 76 – Emergency Work

1. Work Includes: All the labor and equipment items noted in the Bid Form apply to emergency repair work authorized by the Owner during the Contract Period. The Contractor shall make available to the Owner, on a 24-hour basis during the Contract Period, such portion of his labor force, materials and equipment as may be required by the Owner for the purpose of making, or assisting in, repairs to water mains and other facilities owned and operated by the Owner. For emergency repairs, the Contractor shall furnish a Qualified Water Main

Installation Crew. The Contractor shall mobilize and furnish all labor, materials and equipment with respect to emergency repairs and shall give highest priority and continuing attention to such Work until the repairs and improvements have been completed to the Owner's satisfaction. The Contractor shall respond and be mobilized on site within 4 hours upon notice from the Owner. The Contractor shall provide skilled laborers (pipelayer, tailman, laborer), foreman, operators and all necessary equipment, tools, and material to expose and perform emergency repairs on water mains in strict accordance with the contract requirements to repair existing water mains as directed by the Owner. Mobilization and Demobilization shall be included in the labor and equipment rates provided in the Bid Form.

2. Unit of Measure: As noted in the Bid Form.
3. Payment will be made based on unit prices for labor, equipment, and material required to complete the repair of the water mains.
4. Payment includes: Full compensation for labor, equipment, profit, overhead and incidentals to complete the emergency repairs.
5. Items required to perform emergency repairs but not listed in the form of bid will be paid for based on actual cost plus applicable contract mark-ups.

1.07 PAYMENT

A. Payment Includes: Full compensation for all required labor, products provided by the contractor, tools, equipment, plant, transportation, services and incidentals; erection or application of an Item of the Work, overhead and profit.

B. Final Payment: Final Payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities accepted by the Owner multiplied by the unit price for the Work which is incorporated in or made necessary by the Work. See Section 00200, 1.24 for liquid asphalt adjustment information.

1.08 DEFECT ASSESSMENT

A. Replace the Work, or portions of the Work, not conforming to the specified requirements.

B. If, in the opinion of the Owner, it is not practical to remove and replace the Work, the Owner will direct that the defective Work may remain or be partially replaced and the Unit Price will be adjusted to a new price at the discretion of the Owner.

1.09 NON-PAYMENT FOR REJECTED WORK

A. Payment will not be made for any of the following where products are provided by the Contractor:

1. Products wasted or disposed of in a manner that is not acceptable.
2. Products determined as unacceptable before or after placement.
3. Products not completely unloaded from the vehicle.
4. Products placed beyond the limits required or specified when the additional Work is required due to damage caused by the Contractor's failure to confine his work within those limits.
5. Products remaining on hand after completion of the Work.
6. Loading, hauling and disposing of rejected Products.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION 01200

NO TEXT THIS PAGE

SECTION 01250

CONTRACT MODIFICATION PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Change Orders

B. Work Orders

1.02 DEFINITIONS

A. Change Order: Refer to the definition in the General Conditions.

B. Work Order: Refer to the definition in the General Conditions.

C. Overhead: Refer to the definition in the General Conditions.

D. Extra Work: Refer to the definition in the General Conditions.

1.03 SUBMITTALS

A. Labor and Equipment Rates: Submit a listing of employees, in accordance with Section 01330, providing the employee's name, job title or description and the hourly rate of pay including straight and overtime rates, labor burden rate, and the resulting billable rates. Also include hourly rates for equipment.

1. Provide submittal within 14 days of executing the Contract for review and acceptance. Annual updates of labor rates may be submitted for review and acceptance if necessary.

2. Documentation including certified payrolls may be required to validate rates.

3. Payment for Emergency Repair work will be based on the rates listed in the Bid Form.

1.04 CHANGE ORDERS

A. Initiation: Proposed Change Order

1. Initiated by Owner. The Owner may issue a Request for Proposed Change Order. The request will contain a description of the intended change with supplementary or revised Drawings and Specifications as applicable and the projected time for accomplishing the change.

2. Initiated by Contractor: The Contractor may propose a change in the Work by submittal of a Proposed Change Order (PCO) to the Owner. The PCO will include:

a. a detailed description of the Contractor's proposed change to the Work, including supplementary or revised Drawings and Specifications, as applicable;

b. a statement of the reason for the proposed change;

c. a statement of the impact of the proposed change, if any, on the Contract Period and/or the Contract Sum; and

d. such other supporting documentation as may be necessary including a detailed breakdown to permit the Owner to fully evaluate the information set forth in (a) through (c) above.

3. By submittal of a Proposed Change Order hereunder, the Contractor certifies and agrees as follows:

a. He has carefully reviewed and evaluated the proposed change to the Work and determined that implementation of such a change is in the best interests of the Project; and

b. The information set forth in the Proposed Change Order (including the statement of impact set forth in Item 2c above is accurate and complete, to the best of his knowledge and belief.

B. Execution of Proposed Change Order:

1. When a Proposal is requested for a change in the Work, the Contractor shall submit his proposal within 14 days following receipt of the Request for Proposed Change Order. The Proposal shall state the increase or decrease, if any, in Contract Period and Contract Sum.

2. The Contractor shall explain the proposal in as much detail as requested by the Owner.

3. Any decrease in price for omitted Work shall include appropriate amounts for profit and overhead.

4. The Owner will review the Proposal and may request additional information and documentation which the Contractor shall provide promptly.

5. If the Owner decides to proceed with the change, it will issue a change order for signature first by the Contractor and then by the Owner.

6. The Contractor shall promptly complete the approved change in the Work on receipt of the executed Change Order.

a. Failure to sign the Change Order by the Contractor shall not relieve him from performing the Work if the Change Order is signed by the Owner.

C. Costs: The cost of both additive and deductive changes in the Work shall be determined as follows:

1. Labor: Gross labor wages of laborers, crew foreman and general foreman performing or directly supervising the Work on the Site. Superintendent, Project Engineer and Project Manager costs are not allowed.

2. Labor Burden: Net premium for other allowable expenses and Workman's Compensation Insurance, taxes pursuant to the Federal Social Security Act.

3. Additional Materials: Necessary extra materials, delivered at the site.

4. Plant and Equipment: Rent for plant and equipment shall be at the cost for rentals from an independent firm (i.e. a firm which is not owned in whole or in part by the Contractor). If the equipment is owned by the Contractor or rented from a firm in which the Contractor has an interest, the rent shall be calculated in accordance with the applicable provisions and terms of the "Rental Rate Blue Book" service provided by EquipmentWatch.

5. The costs above shall be from the rates supplied in accordance with Section 1.03A plus any yearly cost adjustment as allowed by the Contract.

6. Subcontractor Costs: Subcontractor's direct costs, determined by items 1 through 4 in the immediately preceding subparagraphs, plus maximum profit and overhead of 20 percent.

7. Overhead and Profit:

a. For items 1 through 4 above: plus 20 percent

b. For item 5 above: plus 10 percent.

1.05 WORK ORDERS

A. Initiation: The Owner may issue a Work Order with a Notice to Proceed without a prior Request for a Proposed Change Order or the Contractor's signature.

B. Method of Compensation: The Owner will designate the method of determining the amount of compensation or credit, if any, based on one of the methods contained in this Section and the General Conditions.

C. Timing of the Work: The Contractor shall proceed with the change in the Work immediately upon receipt of the Work Order.

D. Incorporation in Contract Documents: The Work Order will be incorporated into the Contract Documents via a Change Order at a later date.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION 01250

NO TEXT THIS PAGE

SECTION 01290

APPLICATIONS FOR PAYMENT

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Submit Applications for Payment to the Owner in accordance with the schedule established by the General Conditions of the Contract and Agreement Between Owner and Contractor.

1.02 RELATED WORK

A. Section 00500: Agreement Between Owner and Contractor

B. Section 00700: General Conditions

C. Section 00800: Supplementary Conditions

D. Section 01250: Contract Modification Procedures

E. Section 01320: Construction Schedule

F. Section 01720: Field Engineering and Surveying

G. Section 01770: Contract Closeout

1.03 FORMAT AND DATA REQUIRED

A. Submit applications in automated format using the Application for Payment form provided by the Owner (under Exhibits to the General Conditions). Payment applications may be emailed to the Owner. Each submittal shall be accompanied by a spreadsheet providing complete documentation of all items for which payment is requested. Text and tabular data shall be in Microsoft Excel latest version for Windows format. No payment will be made until the Schedule of Values is approved.

B. Monthly updated progress schedule will be a prerequisite to payment.

1.04 PREPARATION OF APPLICATION FOR PROGRESS PAYMENT

A. Application Form:

1. Fill in required information, including that for Change Orders executed prior to date of submittal of application.

2. Fill in summary of dollar values to agree with respective totals indicated on continuation sheets.

3. Execute certification with signature of a responsible officer of Contract firm. An original signature shall appear on each copy submitted.

B. Continuation Sheets:

1. Fill in total list of all scheduled component items of Work with item number and scheduled dollar value for each item.

2. Fill in dollar value in each column for each scheduled line item when work has been performed or products stored. Round off values to nearest dollar, or as specified for Schedule of Values.

3. List each Change Order executed prior to date of submission at the end of the continuation sheets. List by Change Order Number, and description, as for an original component item of work.

4. To receive approval for payment on component material stored on site, submit certified true copies of the original paid invoices with the application for payment first made for these materials. Refer to Article 10, Section 00700 for payment on stored materials.

5. For unit price contracts, the pay application must reflect actual quantities of line item installed of verified by the Owner through the Owner's Inspector or Engineer.

1.05 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

A. When requested, submit substantiating information with a cover letter identifying:

1. Project.

2. Application number and date.

3. Detailed list of enclosures.

4. For stored products:

a. Item number and identification as shown on application.

b. Description of specific material.

B. Submit one copy of data and cover letter for each copy of application.

C. The Contractor shall maintain an updated construction schedule in accordance with Section 01320. As a prerequisite for monthly progress payments, contractor shall submit the updated construction schedule with the application for progress payments. If the Contractor fails to submit the required updated schedule within the time prescribed, the Owner may withhold approval of progress payment estimates until such time as the Contractor submits the required updated schedule. Submit as required under Section 01320.

D. The Contractor shall demonstrate, as a prerequisite for monthly progress payments, compliance with all requirements specified in Section 02370 to the Owner. If the Contractor fails to demonstrate compliance with Section 02370, the Owner may withhold approval of progress payment estimates until such time as the Contractor demonstrates to the Owner full compliance with the approved erosion and sedimentation control permit and Section 02370.

1.06 PREPARATION OF APPLICATION FOR FINAL PAYMENT

A. Fill in Application form as specified for progress payments.

B. Use continuation sheet for presenting the final statement of accounting as specified in Section 01770 – Contract Closeout.

C. Submit all Project Records Documents and other contract-required deliverables in accordance with Sections 01770 and 01780.

1.07 SUBMITTAL PROCEDURES

A. Submit Applications for Payment to the Owner at the times stipulated in the Agreement.

B. Number: Three copies of each Application

C. When Application is found to be properly completed and corrected, three originals will be transmitted to Owner and one copy will be returned to Contractor.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION 01290

NO TEXT THIS PAGE

SECTION 01310

PROJECT MEETINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pre-construction Meetings

B. Progress Meetings

1.02 PRECONSTRUCTION MEETINGS

A. General: Prior to the commencement of Work at the Site, a preconstruction conference will be held at a predetermined time and place.

B. Preconstruction Conference:

1. Attendance: The conference shall be attended by the following:

a. The Contractor and his Superintendent

b. The principal Subcontractors

c. The representatives of principal suppliers and manufacturers as appropriate

d. The Authorized Representatives of the Owner

e. Governmental representatives as appropriate

f. Others, as requested by the Contractor or the Owner

2. Purpose: The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed, and procedures for handling such matters, established. The agenda will include the following items:

a. Transmittal, review, and distribution of Contractor's submittals

b. Processing applications for payment

c. Maintaining record documents

d. Critical work sequencing

e. Field decisions, Change Orders and Work Orders

f. Use of premises, office and storage areas, security, housekeeping, and the Owner's needs

g. Major equipment deliveries and priorities

h. Contractor's assignments for safety and first aid

3. Meeting Chairman: The Owner will preside at the conference and will arrange for keeping the minutes and distributing the minutes to all persons in attendance.

1.03 PROGRESS MEETINGS

A. Purpose: The purpose of the meetings will be to review the progress of the Work, maintain coordination of efforts, discuss changes in scheduling, and resolve other potential problems.

B. Scheduling: The Owner and the Contractor will schedule and hold regular progress meetings at least monthly and at other times as requested by the Owner or required by progress of the Work. The Contractor, the Owner, and all subcontractors active on the site shall be represented at each meeting. The Contractor may, at his discretion, request attendance by representatives of his suppliers, manufacturers, and other subcontractors.

C. Meeting Chairman: The Owner shall preside at the meetings and provide for keeping and distributing the minutes.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION 01310

SECTION 01320

CONSTRUCTION SCHEDULE

PART 1 - GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

A. This Section specifies the general methods and requirements of submissions applicable to the Construction Progress Schedule. Detailed submittal requirements are specified in the technical sections.

1.02 CONSTRUCTION PROGRESS SCHEDULE

A. Submit the baseline schedule within 20 calendar days of Notice to Proceed.

B. Work shall be scheduled using the Critical Path Method (CPM) type of network analysis. The schedule should be developed and maintained using MS Project, latest Windows version or an approved equal.

C. The Critical Path Method type construction schedule will be used to monitor job progress. The Contractor shall be responsible for providing all information concerning the sequencing, logic and duration of all activities as well as providing the initial CPM logic network (in electronic and paper form) diagram Gantt Chart and tabular report data. Once the baseline schedule is accepted by the Owner, the Contractor shall be responsible for providing monthly updates of the CPM schedule showing actual progress. The Contractor shall submit the computerized printout of the schedule and highlight major changes, if any, on a monthly basis.

D. The contractor shall provide 3-week look-ahead reports at each Monthly Progress meeting as specified in Section 01310.

E. The schedule shall show fabrication and delivery times for all major equipment items.

F. The schedule must include all required start-up and commissioning activities.

G. A CPM schedule which shows a completion of any milestone or completion dates prior to the contractual completion date for that milestone or completion date may be accepted, but in no event shall be acceptable as a basis for a claim for delay against the Owner and any of their authorized representatives if the early completion date is not met by the Contractor.

H. Schedule Revisions. The Contractor shall submit any proposed revisions to the accepted baseline CPM schedule to the Owner for review and acceptance. CPM revisions shall be submitted as an electronic file. All proposed revisions to activities, logic, activity durations, and critical path shall be justified in written tabular form and shall include the impact of the proposed schedule revisions on the project. The Contractor shall not make any changes in the accepted baseline CPM schedule without the prior written acceptance of the Owner.

I. Float

1. Definition of Float. As employed in the Contract Documents, the terms “float” and “float time” shall be used interchangeably to mean the period of time between the early start date and the late start date, or the early finish date and the late finish date of any activities set forth on the Construction Schedule.

2. Ownership of Float. The Owner shall have and retain exclusive ownership of the float.

3. Float Time. The Contractor shall not be entitled to any adjustment in the Project Duration, the Construction Schedule, or the Contract Sum, or to any additional payment of any sort by reason of the loss or use of any float time. The Owner may initiate changes to the Work that absorb float time without obligation to adjust or extend the overall completion date or any intermediate completion dates set forth in the CPM network. Owner-initiated changes that affect the critical path on the CPM network shall be the sole grounds for extending (or shortening) the Project Duration. Contractor-initiated changes that encroach on the float time identified in the CPM network may be accomplished with the Owner's prior approval. Such changes, however, shall give way to Owner-initiated changes competing for the same float time. Delays in the critical path that are not associated with proper requests for time extensions in accordance with Article 8 of the General Conditions shall be deemed to be the responsibility of the Contractor.

J. Delays to Critical Path

1. Whenever it becomes apparent from the current monthly CPM schedule update that delays to the critical path have resulted and these delays are through no fault of the Owner and hence, that the Contract completion date will not be met, or when so directed by the Owner, the Contractor shall take some or all of the following actions at no additional cost to the Owner.

a. Increase construction manpower in such quantities and crafts as will substantially eliminate the backlog of Work.

b. Increase the number of working hours per shift, shifts per day, or working days per week; the amount of construction equipment; the forms for concrete work; etc., or any combination of the foregoing to substantially eliminate the backlog of Work.

c. Reschedule activities to achieve maximum practical concurrence of accomplishment of activities, and comply with the revised schedule.

d. The Contractor shall submit to the Owner for review a written statement of the steps he intends to take to remove or arrest the delay to the schedule. The Contractor shall promptly provide such level of effort to bring the Work back on schedule. Should schedule delays persist, the Contractor's Surety may be asked to attend schedule update meetings.

e. Failure of the Contractor to comply with the requirements herein shall subject him to, at the Owner's sole discretion, withholding, in partial or in total, payments otherwise due the Contractor for work performed under the Contract. Any withholding of monies is not a penalty for noncompliance, but is an assurance for the Owner that funds will be available to implement these requirements should the Contractor fail to do so, since failure of the Contractor to comply with these requirements shall mean that the Contractor failed to prosecute the Work with such diligence as to ensure its completion within the contractual dates.

K. The Contractor will not be entitled to any extension of time for the completion of the Project, nor to recover any damages for any delay attributed to the Owner or their agents, with respect to any delay that is alleged to have occurred during a period of time in which the Contractor has failed to provide or to maintain an approved accepted schedule that meets all requirements of the Contract Documents.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

END OF SECTION 01320

NO TEXT THIS PAGE

SECTION 01330

SUBMITTALS

PART 1 GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

A. This Section specifies the general methods and requirements of submissions applicable to Shop Drawings, Product Data, Samples, Mock Ups, Construction Photographs, and Submittal Schedules for all non-Owner supplied materials. Detailed submittal requirements are specified in the technical sections.

B. All submittals shall be clearly identified by reference to Section Number, Paragraph, Drawing Number or Detail as applicable. Submittals shall be clear and legible and of sufficient size for presentation of data.

1.02 CONSTRUCTION PROGRESS SCHEDULE

A. Contractor shall submit to Owner for review a schedule of the proposed construction operations in accordance with Section 01320.

B. At least monthly the schedule shall be revised and resubmitted as necessary to reflect changes in the progress of the Work.

C. Owner may require Contractor, at Contractor's expense, to add to its plant, equipment, or construction forces, as well as increase the working hours, if operations fall behind schedule at any time during the construction period.

D. If the initial progress schedule or any subsequent revision is not acceptable to Owner, the schedule shall be revised and resubmitted as many times as necessary until the schedule is acceptable.

1.03 SHOP DRAWING SUBMITTAL SCHEDULE

A. Contractor shall submit to Owner a schedule of submittals for the Shop Drawings and Engineering Data that are required by the specifications in accordance with Section 01320.

1.04 PROGRESS REPORTS

A. A progress report shall be submitted to Owner each month with the application for partial payment. If the Work falls behind schedule, Contractor shall submit additional progress reports at such intervals as Owner may request.

B. Each progress report shall include sufficient narrative to describe current and anticipated delaying factors, their effect on the progress schedule, and proposed corrective actions. Any Work reported complete, but which is not readily apparent to Owner, must be substantiated with satisfactory evidence.

C. Each progress report shall also include three copies of the accepted graphic schedule updated to indicate actual progress.

1.05 SHOP DRAWINGS AND ENGINEERING DATA.

A. General

1. Shop Drawings and engineering data (submittals) covering all equipment and fabricated and building materials which will become a permanent part of the Work under this Contract shall be submitted to Owner for review. Submittals shall verify compliance with the Contract Documents, and shall include drawings and descriptive information in sufficient detail to show the kind, size, arrangement, and operation of component materials and devices; the external connections, anchorages, and supports required; performance characteristics; and dimensions needed for installation and correlation with other materials and equipment. When an item consists of components from several sources, Contractor shall submit a complete initial submittal including all components.

2. The Contractor may request access to electronic media files of the Contract Drawings to assist submittal preparation. The Contractor shall enter into an agreement with the Owner to use these electronic files and be subject to constraints under the agreement. The Contractor will be required to sign the Owner's disclaimer if electronic files are requested.

3. Where required, Shop Drawings shall be sealed by a professional engineer licensed in the Commonwealth of Virginia including, but not limited to, submittals required by the Fairfax County Special Inspections Program, Fairfax County building permit approvals and VDOT standards and specifications, and where indicated in the specifications.

4. All submittals, regardless of origin, shall be stamped with the approval of Contractor and identified with the name and number of this Contract, Contractor's name, and references to applicable specification paragraphs and Contract Drawings. Each submittal shall indicate the intended use of the item in the Work. When catalog pages are submitted, applicable items shall be clearly identified, and inapplicable data crossed out. The current revision, issue number, and date shall be indicated on all drawings and other descriptive data.

5. Contractor shall be solely responsible for the completeness of each submission. Contractor's stamp of approval is a representation to Owner that Contractor accepts sole responsibility for determining and verifying all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data, and that Contractor has reviewed and coordinated each submittal with the requirements of the Work and the Contract Documents.

6. All deviations from the Contract Documents shall be identified as deviations on each submittal and shall be tabulated in Contractor's letter of transmittal. Such submittals shall, as pertinent to the deviation, indicate essential details of all changes proposed by Contractor (including modifications to other facilities that may be a result of the deviation) and all required piping and wiring diagrams.

7. Eight copies of each shop drawing and necessary data shall be submitted to Owner. Owner will return two marked copies (or one marked reproducible copy) to Contractor. When requested by the Owner, the Contractor shall submit 3 additional copies of an approved submittal with all markups and comments incorporated as a record set submittal. Additional review time for a record set submittal shall be for the Owner (unless it is rejected as non-compliance.)

8. Facsimile (fax) copies will not be acceptable. Owner will not accept submittals from anyone but Contractor. Submittals shall be consecutively numbered in direct sequence of submittal and without division by subcontracts or trades.

9. Electronic Submittals: The Contractor has the option to transmit submittals electronically in a pdf format to a website designated by the Owner. The electronic submittal must contain all information required of hard copy submittals. Reviews will be completed and returned electronically to the website. Once the submittal has been approved by the Owner and returned electronically to the website, the Contractor shall submit three (3) hard copies to the Owner for their records with all mark-ups and comments incorporated. Resubmission of submittals transmitted electronically shall conform to the requirements of paragraph 1.05.E of this Section. Where submittals are required by the Fairfax County Special Inspections Program, three (3) additional hard copies of the approved submittals may be required in accordance with paragraph 1.05.D.

10. Electronic Correspondence: The contractor may submit electronic pdf format copies of project correspondence via email, followed up with the original copy via US Mail or hand delivery.

11. Submittals shall contain:

    a. The date of submission and the dates of any previous submissions.

    b. The Project title and number.

    c. Contractor identification.

    d. The names of:

        1) Contractor

        2) Supplier

        3) Manufacturer

    e. Identification of the product, with the section number, page and paragraph(s).

    f. Field dimensions, clearly identified as such.

    g. Relation to adjacent or critical features of the work or materials.

    h. Applicable standards, such as ASTM or Federal Standards numbers.

    i. Identification of deviations from Contract Documents.

    j. Identification of revisions on resubmittals.

    k. A blank space suitably sized for Contractor and Engineer stamps.

    l. Where calculations are required to be submitted by the Contractor, the calculations shall have been checked by a qualified individual other than the preparer. The submitted calculations shall clearly show the names of the preparer and of the checker.

B. Owner's Review of Submittals.

1. Owner's review of submittals will cover only general conformity to the Drawings and Specifications, external connections, and dimensions which affect the layout. Owner's review does not indicate a thorough review of all dimensions, quantities, and details of the

material, equipment, device, or item shown. Owner's review shall not relieve Contractor of Contractor's sole responsibility for errors, omissions, or deviations in the drawings and data, nor of Contractor's sole responsibility for compliance with the Contract Documents.

2. In general, Owner's submittal review period shall be 28 consecutive calendar days in length and shall commence on the first calendar day immediately following the date of arrival of the submittal or resubmittal in Owner's office. Submittals requiring complex review and coordination may involve additional review time. The time required to mail the submittal or resubmittal back to Contractor shall not be considered a part of the submittal review period.

3. If the shop drawings, data or samples as submitted describe variations and show a departure from the Contract requirements which Owner finds to be in its interest and to be so minor as not to involve a change in Contract Price or Contract Time, Owner may return the reviewed drawings without noting an exception.

4. Submittals will be returned to the Contractor under one of the following codes.

   Code 1 "APPROVED" is assigned when there are no notations or comments on the submittal. When returned under this code the Contractor may release the equipment and/or material for manufacture.

   Code 2 "APPROVED AS NOTED". This code is assigned when a confirmation of the notations and comments IS NOT required by the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product.

   Code 3 "APPROVED AS NOTED/CONFIRM". This combination of codes is assigned when a confirmation of the notations and comments IS required by the Contractor. The Contractor may, at his own risk, release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product. This confirmation shall specifically address each omission and nonconforming item that was noted. Confirmation is to be received by the Owner within 15 calendar days of the date of the Owner's transmittal requiring the confirmation.

   Code 4 "APPROVED AS NOTED/RESUBMIT". This combination of codes is assigned when notations and comments are extensive enough to require a resubmittal of the entire package. This resubmittal is to address all comments, omissions and nonconforming items that were noted. Resubmittal is to be received by the Owner within 15 calendar days of the date of the Owner's transmittal requiring the resubmittal.

   Code 5 "NOT APPROVED" is assigned when the submittal does not meet the intent of the Contract Documents. The Contractor must resubmit the entire package revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the Contract Documents.

   Code 6 "COMMENTS ATTACHED" is assigned where there are comments attached to the returned submittal which provide additional data to aid the Contractor.

   Code 7 “RECEIPT ACKNOWLEDGED” is assigned to acknowledge receipt of a submittal that is not subject to the Owner’s review and approval and is being filed for information purposes only.

Codes 1 through 5 designate the status of the reviewed submittal with Code 6 showing there has been an attachment of additional data.

5. Resubmittals will be handled in the same manner as first submittals. On resubmittals the Contractor shall identify all revisions made to the submittals, either in writing on the letter of transmittal or on the shop drawings by use of revision triangles or other similar methods. The resubmittal shall clearly respond to each comment made by the Owner on the previous submission. Additionally, the Contractor shall direct specific attention to any revisions made other than the corrections requested by the Owner on previous submissions.

6. Partial submittals may not be reviewed. The Owner will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the Contractor and will be considered "Not Approved" until resubmitted. The Owner may at his option provide a list or mark the submittal directing the Contractor to the areas that are incomplete.

7. Repetitive Review

    a. Shop drawings and other submittals will be reviewed no more than twice at the Owner's expense (excluding one record set review cycle). All subsequent reviews will be performed at times convenient to the Owner and at the Contractor's expense, based on the Owner's then prevailing rates. The Contractor shall reimburse the Owner for all such fees incurred. Submittals are required until approved.

    b. Any need for more than one resubmission, or any other delay in obtaining Owner's review of submittals, will not entitle Contractor to extension of the Contract Time.

8. If the Contractor considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, the Contractor shall give written notice thereof to the Owner at least 20 working days prior to release for manufacture.

9. When the shop drawings have been completed to the satisfaction of the Owner, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Owner.

10. When the drawings and data are returned marked "NOT APPROVED", the corrections shall be made as noted thereon and as instructed by Owner and six corrected copies (or one corrected reproducible copy) resubmitted. Facsimile (fax) copies will not be acceptable.

11. When the drawings and data are returned marked "APPROVED AS NOTED", "APPROVED", or "RECORD COPY", no additional copies need be furnished unless requested by Owner at time of review.

C. Contractor's Responsibilities

1. Review shop drawings, product data and samples, including those by subcontractors, prior to submission to determine and verify the following:

    a. Field measurements

    b. Field construction criteria

    c. Catalog numbers and similar data

d. Conformance with related Sections

2. Each shop drawing, sample and product data submitted by the Contractor shall have affixed to it the following Certification Statement including the Contractor's Company name and signed by the Contractor: "Certification Statement: by this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements." Shop drawings and product data sheets 11 in x 17 in and smaller shall be bound together in an orderly fashion and bear the above Certification Statement on the cover sheet. The cover sheet shall fully describe the packaged data and include a listing of all items within the package. Submittals shall be delivered to the Owner.

3. The Contractor shall utilize a 10 character submittal identification numbering system in the following manner:

   a. The first character shall be a D, S, or M, which represents Shop/Working Drawing and other Product Data (D), Sample (S), or Operating/ Maintenance Manual (M).

   b. The next five digits shall be the applicable Section Number.

   c. The next three digits shall be the numbers 001 to 999 to sequentially number each initial separate item or drawing submitted under each specific Section Number.

   d. The last character shall be a letter, A to Z, indicating the submission, or resubmission of the same Drawing, i.e., "A=1st submission, B=2nd submission, C=3d submission, etc. A typical submittal number would be as follows:

D 03300 008 B

D	=	Shop Drawing
03300	=	Section for Concrete
008	=	The eighth initial submittal under this section
B	=	The second submission (first resubmission) of that particular shop drawing

4. Notify the Owner in writing, at the time of submittal, of any deviations in the submittals from the requirements of the Contract Documents.

5. The review and approval of shop drawings, samples or product data by the Owner shall not relieve the Contractor from the responsibility for the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the Contractor and the Owner will have no responsibility therefor.

6. No portion of the work requiring a shop drawing, sample, or product data shall be started nor shall any materials be fabricated or installed prior to the approval or qualified approval of such item. Fabrication performed, materials purchased or on site construction accomplished which does not conform to approved shop drawings and data shall be at the Contractor's risk. The Owner will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.

7. Project work, materials, fabrication, and installation shall conform with approved shop drawings, applicable samples, and product data.

D. Submittals Required by Fairfax County Special Inspections Program

1. The Contractor shall submit three additional sets of drawings and data for the following items (if applicable) to satisfy the submission and approval requirements of the Fairfax County Special Inspections document:

   Structural steel
   Cast in place concrete
   Precast concrete
   Masonry
   Soils and foundations
   Earth retention systems

2. The Owner will review, approve, and stamp these submittals in accordance with the Special Inspections Document and return them to the Contractor. After these submittals have been approved by the Owner, the Contractor shall submit the three copies to the Fairfax County Special Inspections Section of the Commercial Inspections Branch, Division of Inspection Services, Department of Environmental Management. Following County review and approval, the Contractor shall pick up the documents from the County office and deliver one approved copy to the Owner. The contractor shall keep one approved copy on site with the Record Documents. The Contractor shall be responsible for the submittal and return of all shop drawings required by the Fairfax County Special Inspections Program.

E. Resubmittal of Drawings and Data

1. Contractor shall accept full responsibility for the completeness of each resubmittal. Contractor shall verify that all corrected data and additional information previously requested by Owner are provided on the resubmittal.

2. When corrected copies are resubmitted, Contractor shall in writing direct specific attention to all revisions and shall list separately any revisions made other than those called for by Owner on previous submissions.

3. Requirements specified for initial submittals shall also apply to resubmittals. Resubmittals shall bear the number of the first submittal followed by a letter (A, B, etc.) to indicate the sequence of the resubmittal.

4. If more than one resubmission is required because of failure of Contractor to provide all previously requested corrected data or additional information, Contractor shall reimburse Owner for the charges for review of the additional resubmissions. This does not include initial submittal data such as shop tests and field tests which are submitted after initial submittal.

5. Resubmittals shall be made within 30 days of the date of the letter returning the material to be modified or corrected, unless within 14 days Contractor submits an acceptable request for an extension of the stipulated time period, listing the reasons the resubmittal cannot be completed within that time.

6. Any need for more than one resubmission, or any other delay in obtaining Owner's review of submittals, will not entitle Contractor to extension of the Contract Times unless delay of the Work is directly caused by a change in the Work authorized by a Change Order or by failure of Owner to review any submittal within the submittal review period specified herein and to return the submittal to Contractor.

F. Color Selection

1. Color selections have been selected by the Owner and appear in Section 09900. If color selections have not been specified, Contractor shall submit color choices for Owner selection.

1.06 PROFESSIONAL ENGINEER (P.E.) CERTIFICATION FORM

A. If specifically required in other related Sections, submit a P.E. Certification for each item required, in the form attached to this Section, completely filled in and stamped.

PART2 PRODUCTS
(Not Used)

PART 3 EXECUTION
(Not Used)

P.E. CERTIFICATION FORM

The undersigned hereby certifies that he/she is a professional engineer licensed in the Commonwealth of Virginia and that he/she has been employed by

_____to design
(Name of Contractor)

_____
(Insert P.E. Responsibilities)

in accordance with Section _____for the

_____ Project.

The undersigned further certifies that he/she has performed the design of the _____

_____

_____, that said design is in conformance with all applicable local, state and federal codes, rules, and regulations, and that his/her signature and P.E. stamp have been affixed to all calculations and drawings used in, and resulting from, the design.

The undersigned hereby agrees to make all original design drawings and calculations available to Fairfax Water (Owner) or the Owner's representative within seven days following written request therefore by the Owner.

_____	_____
P.E. Name	Contractor's Name
_____	
P.E. License Number	
_____	_____
Signature	Signature
_____	_____
Address	Title
	_____
	Address

END OF SECTION 01330

NO TEXT THIS PAGE

SECTION 01410

REGULATORY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Partial outline of the major laws, codes and requirements to be followed on the project.

1.02 REFERENCES

A. Commonwealth of Virginia Department of Health Waterworks Regulations.

B. Building Officials and Code Administrators International (BOCA) BASIC/National Building Code.

C. Virginia Uniform Statewide Building Code (VUSBC)

D. Virginia Department of Transportation (VDOT) Road and Bridge Specifications

E. Fairfax County Special Inspections Manual

F. Fairfax County Public Facilities Manual

1.03 REGULATORY REQUIREMENTS

A. Compliance with the Law: Precautions shall be exercised at all times for the protection of persons and property. The safety provisions of all applicable laws, building and construction codes including, but not limited to, the U.S. Department of Labor Occupational Safety and Health Regulations for Construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54), shall be observed. The U.S. Department of Labor Safety and Health Regulations shall be complied with except where state safety standards have been approved by the Secretary of Labor in accordance with provisions of the Occupational Safety and Health Act, in which case compliance with state and local standards is required.

B. Work on State Highways: The Owner will obtain all permits required where Work is to be performed within the right-of-way of highways, roads, or other public areas under the control and jurisdiction of VDOT. The Contractor shall become familiar with the requirements of VDOT, particularly regarding cutting and crossing of roadways, materials, and methods of backfilling, maintenance of roadways, drainage and other structures, protection of the traveling public, final restoration of roadway surfaces, tree clearings, and restrictions on working hours, before commencing work on highways, roads and other public areas under the control and jurisdiction of VDOT. The Contractor shall comply with all the requirements of VDOT pertaining to the Work to be performed under the Contract, including but not limited too; LCAMS, VA Traffic and TOC notifications and submissions. The Contractor shall complete all requirements of the VDOT Land Use Permit, so that the Owner can obtain written approval and release from VDOT, before final payment will be allowed under this contract. No storing Materials or Equipment in the VDOT Right-Of-Way is allowed unless specifically approved by VDOT.

C. VDOT Holiday Schedule: During the following Holiday time periods, no lane closures shall be performed without the written permission of VDOT.

- January 1: From Noon on the preceding day until Noon on the following day, except as noted below.
- Martin Luther Kings, Jr. Day and Lee Jackson Day*
- President’s Day*
- Easter*

- Memorial Day: From Noon on the preceding day until Noon on the following day, except as noted below.
- July 4: From Noon on the preceding day until Noon on the following day, except as noted below.
- Labor Day: From Noon on the preceding day until Noon on the following day, except as noted below.
- Columbus Day*
- Veteran's Day*
- Thanksgiving Day: From Noon on the Wednesday Thanksgiving Day until Noon on the Monday following Thanksgiving Day.
- Christmas Day: From Noon on the preceding day until Noon on the following day, except as noted below.

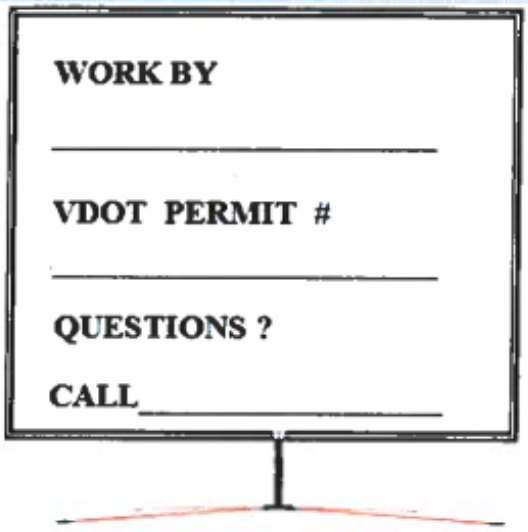
If the Holiday occurs on a Friday or Saturday: From Noon on the preceding Thursday until Noon on the following Monday.

If the Holiday occurs on a Sunday or Monday: From Noon on the preceding Friday to noon on the following Tuesday.

*Note – For low-volume roadways (local roads), lane closures will not be allowed during the holidays; however, there will be no restriction to the preceding and the following day.

D. VDOT Project Sign:

LUP-IS



1. Sign must not be oriented facing traffic approaching from any direction
2. Sign must be non-reflective
3. Sign must use Times New Roman font and should not use MUTCD sign fonts (or Clearview)
4. Sign must not show any logos
5. Sign must not contain the contractor's name (unless the contractor is the permittee)
6. Sign must be installed outside clear zone within 50' of work area
7. Sign must remain on site until final restoration of right of way
8. For multiple work locations within subdivisions, at least one sign may be installed at the main work area
9. Sign must be at least 36"X36" and made of water-resistant material and firmly secured
10. Sign must be blue with white 3" lettering
11. Sign shall not be installed on existing VDOT sign posts and should not impede pedestrian mobility

E. Contractor shall conform to applicable sections of the Virginia State Board of Health "Waterworks Regulations" and these Specifications during the installation, testing and disinfection of Waterworks facilities.

F. Applicable Codes: The codes listed under references of this Section are the applicable codes for this project. Other standard codes which apply to the Work are designated in the individual specification Sections.

G. When work is being performed outside of Fairfax County and within the limits of City of Fairfax or City of Falls Church, the Contractor must comply with all the regulatory and permit requirements of those jurisdictions as well as all other applicable contract requirements.

1.04 PERMITS

A. The Contractor shall comply with the provisions of all permits issued.

B. The Owner will provide the Contractor with the VDOT Land Use and Open Cut Permits and City of Fairfax and City of Falls Church Right-Of-Way permits and any required U.S. Army Corps of Engineers/Virginia Marine Commission/Virginia Department of Environmental Quality environmental permits for the non-emergency water main installation projects performed under this Contract. When construction permits are accompanied by regulations or requirements issued by an agency or municipality, it shall be the Contractor's responsibility to familiarize himself and comply with such regulations or requirements as they apply to his operations.

C. The Contractor shall abide by the conditions of permits related to the Work and shall obtain proof of satisfaction of conditions from issuers of permits prior to acceptance of the Work by the Owner.

D. The contractor is responsible for providing a Responsible Land Disturber for this Work. This individual shall have successfully completed the VDOT Erosion & Sediment Control Contractor Certification training and shall comply with the requirements of the VDOT Erosion and Sediment Control Contractor Certification form, included as a Special Provision to the approved VDOT Land Use Permit.

E. Trade Permits: The Contractor shall be responsible for obtaining his own trade permits.

F. Any permits required for construction that have not been obtained by the Owner shall be obtained by the Contractor at no additional cost to the Owner.

G. The Contractor shall submit all required documentation for permits to be obtained by the Contractor without delay, allowing for adequate review time by approving authorities. Any delay caused by the failure of the Contractor to submit permit applications in a timely fashion or to respond to comments from reviewers, will not entitle the Contractor to an extension of time.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not used

END OF SECTION 01410

SECTION 01420

REFERENCES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Abbreviations

B. Reference Standards

1.02 ABBREVIATIONS AND SYMBOLS

A. Technical Societies, organizations, other bodies: Reference to a technical society, organization, or body may be made in the Specifications by abbreviations in accordance with the following list:

AAMA	Architectural Aluminum Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ACPA	American Concrete Pipe Association
AFBMA	Antifriction Bearing Manufacturers Association
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute
AREA	American Railway Engineering Association
APA	American Plywood Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASSE	American Society of Sanitary Engineering
ASTM	American Society for Testing and Materials
AWPA	American Wood Products Association
AWWA	American Water Works Association
CISPI	Cast Iron Soil Pipe Institute
CMAA	Crane Manufacturers Association of America
CRSI	Concrete Reinforcing Steel Institute
DHI	Door and Hardware Institute
FGMA	Flat Glass Marketing Association
IEEE	Institute of Electrical and Electronics Engineers
IFI	Industrial Fasteners Institute
ISA	International Society of Arboriculture
NAAMM	National Association of Architectural Metals
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association Manufacturers
OSHA	Occupational Safety and Health Administration
PCI	Prestressed Concrete Institute
SAE	Society of Automotive Engineers
SCPRF	Structural Clay Products Research Foundation
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SPI	Society of the Plastics Industry
SSPC	Steel Structures Painting Council

UL	Underwriters' Laboratories, Inc.
USACOE	U.S. Army Corps of Engineers
USBS	U.S. Bureau of Standards
USBR	U.S. Bureau of Reclamation
VDH	Virginia Department of Health
VDOT	Virginia Department of Transportation
VSWCB	Virginia State Water Control Board

B. Common Abbreviations:

AWG	American Wire Gauge
CS	Commercial Standard
Fed Spec	Federal Specifications
IPS	Iron Pipe Size
MIL	Military Specification
NEC	National Electrical Code
PS	Product Standard

1.03 REGULATORY REQUIREMENTS

A. Reference to Standards: Whenever reference is made to furnishing materials or testing thereof to conform to the standards of any technical society, organization, or body, it shall be construed to mean the latest standard, code, or specification, adopted and published at the time of the Bid unless otherwise noted.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION 01420

SECTION 01450

QUALITY CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Inspection Services

B. Inspection of Materials

C. Contractor's Quality Control

1.02 SUBMITTALS

A. Certificates of Manufacture: The Contractor shall furnish the Owner authoritative evidence in the form of Certificates of Manufacture that the non-Owner supplied materials and equipment to be used in the Work have been manufactured and tested in conformity with the Contract Documents. These certificates shall include copies of the results of physical tests and chemical analyses, where necessary, that have been made directly on the product or on similar products of the manufacturer.

1.03 INSPECTION OF WORK

A. Work May Be Rejected at Any Time: During the progress of the Work and until the Date of Final Completion, the Contractor shall at all times afford the Owner's Inspector and other Authorized Representatives every reasonable, safe, and proper facility for inspecting the Work at the Site. The observation and inspection of any Work shall not relieve the Contractor of any of his obligations to perform proper and satisfactory Work as herein specified. If at any time an inspection, test, or analysis of Work reveals faulty design, inferior, or defective materials, poor workmanship, improper installation, excessive wear, or nonconformity with the requirements of the Contract Documents, such Work will be rejected and shall be replaced with satisfactory Work at the Contractor's expense. Finished or unfinished Work found not to be in strict accordance with the Contract shall be replaced as directed, even though such Work may have been previously approved and payment made therefore.

B. Removal of Rejected Work and Materials: The Owner's Inspector or Authorized Representatives shall have the right to reject materials and workmanship which are defective or require correction. Rejected Work and materials must be promptly removed from the Site, which must at all times be kept in a reasonably clean and neat condition.

C. Failure to Reject Inferior Work and Materials: Failure or neglect on the part of the Owner or its Authorized Representatives to condemn or reject bad or inferior Work or materials shall not imply an acceptance of such Work or materials. Nor shall it be construed as barring the Owner or its Authorized Representatives at any subsequent time from recovering damages or a sum of money needed to build anew all portions of the Work in which inferior workmanship or improper materials were used.

D. Examination of Completed Work: Should it be considered necessary or advisable by the Owner's Inspector or Authorized Representatives at any time before final acceptance of the Work to make examinations of portions already completed, by removing or tearing out all or portions of such Work, the Contractor shall, on request promptly furnish all necessary facilities, labor, and material for that purpose. If such Work is found to be defective in any respect, the Contractor shall defray all expenses of such examination and of satisfactory reconstruction. If, however, such Work is found to meet the requirements of the Contract, the cost of examination and restoration of the Work shall be considered an item of Extra Work to be paid for in accordance with the provisions of these Contract Documents.

E. Proper Operation of Equipment during Tests or Training: The Contractor shall be fully responsible for the proper operation of equipment during tests and instruction periods and shall neither have nor make any claim for damage which may occur to equipment prior to the time when the Owner accepts the Work and issues a Certificate of Final Completion.

1.04 INSPECTION OF MATERIALS

A. Inspection During Manufacture, Preparation or Testing: Where required by the Contract Documents, the Contractor shall give notice in writing to the Owner sufficiently in advance of his intention to commence the manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction. Such notice shall contain a request for inspection, the date of commencement, and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice, the Owner will arrange to have a representative present at such times during the manufacture or testing as may be necessary to inspect the materials, or he will notify the Contractor that the inspection will be made at a point other than the point of manufacture or testing, or he will notify the Contractor that the inspection will be waived. The Contractor must comply with these provisions before shipping any materials. Such inspection will not release the Contractor from the responsibility for furnishing materials meeting the requirements of the Contract Documents.

B. Testing Electrical and Mechanical Equipment: Tests of electrical and mechanical equipment and appliances shall be conducted in accordance with recognized test codes of the ANSI, ASME, or IEEE, except as may otherwise be stated herein.

1.05 COSTS OF INSPECTION

A. Inspection by the Owner or its Authorized Representatives: All inspection and testing of materials furnished under this Contract will be performed by the Owner or its Authorized Representatives or inspection bureaus without cost to the Contractor, unless otherwise expressly specified. The Contractor shall reimburse the Owner for expenditures incurred in making such tests on materials and equipment which were rejected for noncompliance.

B. Shop and Field Tests: The cost of shop and field tests of equipment and certain other tests specifically called for in the Contract Documents shall be borne by the Contractor, and such cost shall be deemed to be included in the Contract Sum.

C. Tests for Equivalent Materials and Equipment: Materials and equipment submitted by the Contractor as the equivalent to these specifically named in the Contract may be tested by the Owner for compliance. The Contractor shall reimburse the Owner for expenditures incurred in making such tests on materials and equipment which were rejected for noncompliance.

1.06 FAILURE TO COMPLY WITH CONTRACTS

A. Rejection of Equipment or Material: If it is ascertained by testing or inspection that the material or equipment does not comply with the Contract, the Contractor will be notified, and he will be directed to refrain from delivering said material or equipment, or to remove it promptly from the Site or from the Work and replace it with acceptable material without cost to the Owner. Failure of the Owner or its Authorized Representatives to ascertain noncompliance or to notify the Contractor of any noncompliance shall not relieve the Contractor from fulfilling his obligations under the terms and conditions of the Contract.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 PREPARATION

A. Equipment and Machinery: The Contractor shall have on hand sufficient proper equipment and machinery of adequate capacity to facilitate the Work and to handle all emergencies normally encountered in Work of this character.

END OF SECTION 01450

NO TEXT THIS PAGE

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General Requirements

B. Temporary Utilities

C. Temporary Construction

D. Barricades and Enclosures

E. Security

F. Temporary Controls

G. Access and Parking

H. Field Offices and Sheds

1.02 RELATED SECTIONS

A. Section 02370 Erosion and Sediment Control

1.03 GENERAL REQUIREMENTS

A. Contractor to Furnish Temporary Facilities: All false work, scaffolding, ladders, hoistways, braces, pumping plants, shields, trestles, roadways, sheeting, centering forms, barricades, drains, flumes, and the like, any of which may be needed in the construction of any part of the Work and which are not herein described or specified in detail, must be furnished, maintained and removed by the Contractor, and he shall be responsible for the safety and efficiency of such works and for any damage that may result from their failure or from their improper construction, maintenance or operation.

B. First Aid: In addition to any other requirements, the Contractor shall maintain a readily accessible, completely equipped first aid kit at each location where work is in progress.

C. Safety Responsibility: The Contractor shall be solely responsible for safety and security at the site. The Contractor will indemnify and hold harmless the Owner and its Authorized Representatives for any safety violation, or noncompliance with governing bodies and their regulations, and for accidents, deaths, injuries, or damage at the site during occupancy or partial occupancy of the site by the contractor and while performing any part of the Work. If Owner determines conditions to be unsafe, a stop work order will be issued until the unsafe conditions are corrected at no additional cost to Owner.

1.04 TEMPORARY UTILITIES

A. Water: The Contractor will be provided with water by the Owner at no expense for normal use. The Owner will supply at no cost to the Contractor a maximum of 110% of the volume of the pipelines and water bearing structures for testing pipelines. Additional water required for testing by the Contractor will be provided at the Owner's standard rates for the additional volume required. The Contractor shall, if necessary, provide and lay water lines to the place of use; secure all necessary permits and pay for all taps to water mains and hydrants.

B. Light and Power: The Contractor shall provide at his own expense temporary lighting and power facilities required for the proper construction and inspection of the Work. If these facilities are inadequate, the Contractor will not be permitted to proceed with any portion of the Work affected thereby. Temporary lighting and power shall be maintained until the Work is accepted.

C. Heat: The Contractor shall provide temporary heat, whenever required, for work being performed during cold weather and to prevent freezing of water pipes and other damage to the Work or existing facilities.

D. Sanitary Facilities: The Contractor shall not be allowed to use any of the Owner's existing sanitary facilities or those included in the Work. The Contractor shall furnish and maintain adequate temporary sanitary facilities for his personnel, including all subcontractor personnel, for the duration of the Contract; shall prohibit and prevent nuisances on the site of the Work or on adjoining property; and shall permanently remove from the site any employee who violates this rule. The Contractor shall also abide by all applicable health and environmental regulations and shall obtain all permits required by local code.

E. Connections to Existing Utilities:

1. Unless otherwise specified or indicated, the Contractor shall make all necessary connections to existing facilities including structures, drain lines, and utilities such as water, sewer, gas, telephone, and electricity. In each case, the Contractor shall receive permission from the Owner or the owning utility prior to undertaking connections. The Contractor shall protect facilities against deleterious substances and damage.

2. Connections to existing facilities which are in service shall be thoroughly planned in advance, and all required equipment, materials, and labor shall be on hand at the time of undertaking the connections. Work shall proceed continuously to complete connections in the minimum time. Operation of valves or other appurtenances on existing utilities, when required, shall be by or under the direct supervision of the owning utility.

1.05 TEMPORARY CONSTRUCTION

A. Temporary Bridges: The Contractor will be required to place and design suitable temporary bridges where necessary for the maintenance of vehicular and pedestrian traffic. He shall be responsible for the sufficiency and safety of all such temporary work or bridges and for any damage which may result from their failure or their improper construction, maintenance, or operation and will indemnify and save harmless the Owner from all claims, suits or actions, and damages or costs of every description arising by reason of failure to comply with the above provisions.

1.06 BARRICADES AND ENCLOSURES

A. Protection of Workmen and Public: During the prosecution of the Work, the Contractor shall put up and maintain at all times barriers and lights to prevent accidents. The Contractor shall provide

suitable barricades, lights, "danger" or "caution" or "street closed" signs and watchmen at all places where the Work causes obstructions to the normal traffic or constitutes in any way a hazard to Owner's personnel or the public.

B. Barricades and Lights:

1. Streets, Roads and Highways: All streets, roads, highways, and other public thoroughfares which are closed to traffic shall be protected by effective barricades which display acceptable warning signs (meeting VDOT standards). Barricades shall be located at the nearest public highway or street on each side of the blocked section.

2. Excavations and Trenches: All open trenches and other excavations shall have barricades, signs, and lights suitable to provide adequate protection for plant personnel. Obstructions such as material piles and equipment shall be posted with similar warning signs and lights.

3. Statutory Requirements: All barricades, signs, lights, and other protective devices shall be installed and maintained in conformity with applicable statutory requirements and, within highway rights-of-way, as required by the authority having jurisdiction there over.

1.07 FENCES

A. Existing Fences: Existing fences affected by the Work shall be maintained by Contractor until completion of the Work. Fences which interfere with construction operations shall not be relocated or dismantled until written permission is obtained from the owner, and the period the fence may be left relocated or dismantled has been agreed upon. Where fences must be maintained, adequate gates shall be installed. Gates shall be kept closed and locked at all times when not in use.

B. Restoration: On completion of the Work, the Contractor shall restore all fences to their original or better condition and to their original location at no additional cost.

1.08 SECURITY

A. Preservation of Property:

1. The Contractor shall preserve from damage all property along the line of the Work in the vicinity of or in any way affected by the Work, the removal or destruction of which is not called for by the Drawings. He shall preserve from damage public utilities, trees, lawn areas, building monuments, fences, pipe and underground structures, and public streets. (Normal wear and tear of streets resulting from legitimate use by the Contractor shall not be considered as damage.) Whenever the Contractor damages such property, he shall immediately restore it to its original condition at his own expense.

2. In case of failure on the part of the Contractor to restore such property or make good such damage or injury, the Owner may, upon 24 hours written notice, proceed to repair, rebuild, or otherwise restore such property as may be deemed necessary, and the cost thereof will be deducted from any moneys due or which may become due the Contractor under this Contract. If removal, repair or replacement of public or private property is made necessary by alteration of grade or alignment authorized by the Owner and not contemplated by the Contract Documents, the Contractor shall be compensated, in accordance with the General Conditions provided that such property has not been damaged through fault of the Contractor or his employees.

B. Public Utility Installations and Structures:

1. Public utility installations and structures shall be understood to include all poles, tracks, pipes, wires, conduits, vaults, manholes, and other appurtenances and facilities, whether owned or controlled by public bodies or privately owned individuals, firms or corporations, used to serve the public with transportation, gas, electricity, telephone, storm and sanitary sewers, water, or other public or private utility services. Facilities appurtenant to public or private property which may be affected by the Work shall be deemed included hereunder.

2. The Contract Documents contain data relative to existing public utility installations and structures above and below the ground surface. Existing public utility installations and structures are indicated on the Drawings only to the extent such information was made available to, or discovered by, the Owner in preparing the Drawings. This data is not guaranteed for completeness or accuracy, and the Contractor is responsible for making his own investigations to fully inform himself of the character, condition, and extent of all installations and structures that may be encountered and that may affect the construction operations.

3. Further, the Contractor is responsible for enforcing the requirements of Chapter 63, Fairfax County Code-Excavation and Utility Line Installation. In particular, the Contractor is directed to Section 63-2-2, “Demolition or Excavation; Prior Notice” of the aforesaid Code. The Contractor shall contact "Miss Utility" sufficiently in advance of the start of construction to comply with this requirement.

4. The Contractor shall, at all times in performance of the Work, employ proven methods and exercise reasonable care and skill to avoid unnecessary delay, injury, damage, or destruction to public utility installations and structures; and shall avoid unnecessary interference with, or interruption of, public utility services; and cooperate fully with the owners thereof to that end.

5. Any water, gas, or other utility damaged during the Work shall be repaired or replaced by the Contractor at his expense, if the utility is as shown on the plans, or as marked in the field, or where reasonable care to avoid the damage was not exercised. Any utility damaged due to over-excavation by the Contractor beyond or below the lines and grades given by the Owner shall be repaired or replaced by the Contractor at his expense, to include any damages incurred by a homeowner.

6. The Contractor must remove, replace, relocate, repair, rebuild, and secure at his expense any public utility that he has damaged. The Contractor shall be responsible and liable for any consequential damages done to or suffered by any public utility installations or structures. The Contractor also shall be responsible for any injury, damage, or loss which may result from or be consequent to interference with, or interruption or discontinuance of, any public utility service.

7. The Contractor shall give written notice to the owners of all public utility installations and structures affected by his proposed construction operations, sufficiently in advance of breaking ground in any area or on any unit of the Work, to obtain their permission before disturbing the lines and to allow them to take measures necessary to protect their interests. The Contractor must advise the Chiefs of Police and the Fairfax County Fire and Rescue Services of any excavation in public streets or the temporary shut-off of any water main. At least 24 hours’ notice shall be given by the Contractor to all affected property owners whenever service connections are taken out of service.

C. Work on Private Property:

1. Where installations are to be placed on private property, rights-of-way or easements will be secured by the Owner without cost to the Contractor. The Contractor shall conduct his operations along rights-of-way and easements through private property to avoid damage to the property and to minimize interference with its ordinary use. The Contractor shall, upon completion of the Work through such property, restore the surface and all fences or other structures disturbed by his operations as nearly as possible to the conditions in which he found them or better. No material shall be used or removed from private property without the consent of the Owner or responsible party in charge of such property. The Contractor shall save the Owner harmless from any claim or damage arising out of or in connection with the performance of Work across and through private property.

2. If in the opinion of the Owner, restoration Work is not performed promptly, the Owner, with 7 days notification to the Contractor, may retain the services of another contractor to perform the restoration Work. The cost for the performance of this restoration Work authorized by the Owner and performed by others shall be at the Contractor's expense.

3. The Contractor shall give a minimum of 24 hours' advance notice (unless noted otherwise on the Drawings) to owners of private property adjacent to the Work to be performed under this Contract of the necessity to remove or obstruct the means of access to such property and, in the event that the removal or obstruction of the regular access shall exceed a period of 4 hours, he shall arrange temporary means of access. All driveways shall be temporarily restored with compacted gravel immediately after completion of pipe laying operations therein. Access to fire stations, hospitals and other essential emergency services facilities shall be maintained at all times.

4. As a prerequisite to obtaining the final payment for Work performed under any project, the Fairfax Water may require the Contractor to obtain a release, on forms to be provided by the Fairfax Water, from each owner of private property upon which any portion of the Work was performed at no additional cost to Fairfax Water. Fairfax Water shall be the sole judge as to whether private property has been restored to an acceptable condition. Contractor shall pay special attention to all time constraints, work and restoration requirements.

D. Miscellaneous Structures: The Contractor shall be held entirely responsible for all injuries or damage to culverts, building foundations and walls, retaining walls, or other structures of any kind met with during the prosecution of the Work, and shall be liable for damages to public or private property resulting therefrom. All pipes carrying liquid shall be adequately protected against freezing.

E. Protection of Trees and Lawn Areas:

1. All trees and shrubs, except those ordered to be removed, shall be adequately protected by boxes or otherwise by the Contractor. No excavated material shall be placed so as to injure such trees or shrubs. Trees or shrubs destroyed by accident or negligence of the Contractor or his employees shall be replaced by him with new stock of similar size and age, at the proper season, and at the Contractor's expense.

2. Lawn areas shall be left in as good condition as before the start of the Work. The areas where sod has been removed shall be restored by seeding or sodding in accordance with the requirements of Section 02920.

1.09 TEMPORARY CONTROLS

A. During Construction:

1. Debris Control:

a. During construction of the Work, the Contractor shall at all times keep the site of the Work and adjacent premises as free from materials, debris, and rubbish and shall remove such from any portion of the site if, in the Owner's opinion, such material, debris, or rubbish constitutes a nuisance or is objectionable.

2. Remove Surplus Materials: The Contractor shall remove from the site all these surplus materials and temporary structures when they are no longer needed.

3. Construction Materials: Construction materials such as concrete forms and scaffolding shall be neatly stacked by the Contractor when not in use. The Contractor shall promptly remove splattered concrete, asphalt, oil, paint, corrosive liquids, and cleaning solutions from surfaces to prevent marring or other damage.

4. Volatile Wastes: Volatile wastes shall be properly stored in covered metal containers and removed daily.

5. Waste Disposal: Wastes shall not be buried or burned on the site or disposed of into storm drains, sanitary sewers, streams, or waterways. All wastes shall be removed from the site and disposed of in a manner complying with local ordinances and antipollution laws.

B. Smoke Prevention:

1. The Contractor shall strictly observe all air pollution control regulations.

2. No open fires will be permitted on site.

C. Noises:

1. Acceptable Noise Levels: The Contractor shall be responsible for maintaining acceptable noise levels in the vicinity of the Work during the performance of the Work under this Contract. The Contractor shall limit noise production to acceptable levels by using special mufflers, barriers, enclosures, equipment positioning, and other approved methods, based on the requirements of the regulatory agency.

2. Variance Requirements: The Contractor shall supply written notification to the Owner sufficiently in advance of the start of any Work which violates this provision and shall not proceed until the Contractor obtains all applicable authorizations, including a variance from the regulatory agency and the Owner's written consent, have been obtained. The Contractor shall be responsible for filling out all forms necessary to obtain the waiver and shall provide for the Owner’s review and signature prior to submission to the County.

D. Hours of Operation:

1. Allowable hours for work within the Right of Way is limited by permit requirements, as issued by VDOT, the City of Fairfax, or the City of Falls Church.

2. The Contractor shall keep the Owner informed regarding his hours of operation and work activities. The Contractor shall submit his normal working hours to the Owner prior to starting any work in the field. Whenever the Contractor works outside his normal working hours, adequate advance notice shall be provided to the Owner.

3. No non-emergency Work, including equipment moves, shall be performed prior to the 7:00 A.M. start time or all day on Sundays without prior authorization by the Owner.

E. Dust Control:

1. The Contractor shall take measures to prevent unnecessary dust. Earth surfaces exposed to dusting shall be kept moist with water or by application of a chemical dust suppressant. Materials in piles or in transit shall be covered to prevent blowing or spreading dust.

2. Buildings or operating facilities which may be affected adversely by dust shall be adequately protected. Machinery, motors, instrument panels, or similar equipment shall be protected by suitable dust screens. Proper ventilation shall be included with dust screens.

3. Sweep and wash all paved roads daily.

4. Sweep and wash all paved roads used for hauling roads twice daily.

5. Provide wheel wash facility at locations adjacent to paved roads. All vehicles leaving unpaved roads must use the wheel wash facility before using the paved roads.

F. Pollution Control: The Contractor shall prevent the pollution of drains and watercourses by sanitary wastes, sediment, debris, and other substances resulting from construction activities. No sanitary wastes shall be permitted to enter any drain or watercourse other than sanitary sewers. No sediment, debris, or other substances shall permitted to enter sanitary sewers, and reasonable measures shall be taken to prevent such materials from entering any drain or watercourse.

G. Erosion Control: Erosion Control shall be in accordance with Section 02370 – Erosion and Sediment Control.

H. Temporary Drainage Provisions:

1. The Contractor shall provide for the drainage of stormwater and any water applied or discharged on the Site in performance of the Work. Drainage facilities shall be adequate to prevent damage to the Work, the Site, and adjacent property.

2. Existing drainage channels and conduits shall be cleaned, enlarged, or supplemented as necessary to carry all increased runoff from the Contractor's operations. Dikes shall be constructed as necessary to divert the increased runoff from entering any adjacent property (except in natural channels), to protect the Owner's facilities and the Work, and to direct water to drainage channels or conduits. Ponding shall be provided as necessary to prevent downstream flooding.

3. Maintain all excavations free of water. Provide, operate, and maintain pumping equipment.

1.10 ACCESS AND PARKING

A. Access:

1. Access to the site of the work shall be restricted to existing public roads and to roads and easements owned by the Owner. Contractor shall comply with all permitting agency requirements.

2. The Contractor shall construct and maintain all access of haul roads, except where noted, necessary for equipment and material movement.

3. The Contractor shall provide and maintain suitable parking areas for the use of all construction workers and others performing Work or furnishing services in connection with the Contract, to avoid any need for parking personal vehicles where they may interfere with public traffic or construction activities.

1.11 MAINTENANCE OF TRAFFIC

A. Maintenance of Traffic:

1. The Contractor shall conduct his work in such a manner as to interfere as little as possible with public travel, whether vehicular or pedestrian. Whenever it is necessary to cross, obstruct, or close roads, driveways, parking spaces and walks, whether public or private, the Contractor shall provide and maintain suitable and safe bridges, detours, or other temporary expedients for the accommodation of public and private travel, and shall give reasonable notice to owners of private parking and drives before interfering with them. Such maintenance of traffic will not be required when the Contractor has obtained permission from the owner and tenant of private property, or from the Owner having jurisdiction over the public property involved, to obstruct traffic at the designated point.

2. Contractor is required to provide all labor, including up to 3 flaggers, and equipment, including signage, necessary to execute VDOT Typical Traffic Controls 23.1 (Lane Closure on a Two-Lane Roadway Using Flaggers), 28.1 (Lane Closure Operation in an Intersection), or other VDOT Typical Traffic Controls with equal or lesser labor and equipment requirements, and shall be incidental to all Contract Items. Additional traffic control measures, if required, shall be paid for under Item 46 – Miscellaneous Traffic Control.

3. Message Boards: When required, project message boards shall be furnished by the Contractor from a VDOT-approved supplier and placed in accordance with VDOT, City of Fairfax, or City of Falls Church requirements. The Contractor shall be paid for message boards under Item 46 – Miscellaneous Traffic Control.

PART 2 PRODUCTS

(Not Used)

PART 3 EXECUTION

(Not Used)

END OF SECTION 01500

SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General Requirements

B. Manufacturers

C. Transportation and Handling

1.02 SUBMITTALS

A. Manufacturers, Materialmen, Suppliers and Dealers: The names of proposed manufacturers, materialmen, suppliers, and dealers who are to furnish non-Owner supplied materials, fixtures, equipment, appliances, or other fittings shall be submitted to the Owner for acceptance, in accordance with Section 01330, as early as possible, to afford proper investigation and checking. Such acceptance must be obtained before shop drawings will be reviewed. No manufacturer will be accepted for any materials to be furnished under this Contract unless he is, in the Owner's opinion, of good reputation and has a plant of ample capacity. He shall, upon the Owner's request, be required to submit evidence that he has manufactured a product like the one specified that has been previously used for a like purpose and for a sufficient period of time to demonstrate its satisfactory performance.

B. Samples: Submit samples for approval in accordance with the individual specification sections.

1.03 GENERAL REQUIREMENTS

A. Owner provides the material noted in Section 02510 Water Main and Appurtenances.

B. Conformance with Laws, Ordinances, Codes, and Specifications: All materials and appliances used in construction shall be in accordance with the Contract Documents and shall be a grade sufficient to conform to the requirements of any applicable laws, ordinances, and codes.

C. Quality Requirements:

1. Materials and Equipment: All materials and equipment incorporated into the Work shall be new, unused, and correctly designed. Materials and equipment shall be of a standard, high-grade quality, produced by expert workmen, and intended for the use for which they are offered. Materials or equipment which in the Owner's opinion are inferior or of a lower grade than indicated, specified, or required will not be accepted.

2. Workmanship: The quality of workmanship and materials entering into the Work under this Contract shall conform to the requirements of the Contract Documents.

D. Standards:

1. Equipment and Appurtenances: Equipment and appurtenances shall be designed in conformity with ANSI, ASME, IEEE, NEMA, AWWA, and any other applicable standards and shall be of rugged construction and of sufficient strength to withstand all stresses which may occur during fabrication, testing, transportation, installation, and all conditions of operation. Details shall be designed for appearance as well as utility. Protruding members, joints, corners, and the like shall be finished the same in appearance. All exposed welds shall be ground smooth, and the corners of structural shapes shall be ground smooth, and the corners of structural shapes shall be mitered.

2. Electrical Requirements: Electrical devices, motors, equipment, control panels, electrical equipment enclosures, and other electrical equipment appurtenances shall be UL listed. Shop drawings for electrical equipment shall denote that the represented material has the UL label. Non-listed materials and special equipment devices not normally UL listed and labeled shall equal or exceed the latest UL standards for such types of equipment. The Contractor shall be responsible for providing the services of an electrical inspection firm to certify compliance of all non-listed materials to the UL standards and for providing materials with an inspection label in accordance with local code requirements.

1.04 MANUFACTURERS

A. General:

1. Unless otherwise shown or specified, materials and equipment appearing in Fairfax Water's "Approved Product List" shall be provided by one of the approved manufacturers also listed. The "Approved Product List" may be obtained via Fairfax Water's internet website: www.fairfaxwater.org.

2. Unless specifically named in the specifications, a manufacturer shall have furnished equipment of the type and size specified in the Contract Documents which has been in successful operation for not less than the five years.

3. All transactions with the manufacturers or subcontractors shall be through the Contractor.

4. Any two or more pieces of material or equipment of the same kind, type, or classification used for identical types of service, shall be made by the same manufacturer.

1.05 TRANSPORTATION AND HANDLING

A. Delivery: The Contractor shall deliver materials in quantities sufficient to ensure the uninterrupted progress of the Work and its completion within the allotted time. The Contractor shall deliver materials to or pick up from Fairfax Water's storage yards, as needed for the project. The locations of Fairfax Water's storage yards are given in Section 02510. The Contractor shall also coordinate deliveries in order to avoid delay in, or impediment of, the progress of the Work of any related contractor.

B. Storage: No storage of materials or equipment is permitted in the VDOT Right-of-Way unless specifically approved by VDOT.

C. Care and Protection: The Contractor shall be solely responsible for properly storing and protecting all materials, equipment, and Work furnished under this Contract or furnished by Owner from the time such materials and equipment are delivered at the site of the Work until final acceptance thereon. He shall at all times take necessary precautions to prevent injury or damage to such materials, equipment, and Work by whatever cause, including, without limitation, water, freezing, dust and atmospheric contaminants, or inclemency's of the weather. All injury or damage to materials, equipment, or Work resulting from any causes whatsoever shall be made good by the Contractor.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION 01600

SECTION 01630

PRODUCT OPTIONS AND SUBSTITUTIONS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This section outlines the policies and procedures for obtaining consideration and acceptance of products other than those specified.

1.02 RELATED SECTIONS

A. Section 01600 - Materials and Equipment

1.03 DESIGN REQUIREMENTS

A. Intention of Contract Documents: It is the intention of these Contract Documents that the Work be constructed with the specified products. The Contractor shall base his bid price on the products specified. The Owner has the right to reject proposed substitutions for any reason.

1.04 SUBMITTALS

A. Substitution Requests: For a period of 20 Days after issuance of a Notice to Proceed, the Owner will consider written requests from the Contractor for substitution of products other than those specified. The Contractor shall submit a separate request for each product, supported with complete data, drawings, and samples as appropriate, including but not limited to the following information:

1. A detailed description of the Contractor's proposed substitution with comparison to product specified, including supplementary or revised Drawings and Specifications, as applicable.

2. A statement of the reason for the proposed substitution and an explanation as to why implementation of such substitution would benefit the Project.

3. Effects on the Construction Schedule.

4. Cost data comparing the proposed substitution with the product specified and the amount of credit that the Contractor proposes to issue to the Owner if the proposed substitution is accepted.

5. Any required license fees or royalties.

6. Availability of maintenance service and source of replacement parts and materials.

7. Such supporting documentation as may be necessary under the circumstances to permit the Owner to evaluate fully the information set forth in 1 through 6 above.

B. Contractor to Submit Requests for Substitutions: Requests for review of a substitution or equivalence will not be accepted from anyone except the Contractor. Moreover, such requests will not be considered until after the contract award.

C. No substitution will be accepted for any product to be furnished under this Contract unless the manufacturer is, in the Owner's opinion, of good reputation and has a plant of ample capacity.

The manufacturer shall, upon the Owner's request, be required to submit evidence that he has manufactured a product like the one specified that has been previously used for a like purpose and for a sufficient length of time to demonstrate its satisfactory performance.

D. In no case shall the Owner’s acceptance of a substitution be considered as grounds for a contract time extension or delay claim by the Contractor.

1.05 QUALITY ASSURANCE

A. Contractor Certification: By the submittal of a substitution request, the Contractor shall represent that:

1. He has investigated the proposed substitute product and determined that it is equal to or superior in all respects to the product specified;

2. He shall provide the same warranties or bonds for the substitutions as for the specified products;

3. He shall coordinate the installation of an accepted substitution into the Work and make such other changes as may be required to make the Work complete in all respects;

4. He shall waive all claims for additional costs due to the substitution which may subsequently become apparent.

B. Contractor Responsible for Performance: Neither the acceptance by the Owner of alternate material or equipment as being equivalent to that specified nor the furnishing of the material or equipment specified shall in any way relieve the Contractor of responsibility for failure of the material or equipment due to faulty design, material, or workmanship, to perform the functions required by the Contract Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01630

SECTION 01720

FIELD ENGINEERING AND SURVEYING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The requirements related to construction to designated lines, grades and elevations.

1.02 CONSTRUCTION TO LINES AND GRADES

A. All work under this Contract shall be constructed in accordance with the lines, grades, and elevations shown on the Drawings. The full responsibility for keeping alignment and grade shall rest upon the Contractor. Included shall be preparation of cut sheets.

1.03 SURVEYS

A. Horizontal and Vertical Controls: Base horizontal and vertical control points will be established or designated by the Owner. Water main coordinates and curve data may also be provided on the Drawings to assist the Contractor in the layout of the water mains. These points shall be used as datum for the Work. All additional survey, layout, preparation of cut sheets, and measurement work shall be performed by a Land Surveyor, licensed in the Commonwealth of Virginia, employed by the Contractor as a part of the Work. Stake-out for all water mains shall be performed at intervals of 50 feet, at all appurtenances, and as otherwise directed by the Owner. Contractor shall submit cut sheets for review and approval by the Owner prior to beginning water main installations.

B. Scheduling: The Contractor shall keep the Owner informed sufficiently in advance of the times and places at which he wishes to do Work, so that base horizontal and vertical control points may be established and any checking deemed necessary by the Owner may be done with minimum inconvenience to the Owner and without delay to Contractor in accordance with Section 01320 – Construction Schedule.

C. Delay of Work: It is the intention not to delay the Work for establishment of control points and checking of lines and grades set by the Contractor but, when necessary, the Work shall be suspended for such reasonable time as the Owner may require for this purpose. The Owner will not be liable for such delays.

D. Survey information is based on the 1983 NAD Virginia State Grid, North Zone, for Horizontal Control and the NAVD 88 for Vertical Control.

E. Layout of Work: The Contractor shall provide an experienced instrument man, competent assistants, and any instruments, tools, stakes, and other materials required to complete the survey, layout, and measurement performed by the Contractor.

1.04 PROTECTION OF SURVEY DATA

A. Safeguarding Points: The Contractor shall safeguard all points, stakes, grade marks, monuments, and bench marks made or established on the Work, and replace them if disturbed, and bear the entire expense of checking replaced marks and rectifying Work improperly installed.

B. Safeguarding Property Corners: The Contractor shall safeguard all existing and known property corner and other survey monumentation adjacent but not related to the Work and shall re-establish them if disturbed or destroyed.

1.05 RECORDS

A. Maintain a complete, accurate log of all control and survey work as it progresses.

B. Maintain an accurate record of all changes, revisions and modifications.

C. Locate by survey the horizontal and vertical locations of all buried pipe and structures exposed during the work.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION 01720

SECTION 01730

CUTTING AND PATCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirements and limitations for cutting and patching of Work.

1.02 GENERAL REQUIREMENTS

A. Coordinating Work: The Contractor shall do all cutting, fitting or patching of the Work that may be required to make several parts thereof join and coordinate in a manner satisfactory to the Owner and in accordance with the Contract Documents. The restoration shall be performed by competent workmen skilled in the trade.

B. Correcting Defective Work: The Contractor shall perform all cutting and patching required for the Work, as may be necessary in connection with uncovering Work for inspection or for correcting defective work.

C. Improperly Timed Work: The Contractor shall perform all cutting and patching required to install improperly timed Work, to remove samples of installed materials for testing, and to provide for alteration of existing facilities or for the installation of new Work in the existing construction.

D. Limitations: Except when the cutting or removal of existing construction is specified or indicated, Contractor shall not undertake any cutting or demolition which may affect the structural stability of the Work or existing facilities without the Owner's concurrence.

1.03 SCHEDULING

A. Connections with Existing Facilities: The Contractor is advised that if any connections, replacement, and other Work requiring the shutdown of an existing facility are necessary, these shutdowns can only be scheduled at times when the impact on the Owner's normal operation is minimal. At no additional cost to the Owner, the Contractor may be required to work overtime, nights and weekends in making these connections, especially if the connections are made at times other than those specified. When a shutdown of an existing facility is necessary the contractor shall complete the tie-in in as expeditious a manner as possible, minimizing the down time of the existing facility. Once an existing facility is shut down, the contractor shall work continuously (24 hours per day) on the tie-in until the new facility has been placed back into service

B. The Owner must be notified at least 10 days in advance of any shutdown required as a result of the Contractor's Work. A detailed plan for any shut-down and tie-in is required to be submitted under Section 01140 for review at least 28 days in advance of such shut-down and/or tie-in. Shutdowns shall be shown on the project schedule submitted by the Contractor.

C. All shutdowns shall be incorporated into the Contractor's Schedule in accordance with the provisions of Section 01320.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 PREPARATION

A. Shoring Bracing: The Contractor shall provide all shoring, bracing, supports, and protective devices necessary to safeguard all Work and existing facilities during cutting and patching operations.

B. Removal of Existing Materials: Materials shall be cut and removed to the extent indicated on the Drawings or as required to complete the Work at no additional cost. Materials shall be removed in a careful manner with no damage to adjacent facilities or materials. Materials which are not salvageable shall be removed from the site by the Contractor.

3.02 RESTORATION

A. Restoration of Existing Facilities: All Work and existing facilities affected by cutting operations shall be restored with new materials, or with salvaged materials acceptable to the Owner, to obtain a finished installation with the strength, appearance, and functional capacity required. If necessary, entire surfaces shall be patched and refinished.

END OF SECTION 01730

SECTION 01770

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This section includes the procedures to be followed when closing out the contract.

1.02 FINAL FIELD TESTS

A. Requirements: Upon completion of the Work and prior to final payment, the Contractor shall furnish all labor, materials, and instruments and shall make field tests of equipment as specified to prove compliance with the Contract Documents. If the field tests disclose that any equipment furnished by the Contractor under this Contract does not comply with the requirements of the Contract Documents, the Contractor shall make all changes, adjustments, and replacements required, and repeat the field tests until compliance with those requirements is demonstrated.

1.03 SUBMITTALS

A. Manufacturer's Certificates: Manufacturer's certificates confirming that materials and equipment have been properly installed and are ready to be placed in service shall be submitted by the Contractor prior to Beneficial Use.

B. Operation and Maintenance Data: All operation and maintenance manuals and data required for proper operation and maintenance of equipment shall be submitted by the Contractor prior to Beneficial Use.

C. Project Record Documents: Project record documents required by the individual specification Sections shall be submitted within 14 days of the date of the Notice of Completion for Beneficial Use.

D. Paragraphs A, B, and C preceding are considered requirements for Beneficial Use.

1.04 BENEFICIAL USE

A. Notification: When the Contractor considers the Work ready for Beneficial Use, the Contractor shall so notify the Owner in writing.

B. Inspection: After the Contractor's notification, the Owner and Contractor shall make an inspection of the Work to determine the status of completion. If the Owner does not consider the Work complete for Beneficial Use, the Owner shall notify the Contractor in writing giving reasons therefor. If the Owner considers the Work complete for Beneficial Use, he shall prepare and deliver to the Contractor a Notice of Completion for Beneficial Use fixing the date of Beneficial Use, and stating the responsibilities between the Owner and Contractor for operation, heating, utilities, and maintenance. The Notice shall include a list of items to be completed or corrected before final acceptance.

1.05 RELEASING COMPLETED WORK FOR USE

A. It is the intent of these Specifications that all newly constructed Work be placed in use as rapidly as it can be constructed, inspected and accepted and placed in service for its intended use. The Contractor shall arrange his operations to permit access to all such parts of the Work by the Owner and other contractors for the Owner.

B. Taking over of parts of the Work for operation before completion of the entire Contract shall not relieve the Contractor of any responsibility for proper integrated operations of all parts of the Work, nor shall it act to relieve him of any responsibilities under the Contract except as follows:

1. When parts of the Work are accepted by the Owner in advance of the date of Beneficial Use for the entire Project and such Work is taken over for use by the Owner, the starting date for the warranty period shall be the date for that portion of the Work accepted for Beneficial Use by the Owner.

2. The Owner will issue certificates describing the Work which is taken over for use by the Owner and the Contractor shall furnish all maintenance and guarantee information of manufacturers or suppliers that is applicable to the Work being taken over for use.

1.06 FINAL CLEANING

A. Removal of Contractor's Materials: At the conclusion of the Work, all erection plant, tools, temporary structures and materials belonging to the Contractor shall be promptly taken away and he shall remove and promptly dispose of all water, dirt, rubbish or any other foreign substances.

B. Cleaning Materials and Equipment: The Contractor shall thoroughly clean all materials installed by him and existing structures, materials or equipment soiled by the contractor during construction and shall deliver over such materials and equipment undamaged in a bright, clean and polished condition.

1.07 FINAL INSPECTION

A. When the Work has been completed in accordance with the requirements of the Contract and final cleaning has been performed, the Contractor shall request a final inspection which shall be performed by the Owner within 10 days after receipt of the request. The Work will be deemed complete as of the date set by the Contractor if, upon inspection, the Owner determines that no further Work remains to be done at the site. Upon determination that all Work is completed, the Owner will issue a certificate of final completion.

B. However, if such inspection, in the opinion of the Owner, reveals items of Work still to be performed, the Contractor shall promptly perform them and then request a reinspection. In the event the Owner then determines that the Work is complete, the date of final completion shall be deemed to be the last day of such reinspection.

C. Final completion is contingent on final approval and permit release by authorities having jurisdiction.

D. When the Owner finds that the Work is acceptable under the Contract Documents, he shall request the Contractor to make closeout submittals.

1.08 REINSPECTION FEES

A. Should the Owner perform reinspections due to failure of the Work to comply with the claims of status of completion made by the Contractor, the Owner will be reimbursed for such inspection.

1.09 CONTRACTOR'S CLOSEOUT SUBMITTALS TO OWNER

A. Submit evidence of compliance with requirements of governing authorities.

B. Submit evidence of payment and release of liens: Requirements of General Conditions.

1.10 FINAL ADJUSTMENT OF ACCOUNTS

A. Submit a final statement of accounting to the Owner.

B. Statement shall reflect all adjustments to the Contract amount:

1. The original Contract amount.

2. Additions and deductions resulting from:

a. Change Orders.

b. Units installed and unit prices.

c. Deductions for uncorrected or incomplete Work.

d. Deductions for liquidated damages.

e. Deductions for reinspection payments.

f. Other adjustments.

g. Extended engineering and/or inspection services and inspection overtime.

h. Excessive shop drawings review cost by the Owner.

3. Total Contract amount as adjusted.

4. Previous payments.

5. Remaining payment due.

1.11 FINAL APPLICATION FOR PAYMENT

A. Contractor shall submit the final Application for Payment reflecting the above final contract value in accordance with procedures and requirements stated in the General Conditions. Release of Retainage will not occur until VDOT, City of Fairfax, or City of Falls Church has released the Land Use and Open Cut Permit.

PART 2 - PRODUCTS
(Not Used)

PART 3 - EXECUTION
(Not Used)

END OF SECTION 01770

SECTION 01780

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Maintain at the site for the Owner one record copy of:

1. Drawings
2. Specifications
3. Addenda
4. Change Orders and other Modifications to the Contract
5. Work Orders or written instructions
6. Approved Shop Drawings and Product Data and Samples
7. Field Test records

1.02 RELATED WORK

A. Shop Drawings, Working Drawings, Product Data and Samples are included in Section 01330.

B. Field Engineering is included in Section 01720.

1.03 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store working drawings, submittals, shop drawings, and samples in field office apart from documents used for construction.

B. File all documents and samples in accordance with CSI/CSC format.

C. Maintain all documents in a clean, dry, legible condition and in good order. Do not use the Record Documents for construction purposes.

D. Make all documents and samples available at all times for inspection by the Owner.

1.04 RECORD DRAWINGS

A. The Owner will maintain all record drawings. The Contractor shall maintain and provide redline drawings upon project completion.

1.05 RECORDING

A. Label each document "PROJECT RECORD" in neat large font.

B. Record information concurrently with construction progress.

1. Do not conceal any work until required information is recorded.

2. Project record drawings will be checked monthly prior to approval of monthly partial payment.

C. Clearly record actual construction on the drawings:

1. All underground piping with elevations and dimensions. Changes to piping location, horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements. Actual installed pipe material, class, etc.

2. Determine installed pipeline location from the construction baseline or from physical features shown on the Drawings. Show dimensions to nearest foot on project record documents.

3. Field changes of dimension and detail.

4. Changes made by Work Order or by Change Order.

5. Details not on original contract drawings.

6. Equipment and piping relocations.

D. Submittals: Shop Drawings, Product Data and Samples (after final review and approval):

1. One record set of all submittals approved by the Owner.

1.06 SUBMITTAL

A. Accompany submittal with transmittal letter in duplicate, containing:

1. Date.

2. Project title and number.

3. Contractor’s name and address.

4. Title and number of each Record Document.

5. Signature of Contractor or his authorized representative.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01780

SECTION 02260

EXCAVATION SUPPORT SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shoring and Bracing

B. Trench Shields (Boxes)

1.02 UNIT PRICES

A. Refer to Section 01200 – Measurement and Payment.

1.03 REFERENCES

A. ASTM D245 – Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber.

B. American Wood Preservers Association C2.

C. Occupational Safety and Health Standards - Excavations; Final Rule 29CFR Part 1926. Occupational Safety and Health Administration (OSHA).

1.04 SUBMITTALS

A. Submit shop drawings and material certificates of compliance in accordance with Section 01330 – Submittals.

B. Design Data:

1. Submit design drawings of excavation support system to be used at locations of all water main installations, including but not limited to: locations of all vaults, access and receiving pits for trenchless crossings, water system interconnections and tie-in locations, and similar structures. Excavation support system shall include provisions to protect and support existing utilities, including but not limited to poles, manholes, water and sewer mains, brick screen walls, underground cables, etc. Drawings must be sealed and signed by a Professional Engineer licensed in the Commonwealth of Virginia.

2. Trench Shields: Submit design or approval of trench shields by licensed Professional Engineer.

a. Refer to OSHA Standard for design requirements.

1.05 REGULATORY REQUIREMENTS

A. OSHA: Comply with OSHA regulations for excavation safety.

B. Virginia Department of Labor and Industry: Comply with requirements of Virginia Department of Labor for Excavation Safety.

PART 2 PRODUCTS

2.01 MATERIALS

A. Timber and Lumber: Timber and lumber shall meet the requirements of ASTM D245 and the following:

1. General: Timber and lumber shall be free from shakes, wanes, black and unsound knots and decay.

2. Untreated Lumber: Timber and lumber for shoring and bracing shall be new pine, Douglas fir, or spruce unless otherwise shown or specified.

Timber and lumber for decking and supports shall be hard yellow pine. No secondhand timber or lumber shall be used where strength and appearance are considerations.

3. Treated Lumber: Treated timber and lumber shall be well seasoned No. 1 southern yellow pine or Douglas fir, reasonably free of knots, splits, seasoning checks, pitch pockets and streaks, wormholes and other defects.

   a. Timber and lumber shall be treated with Grade One coal-tar wood preserving oil by the empty cell process, in conformity with the requirements of the American Wood Preservers Association C2.

2.02 EQUIPMENT

A. Trench Shields: Trench Shields and/or other shoring, bracing, etc. shall meet all applicable OSHA Requirements for such units.

PART 3 EXECUTION

3.01 INSTALLATION

A. General: Shore and brace excavations as required by law and all applicable regulations or where conditions dictate to prevent shifting of material or damage to structures or adjacent property, and to avoid delays to the Work.

B. Bracing: Arrange bracing to avoid placing strain on portions of the completed Work until the shoring and bracing is to be removed.

C. Trench Shields: Trench Shields shall be installed in accordance with manufacturer's instructions.

3.02 REMOVAL

A. Shoring and bracing: Remove shoring and bracing as excavation is backfilled in a manner which avoids caving of the bank, damage to the Work, and disturbance to adjacent areas, pipelines, and other under-ground utilities or structures.

   1. Voids: Fill voids left by withdrawal of the shoring by jetting, ramming or as otherwise directed.

B. Sheeting Left in Place: Sheeting shall be left in place only where indicated on the Drawings or when directed by the Owner.

END OF SECTION 02260

SECTION 02315

EXCAVATING, BACKFILLING, AND COMPACTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Excavating Trenches for Water Mains and Appurtenant Facilities.

B. Rock Excavation

C. Backfilling and Compacting

1.02 UNIT PRICES

A. Refer to Section 01200 – Measurement and Payment.

1.03 REFERENCES

A. Land Use Permit Manual, Virginia Department of Transportation.

B. Road and Bridge Specifications, Virginia Department of Transportation.

C. ASTM D698 - Test Methods for Moisture Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5 lb. Hammer and 12-inch Drop.

D. Manual of Accident Prevention in Construction. Associated General Contractors of America.

E. Occupational Safety and Health Standards-Excavation; Final Rule 29 CFR Part 1926, OSHA.

F. Virginia Work Area Protection Manual

G. Fairfax County Public Facilities Manual

1.04 SUBMITTALS

A. Submit shop drawings and material certificates of compliance in accordance with Section 01330 – Submittals.

B. Materials and Certifications:

1. Select Fill: Submit letter of certification and list of material composition and properties from each supplier of select fill.

2. Compaction Test Reports: Submit reports for each location of field compaction test. Reports shall include results of field density tests, moisture consent, and degree of compaction.

1.05 DEFINITIONS

A. Utility: Buried pipe, conduit, or cable, surface features such as swales and ditches, and overhead wires or cables including their supports.

B. Earth: The softer materials of the outer surface of the earth. The basic constituents are the products of rock disintegration, glaciation, and erosion, consisting of boulders, cobbles, pebbles, sand, silt, and clay.

C. Rock Excavation: Rock excavation shall consist of excavation and offsite disposal of materials that cannot be split or dislodged with the bucket of an excavator. The Owner, in consultation with the geotechnical engineer, will provide a written determination of whether or not rock excavation is required. Rock excavation quantity will be measured in place. Cement-treated rock, soil cement, or asphalt paving in excess of 7.5 inches will be classified as Rock Excavation, provided a hoe-ram attachment is used for removal.

D. Heavy Clearing: Clearing areas where the average diameter of the trees measured at the trunk is greater than 4 inches and the average spacing of the trees is less than 8 feet on center. All other clearing shall be incidental and no additional payment shall be made.

1.06 FIELD MEASUREMENTS

A. Bench Marks: Verify that survey bench marks and intended elevations for the Work are as shown on the Drawings. Refer to Section 01720 for additional requirements.

1.07 TREE CUTTING REQUIREMENTS

A. Establish Clearing Limits: The clearing limits shall be as defined on the Drawing's under Limits of Construction. All trees within the construction limits shall be removed unless denoted to be saved (via tree protection). Prior to tree removal or beginning clearing operations, the Contractor shall identify the clearing limits for the Project using yellow ribbon to designate the boundaries.

1. Specific trees to be saved within the clearing limits shall be flagged.

2. Clearing limits and trees to be saved will be reviewed at the site by the Owner.

3. Trees (up to 30 feet tall) located outside of the designated clearing limits, whose branches overhang within the limits of construction, shall be trimmed back by a qualified landscape contractor approved by the Owner at no additional cost to the Owner.

B. Authorization for Tree Removal: No tree shall be removed until Contractor has written approval from the Owner.

C. Consequences for Unauthorized Tree Removal: At the discretion of the Owner, one of the following measures will be imposed as a remedy for each tree removed without prior approval.

1. At his expense, Contractor shall plant minimum 10 foot tall replacement trees in quantities which equal the number of trees removed.

a. The species of replacement trees will be the same as the trees which were removed, or as directed by the Owner.

2. Contractor shall be required to pay the Owner a penalty fee for each tree removed.

a. The penalty fee will be computed using the International Arborists Society, formula, as applied by the Owner.

1.08 WORK REQUIREMENTS IN FEDERAL, STATE, OR COUNTY RIGHTS-OF-WAY

A. Permits: Refer to Section 01410 - Regulatory Requirements, for permits obtained by the Owner. All other permits shall be obtained by the Contractor.

1. The Contractor shall assume all responsibility for fulfilling any and all requirements specified in right-of-way permits.

2. All applicable provisions for work in the State Right-of-Way are set up in the "Land Use Permit Manual," Maintenance Division, Virginia Department of Transportation, Richmond, Virginia, as can apply to the type of Work covered by this permit, shall apply, including provisions for revocation of permit.

a. The Contractor shall assist the Owner in obtaining a release from the Land Use permit in accordance with the requirements of this Section and Section 01410.

b. The Contractor shall be prohibited from working in the State Right-of-Way on the designated State/Federal Holidays listed in Section 108.02 of the VDOT Road and Bridge Specification, latest edition.

3. Contractor shall employ VDOT certified personnel for clearing and tree trimming operations within the VDOT Right-of-Way.

1.09 ADDITIONAL REGULATORY REQUIREMENTS

A. Naturally Occurring Asbestos: The Contractor shall comply with all applicable regulations of OSHA and the Fairfax County Health Department concerning Working requirements in areas containing naturally occurring asbestos deposits.

1.10 WARRANTY

A. The Contractor shall be responsible for correcting any settlement in backfill or pavement for a period of one year after final completion of the Work.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. Select Fill: Select fill shall meet the following requirements:

1. Crushed Stone: Crushed Stone shall consist of 21A crushed stone conforming to VDOT specifications, or an approved substitute. NOTE: No. 57 stone shall be used (in lieu of 21A stone) at creek crossings and in areas containing groundwater.

2. The conversion factor for Select Fill supplied by weight instead of volume will be 3000 pounds per cubic yard.

B. Suitable Fill: Suitable fill material shall conform to the following requirements.

1. Type I: Type I material shall consist of clean earth excavated from the trench containing no stone larger than 3/4 inch across.

2. Type II: Type II suitable material may be substituted for Type I suitable material, in the area from 12 inches above top of pipe to original grade. Type II material shall contain good earth and stone excavated from the trench.

a. Stone material contained in Type II suitable fill shall not exceed 6 inches across and shall be uniformly distributed.

b. Type II suitable material shall not consist of more than 50 percent stone by volume.

2.02 BEDDING MATERIALS

A. Bedding: Pipe bedding shall be Crushed Stone and shall meet the requirements of Paragraph 2.01.A.1 above.

PART 3 EXECUTION

3.01 PREPARATION

A. Identify: Required lines, levels, contours, and datum.

B. Protect Existing Vegetation: Protect plant life, lawns, and other features remaining as a portion of final landscaping.

C. Protect Existing Features: Protect bench marks, existing structures, fences, sidewalks, paving, mailboxes, gas line markers, curbs, and other similar features from excavation equipment and vehicular traffic.

D. Clearing: The site of all open cuts and excavation shall be first cleared of trees, stumps, shrubs, underground and other obstructions prior to excavation.

1. Clearing within easements and rights-of-way shall be limited to the construction limits shown on the Drawings.

2. Remove and dispose of cleared materials and debris unless otherwise directed by the Owner.

3. Remove topsoil and stockpile for use in restoration of excavated areas.

3.02 WORK IN RIGHT-OF-WAY

A. Length of Open Trenches: The maximum length of trench at any time, including backfill portion of same not then suitable for traffic, shall not exceed 150 feet. Trenches shall not be left open overnight.

B. Repair of Damage: When pavement edge or shoulder is damaged due to diversions of traffic away from the pipe laying operation, repairs shall be made as directed.

C. Open Cut Requirements: Wherever pavement is permitted to be cut, not over one-half of the width shall be disturbed at one time. For crossings, the first opening shall be completely restored to satisfactory travel conditions before the second half is opened. Where the pavement is disturbed, or deemed weakened, it shall be restored or replaced as directed in its entirety, or such portion or portions as deemed necessary.

D. Stockpiling Excavated Materials: No excavated material shall be placed on the pavement, without written permission. When so permitted, protect pavement with a 1-inch layer of sand or approved substitute material at no additional cost to the Owner. The pavement shall be satisfactorily cleaned by an approved method.

E. Equipment Restrictions: No cleated equipment shall be used on pavement. Where track equipment must enter paved areas, protect pavement with a sufficient layer of sand or approved substitute material at no additional cost to the Owner.

F. Traffic Maintenance:

1. Contractor is responsible for notifying regulatory agencies prior to any lane closure and again after the lane is opened.

2. Traffic Control: Traffic shall not be blocked or re-routed without special written permission of the regulatory agency. Where one-way traffic is permitted to be maintained, it shall be flagged 24 hours per day. Traffic shall at all times be properly protected by adequate lights, barricades, signs and flagmen when needed. Signs shall be in accordance with the current specifications of the Virginia Manual on Uniform Traffic Control Devices.

3. Entrances: Road and street connections and private entrances shall be kept in a satisfactory condition. Entrances shall not be blocked, and ample provision shall be made for safe ingress and egress to adjacent property at all times.

4. Pedestrian Traffic: If sidewalk or trail is blocked by construction activities, the pedestrian traffic shall be re-routed around the construction area. Traffic shall at all times be properly protected by adequate lights, barricades, signs and fencing in accordance with Section 01500.

G. Correction of Hazardous Situations: The Contractor shall immediately correct any situation which may arise which the Owner deems hazardous to the traveling public.

H. Drainage Requirement: Maintain all drainage facilities in accordance with Section 01500.

I. Dust Control: The Contractor shall ensure that dusty conditions are controlled in accordance with Section 01500.

J. Pavement Restoration: Refer to Section 02700 for pavement restoration requirements.

K. Construction Entrances: The Contractor shall construct and maintain construction entrances at locations designated on the Drawings, or as approved by the VDOT Inspector, in accordance with the Erosion & Sediment Control notes and details on the drawings.

L. Additional Requirements: Refer to Section 01410 Regulatory Requirements, and the VDOT Land Use Permit, for additional VDOT requirements and restrictions.

3.04 EARTH EXCAVATION

A. Shaping and Trimming: Excavate trenches to the widths and depths specified below, except where indicated otherwise.

1. Trench width at bottom of pipe:

Nominal Pipe Diameter (Inches)	Trench Width (Inches) Ductile Iron
3 – 4	24
6 – 16	OD + 18
24 - 36	OD + 24
42-54	OD + 30

2. Trench Bottom: Grade and align pipe trench bottoms to provide bearing for the full length of the pipe barrel. Provide bell holes for the proper assembly of pipe joints.

B. Additional Excavation: If unsuitable bedding materials are encountered at the specified elevation, or if additional depth is required for other reasons, no additional payment will be made unless such further excavation is carried to the depth requested by the Contractor and approved in writing by the Owner. It is the responsibility in the first instance of the Contractor to evaluate the suitability of bedding materials and to notify the Owner of any irregularity or unsuitability. Notwithstanding the foregoing, in the event the Owner determines the bedding materials in any area to be unsuitable, with or without the concurrence of the Contractor, the Contractor shall promptly follow the direction of the Owner in addressing such condition. Where additional excavation has been ordered and approved, the Contractor shall replace the removed material with Class D concrete, or select fill material as directed by the Owner.

C. Unauthorized Excavation: Wherever the excavation is carried beyond or below the lines and grades given by the Owner, except as specified above, all such excavated space shall be refilled with such material and in such manner as may be directed in order to ensure the stability of the various structures. Beneath all structures, space excavated without authority shall be refilled by the Contractor at his own expense, with Class D concrete or select fill materials, as ordered by the Owner.

D. Disposal of Material: Top soil suitable for final grading shall be stored on the site separately from other excavated material. If there is no suitable location at the site for material storage, then the material may be stored offsite at no additional cost to the Owner. Other surplus excavated material unsuitable for backfilling or in excess of that required for constructing fills and embankments as shown on the Drawings shall be removed by the Contractor at no additional expense to the Owner.

E. Excavation support systems: Refer to the provisions of Section 02260 for requirements.

F. Removal of Water: Refer to the provisions of Section 01500 for requirements.

G. Removal and disposal of Petroleum-Contaminated Soil and Groundwater: In areas where petroleum-contaminated soils are encountered along the proposed water main alignment, the contractor, as directed by the Owner, shall remove and dispose of all contaminated soils within the pipeline trench where the Total Petroleum Hydrocarbon (TPH) concentration exceeds 50 mg/kg. The contractor shall remove the subject soils as directed by the Owner in accordance with applicable regulations of the Virginia Department of Environmental Quality (VDEQ), the U.S Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), and industry-recognized removal procedures. The contaminated soils shall be disposed of at a certified land fill site for the concentration levels encountered. Suitable clean fill material will be put in place above newly installed water main, if non-paved area, in accordance with Fairfax Water's standard Trench Details. Additionally, the Contractor shall install trench plugs at each end of the limit of contaminated soils in accordance with Fairfax Water's standards.

The Contractor shall also obtain all necessary permits and inspections as required by local, state, and federal laws, rules, and regulations. The contractor shall make reasonable efforts to excavate only contaminated soil necessary for the implementation of this project, and shall separate it from any other clean soil.

The Contractor shall handle the contaminated soil (from its generation to its disposal) in accordance with the pertinent sections of DEQ Guidance Document# 99-2004 (Storage Tank Program Technical Manual). In summary, the contractor shall characterize the excavated contaminated-soil in accordance with either VAC 20-80-700 or the permit requirements of the facility. Applicable VAC 20-80-700 regulations are referenced. Contaminated soil shall be treated by means of a low temperature thermal desorption or bioremediation process. Remediation shall be performed off-site in accordance with Virginia Department of Environmental Quality regulations, or as directed by the engineer.

After remediation, the contractor shall provide the Owner with copies of the signed transportation manifest, disposal records, and certificate of remediation, or other written documentation indicating that the soil had been adequately treated. Disposal of the treated soil shall be in accordance with applicable Virginia Department of Environmental Quality regulations.

Likewise, the contractor shall follow the engineer instructions and manage the petroleum contaminated groundwater from the generation to its disposal in accordance with Section 6.1 of the VDEQ Guidance Document # 99-2004. According to the referred Guidance Document, the proper handling of the wastewater will be depending on the nature and level of contamination as well as the quantity of the water.

If the contractor chooses onsite treatment, the contractor or his consultant shall submit a VPDES permit application to the VDEQ for approval and consult with the Fairfax County Storm Water Pollution Section/Office. The onsite treatment system may encompass frac tanks for temporary storage, air stripper to remove volatile components, and a carbon filtration system for sediments. If instead, the contractor opts for other treatment method, he may, provided it complies with the federal, state, local, and VDOT specifications.

The contractor is required to comply with all VDEQ applicable regulations including permits, storage time limit, sampling, chemical analyses, and inspections. Moreover, the contractor shall provide the ENGINEER/OWNER with all records of the disposal and testing, and keep copy of these records until the case is closed.

The contractor will be compensated for removal and disposal of contaminated soils based on actual documented costs for treatment and disposal of the contaminated soil and groundwater plus applicable contract markup. The contractor shall provide the Owner with actual subcontractor invoices, hauling and disposal documentation, transportation manifest records, disposal receipts, and all other records associated with each event.

3.05 ROCK EXCAVATION

A. Limits of Rock Excavation: Excavate rock within the widths and depths specified for earth excavation and specified in this paragraph.

1. Proposed Structures: Excavate only to the bottom of structure.

2. Rock Trench: Remove rock to a minimum of 6 inches below the bottom of pipe and replace with 6 inches of select fill material for pipe bedding.

3. Existing Structures: Excavate rock within 5 feet of existing structures and utilities by wedging, barring or other approved method.

4. Rock excavation may be performed by the use of a rock trenching machine or other approved method. Machine shall be adequate to excavate rock of the type and in the quantities necessary to perform the work required by this project.

5. When the use of a rock trenching machine is inappropriate (such as at utility crossings), rock shall be excavated by barring, wedging or other approved methods.

B. Blasting

1. Blasting shall not be permitted.

C. Protection of Backfill Material

1. Excavated materials from rock excavation operations, that are deemed suitable for use as backfill, shall be placed back in the trench, compacted, and protected from inclement weather prior to re-excavation for, and during new pipeline installation, at no additional cost to the Owner. If the Contractor fails to protect the suitable material, thereby allowing it to become unsuitable, he shall provide select fill at no additional cost to the Owner.

2. Unsuitable Materials: Refer to the provisions for disposal of materials under the earth excavation requirements of this specification section.

3.06 BACKFILLING

A. Pipe Trenches: Backfill trenches to original grade or to such other grades as shown or directed.

1. Manual Backfilling: Backfill around pipe manually with select fill, from 6 inches below the pipe up to 6 inches above the pipe in non-paved areas, unless specified otherwise herein. Limits of select fill in paved (roadway) areas, at stream crossings, under asphalt trails, or other designated areas shall be as defined on the Trench details on the Drawings. If rock is encountered, backfill around pipe (with select fill) from below pipe, in accordance with limits of rock excavation defined in paragraph 3.05.A.2 above, up to 6 inches above the pipe. This material shall be placed in layers approximately 6 inches thick, up to the limits indicated (on the trench details) on the Drawings, each layer being thoroughly tamped and compacted in place to a minimum of 95% of maximum dry density in accordance with ASTM D698 and VDOT Road and Bridge specifications. Tamp using tools of approved weight to the following points:

Nominal Pipe Diameter	Top of Manual Backfilling
16 Inches and Under	12 Inches Above Top of Pipe
Greater than 16 Inches	6 Inches Above Top of Pipe

2. Backfilling by machine in non-paved areas: After backfilling around the pipes as specified above, the remainder of the trench may be backfilled by machine with suitable fill, but the Work shall be done in such a way as to prevent dropping of material directly on top of the pipe or structure. Material shall be deposited in uniform horizontal layers up to 2 feet in depth and compacted to a minimum 85% density in accordance with ASTM D698. If, due to rain or other causes, the material is too wet for satisfactory compaction, it shall be allowed to dry partially before compacting.

3. Select fill: Where select fill material is ordered by the Owner to bed and backfill the pipe, this material shall be consolidated to the identical points specified where suitable fill material is used as backfill. The use of select material shall be based upon the actual trench conditions encountered and depth shall be determined by the Owner.

4. Prevention of Settlement: Where structures such as pipelines, walks, asphalt trails, driveways and roadways are to be constructed or replaced later, on backfilled areas, the entire backfill in such areas placed in layers, rolled, rammed, or otherwise thoroughly compacted to a minimum of 95% of maximum dry density to prevent settlement.

5. Use of water for compaction is prohibited.

B. Backfilling Around Structures: Backfilling around thrust collars, and other structures and conduits shall be performed manually.

1. Removal of foreign matter: Remove lumber, rubbish, braces and refuse from behind walls prior to starting backfill operation.

2. Backfill shall be compacted to a minimum 95% density.

C. Backfilling in VDOT Right-Of-Way: The following additional requirements apply for work performed in VDOT rights-of-way:

1. Backfill compaction: All backfill shall be placed in layers of not greater thickness than 6 inches, and shall be compacted to at least 95% of maximum dry density in accordance with Virginia Department of Transportation Road and Bridge Specifications. Compact with

pneumatic tampers or by other approved methods. Compaction by water shall not be permitted.

2. Rejection of unsuitable materials: The VDOT inspector may, at his discretion, reject backfill material which he determines to be unsuitable.

3. Backfill requirements beneath aggregate surfaces: When the excavation is made beneath aggregate surfaces, the top 10 inches of the trench must be replaced in accordance with the requirements of Section of 02700.

D. Compaction testing by an independent testing laboratory shall be provided by the Owner.

1. One compaction test shall be made for each 250 linear feet of pipeline installed. Test location and depth will be as directed by the Owner. Testing shall be continued along the backfill benching so as not to delay pipe laying activities.

3.07 EARTH EMBANKMENTS

A. General: Fills and embankments, required for the construction or completion of the Work shall be constructed where shown on the Drawings and to the lines and grades given by the Owner.

B. Removal of Vegetation: The entire surface of the ground to be covered with embankment shall be stripped of all grass, vegetation, topsoil, or destructible material of any kind, including rubbish, before any embankment material is placed.

C. Embankment Materials: Earth embankment shall be made of the best material available from the excavation, so far as this is sufficient and of satisfactory character. No rubbish or other destructible matter shall be used in embankments. Any additional material needed for earth embankment shall be from borrow pits approved by the Owner, and this material shall be reasonably free from vegetable matter, large boulders, or rocks, greater than 6 inches in diameter, and shall be a material that can be solidly compacted and will remain stable when wet.

D. Placement and Compaction Requirements: Wherever any structure is to be built upon embankments or fill, the earth for the embankment shall be placed in layers of 8 inches in loose depth, and each layer shall be thoroughly sprinkled and compacted before the next layer is added. If, due to rain or other causes, the material is too wet for satisfactory compaction, it shall be allowed to dry partially before compacting. The layers shall extend entirely across the fill and shall be approximately level. Each layer shall be thoroughly compacted by the travel of trucks, where possible, or other machines. If ordered by the Owner, the earth shall be compacted by rolling with a sheeps foot or tamping roller having a minimum weight on each tamper of 200 pounds per square inch of cross-sectional tamping area. The earth embankment, as specified above, shall be left to stand for as long a time as possible during the progress of construction and shall not be built upon until approved by the Owner. The Contractor shall conduct compaction testing in accordance with Paragraph 3.06.D above.

E. Finish grading: Before leaving the Work or before topsoil is placed, the top and slopes of all embankments shall be carefully trimmed to the slopes, lines and grades established by the Owner, and any depressions shall be brought to grade with acceptable material. In general, for lawn areas, the embankments shall be fine graded to a true surface 4 inches below the established grade. For other areas, the embankments shall be fine graded to the established grade.

F. Removal of unsatisfactory material: If any of the material is not sufficiently compacted in and by the methods being used, such material shall be removed from the embankment and replaced with approved material compacted to meet the required density.

3.08 RESTORATION

A. General: The Contractor shall be responsible for maintenance and careful removal of fences, gas line markers, small trees, shrubs and other similar features. Temporary restoration of these items, if needed, shall be accomplished within 24 hours. All items covered by this section shall

be restored or replaced in kind by the Contractor immediately upon completion of pipe installation in the affected area.

B. Complete finish grading and restoration of excavated areas in accordance with Section 02920 and the Drawings.

C. Pavement: Refer to the provisions of Section 02700.

END OF SECTION 02315

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SECTION 02400

TRENCHLESS CROSSINGS AND OPEN CUT CASINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Trenchless Crossings: Perform crossings by one or more of the following methods:

1. Boring
2. Liner plate tunneling
3. Horizontal Directional Drill (HDD)

B. Pipe Installation: Pipe installation within encasing conduit

C. Prices

1. Refer to Section 01200 – Measurement and Payment.

1.02 REFERENCES

A. ASTM A123 Standard Specification for Zinc (Hot-dip Galvanized) Coatings on Iron and Steel Products

B. ASTM A153 Standard Specification for Zinc Coating (Hot-dip) on Iron and Steel Hardware

C. ASTM A307 Standard Specification for Carbon Steel Bolts and Studs

D. ASTM C62 Specification for Building Brick (Solid Masonry Units Made From Clay or Shale)

E. AREMA Manual for Railway Engineering – American Railway Engineering and Maintenance-of-Way Association (AREMA)

F. VDOT Road and Bridge Specifications

1.03 DEFINITIONS

A. Trenchless Crossing: The installation of a system consisting of conduit and appurtenances such as tunnel liner plate or casing pipe and a carrier pipe (water main) by one or a combination of methods commonly known as jacking, boring or tunneling. Trenchless Crossing shall be considered equivalent with Tunneled Crossings in these documents.

B. Open Cut Casing: The installation of steel casing pipe and a carrier (water main) by the open trench excavation method.

1.04 SUBMITTALS

A. Submit shop drawings, installation procedures and qualifications, and material certificates of compliance in accordance with Section 01330 – Submittals.

B. Shop Drawings: Furnish shop drawings for the following items:

1. Casing pipe
2. Casing insulators:
    a. Type
    b. Number
    c. Spacing
    d. Installation instructions

3. Liner plate:
    a. Cross section dimensions
    b. Diameter
    c. Thickness
    d. Grout hole locations

C. Methods and Procedures: Provide an outline of the methods and procedures, including drawings, specifications and methods of operation for the following:

1. Boring/Jacking equipment and methods: Provide materials outlining methods of operation, design and specifications for boring operation.
2. Liner plate construction methods: Provide an outline of the methods to be used in prosecuting Work.
3. Open cut casing methods: Provide an outline of the methods to be used in prosecuting work.
4. HDD methods: Provide an outline of the methods to be used in prosecuting the work, along with all other requirements listed on the Drawings.

D. Design Data:

1. Liner plate: Submit design drawings and load computations for liner plate. Drawings shall be sealed and signed by a Professional Engineer licensed in the Commonwealth of Virginia.
2. Grout mixture: Submit grout mixture design for filling voids outside liner plate.

1.05 QUALIFICATIONS

A. Trenchless Crossing and Open Cut Casing Contractor: Trenchless Crossings shall be constructed by personnel fully qualified and experienced for the Work. The Contractor shall have a minimum of ten (10) years' experience of the type, size and complexity similar to work on this project.

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B. Upon request, the Contractor shall submit the Trenchless Crossing Superintendent's and installation crew's experience in installing the trenchless crossing and the method of installation. Give project titles, casing/pipe diameter and length, locations, reference contacts, addresses, and telephone numbers.

1.06 REGULATORY REQUIREMENTS

A. Governmental Agencies: Cooperate with the governmental agency such as Virginia Department of Transportation (VDOT) or other agency with jurisdiction over the roadway or crossing.

1. Materials shall conform to the regulating agency's standards or Fairfax Water's if more rigorous.
2. The approval of all materials and methods shall be obtained from the appropriate agency prior to start of Work.

PART 2 PRODUCTS

2.01 STEEL CASING PIPE

A. Materials: Welded steel pipe for boring and jacking highway crossings shall be carbon steel, in accordance with ASTM A139, Grade B, and shall have a minimum wall thickness of 0.500 inches, in accordance with VDOT requirements. Joints for casing pipe shall be squared and continuously welded.

B. Size: See Contract Drawings for casing pipe size required

2.02 CASING INSULATORS

A. Approved Manufacturers: In accordance with Fairfax Water's "Approved Products List". This document is available at Fairfax Water's internet website: www.fairfaxwater.org.

B. Materials:

1. Insulators shall be 8 inches in length for pipe 12 inches and less in diameter, and 12 inches in length for pipe 14 inches and greater in diameter.

2. Runner width shall be a minimum of 2 inches.

2.03 END CLOSURES

A. Materials:

1. Brick: ASTM C62 grade MW or better
   a. New, whole bricks of uniform standard commercial size with straight parallel edges and square corners.

2. Mortar: composed of one part cement, two parts sand, and water.

2.04 GROUT

A. Materials: Grout for filling voids outside of liner plates shall consist of Portland cement, fine aggregate, and water.

1. Fine aggregate: refer to Section 03300 Cast In Place Concrete

2. Admixtures: Submit information on admixtures proposed to improve flow ability of grout mixture.

2.05 LINER PLATE

A. Approved Manufacturers: In accordance with Fairfax Water's "Approved Products List". This document is available at Fairfax Water's website: www.fairfaxwater.org.

B. Materials: Hot-dipped galvanized steel in accordance with the requirements of ASTM A123.

1. Thickness: Liner plate shall be a minimum of 8 gage in thickness and shall be capable of supporting an AASHTO HS20 loading as well as all other superimposed loads. Each section of liner plate shall be certified by the manufacturer for thickness and material quality, galvanizing quality and quality of bituminous coating.

2. Grout holes: Provide a minimum of 1 grout hole for every 3 liner plate rings.

   a. Grout holes shall be 2-inch half couplings provided with 2-inch cast iron plugs.

3. Bolts and nuts: Provide bolts and nuts of the length, diameter and quality recommended by the manufacturer.

   a. Bolts and nuts shall conform to ASTM A307, Grade B.

   b. Bolts and nuts shall be hot-dipped galvanized in accordance with ASTM A153

2.06 HORIZONTAL DIRECTIONAL DRILL MATERIAL

A. Refer to the Drawings for requirements.

2.07 CORROSION CONTROL

A. Refer to Section 13110 for requirements.

2.08 SLED ASSEMBLIES

A. Provide design where project requirements dictate.

PART 3 EXECUTION

3.01 PREPARATION

A. Identify: Required lines, levels, contours and datum.

3.02 PROTECTION

A. Existing Structures: Protect existing structures and benchmarks from excavation equipment.

B. Highways: Protect highway being crossed from damage or disturbance due to excavation or settlement.

C. Utilities: Maintain and protect above and below grade utilities which are to remain. Contractor shall be responsible for verifying locations of all underground utilities at Trenchless Crossings.

D. Settlement Monitoring: Set up surveyed monitoring points to be recorded prior to bore & jack or tunneling and monitor daily during the trenchless crossing. A post survey of the monitoring points will be required at the substantial completion stage and at the one year warranty stage. Survey shall be completed to verify no surface settlement or lift occurs. A minimum of 9 monitoring points shall be established and monitored. The surface points should be surveyed to the nearest 0.01 feet prior to the start of any jack and bore operations to establish baseline conditions. During jack and bore operations the surface points should be surveyed each morning prior to construction start. If the monitoring identifies a change in surface grade along the trenchless crossing, the Contractor shall be responsible for restoration to pre-construction grades at no additional cost to the Owner. Upon completion, Contractor shall provide Record Drawings in addition to requirements in Section 01780.

3.03 ACCESS PIT CONSTRUCTION

A. Safety: Take all measures necessary to assure safe working conditions including the following:

1. Provide protective concrete barriers and steel plating at top of access pits.

2. Provide excavation support system in accordance with Section 02260.

B. Water Control: Maintain excavation free of water in accordance with Section 01500 - Construction Facilities and Temporary Controls.

C. Bore Pit Requirements: Size the access pits to permit the Work to be performed safely and at the lines and grades shown on the Drawings.

3.04 TRENCHLESS CROSSING CONSTRUCTION

A. General: The Contractor has the option of installing liner plate, at no additional charge to the Owner, in lieu of jacking or boring.

1. Increase in size of encasing conduit or other material changes required by the Contractor's selection of liner plate shall be his responsibility.

2. Carrier pipe within casing/liner plate installation shall be restrained.

B. Boring Method:

1. Boring machine: Boring machines shall afford adequate protection against loss of ground, and permit ground support adjacent to trenchless crossing's face as required by ground conditions.

a. Use a method of advancing the boring machine which ensures correct alignment at all times without binding or imposing excessive loads on the initial trenchless crossing supports or upon the supporting ground.

2. Deviation from line and grade shall not exceed 3 inches in any direction at any point along the casing pipe.

C. Liner Plate Method:

1. General: Discontinue trenchless crossing operations when cave-ins or loose materials are encountered or anticipated. Provide approved shoring and fill voids in accordance with

VDOT requirements with pressure grouting prior to continuing Work.

a. Bulkhead trenchless crossing heading at any interruption of the tunneling operation.

b. Conduct trenchless crossing operation continuously on a 24-hour basis when so directed by VDOT or other agency with jurisdiction over the crossing, at no additional cost.

2. Trimming excavation: Exercise care in trimming excavation surface to provide a snug fit of liner plates against undisturbed material.

a. Advance excavation only the amount required for installation of the succeeding liner plate section.

b. Support vertical face of excavation to prevent sloughing.

3. Rock excavation and removal: Remove rock encountered in the excavation by means of air hammers in a manner which minimizes the occurrence of voids outside the liner plates.

4. Deviation from line and grade shall not exceed 3 inches in any direction, at any point along the trenchless crossing.

5. Grouting: Place a uniform Portland cement grout mixture under pressure behind the liner plates to fill voids existing between liner plate and undisturbed material.

a. Install a threaded plug in each grout hole as grouting is completed there.

b. Keep grouting of liner plate within 4 feet of tunnel heading. Grout entire length of liner plate installed when trenchless crossing operations cease overnight.

D. Open Cut Casing Method:

1. Excavate trench and provide 6-inch compacted select fill bedding for steel casing pipe.

2. Deviation from line and grade: Deviation from line and grade shall not exceed 3 inches in any direction at any point along the casing pipe.

E. Horizontal Directional Drill Method:

1. Refer to the Drawings for requirements.

E. Corrosion Control:

1. Install test stations and other corrosion control measures in accordance with Section 13110- Cathodic Protection.

3.05 CARRIER PIPE INSTALLATION

A. Pipe Joints: Assemble carrier pipe for installation within casing pipe or liner plate tunnel in accordance with Sections 02510.

B. Casing Insulators: Install insulators in accordance with approved submittals and Drawings. Center-to-center spacing shall not exceed that indicated on the Drawings.

3.06 END CLOSURES

A. Masonry Closures: Seal ends of encasing conduit with brick masonry and mortar.

B. Drainage from encasing conduit: Provide means for drainage from encasing conduit. Install VDOT type LD-1 Leak Detector at lower end of casing.

END OF SECTION 02400

NO TEXT THIS PAGE

SECTION 02510

WATER MAINS AND APPURTENANCES

PART 1 GENERAL

1.01 DESCRIPTION

A. Scope:

Contractor shall furnish all labor, supervision, tools, equipment and incidentals required to deliver and install ductile iron pipe (DIP), polyvinyl chloride (PVC) or high density polyethylene (HDPE), fittings, specials, and accessories for the water pipeline as required by the Contract Documents and required to complete the Work.

B. Unit Prices: Refer to Section 01200, Measurement and Payment.

1.02 RELATED SECTIONS

A. Section 02260 – Excavation Support Systems

B. Section 02315 – Excavating, Backfilling, and Compacting

C. Section 02370 – Erosion and Sediment Control

D. Section 02512 – Thrust Restraints

E. Section 02513 – Disinfection of Water Distribution Systems

F. Section 02514 – Leakage Tests

G. Section 02700 – Paving and Surfacing

H. Section 02920 – Lawns and Grasses

I. Section 03300 – Cast-In-Place Concrete

J. Section 13110 – Cathodic Protection

1.03 QUALITY ASSURANCE

A. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise required by the Contract Documents.

1. AWWA/ANSI C110/A21.10 Ductile-Iron and Gray-Iron Fittings.
2. AWWA/ANSI C111/A21.11 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
3. AWWA C115/A21.15 Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
4. ASME B16.1/B16.5 Pipe Flanges and Flanged Fittings.
5. AWWA C600 Installation of Ductile-Iron Mains and Their Appurtenances.
6. AWWA/ANSI C104/A21.4 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
7. AWWA/ANSI C151/A21.51 Ductile-Iron Pipe Centrifugally Cast.
8. ASTM F3125 High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated.
9. AWWA/ANSI C153/A21.53 Ductile-Iron Compact Fittings.
10. AWWA C900 Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4-inch Through 60-inch.
11. ANSI/AWWA C906 Polyethylene (PE) Pressure Pipe and Fittings, 4-inch Through 65-inch, for Waterworks.

12. AWWA C509 Resilient-Seated Gate Valves for Water Supply Service.
13. AWWA C504 Rubber-Seated Butterfly Valves.
14. AWWA C502 Dry-Barrel Fire Hydrants.
15. AWWA C206 Field Welding of Steel Pipe.
16. Commonwealth of Virginia/State Board of Health, Waterworks Regulations.
17. Fairfax Water, Planning and Engineering Division, Approved Products List.

1.04 SUBMITTALS

A. Shop Drawings: For materials not furnished by the Owner, submit for the following in accordance with Section 01330:

1. Pipe, fittings, valves and valve boxes, and specials
2. Adapters
3. Mechanical couplings
4. Temporary bulkheads
5. Connections to other mains
6. Valve or other water main closures
7. Product Data: as required to completely describe the materials being furnished including, but not limited to:
    a. Design drawings, calculations, specifications, and product data sheets necessary to fully describe all materials, components, and finished products and to show conformance with the Contract Documents.
    b. Dimension drawings showing full details of the pipe.
8. Other items required by the Contract documents, or requested by the Owner.

B. Letter of Certification from Contractor: Contractor shall submit a letter certifying that items to be supplied by the Contractor shall be from Fairfax Water's "Approved Product List" whenever applicable.

C. Marking Schedule: Marks to be used on the outside of finished Materials to identify pipes, fittings, specials, and accessories shown on shop drawings and laying schedules, if required.

D. Affidavit of Compliance: Furnish affidavit of compliance certifying that the Materials being furnished by the Contractor comply with all applicable provisions of referenced AWWA Standards and the Contract Documents.

E. Quality Assurance Reports:

1. Mill certificates and physical property test reports for pipe walls and other fabrications required by the Contract Documents.
2. Hydrostatic test reports for each test.

F. Proposed Methods and Procedures: Submit for the following in accordance with Section 01330.

1. Equipment, materials, and procedures for handling pipe, fittings and specials at the site.
2. Pipe closure methods and procedures.
3. Wrapping for buried flanges.

G. Manufacturer's Certification: Submit the following in accordance with Section 01330.

1. Copper coupling: Submit records of chemical analysis, certified test reports stating conformance with the specifications.

H. Test Specimens: Furnished from pipe shell and gaskets when requested by the Owner.

I. Acceptance of any submittal by the Owner shall not relieve the Contractor of his responsibility to meet the requirements of the Contract Documents.

J. Installation Experience:

1. The Contractor shall provide the services of a competent foreman for each crew, with experience in accordance with the requirements of the Request for Qualification (RFQ 22-013). Upon request, Contractor shall provide qualifications for any new foreman and crew personnel added to the Work.

1.05 REGULATORY REQUIREMENTS

A. Commonwealth of Virginia/State Board of Health: Water main installation shall be in accordance with the Waterworks Regulations of the State Board of Health

B. Reduction of Lead in Drinking Water Act: All products and materials shall comply with Public Law 111-380.

C. Other requirements as specified in specification Section 01410, Regulatory Requirements, of the Contract Documents.

1.06 DELIVERY, STORAGE AND HANDLING OF MATERIALS

A. Ductile Iron Pipe and Polyvinyl Chloride Pipe/High Density Polyethylene: Loading, unloading, handling, inspection and storage of ductile iron and gray iron pipe, fittings, accessories, and appurtenances shall be performed in accordance with AWWA C600 and the following:

1. Delivery of pipe supplied by the Owner will be scheduled and coordinated with the pipe manufacturer by the Owner.

2. Each piece shall be examined for defects by representatives of the Owner and the Contractor. Defective pieces shall be duly marked “DEFECTIVE -- DO NOT USE.”

3. All defective pieces shall be returned to the manufacturer at his expense. If defective materials are not removed from the project site within 30 days following written notification by the Owner, they will be removed by the Owner at the expense of the supplier. No piece shall be laid which is known to be defective. If any piece is discovered to be defective after having been laid, it shall be removed and replaced with a sound one in a satisfactory manner.

4. Store pipe, fittings, valves, and appurtenant materials in a manner which will protect them from becoming dirty or damaged prior to installation.

a. Pipe, fittings, valves, and appurtenant materials which are visibly dirty shall be cleaned to the Owner’s satisfaction or replaced at the Contractor’s expense prior to installation.

B. Shipments of materials to Contractor or Subcontractor shall be delivered to the site only during regular working hours when the Owner’s Representative is present on site. Shipments shall be addressed and consigned to the proper party giving name of Project, location and city. Shipments shall not be delivered to the Owner’s storage yard except where otherwise directed. The Owner reserves the right to reject any materials delivered when the Owner’s Representative is not present on site.

C. If it is necessary to move stored materials and equipment during construction, Contractor shall move or cause materials and equipment to be moved without any additional compensation.

D. Arrange deliveries of products in accordance with construction schedules to facilitate inspection prior to installation.

E. Coordinate deliveries to avoid conflict with Work and conditions at site.

F. Do not have products delivered to Project site until related Shop Drawings have been approved by the Owner.

G. Use web slings or forklifts to handle the pipe. Metal chains, cable tongs or other equipment likely to cause damage to the coating shall not be used. Hooks shall not be used on the ends of the pipe.

H. Where forklifts are used, their bearing surfaces must be padded with protective forklift sleeves/pads or suitable material approved by the Owner.

I. Web slings shall be of a type and width that will not damage the coating. Slings shall not pass through the pipe.

J. If cables or chains are used during transportation, they must be properly padded with approved suitable material to protect the coating from damage. Use padded separator strips between pipe and cable or chains.

K. Pipe, fittings, and specials shall be unloaded opposite to or as close to the place where they are to be laid as is practical to avoid unnecessary handling.

L. Materials cracked, gouged, chipped, dented or otherwise damaged will not be accepted. Minor defects in the pipe or coatings may be repaired at the site by a method approved by the manufacturer of the materials and by the Owner. Damaged pipe, fittings, specials and accessories shall be repaired or replaced at Contractor's expense.

M. The Owner reserves the right to inspect all materials before unloading at the site. Any materials rejected shall not be unloaded and shall be returned to the manufacturer at no additional cost to the Owner.

1.08 HANDLING MATERIALS FURNISHED BY THE OWNER

A. Obtaining Materials: The Contractor shall arrange for obtaining materials supplied by the Owner in the following manner unless specified otherwise.

1. The pipe and pipe fittings shall be delivered to the project site by the Owner’s pipe manufacturing contractor unless the materials are already in stock at one of the Owner’s property yards. In these instances the Contractor shall unload and string such materials at no additional cost to the Owner. Included in this operation is a maximum waiting period of 4 hours for the arrival of the pipe delivery trucks to the project site. If the pipe materials cannot be strung out along the pipeline route, the Contractor shall arrange for their stockpiling within approved areas and shall furnish all necessary plant, labor and equipment required to relocate and string the pipe and fittings where required, at no additional cost to the Owner.

2. All other material furnished by the Owner shall be secured by the Contractor from the Owner’s storage yards currently located at 4400 Henninger Court, Chantilly, Virginia; 8001 Cinderbed Road, Newington, Virginia; 1295 Fred Morin Drive (Corbalis Water Treatment Plant), Herndon, Virginia; and at 217 Gordon Road, Falls Church, Virginia; and Owner’s two planned storage yards located at 2926 Industry Lane, Fairfax, Virginia; and 14925 Willard Road, Chantilly, Virginia. Both planned storage yards are scheduled to be in service during the lifetime of this contract.

3. The Contractor shall carefully inspect all material at the time of delivery and shall note any missing, damaged or defective material on the packing list accompanying the shipment prior to accepting delivery thereof.

    a. Any missing, damaged or defective material found after the Contractor has accepted delivery of the material shall be replaced by the Contractor at no additional cost to the Owner.

b. Only one complete valve box shall be furnished for each valve supplied by the Owner. Should the Contractor damage the valve box prior to having the Work accepted by the Owner, he shall furnish an equal replacement at his own expense. Occasionally used valves or hydrants may be furnished, in which case the Contractor shall cooperate with the Owner in placing them in operation.

4. The Contractor shall be responsible for supplying all labor, equipment and other facilities required to load and deliver such items to the Project site. Contractor shall also be responsible for providing equipment and operator(s) for loading all material at Corbalis; at all other storage yards, the Owner will provide one operator and equipment for loading of materials. Before loading such items at the storage yard(s), the Contractor shall inspect the same and report any evidence of damage or imperfection to the Owner. Any damaged or imperfect item noted at that time will be replaced by the Owner. Any item damaged by the Contractor during loading or delivery to the Project site shall be replaced by the Contractor.

B. Returning Unused Materials: All materials shall remain the property of the Owner:

1. All unused items shall be returned to the Owner's property yard(s) by the Contractor at his expense.

2. Any excess material on hand upon the completion of the Project shall be cleaned, loaded, delivered and unloaded at such Owner's storage yard listed above or as may be designated by the Owner. Payment will be made in accordance with Section 01200 for transporting pipe to and from the Owner's property yard.

1.07 SALVAGE

A. All materials such as hydrants, valves, valve boxes, pipe and fittings, damaged or removed by the Contractor shall be disposed of by the Contractor, at his expense.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fairfax Water publishes an "Approved Products List" which lists, by category, manufacturer's products approved for use in Fairfax Water's system. Manufacturers' products covered by the categories included in this document which are not specifically listed are not approved for use. This document is available at Fairfax Water's internet website: www.fairfaxwater.org.

B. Paint Coatings: Refer to Section 09900

C. Gasket Lubricants: Only non-toxic lubricants recommended by the pipe manufacturer and approved by the Virginia Department of Health for use in potable water shall be used on gaskets. Petroleum-based or other types of lubricants that can damage the gasket shall not be used.

2.02 MATERIALS

A. Materials Furnished by the Owner

1. Unless otherwise specified, the Owner will furnish the following materials at no additional cost to the Contractor:

a. Mechanical and push-on joint Ductile Iron Pipe, fittings and the following appurtenances:

1) Glands, including restraining glands, gaskets, nuts and bolts for mechanical joints.

2) Gaskets and lubricants for push-on joints.

b. Fire hydrants and the following appurtenances:

1) 6-inch diameter connecting pipe.

c. Mechanical Joint Valves

1) Mechanical joint gate valves and valve boxes for diameters 4 inch through 14-inch.

2) Mechanical joint butterfly valves and valve boxes for direct buried valves 16-inch and greater in diameter.

d. Flanged valves for installation in vaults or direct bury.

e. Tapping sleeves, tapping saddles, and valves.

f. Copper pipe and the following appurtenances for service connections:

1) Meter boxes and covers.

2) Curb boxes.

3) All other necessary materials with the exception of concrete and gravel.

g. Steel water pipe, fittings and specials.

1) Steel casing pipe will not be supplied by the Owner.

h. Polyethylene encasement.

2. The Contractor shall furnish all other required materials not included on the preceding list at his expense unless otherwise specified.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing field conditions.

B. Perform test pits at least 100 feet in advance of all utility crossings and interconnection locations and as required on the Drawings or by Call Before You Dig regulations. If Contractor fails to perform test pit as noted on a marked utility, any damage or conflict found will be resolved at his expense.

C. Inspect water main materials for cleanliness and absence of damage.

D. Verify that excavation base is dry and ready to receive the Work and that excavation, foundations, dimensions and elevations are as indicated on laying schedules or accepted by Owner.

E. Verify that rated working pressure of the item to be installed is satisfactory for the service shown on the Drawings.

3.02 GENERAL

A. Installation of each pipe joint and appurtenance shall be made in the presence of an Owner Representative. The Contractor shall coordinate his construction activities daily with an Owner Representative and shall notify the Owner's Representative 48 hours minimum prior to each installation.

B. Install materials as shown, specified, or recommended by the manufacturer and in conformance with reference standards and accepted Shop Drawings.

C. Cover over the pipe shall be as shown on the Drawings, specified or otherwise accepted by the Owner.

D. Earthwork shall be as shown on the Drawings and specified in the applicable Sections of these Specifications.

E. Take field measurements as necessary to ensure proper fitting of Work.

F. Changes in alignment and grade shall be made by deflecting joints or with beveled or mitered pipe except where bends or similar fittings are shown.

G. All materials shall be carefully examined for cracks, dents, damage or other defects before installation. Defective materials shall be rejected, removed and replaced. Any material found to be broken or defective after it has been installed shall be rejected, removed and replaced as specified in this Section.

3.03 PREPARATION

A. Ductile Iron Pipe and Fittings:

1. Push-on Joints

a. Thoroughly clean the groove and bell socket and insert the gasket, making sure that it faces the proper direction and is correctly seated.

b. After cleaning any dirt or foreign material from the plain end, apply lubricant in accordance with the pipe manufacturer's recommendations.

c. When pipe is cut in the field, bevel the plain end with a grinder or heavy file to remove all sharp edges.

2. Mechanical Joints: The socket and plain end shall be wiped clean of all sand and dirt and any excess coating in the bell shall be removed. The plain end, bell socket and gasket shall be washed with a soap solution.

3. Flanged Joints: Rust-prevention grease shall be removed from the flanges using a solvent-soaked rag. The flanges and gasket shall then be wiped clean of all dirt and grit.

4. All joints shall be made in the presence of an Owner’s Representative.

5. Keep a sufficient quantity of joint lubricant, gaskets, welding rod, joint lining and coating material on hand at all times.

3.04 DUCTILE IRON AND POLYVINYL CHLORIDE/HIGH DENSITY POLYETHYLENE PIPE INSTALLATION

A. Excavating, Trenching and Backfilling: shall be in accordance with Section 02315.

1. All Work under this Contract shall be constructed in accordance with the lines and grades shown on the Drawings. Contractor shall assume the full responsibility for establishing and maintaining alignment and grade.

2. The Contractor shall lay all pipes in trenches in accordance with the pipe manufacturer's approved laying schedule, when applicable, and the requirements of Section 02315 and this Section.

B. Pipe Laying:

1. Proper and suitable tools and appliances for the safe and convenient cutting, handling and laying of the pipe and fittings shall be used. The pipe and fittings shall be thoroughly cleaned by power washing before they are laid and shall be kept clean until they are accepted in the completed Work. Special care shall be exercised to avoid leaving bits of wood, dirt and other foreign particles in the pipe. If any such particles are discovered before final acceptance of the Work, they shall be removed and the pipe, valves and fittings replaced at the Contractor's expense. All mains shall be kept absolutely clean during construction. In matters not covered by these Specifications, laying of ductile iron and polyvinyl chloride/high density polyethylene pipe shall meet the requirements of AWWA Standards C600, C900, and C906. Exposed ends of uncompleted lines shall be capped or otherwise temporarily sealed with approved watertight bulkheads at all times when pipe laying is not actually in progress.

2. Pipe laid in excavations shall be laid on good foundation, trimmed to shape and, secured against settlement. At joints, enough depth and width shall be provided to permit the making of the joints and the inspection of the bottom half of the joint. All elbows and tees shall be properly backed up and anchored so that there will be no movement of the pipe

in the joints due to internal or external pressure. Pipes shall have solid bearing throughout their entire length.

3. The Contractor shall lay all pipes in strict accordance with the manufacturer's recommended procedures. When it is necessary to deflect pipe from a straight line in either the horizontal or vertical direction, or as otherwise directed by the Drawings or the laying schedule for curves, pipe deflections shall have a maximum joint deflection eighty per cent of the value shown in the joint deflection tables in AWWA C600. Under normal laying conditions, the depth of cover shall be 4 feet.
4. Where pipe is laid in rock trenches, a minimum space of 6 inches of the rock shall be removed below the outside bottom of the pipe and shall be filled with select material to the limits of, and in accordance with Section 02315 before the pipe is laid.
5. When special beddings are shown on the Drawings or are ordered by the Owner, they shall conform to the requirements of Section 02315 of these Specifications.
6. Temporary bulkheads shall be installed at the ends of sections where adjoining water mains have not been completed. All such bulkheads shall be removed when the need for them has passed or when ordered by the Owner.

C. Joining Pipe and Fittings:

1. When joining pipes and fittings, the Work shall be done in strict accordance with the requirements of AWWA C600, the manufacturer's printed instructions, approved submittals and these Specifications.
2. Push-on joints shall be assembled with general procedure to be as follows:
   a. Prepare pipe and joint as described in this specification Section.
   b. Push the plain end into the bell of the pipe. Keep the joint straight while pushing. Make deflection after the joint is assembled.
3. Mechanical joints shall be assembled with general procedure to be as follows:
   a. Prepare the socket and plain end as described in this specification section.
   b. Place the gland on the plain end with the lip extension toward the plain end of the pipe, followed by the gasket with the narrow edge of the gasket toward the end of the pipe.
   c. The pipe shall be pushed into the bell socket and the gasket pressed firmly and evenly around the entire socket. The gland is then pushed up to the bell and centered on the pipe. Glands may require a wedge under the top side to assist in centering the gland lip against the gasket.
   d. The bolts shall then be inserted and tightened with the fingers until all are even. A ratchet wrench shall be used to complete the tightening of the bolts, care shall be exercised to tighten the opposite nuts to keep the gland square with the socket and the bolt stress evenly distributed. The following torque shall be applied:

BOLT SIZE	TORQUE
5/8-inch	45-60 Ft. lb.
3/4-inch	75-90 Ft. lb.
1-inch	100-120 Ft. lb.
11/4-inch	120-150 Ft. lb.

   e. Once the installation of all nuts and bolts has been completed, petrolatum tape and compatible primer shall be applied in accordance with Section 13110 of these specifications.
4. Flanged joints: shall be assembled with general procedure to be as follows:
   a. Prepare flanges in accordance with the requirements of this specification Section.

b. The flanges shall be accurately aligned, using a spirit level, and pipe properly supported before the gasket and bolts are inserted. The rubber gasket shall be carefully placed to ensure full flow and proper sealing of the joint.

c. Bolt threads shall be given a light coat of thread lubricant and then inserted and the nuts turned up by hand. Bolts shall then be pulled up with a wrench employing the crossover method. Applied torques shall be in strict accordance with the manufacturer's requirements.

D. Pipe Cradles, Encasements, and Other Support: Where concrete cradles or encasements are required, they shall be constructed in accordance with Section 03300 of these specifications, and the Drawings.

E. Thrust Restraints: Thrust Restraints including restraining glands, concrete anchors and thrust collars, strapping, or other approved restraining devices shall be in accordance with Section 02512 of these specifications, and the Drawings.

F. Corrosion Control: Provide corrosion control measures in accordance with Section 13110 of these specifications, where indicated.

G. Temporary Bulkheads: At the ends of sections where adjoining pipelines have not been completed and are not ready to be connected, install temporary, externally braced test plugs approved by the Owner. All such externally braced test plugs shall be removed when the need for them has passed or when ordered by the Owner.

H. Pipe Installed within Structures and Concrete Encasements: Where temporary support are used, they shall be sufficiently rigid to prevent shifting of the pipe. No reinforcing in structure or concrete encasements shall touch the pipe.

I. Sanitary Sewer Crossings:

1. Maintain required separation between water and sewer facilities in accordance with Virginia State Board of Health "Waterworks Regulations".

2. Provide concrete pier supports for existing sanitary sewer pipe crossing over the water main in accordance with the Drawings.

J. Utility Crossings:

1. Separation of 6-inch or less requires expansion material and shall be in accordance with the Fairfax Water Approved Products List.

K. Cathodic Protection: Provide field-applied petrolatum tape coating per Section 13110 for:

1. Buried mechanical joints, buried bolts, nuts, couplings harness tie rods, saddles, iron and steel anchors, and other connecting hardware.

2. Service clamps, other transition fitting between copper services and ductile iron pipe.

3. Pipe embedded in concrete anchor blocks or otherwise in contact with concrete, extending through the concrete adjacent 6 inches in both directions.

4. Provide other corrosion control measures where indicated per Section 13110.

L. Polyethylene Encasement: Provide and install in accordance with ANSI/AWWA C105/A21.5.

1. Contractor shall install a single layer of V-Bio polyethylene encasement film over all water mains.

2. Overlapping Sections: Provide 2-foot overlap between sections of polyethylene. Completely tape overlapping sections to hold securely in place during backfilling, using compatible polyethylene tape.

3. Repair of Openings in Encasement: Repair holes, slits, or openings of any size, to restore integrity of polyethylene in accordance with manufacturer’s recommendation.

4. Installation at Hydrants and Interconnections: Provide opening or other means at base of hydrant riser to avoid water accumulation under encasement because of water relief.

5. Backfill around polyethylene encasement shall be VDOT 21A stone, in accordance with the trench detail on the Drawings.

M. All work performed by the Contractor shall conform to applicable sections of the Virginia State Board of Health "Waterworks Regulations" and these Specifications during the installation, testing and disinfection of waterworks facilities.

3.05 VALVES AND HYDRANTS

A. Joints: Joints shall be made up in accordance with the procedures outlined in this specification Section.

B. Valves:

1. Valves shall be carefully erected in their respective positions free from distortion and strain with operators vertical unless otherwise shown on the Drawings. The valves shall be placed and left in satisfactory operating condition. Restrain valves as required.

2. Unless otherwise shown or specified, direct burial valves and valves in vaults or manholes shall have 2-inch square operating nuts. If the operating nut is 4-feet or more below grade, it shall be provided with extended shafts and 2-inch operating nuts extending to 3-feet below grade.

3. Natural rubber seat rings shall be coated with an approved opaque material which shall protect the rubber from attack by ozone and other deleterious materials.

4. Rubber seated valves, which are to be stored for longer than three months shall be partially opened to prevent damage or permanent deformation to the seat ring.

5. Valve boxes shall be adjusted with the tops at the proper grade. Valve boxes in unpaved areas shall be installed with concrete in accordance with the Standard Details. The top section of the valve box will overlap the lower section with a minimum lap of 2-inches.

C. Hydrants: Hydrants shall stand plumb and shall have their hose nozzles parallel to the water main and their pumper nozzles facing the street or as directed by the Owner. The hydrant shall be turned on its base in order to have the pumper nozzles facing the street. All hydrants shall be coated in accordance with Section 09900.

3.06 CONNECTIONS TO THE WATER SYSTEM

A. The Contractor shall connect the pipelines to existing water mains and make provisions for the phase connections, as shown on the drawings. When system shutdown is necessary, the Contractor shall provide the Owner a minimum of ten (10) days' notice prior to each scheduled tie-in, so that advance notice may be given to the affected customers.

B. The Contractor shall meet with the Owner's representative and provide a written narrative for review and approval of his proposed scheduling and construction procedures for the connection(s). No additional payment will be made to the Contractor for work which must be performed at night. Approval of the Contractor's connection(s) schedule and construction procedures by the Owner does not relieve the Contractor from his total responsibility to see that the connection(s) is successfully completed within the designated time frame.

C. The Owner will coordinate closing all valves in making shutdown and open all valves in restoring pressure to the existing main and initiating pressure in the new installation. Connections to water mains shall be made by the Contractor only after complete preparation for such Work has been made.

D. At each location where a new water main is to be connected to the existing water main, the Contractor shall not order material for the connection until he has dug a test pit and verified the exact location, size, outside diameter, roundness, elevation, material, joint location, type and direction of the existing water main. The Contractor shall dig test pits only in the

presence of an authorized representative of the Owner. If the test pit shows there is a conflict with an existing utility or a water main connection has to be modified, the Contractor shall submit test data information to the Owner. The Owner will review and modify the drawings as required.

E. Prior to the commencement of any water main interconnection work, the Contractor shall have all necessary materials, tools and equipment at the work site. Pipe, fittings and valves shall be pre-assembled as much as possible to reduce the time of water service interruption. Also the geometry of the connection shall be verified by the Contractor prior to starting the connection. Where existing mains are provided with fittings for the purpose of connecting to the new main, the Contractor shall remove the plugs or bulkheads, clean the ends, prepare them for connection to the new pipeline, and make the new joint.

F. The Contractor shall work continuously and expeditiously around the clock using multiple crews until the connections are successfully installed and water service is restored. Where the new water main is to be connected at more than one point to the existing water system, connections shall proceed simultaneously. All connection work must be successfully completed within the time specified by the Owner, unless noted differently in writing by the Owner. The Contractor shall commit the necessary personnel and equipment required to perform the simultaneous connections within the time constraints agreed to by the Owner. Proposed water mains must be in service before the existing water mains can be abandoned.

G. The water released by cutting or opening existing mains shall be removed and the excavation kept dry until all necessary Work within the excavation has been completed.

H. The Contractor shall provide all necessary labor and equipment to cut a sample (coupon) from existing ductile iron and cast iron pipe that will be tied into, removed, or abandoned as part of this project. Size, location, and number of coupons shall be in accordance with Section 01200 or as directed by the Owner. Coupons produced as a result of tapping operations shall also be collected. The Contractor shall provide coupons to the Owner's Inspector upon completion of work.

I. No shutdowns, which result in customers being out of service, will be allowed during Thanksgiving or Christmas week, unless otherwise approved by the Owner.

3.07 SERVICE, AIR RELEASE AND BLOW-OFF CONNECTIONS

A. Service Connections: 1-Inch and 2-Inch service connections shall be installed by the Contractor as required by the Drawings or the Owner.

1. The connections shall be made by tapping the water main with a corporation stop at the top center position on the pipe. An elbow shall be attached thereto and the copper tube connected to the elbow. Allowance for any possible movement of the water main or service piping at the tap shall be accomplished by making a half loop in the copper tube and firmly compacting the backfill under this loop. The tube shall be extended to the concrete curb which the tube shall be passed under and terminated at a curb stop or meter assembly as directed by the Owner. Care shall be used to prevent the tube from crimping, binding or twisting. The concrete curb shall not be removed or damaged. Where required, a curb box shall be placed vertically and aligned over a curb stop for proper access and, where required, a meter box shall be placed around a meter assembly as shown on the Drawings.

2. A minimum of 3 feet of cover shall be placed over the service tube.

B. Air Release or Blow-Off Connections: Connections for air releases and blow-offs shall be installed in accordance with the details on the Drawings.

3.08 LEAKAGE TESTS

A. Perform leakage tests in accordance with Section 02514. Make necessary repairs and repeat tests until required results are obtained.

3.09 DISINFECTION

A. Disinfect finished water mains and appurtenances in accordance with Section 02513. Repeat disinfection and testing until required results are obtained.

3.10 CUTTING AND DISPOSAL OF ASBESTOS CEMENT PIPE

A. Contractor shall comply with the requirements of 29CFR 1926.1101.

3.11 ABANDONMENT OF EXISTING WATER MAINS

A. Upon completion of the installation, acceptance, and placing into service of the proposed water main in conjunction with the associated interconnections, the Contractor shall abandon the existing water mains within the limits indicated on the Drawings or as directed by the Owner. Abandonment of existing mains will include, but not be limited to: closing all valves, removing valve boxes, waterline markers, cutting and plugging existing water mains, removing existing water mains (as required), backfilling, compacting, and other associated work, where indicated on the Drawings and where directed by the Owner. If required by the Drawings and/or directed by the Owner, the Contractor shall backfill abandoned pipes with flowable fill concrete plant mix. The Contractor will be compensated for placement of flowable fill in accordance with Section 01200.

END OF SECTION 02510

SECTION 02512

THRUST RESTRAINTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete Thrust Anchors

B. Concrete Thrust Collars

C. Mechanical Joint Restraints

D. Products Furnished But Not Installed Under This Section

1. Restraining Glands

2. Tie Rods (Strapping) and Tie Bolts (Eyebolts)

1.02 SUBMITTALS

A. Submit material lists and calculations for thrust restraints not shown or different from that shown on the Drawings, in accordance with Section 01330 – Submittals.

B. Submit description and installation instructions for restraining glands.

1.03 UNIT PRICES

A. Refer to Section 01200 – Measurement and Payment.

1.04 REFERENCES

A. ASTM F3125 High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated

B. ASTM A536 Specification for Ductile Iron Castings.

C. AWWA C111 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

D. AWWA C153 Ductile Iron Compact Fittings.

E. AWWA C110 Ductile Iron and Gray Iron Fittings.

PART 2 PRODUCTS

2.01 DUCTILE IRON AND PVC RESTRAINING GLANDS

A. Approved Manufacturers: Fairfax Water publishes an “Approved Products List” which lists, by category, manufacturer’s products approved for use in Fairfax Water’s system. Manufacturers’ products covered by the categories included in this document which are not specifically listed are not approved for use. Copies of this document are available from Fairfax Water’s internet website – http://www.fairfaxwater.org.

2.02 CONCRETE MIXES

A. Concrete for Thrust Anchors and Thrust Collars: Provide concrete in accordance with the requirements of Section 03300.

PART 3 EXECUTION

3.01 INSTALLATION

A. Provide thrust restraints shown or otherwise necessary to resist movement in new or existing water mains.

3.02 CONCRETE THRUST ANCHORS

A. Provide concrete thrust anchors at all bends, tees, plugs, caps, and hydrants, and where shown otherwise on the Drawings.

B. Dimensions: Refer to the Drawings for dimensions of thrust anchors.

C. Installation: Bearing area for thrust anchors shall be against undisturbed earth. The face of the excavation shall be flat and at the proper angle to the fitting.

1. Install thrust anchors such that pipe and fitting joints are accessible for repair.

2. Brace the bowl of each hydrant against the required area of unexcavated earth at the end of the trench with concrete thrust anchor.

D. Installation: Provide and place concrete in accordance with requirements of Section 03300.

3.03 CONCRETE THRUST COLLARS

A. Provide concrete thrust collars at the locations shown on the Drawings.

B. Dimensions: Refer to the Drawings for dimensions of thrust collars.

C. Reinforcement: Provide reinforcing steel where shown on the Drawings and in accordance with Section 03300.

D. Installation: Provide and place concrete in accordance with requirements of Section 03300.

3.04 CONCRETE

A. Curing: Cure all concrete thrust anchors for a minimum of seven days prior to pressure testing, unless noted otherwise (i.e. locations of high-early strength concrete) on the Drawings or directed by the Owner.

B. Backfilling: Backfill around concrete thrust anchors according to the requirements of Section 02315 - Excavating, Backfilling and Compacting, and the following:

1. Do not backfill thrust collars or thrust anchors until a minimum of four hours has elapsed.

3.05 RESTRAINING GLANDS

A. Install mechanical joint restraint in accordance with the manufacturer's instructions.

END OF SECTION 02512

SECTION 02513

DISINFECTION OF WATER DISTRIBUTION SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Disinfection: Disinfection of potable water distribution and transmission systems.

B. Testing: Testing and reporting results.

1.02 UNIT PRICES

A. Disinfection: No separate payment shall be made for disinfection of water mains and appurtenances.

1.03 REFERENCES

A. AWWA B300 Hypochlorites

B. AWWA B301 Liquid Chlorine

C. AWWA C651 Disinfecting Water Mains

D. AWWA C655 Field Dechlorination

E. Waterworks Regulations - Commonwealth of Virginia/State Board of Health

1.04 SUBMITTALS

A. Test Reports: Indicate results comparative to specified requirements.

B. Dechlorination methods and chemicals to be used as specified herein.

1.05 PROJECT RECORD DOCUMENTS

A. Record Documents: Submit under provisions of Section 01770 – Contract Closeout.

1. Disinfection report; record:

a. Type and form of disinfectant used.

b. Date and time of disinfectant injection start and time of completion.

c. Test locations.

d. Initial and 24 hour disinfection.

e. Date and time of flushing start and completion.

f. Disinfectant residual after flushing in ppm for each outlet tested.

g. Method of chlorination

1.06 QUALITY ASSURANCE

A. Performance Standard: Work shall be performed in accordance with the Virginia State Board of Health "Water Works Regulations," AWWA C651, and as modified herein.

B. Bacteria Tests will be performed by the Owner’s laboratory.

PART 2 PRODUCTS

2.01 DISINFECTION CHEMICALS

A. Chemicals: AWWA B300, Hypochlorite, or AWWA B301, Liquid Chlorine.

2.02 OTHER PRODUCTS

A. Corporation Stops: Mueller H-10013 Corporation Stops

PART 3 EXECUTION

3.01 EXAMINATION

A. Cleaning and Inspection: Verify that the water main has been cleaned and inspected.

3.02 EXECUTION

A. Disinfection of Water Mains under 24 Inches: Disinfect water mains in accordance with AWWA Standard C651 and the Commonwealth of Virginia/State Board of Health Waterworks Regulations.

B. Disinfection of Water Mains 24-Inches and Greater: Disinfection of water mains 24-inches and greater in diameter shall be performed using either the Continuous Feed, Slug, or Spray Method in accordance with AWWA Standard C651 and the Commonwealth of Virginia/State Board of Health Waterworks Regulations. In the event AWWA Standards and the Virginia Waterworks Regulations differ, the more restrictive shall control.

C. The Owner will provide the water for the initial filling of the water main, testing and chlorination, unless otherwise directed by the Owner. The Contractor shall utilize only the existing taps and hydrants available on existing, adjacent water mains to obtain water for filling the new mains and shall submit a detailed filling and testing procedure to the Owner for review and approval, in accordance with Section 02514, Paragraph 1.03. The Contractor shall provide all pumps, meters, gauges, hoses, control valves, approved cross-connection control (backflow prevention) devices, sleeves, plugs/caps, and other equipment associated with the filling, leakage testing, sampling and flushing the water main at no additional cost to the Owner. The Contractor will be responsible for all costs associated with providing additional water for subsequent testing operations beyond the initial testing requirements.

D. Leakage Testing: Pressure test water main in accordance with Section 02514.

E. Flushing: The water main shall be flushed at locations approved by the Owner, and in the following manner:

1. General: Let water flow at the maximum rate possible until it is clear (<1.0 NTU) and a chlorine residual is obtained which is comparable to the source water. The Owner will advise the Contractor on how long to flush.
    a. The Owner will be present at the start of the flushing process to verify procedures.
2. Flushing from fire hydrants:
    a. Open fire hydrant valve, street valve and source valve completely for free discharge. Use the diffuser if necessary.
    b. If a fire hydrant cannot provide for a free discharge even with a diffuser, either install a hand control valve on the 2-1/2-inch hose connection (with fire hose if necessary) or use the fire hydrant street valve to control flow. Do not use the fire hydrant valve to control flow.
3. Flushing from Blow-Offs: For blow-offs, insert the 2-inch connector pipe with adapter and attach hose if required, and open blow-off valve to control flow.
4. Time Requirements: If over a week has elapsed between the pressure test and sampling, there should be a very thorough flushing. If the time period has been in excess of a month

or transported water was utilized for pressure testing, special procedures may be required at no additional cost to the Owner.

3.03 QUALITY CONTROL

A. Water Samples: In accordance with AWWA C651, bacteriological samples shall be collected at regular intervals not to exceed 2000 feet. Two consecutive negative samples shall be collected at least 24 hours apart for each sample location.

1. Scheduling: After the water main has been pressure tested, the Owner's Representative and the Contractor's representative will schedule collection of the samples. Samples will not be scheduled in advance of the pressure test.

2. Cancellations: Cancellations or sample failures will be scheduled in turn with original samples.

3. Unsatisfactory Sample: If the samples fail, the Contractor shall reschedule and repeat the flushing and sampling process.

4. Additional Disinfection: If the second sets of samples fail, the water main shall be disinfected again, with a chlorine solution and shall be allowed to sit for a minimum of 24 hours. The flushing and sampling process shall then be repeated.

B. Failure to Meet Quality Standards

1. Water Quality: Should the initial treatment, as determined by the laboratory tests, fail to result in a water comparable in quality to the water served to the public from the existing water supply system, disinfection and flushing shall be repeated until satisfactory results are obtained.

2. Cost of Additional Disinfection: Any labor, materials or equipment needed to rechlorinate or reflush water main shall be furnished by the Contractor at no additional cost to the Owner.

3.04 ENVIRONMENTAL PROTECTION

A. Discharge of Disinfected Water:

1. Discharge: The Contractor shall assume full responsibility for the discharge of disinfected water.

2. Controls: The Contractor shall provide siltation control as required to protect against soil erosion in accordance with Section 02370 - Erosion and Sediment Control.

3. Responsibilities: The Contractor shall be responsible for any damage to vegetation, trees, streams, ponds, and lakes caused by the discharge of heavily chlorinated water. The Contractor shall perform the necessary measures to dechlorinate the water prior to discharging water into any stormwater system, estuary, or other environmentally sensitive area, in accordance with AWWA Standards C651 and C655. All highly chlorinated water supplemented with chlorine and used for disinfection purposes shall be dechlorinated by the Contractor prior to discharge to the environment or storm sewer network. Within the City of Falls Church, all highly chlorinated disinfection water and distribution system flushing water shall be completely dechlorinated by Contractor prior to discharge. Contractor shall be required to completely dechlorinate all discharges if required by federal, state, or local regulations at any time during the Contract Period. Damages or injury to customers served by the Owner resulting from discharges of disinfection water into the system shall be the responsibility of the Contractor and shall be remedied at his expense. Acceptable chemicals used for dechlorination are listed in AWWA Standard C655 - "Field Dechlorination." The Contractor's proposed dechlorination agent shall be submitted to the Owner for approval prior to its use.

END OF SECTION 02513

SECTION 02514

LEAKAGE TESTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hydrostatic pressure and leakage tests

1.02 UNIT PRICES

A. No separate payment shall be made for hydrostatic pressure and leakage testing

1.03 SUBMITTALS

A. Submit detailed description of filling and testing procedures including, but not limited to, the following:

1. Schedule of test sections and piezometric test elevations in accordance with the requirements of Section 01330.
2. Type and location of bulkheads; provisions for thrust restraint.
3. Proposed sources of water and points of introduction into the pipeline.
4. Proposed equipment and methods for admitting test water and filling and dewatering the pipeline.
5. Proposed sequence of activities.
6. Proposed methods and details for testing pipe, joints, closures, etc., installed after completion of hydrostatic tests.

PART 2 PRODUCTS

2.01 MEASURING DEVICES

A. Owner will provide meters and pressure gauges, calibrated and suitable for use in testing.

PART 3 EXECUTION

3.01 GENERAL

A. The water mains shall be tested for leakage by the Contractor at his own expense in the presence of the Owner’s Representative. All tests shall be conducted in a manner to minimize as much as possible any interference with the Contractor's Work or progress. A maximum of 2,500 linear feet of water main may be tested at one time, unless otherwise approved by the Owner.

B. Each section of water main between adjacent butterfly valves (assemblies) shall be tested separately. The maximum differential pressure across any butterfly valve during testing shall not exceed the test pressure recommended by the valve manufacturer, or as specified by the Owner. The Contractor shall provide all temporary bulkheads and thrust restraint to isolate the water main test section, and shall provide all long solid sleeves necessary to make the permanent connection to the system at no additional cost.

C. The Contractor shall notify the Owner when the Work is ready for testing and tests shall be made as soon thereafter as practicable under the direction of the Owner’s Representative. Personnel for reading meters, gauges or other measuring devices will be furnished by the Owner, but all other labor, equipment and materials shall be furnished by the Contractor, unless otherwise specified.

D. Testing of the pipelines shall not be made until at least 7 days have elapsed after all concrete thrust blocking has been installed.

E. The Owner reserves the right to check the completed pipeline for vertical alignment prior to filling with water and testing. The Contractor shall not allow water in any pipelines without the express written permission of the Owner.

F. All air valves shall be installed as indicated on the Approved Drawings and individually checked for proper operation prior to filling the water main for testing. If for any reason it is necessary to drain the water main, the Contractor shall take all precautions required to ensure the safety of personnel entering and inspecting the water main. When draining the water main, all air valves shall be rechecked for proper operation. Pipelines containing large orifice valves shall be filled at a maximum rate of one foot per second.

G. Perform disinfection and bacteriological sampling in accordance with Section 02513.

3.02 TESTING

A. The pipeline shall be filled with water in accordance with Section 02513 for a minimum of 24 hours immediately prior to testing for leakage.

B. The piping shall be tested under the greater of a hydrostatic pressure of 150 psi or 150 per cent of the maximum expected working pressure at the high point of the line unless otherwise shown or directed by the Owner. The piping shall be tested to the target pressure no more than once an hour. Additionally, if required by the Owner, a leakage test at working pressure shall be performed. Air shall be purged from the pipeline through previously-installed appurtenances in the pipe prior to testing. The test pressure shall be applied to the piping by means of a hand pump or other approved method and shall be maintained for minimum of two hours. The test pressure shall not vary by more than plus or minus 5 psi.

C. The usage as determined by the above test shall not exceed the allowable usage as given by the following formula: $L = \frac{SD(P)^{0.5}}{148{,}000}$

Where:

L = allowable usage, in gallons per hour

S = length of pipe tested, in feet

D = nominal diameter of the pipe, in inches

P = average test pressure during the leakage test, in pounds per square inch (gauge)

Actual usage shall be the amount of water (per hour) used to pump the line back up to the target test pressure. If this amount exceeds the “allowable usage” determined by the formula above, the test has failed.

3.03 REPAIRING LEAKS

A. When leakage occurs in any test, the pipe, valves, fittings, appurtenances or joints shall be located and repaired at the expense of the Contractor. If the leak cannot be so located, the Contractor, at his own expense, shall remove and reconstruct as much of the original Work as necessary to obtain a water main that does not exceed the allowable leakage upon testing.

END OF SECTION 02514

SECTION 02700

PAVING AND SURFACING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary Pavement

B. Restoration of Paved and Unpaved Surfaces: Includes restoration of pavement structure including surface, base, and subbase courses where applicable, placed on subgrade; and restoration of aggregate surfaces.

1. Roads: Includes travel lanes and shoulders
    a. VDOT Roads
    b. City of Fairfax Roads
    c. City of Falls Church Roads
    d. Private Roads
2. Driveways and Parking Areas
3. Curb and Gutter
4. Sidewalks
5. Asphalt Trails
6. Temporary Pavement Markings
7. Speed Bumps, Speed Humps, and Speed Tables

1.02 UNIT PRICES

A. Refer to Section 01200 – Measurement and Payment.

B. Limits for Payment:

1. Temporary Pavement: Payment for 2-inch & 3-inch hot mix temporary pavement shall made to the limits specified below:
    a. Payment shall be limited to the area within lines equidistant from and parallel to the water main encompassing a total width of 48 inches greater than the inside diameter of the water main.
    b. Payment shall be limited to the area within lines 18 inches beyond the outside limits of manholes or other special structures or other lines or as specified.
    c. Cold mix will only be allowed when hot mix is not available from a local asphalt plant.
2. Permanent Pavement: Payment for hot mix asphalt pavement shall be for the amount placed within the limits of construction and as directed by the Owner.
3. Payment for Pavement Milling and Overlay shall be for the amount placed within the limits of construction, as directed and measured by regulating authority and/or the Owner, and in accordance with Section 01200. Project final pavement limits are marked by the regulating authority after the installation of the water main is completed for the entire project. No additional compensation will be provided for delays associated with the scheduling of an inspector to mark final paving limits.

4. Aggregate Surfaces: Payment for aggregate surfaced areas shall be limited to the volume of aggregate placed within the following limits:

    a. Aggregate placed to restore existing road shoulders, aggregate trails and driveways.

    b. No payment will be made for aggregate under asphalt trails. This is included in the pay item for 2-inch Asphalt Trail Surface Course Removal and Replacement.

    c. Final Mill and Overlay shall commence immediately after base paving but start no later than 30 days after base paving is completed. The requirement above does not apply in the event of weather limitations as specified in Section 314.03 of the VDOT Road and Bridge Specifications.

1.03 REFERENCES

A. Road and Bridge Specifications, Virginia Department of Transportation.

B. Fairfax County Public Facilities Manual, Latest Edition.

1.04 DEFINITIONS

A. Milling: Preparing rigid or flexible pavement for repair or overlay by removal of existing pavement to a depth of 1-1/2 inch.

B. Pavement Overlay: An asphalt concrete surface course up to 1-1/2 inches in thickness applied over an existing, prepared, paved surface to restore the surface.

1.05 SUBMITTALS

A. Mix Design Data for Asphalt Concrete, in accordance with the requirements of Section 01330.

B. Mix Design Data for Hydraulic Cement Concrete, in accordance with the requirements of Section 01330.

C. Sieve Analysis for Aggregate Materials, in accordance with the requirements of Section 01330.

1.06 REGULATORY REQUIREMENTS

A. Fulfill all provisions of the permitting agencies.

1.07 WARRANTY

A. Pavement Settlement: Refer to Section 02315 for Warranty Requirements.

PART 2 PRODUCTS

2.01 MATERIALS

A. Aggregates: Aggregates include the granular materials used in the base and subbase courses of the pavement structure and the top course on aggregate surfaces.

1. Crusher Run: Crusher run shall conform to the requirements of the VDOT Road and Bridge Specifications.

    a. Crusher Run shall be size number 25 or 26 stone.

2. Aggregate Base: Aggregate Base shall conform to the requirements of the VDOT Road and Bridge Specifications.

    a. Aggregate base shall be Type I, Size 21A.

B. Pavement Marking: Provide reflective, thermoplastic pavement marking materials conforming to VDOT Road and Bridge Specifications.

C. Geotextile underliner (for Asphalt Trails): Refer to the requirement of Section 02370.

2.02 EQUIPMENT

A. Roller: The roller shall be a self-powered, self-propelled unit with a manufacturer's rating of 7 to 10 tons.

B. Milling machine, as approved by VDOT.

2.03 MIXES

A. Asphalt Concrete: Asphalt concrete shall conform to the requirements of the type designated in accordance with the VDOT Road and Bridge Specifications.

1. Permanent and Temporary Surface Course shall be Type SM-9.5A - Plant Mix.

2. Base Course: Type BM-25.0.

3. Surface Course for Asphalt Trails shall be Type SM-2A - Plant Mix.

B. Pavement Overlay: Provide overlay surface where directed by the Owner.

1. Prepare existing paved surface by milling and applying a tack coat in accordance with the VDOT Road and Bridge Specifications and as directed by the Owner.

C. Hydraulic Cement Concrete: Hydraulic cement concrete shall consist of hydraulic cement, fine aggregate, coarse aggregate, water and admixture(s) mixed in the approved proportions; and, conform to the requirements of the type designated in accordance with the VDOT Road and Bridge Specifications.

1. Class of Concrete shall be A3 – Paving.

D. Portland Cement Concrete: Refer to Section 03300 for requirements.

E. Asphalt Tack Coat. Asphalt tack coats shall conform to the requirements of the VDOT Road and Bridge Specifications.

PART 3 EXECUTION

3.01 PREPARATION

A. Trench Backfill: Backfill trench according to the requirements of Section 02315, and the Trench details for paved and non-paved areas, and Asphalt Trail Replacement detail on the Drawings.

B. Removal of Temporary Pavement: Remove and dispose of temporary pavement materials in an approved manner, prior to installation of permanent pavement.

C. Weather Conditions: Refer to VDOT Road and Bridge Specifications for restrictions to paving operations due to unfavorable weather conditions.

3.02 INSTALLATION

A. Temporary Pavement: Temporary pavement shall consist of a 2-inch or 3-inch hot mix asphalt concrete, as directed by the Owner, type SM-9.5A, or approved substitute, surface course placed on the backfill materials required to provide a stable road surface.

1. Use of temporary pavement: Provide temporary pavement in all travel lanes and as directed by the Owner or permitting agencies.

2. Maintenance of Temporary Pavement: Maintain temporary pavement to the satisfaction of the permitting agencies until permanent pavement restoration is completed.

B. Permanent Pavement: Permanent restoration of pavement shall be with the same type of material as that removed or damaged during construction unless noted otherwise herein.

1. Patches: Patches shall be a minimum of 1-foot wide and shall conform to the grade of the existing pavement, unless indicated otherwise on the Drawings.

a. On VDOT roads, City of Fairfax and City of Falls Church, provide a patch which is in accordance with the guidelines on the permits.

b. On private roads and sidewalks, provide a patch which consists of layers of material which are equal in thickness to those of the existing pavement.

c. Existing asphalt trails that are to be removed and replaced shall consist of 2 inches of SM-9.5A over 4 inches of VDOT 21A stone and Geotextile underliner. Refer to Drawings for width of pavement. The Contractor shall restore all existing trails located within the limits of construction, within 7 days of Water Main Installation. The Contractor may install the Geotextile underliner and VDOT 21A stone (to grade) to maintain the trails until placement of final pavement. No payment will be made for additional stone required to maintain the trail which may be damaged by construction equipment, weather degradation or erosion. These costs shall be incidental to the pay item for 2-inch Asphalt Trail Surface Course Removal and Replacement.

d. Replacement Curb and curb gutter shall match that which was removed in style and dimensions.

1) Portland cement concrete curb and curb and gutter shall be completely replaced between expansion joints.

2) Asphalt concrete curb and curb and gutter shall be saw cut at the interface between new and existing.

e. Maintain grades, alignment and configuration of paved ditches.

2. Asphalt Concrete:

a. The surface course shall consist of a minimum 1 1/2-inch thick layer of SM-9.5A, unless otherwise required to match existing, more stringent conditions. Permanent pavement for asphalt trails shall be 2 inches.

b. The base course shall consist of a minimum 7.5-inch thick layer or matching existing conditions of BM-25.0. Base course may be a minimum 6-inch thick layer if milling is completed prior to base installation.

c. Subbase courses shall consist of a minimum 10-inch course of well compacted, stabilized aggregate base materials consisting of VDOT 21A stone. Cap the original width of the aggregate surfaces with a 1-inch layer of crusher run material.

d. Provide an asphalt tack coat between each layer of the pavement structure.

e. Roll the patch with a self-powered, self-propelled unit as described in this Section.

3. Pavement Overlay: Provide overlay surface in accordance with the Drawings or as directed by the Owner.

a. Prepare existing paved surface by milling and applying a tack coat in accordance with the VDOT Road and Bride Specifications and as directed by the Owner.

4. Hydraulic Cement Concrete: Install pavement according to the requirements of the Virginia Department of Transportation Road and Bridge Standards - Section 200 Curbs, Medians – Commercial Entrance Detail (Standard CG-13, Page 203.08), latest edition, as shown on the Drawings.

5. Replace existing loop detectors in accordance with the Virginia Department of Transportation Road and Bridge Standards - Section 1300 Traffic Control Devices - Loop Detector Installation Details (Standard TD-1A, B, C, Pages 1301.45 and 1301.46), latest edition. Contractor to hire qualified subcontractor to provide all labor, materials, equipment and incidentals required to complete the work as shown on the Drawings and in accordance with the requirements above. These costs will be paid under the Miscellaneous Electrical Work Allowance item. Contractor to provide actual invoice from subcontractor accomplishing the work, plus applicable contract markup.

6. Pavement Markings: Restore pavement line markings in accordance with the requirements of the VDOT Road and Bridge Specifications.

7. Speed Bumps, Speed Humps, and Speed Tables: Restore each speed bump, speed hump, or speed table in-kind, and in accordance with VDOT Road and Bridge Specifications. Work includes all painting/striping pertaining to the speed bump, speed hump, or speed table.

C. Aggregate Surfaces:

1. Aggregate surfaced roads and driveways: Provide a 10-inch well compacted stabilized layer of VDOT 21A stone material over the entire width of the trench excavation.

   a. Cap the original width of the aggregate surfaces with a 1-inch layer of crusher run material.

3.03 SCHEDULE

A. Time of Completion of Restoration:

Permanent pavement restoration of street surfaces and other areas shall be made in accordance with the time requirements of VDOT or other governmental agency having jurisdiction, unless denoted otherwise herein.

END OF SECTION 02700

NO TEXT THIS PAGE

SECTION 02920

LAWNS AND GRASSES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Seeding and Fertilizing

B. Sodding

C. Soil Stabilization Mats

1.02 UNIT PRICES

A. Refer to Section 01200 – Measurement and Payment and the following:

B. Limits for Payment: Payment for seeding and fertilizing, or sodding, shall be made to the limits shown on the Drawings or the following:

1. 4-inch through 12-inch diameter water mains: Payment shall be limited to the area within lines equidistant and parallel to the water main centerline encompassing a total width 8 feet greater than the inside diameter of the water main.

2. 14-inch through 36-inch diameter water mains: Payment shall be limited to the area within lines equidistant and parallel to the water main centerline encompassing a total width 10 feet greater than the inside diameter of the water main.

3. Vaults, manholes, and other special structures: Payment shall be in accordance with the unit process to the limits determined by the Owner at the time of Construction.

4. Payment limits in easement areas, if different than the preceding, will be determined by the Owner at the time of Construction.

1.03 REFERENCES

A. Virginia Erosion and Sediment Control Handbook.

1.04 SUBMITTALS

A. Certified Analysis: Provide a certified analysis of the topsoil, seed mix, and fertilizer proposed for use, in accordance with the requirements of Section 01330.

1.05 REGULATORY REQUIREMENTS

A. Seeding and Mulching Requirements: Seeding and mulching procedures shall conform to the applicable provisions of the Virginia Erosion and Sediment Control Handbook.

1.06 STORAGE AND PROTECTION

A. Sod: Store sod in piles of tight rolls or layers laid grass to grass or roots to roots. Sprinkle sod piles with water and cover with straw or moist burlap. Keep sod moist. Sod which is allowed to dry out will be rejected by the Owner.

PART 2 PRODUCTS

2.01 MATERIALS

A. Seed: Provide grass seed mixture composed of 70 percent Kentucky 31 tall Fescue and 30 percent common Kentucky Blue Grass. Under no circumstances shall rye grass be added to the grass mixture. Seed shall be mixed by the seedman to the satisfaction of the Owner. Seed analysis shall be marked on the containers. The seed components shall be free of noxious weed seeds and shall have not less than the following purity and germination:

	PERCENT PURITY	PERCENT GERMINATION
Kentucky Blue Grass	85	75
Kentucky Fescue	98	90

B. Sod: Sod shall be well rooted, healthy, pasture type sod, reasonably free from weeds and shall be selected from areas approved by the Owner. Cut sod into square or rectangular sections of equal width and of a size that will permit them to be lifted without breaking. Cut to a depth approximately equal to the depth of the roots, but in no case shall the depth be less than 1 inch.

1. Sod may be provided in place of seeding at no additional cost to the Owner.

2. Sod shall be provided on all residential private property, where directed by the Owner, to an equal or better condition than existing.

C. Fertilizer: Provide a commercial fertilizer mixture for use on lawn areas which provides a complete plant food and which contains nitrogen, phosphorus and potash in the proportions of 5 percent water soluble nitrogen, 10 percent available phosphorous, and 5 percent water-soluble potash.

D. Topsoil: Suitable topsoil shall be stripped from excavations and stockpiled for reuse in accordance with Section 02315. The Contractor shall supply any additional material required at no cost to the Owner. This soil shall be friable loam, and shall be obtained from naturally well-drained areas. It shall be free from subsoil, clay lumps, stones, stumps, roots, brush, weeded, litter, trash or other harmful material.

PART 3 EXECUTION

3.01 PREPARATION

A. Topsoil: Upon completion of construction in the area to be seeded or sodded, spread a uniform layer of topsoil over the compacted subgrade.

1. Depth of Topsoil: Provide a minimum 4-inch topsoil layer for areas to be seeded and a minimum 3-inch layer of topsoil for areas to be sodded.

2. Finish grading of topsoil: Compact topsoil with an approved roller weighing between 250 and 750 pounds.

a. Provide finished surface without irregularities to the grade shown on the Drawings or, if not shown, the grade which conforms to the existing finished grade.

b. In areas to be sodded, loosen soil to a minimum depth of 2-inches, restore to a uniform grade and sprinkle with water.

B. Fertilizer: Spread fertilizer uniformly, by means of a mechanical spreader, at the rate of 50 pounds per 1000 square feet. Apply fertilizer at least 24 hours prior to seeding or sodding.

3.02 INSTALLATION

A. Seeding: Grass seed shall be sown by a mechanical spreader operated in two directions. Total application shall be 5 pounds to 1,000 square feet. Rake seed lightly into the surface and roll with a light, hard roller. Sprinkle seeded areas with a fine spray in such a manner as not to wash out the seed.

Use care in raking not to destroy the finished grade or to disturb uniform distribution of seed. Perform seeding on a still day and only with the approval of the Owner.

B. Hydroseeding: Application of seed, lime or fertilizer by Hydroseeder will be permitted.

C. Sodding: Provide sod where shown on the Drawings or directed by the Owner. Place sod by hand with close joints. Do not overlap. Fill all gaps with sod and after the sections are set, fill

all joints with loamy topsoil. Following sodding operation, sprinkle area with water and roll or tamp to incorporate sod and sod bed in order to assure a tight joint between strips.

1. Sodding on Slopes: Sod placed on slopes steeper than a 2:1 shall be anchored in place by stakes driven flush with the surface after the tamping and rolling have been completed. Stakes shall be at least 8-inches long and have a cross-sectional area not less than 1 square inch and shall be placed in such a manner as to hold the sod securely in place.

3.03 PROTECTION

A. General: The Contractor shall be responsible for protecting and maintaining sodded and seeded areas until acceptance by the Owner.

B. Protection against Washouts: The Contractor shall protect seeded areas against washouts by covering the area with burlap or straw or by other approved means. Washouts shall be regraded and reseeded until a good sod is established, to the Owner's satisfaction.

C. Watering: The Contractor shall keep the sodded or seeded areas sufficiently moist in order to maintain and promote life and growth of the sod until the Work is accepted.

END OF SECTION 02920

NO TEXT THIS PAGE

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Steel Reinforcing Bars

B. Steel Reinforcing Fabric

1.02 UNIT PRICES

A. Refer to Section 01200 – Measurement and Payment

1.03 REFERENCES

A. ACI-318 Building Code requirements for reinforced concrete

B. Concrete Reinforcing Steel Institute (CRSI) Manual of Practice

C. ASTM A615 Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement

D. ASTM A185 Welded Steel Wire Fabric for Concrete Reinforcement

E. ASTM A497 Welded Deformed Steel Wire Fabric for Concrete Reinforcement

F. ACI 315 Manual of Standard Practice for Detailing Reinforced Concrete Structures

1.04 SUBMITTALS

A. Shop Drawings: Submit completely detailed shop drawings and schedules for steel reinforcing bars in accordance with Section 01330 - Submittals.

B. Certificates: Submit mill test certificates for the Chemical and Physical properties of steel reinforcing bars and steel welded wire fabric in accordance with the requirements of Section 01330.

1.05 DELIVERY, STORAGE AND HANDLING

A. Delivery: Reinforcing steel, as delivered to the Work, shall be in bundles strongly tied. Each group of both bent and straight bars shall be identified with a metal tag giving the identifying number corresponding to the bar schedules and diagrams. All reinforcing shall be properly stored in an orderly manner, at least 12 inches off the ground, and keep clean and protected from the weather.

B. Protection: Reinforcing steel shall be delivered without rust other than such as may have been accumulated during transportation to the Work. It shall at all times be fully protected from moisture, grease, dirt, mortar or concrete. Before being placed in position, it shall be thoroughly cleaned of all loose mill scale and rust and of any dirt, coatings or other material that might reduce the bond. If there is a delay in depositing concrete, the steel shall be inspected and satisfactorily cleaned immediately before the concrete is placed.

PART 2 PRODUCTS

2.01 MATERIALS

A. Reinforcing Steel: Reinforcing steel shall be in accordance with the provisions of ACI 318 and Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practice and the following.

B. Bars: Bars for concrete reinforcement shall be new steel rolled from open hearth steel billets and shall meet the requirements of ASTM A615, Grade 60. Rerolled materials shall not be

permitted. Bars shall be deformed in conformity with ASTM A615 and shall be free of defects. Spiral reinforcing steel shall be fabricated from cold drawn wire in accordance with ASTM A82 or hot rolled plain or deformed bars conforming to ASTM A615, Grade 60.

C. Welded Wire Fabric: Fabric shall be of the electrically welded type, with wires arranged in rectangular patterns of the sizes shown or specified.

1. Welded smooth wire fabric shall conform to ASTM A185

2. Welded deformed wire fabric shall conform to ASTM A497

2.02 FABRICATION

A. Bending Steel Bars: Bars shall be cut to required length and accurately bent by approved methods before placing. Bars shall be bent in the shop unless written approval of field bending is obtained from the Owner. If field bending is permitted, it shall be done only when the air temperature is above 30 degrees F where the bending operation is performed. Bars shall have a minimum inside radius of bend as specified in the CRSI Manual of Standard Practice.

PART 3 EXECUTION

3.01 INSTALLATION

A. Bars:

1. Placement: The bars shall be placed in the exact positions and with the spacing shown or required and shall be securely fastened in position at the intersections to prevent displacement during the placing of the concrete. The bars shall be fastened with black annealed wire of not less than 16 gauge or other approved devices. Spacing chairs of type approved by the Owner shall be furnished and properly placed to support and hold reinforcing bars in position in all beams and slabs, including slabs poured directly on the subgrade. Except where otherwise shown, splices in tension reinforcement shall be as specified in the latest edition of ACI 318. Bar splices shall be staggered, where possible.

a. Refer to Drawings for bar lap splice lengths.

b. Maintain minimum 1-1/2” clearance between rebar and pipes, sleeves or anchor rings.

2. Projecting Ends: On any section of the Work where horizontal bars run further than the length of the forms, the form or head against which the work ends shall be perforated at the proper places to allow the bars to project through a distance at least equal to the lap specified. The projecting ends, however, unless otherwise directed by the Owner, shall be of different lengths so that laps in bars in the same plane do not occur adjacent to each other.

B. Welded Wire Fabric: Steel reinforcing fabric shall be placed in the positions shown, specified, or required to fit the Work. Suitable spacing chairs or supports shall be furnished and placed to maintain the mesh in correct location. Where flat mesh is required, the mesh shall be rolled or otherwise straightened to make a perfectly flat surface before placing. The length of laps not indicated shall be approved by the Owner.

1. Extend all slab reinforcement into the floor slab, wall or roof in accordance with the ACI Code. If such extensions are not obtainable, the bars shall terminate with a standard hook.

2. Cut or bend reinforcing steel bars as needed so that they do not continue through openings in slabs and walls.

3.02 PROTECTION

A. Unless otherwise noted on the Drawings, the following concrete covers shall be provided for reinforcement in cast-in-place concrete:

Concrete cast against and permanently exposed to earth: 3”

Formed concrete exposed to earth, liquid or weather:

#5 and Smaller:	1-1/2”
#6 and #11:	2”

Formed concrete not exposed to earth, liquid or weather: 1-1/2”

END OF SECTION 03200

NO TEXT THIS PAGE

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete Materials

1. Cement
2. Aggregates
    a. Sand
    b. Stone and Gravel
3. Water
4. Admixtures

1.02 UNIT PRICES

A. Refer to Section 01200 – Measurement and Payment.

B. Payment Limits: Payment for the following items will be for open-cut water main installations, to the limits shown on the Drawings, and/or where directed by the Owner. Where limits are not shown, payment will be made for the areas replaced within lines equidistant, parallel and to the following distances from the centerline of the water main.

1. Concrete Curb, Curb and Gutter
    a. 4-inch through 20-inch diameter water main: A total of 48-inches greater than the outside diameter of the water main.
    b. 24-inch through 42-inch diameter water main: A total of 60-inches greater than the outside diameter of the water main.
2. Concrete Sidewalk/Curb Ramp Replacement: Replacement in its entirety to the limits indicated on the Drawings.

1.03 REFERENCES

A. ACI 212 Guide for Use of Admixtures in Concrete.

B. ACI 229 Controlled Low Strength Materials

C. ACI 304 Placing Concrete by Pumping Methods

D. ACI 306 Recommended Practice for Cold Water Concreting.

E. ACI 308 Recommended Practice for Curing Concrete

F. ACI 318 Building Code Requirements for Reinforced Concrete

G. ACI 347 Recommended Practice for Concrete Formwork

H. ACI 614 Recommended Practice for Measuring, Mixing and Placing Concrete

I. ASTM C33 Specification for Concrete Aggregates

J. ASTM C39 Compressive Strength of Cylindrical Concrete Specimens

K. ASTM C42 Obtaining and Testing Drilled Cores and Sawed Beams of Concrete

L. ASTM C94 Specification for Ready Mix Concrete

M. ASTM C109 Compressive Strength of Hydraulic Cement Mortars

N. ASTM C136 Sieve Analysis of Fine and Coarse Aggregates

O. ASTM C138 Test for Unit Weight, Yield and Air Content of Concrete

P. ASTM C143 Test for Slump of Portland Cement Concrete

Q. ASTM C150 Specification for Portland Cement

R. ASTM C171 Sheet Materials for Curing Concrete

S. ASTM C172 Sampling Fresh Concrete

T. ASTM C173 Test for Air Content of Freshly Mixed Concrete by Volumetric Method

U. ASTM C191 Time of Setting of Hydraulic Cement by Vicat Needle

V. ASTM C192 Making and Curing Concrete Specimens in the Laboratory

W. ASTM C260 Air-entraining Admixtures for Concrete

X. ASTM C309 Liquid Membrane-Forming Compounds for Curing Concrete

Y. ASTM C494 Chemical Admixtures for Concrete

Z. ASTM C596 Measuring the Drying of Shrinkage of Mortar Containing Portland Cement

AA. ASTM C827 Tests for Early Volume Change of Cementitious Mixtures

BB. ASTM D412 Specification for Concrete Drain Tile

CC. Federal Specification TT-S227E

DD. Federal Specification TT-S230C

EE. Corps of Engineers C572

FF. VDOT Road and Bridge Specifications, Latest Edition.

1.04 DEFINITIONS

A. Class A Concrete: Class A concrete is high-strength concrete intended principally for precast concrete units.

B. Class B Concrete: Class B concrete is designed for high strength and watertightness and is intended for use in reinforced concrete structures such as thrust collars, columns, walls, beams, slabs, and, in general, where forms, other than simple forms, are required.

C. Class C Concrete: Class C concrete is designed for high strength and watertightness and is intended for use for bottoms of structures, electrical duct encasement, and, in general, where concrete is deposited directly on the bottoms of slopes or excavations and where only simple forms are required.

D. Class D Concrete: Class D concrete is designed as low-strength, plain or reinforced concrete and is intended for use in workmats beneath structures, soil stabilization, pipe cradles, encasement, corrosion control test station pads, guard posts, thrust anchors, filling and other similar purposes.

1. Boulders or Rock Fragments: Clean boulders or rock fragments excavation during construction may be embedded, in quantities approved by the Owner, in large volumes of concrete to provide added bulk.

a. Place boulders or rock fragments carefully so that no voids are left in the concrete.

E. High-Early Strength Concrete: High-Early strength concrete is designed to achieve Class B through Class D 7-day compressive strengths in as little as 1 day and is intended for use in situations where thrust anchors and collars need to achieve 7-day compressive strength early

in order to minimize out of service water mains. High-Early strength concrete may be used only when shown on the Drawings or approved by the Owner.

E. Architectural Concrete: Is defined as the ultimately exposed areas of exterior and interiors of buildings, chambers, galleries, vaults, foundations, parapets (including portions to be covered by roofing or flashing material), tanks and basins limited on the interior to a point that is 2 feet below the normal water level.

F. Mass Concrete: Mass concrete is any cast-in-place concrete with dimensions large enough to require that measures be taken to cope with the generation of heat and attendant volume change to reduce cracking.

G. Flowable Fill Concrete (Controlled Low Strength Material): Flowable fill concrete shall be liquid enough to flow, be self-leveling, excavatable, and have a minimum 28-day compressive strength of 30 psi but not more than 100 psi. Non-excavatable flowable fill concrete shall have a minimum 28-day compressive strength of 125 psi but no more than 200 psi (to be excavatable by machine equipment). Materials shall comply with the recommendations within chapter 3 of ACI 229, latest revision, which include cement, aggregates, fly ash, water, admixtures, slag and other nonstandard materials.

1.05 SUBMITTALS

A. Shop Drawings: Submit Shop Drawings in accordance with the requirements of Section 01330 for the following:

1. Architectural formwork
2. Steel forms

B. Samples: Provide representative samples of the following items in accordance with the provisions of Section 01330.

1. Aggregate: Provide a 50-pound sample 15 days prior to the first day concrete is used.
2. Fine Aggregate for Architectural Concrete: Submit a representative color sample for approval 15 days prior to the first day of use.

C. Concrete Mix Design: Concrete mix designs shall be prepared and submitted to the Owner for approval for each type required.

1.06 REGULATORY REQUIREMENTS

A. American Concrete Institute: Perform Work covered by this Section in accordance with the requirements of the American Concrete Institute.

B. Concrete shall conform to applicable sections of VDOT Road and Bridge Specifications.

1.07 DELIVERY, STORAGE AND HANDLING

A. Cement:

1. Delivery: Cement delivered to the jobsite shall be in strong, well made bags marked with the brand, name of manufacturer and net weight.
2. Storage: Store cement in weathertight building with a wood floor raised above the ground and protected from dampness.
    a. Stack and store individual shipment in a manner which permits each shipment to be readily accounted for at all times.
    b. Provide all facilities necessary to permit sampling and inspection of each shipment.
    c. Do not use cement which has deteriorated.

d. Cement remaining in storage prior to shipment for a period exceeding 6 months after testing shall be re-tested and rejected if it fails to meet any requirements of these Specifications.

e. Do not use previously accepted cement which has been in storage more than 1 year from the time of original acceptance.

B. Aggregate: Keep aggregates clean and free from all other materials during transportation and handling. Keep fine and coarse aggregates separated from each other until measured in batches and placed in the mixture.

1. Stockpiling: Unless finish screening is provided at the batch plant, stockpile aggregates in a manner to prevent segregation and in accordance with ACI Standard 614.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. W. R. Grace and Co.

B. Sonneborn-Contech

C. Sika Chemical Corporation of Lyndhurst, NJ.

2.02 MATERIALS

A. Cement: Provide Standard Portland Cement, Type I, Type II, or Type III (High-Early strength) which meets the requirements of ASTM C150:

1. Domestic manufacturers: Provide cement which is produced domestically.

2. Architectural Concrete: Provide cement which is uniform in color and type from one manufacturer for use in architectural concrete.

B. Fine Aggregate: Fine aggregate shall be natural sharp sand meeting the requirements of ASTM C33 except as modified herein:

1. Limits for deleterious substances: The limits for deleterious substances shall be as set forth in Table 1 of ASTM C33 for concrete subject to abrasion.

2. Color: Fine aggregate for architectural concrete shall be of one type and color.

a. Fine aggregate subjected to the test for organic impurities and producing a color darker than standard will be rejected without exceptions.

3. Soundness: Fine aggregate shall meet the requirements of the soundness test set forth in paragraph 7.1 of ASTM C33.

4. Fine aggregate for mortar and grout: Fine aggregate for mortar and grout shall be well graded within the following limits by weight when tested in accordance with ASTM C1126.

SIEVE	PERCENTAGE PASSING
No. 4	100
No. 8	96 to 100
No. 16	40 to 65
No. 30	15 to 35
No. 50	5 to 15

C. Coarse Aggregate: Coarse aggregate shall consist of gravel or crushed stone and shall meet the requirements of ASTM C33. The limits for deleterious substances and physical property requirements given in Table 3 of ASTM C33 shall apply for each class designation without exception. Coarse aggregate shall be graded according to Sizes 46 and 57 in Table 11 of the Standard.

1. Coarse Aggregate Specification: Size No. 57 shall be used for all thin or closely reinforced concrete work, such as floors and roofs less than 7-inches thick, walls less than 9-inches thick, and all beams. For all other concrete work, Size No. 46 shall be used.

2. Color: Coarse aggregate for concrete shall be of one type and color.

D. Admixtures: The use of admixtures shall be limited to the following:

1. Air-entraining: All concrete, except Class D, shall contain an air-entraining admixture conforming to ASTM C260 and sufficient to produce from 4.5 to 6.5 percent entrained air in the concrete.

2. Water reducing: Water reducing admixtures, conforming to ASTM C494, Type A, shall be used when approved by the Owner.

3. Set retarding: Set retarding admixtures, conforming to ASTM C494, Type D, shall be used when approved by the Owner.

4. Fly ash: Fly ash, for use in flowable fill, shall conform to Section 241 of the VDOT Road and Bridge Specifications.

E. Water: Water used in mixing concrete shall be clean and shall not contain deleterious amounts of acids, alkalies or organic materials. All water shall be furnished from sources approved by the Owner.

F. Expansion Joint Material: Joint filler shall be closed-cell PVC form of the thickness shown.

G. Waterstops: Provide waterstops made of extruded polyvinyl chloride.

1. Requirements for plastic and waterstops: Provide plastic waterstops which meet the requirements of Corps of Engineer Specification ORD-C572, except as modified herein.

a. The Shore A durometer hardness shall be between 65 and 75.

b. The minimum tensile strength shall be 1850 psi.

c. Specific gravity shall not exceed 1.38.

d. Waterstops shall have ribbed longitudinal strips.

2. Dimensions: Unless otherwise shown, provide waterstops which are flat, a minimum of 6-inches wide, not less than 1-1/4-inches thick at the narrowest point, and not less than 3/8-inches thick immediately adjacent to the center.

H. Membrane Waterproofing: Provide membrane waterproofing which meets the requirements of ASTM C309 and is a semi-flexible material composed of an asphaltic core to which is bonded on independent weather proof coating. The coating is to be bonded during the manufacturing process.

1. Protective coating requirements: Protective coating shall form a continuous layer over the waterproofing core.

2. Membrane vapor transmission rate: Membrane shall have a constant rate of water vapor transmission not greater than 0.0066 grains per square foot per hour measured in accordance with ASTM E96.

I. Joint Sealant: Joint sealant materials may be either a single component urethane compound meeting the requirements of Fed. Spec. TT-S-230C or a two-component urethane compound meeting the requirements of Fed. Spec. TT-S-227E, except as modified herein.

1. Urethane sealant: The urethane sealant shall be 100 percent polymer, non-extended, containing no solvent, lime, or coal tar. Color shall be as selected by the Owner, but shall not be black. Sealant properties shall conform to the following Table:

PROPERTY	VALUE	TEST METHOD

Maximum Final cure (days)	10	ASTM D412
Tensile strength (psi)	75-50	ASTM D412
Minimum elongation (1%)	400	ASTM D412
Modulus @ 100% elongation (psi)	35-50	Fed. Spec.
Shore A hardness	20-35	Shore Durometer
Solid content (1%)	98-100	
Peel content (1%)		Fed. Spec.

PROPERTY	VALUE	TEST METHOD
Minimum recovery (1%)	90	Fed. Spec.
Initial tack-free cure (hrs.)	24-48	Fed. Spec.

2. Joint sealant for unbonded joints: Where removable concrete slabs are not poured in place, horizontal and vertical joints shall be filled with self-leveling or non-sagging colma joint sealer, respectively, as manufactured by the Sika Chemical Corporation of Lyndhurst, NJ, or approved equal.

J. Sheet Curing Materials:

1. Paper shall consist of only ply of an approved type of fiber reinforced waterproof building paper, consisting of cross fibers embedded in asphalt between two layers of waterproof building paper.

2. Polyethylene film shall be white, opaque sheeting a minimum of 4 mils in thickness. The sheeting shall be manufactured from virgin resins and shall contain no scrap or additives.

2.03 MIXES

A. Concrete: Concrete to be used in the respective places shown on the Drawings or as specified shall be divided according to compressive strength.

B. Concrete classifications: Refer to these Specifications and the Drawings to determine which class of concrete to use in a given application.

1. Class A concrete shall have 7-day test strength of 3400 psi and 28-day test strength of 5000 psi.

2. Class B concrete shall have 7-day test strength of 2700 psi and 28-day test strength of 4000 psi.

3. Class C concrete shall have 7-day test strength of 2700 psi and 28-day test strength of 3000 psi.

4. Class D concrete shall have 7-day test strength of 1300 psi and 28-day test strength of 2000 psi.

5. High-Early Strength concrete shall have 1-day test strength equal to the applicable Class B, C, or D 7-day test strength requirement above.

C. Concrete mix design: Prepare mix designs for each type of concrete required in accordance with ACI 613.

1. Concrete of any class which is to be placed by pumping methods shall require a separate mix design.

D. Admixtures: Admixtures shall be used as directed in these Specifications and Drawings.

1. When more than one admixture is to be used, each admixture shall be dispensed separately into the mix, and at separate times during the mixing in accordance with ACI 212.

E. Cement content: Concrete, except Class D, shall not contain less than 517 pounds of cement per cubic yard.

F. Water-cement ratio: Concrete mixtures shall be proportioned to give adequate workability for the use intended without exceeding the following prescribed quantities of mixing water:

CONCRETE CLASS	TOTAL WATER – U.S. GALLONS PER 94 LB. SACK OF CEMENT
B	5-1/2
C	5-1/2
D	7-1/4

1. For Class A and High-Early strength concrete, the quantity of mixing water shall be determined on the basis of either laboratory trial batches or field experience in accordance with ACI 318.
2. The quantity of water used in each batch shall be the total quantity, including surface moisture contained in the aggregates.

G. Ready mixed concrete: Ready mixed concrete shall meet the requirements of ASTM C94 except as modified in these Specifications.

2.04 GROUT

A. Grout: Grout shall be a flowable, prepackaged, non-shrink and non-stain grout without dependence on gas expansion forces or enlargement of metal particles for its non-shrink characteristics.

B. Packaging: The grout shall be packed in moisture-proof bags with general instructions for placement printed on the bag.

PART 3 EXECUTION

3.01 PREPARATION

A. Measurement and Mixing: Measurement and mixing of concrete shall be subject to the review of the Owner in all respects and shall be performed in accordance with the recommendations of ACI 304, as modified herein.

1. Measuring requirements: Measure cement, fine and coarse aggregates separately by weight by equipment providing accuracy within 1 percent of the net load weighed. Water shall be measured by a suitable device, accurate to within 1 percent of the total amount required for the batch.
2. Measuring equipment: The accuracy of the weighting equipment shall meet the requirements of the United States Bureau of Standards and standard testing weights and other necessary equipment shall be available at all times for testing the equipment.
3. Mixing: Concrete shall be mixed in rotary, batch type mixer of adequate design to produce a thorough mix, homogenous in composition and uniform in color. Each batch of 1 cubic yard or less shall be mixed not less than 1-1/2 minutes after the last of the ingredients have been added to the mixer. The mixing time shall be increased 15 seconds for each additional cubic yard or fraction thereof.

B. Ready-Mixed Concrete:

1. Rate of delivery: The rate of delivery of the mixed concrete shall be such that the interval between placing of fresh concrete in contact with concrete already placed from previous batches shall not exceed 45 minutes. The elapsed time between the introduction of mixing water to the cement and aggregates and depositing concrete in the Work shall not exceed 60 minutes, including mixing and agitating time.
2. Delivery equipment: Delivery of concrete in non-agitating equipment shall not be permitted.

3. Addition of water: No water shall be added to the concrete at the site unless accepted by the Owner for a specific batch. Acceptance of such addition to one batch shall not be construed as acceptance of additions to subsequent deliveries.

3.02 INSTALLATION

A. Forms:

1. General: The design and engineering of the formwork, as well as its construction, shall be the responsibility of the Contractor. Forms shall be designed, detailed and constructed in accordance with ACI 347 including all tolerances, except as modified herein. Beam and girder soffits shall be erected with a camber as indicated on the Drawings. Where camber is not given, a minimum camber of ¼-inch in 10-feet of span shall be provided. The forms shall be sufficiently braced, shored, and wedged to prevent deflection.

   a. Provide ¾-inch bevel strips at the external angles of walls, beams, pilasters and columns and girders.

   b. Provide sufficient forms for repeated uses to ensure the required rate of progress.

      1) Thoroughly clean and inspect all forms before use.

   c. Apply a suitable form oil to the inside surface immediately before, during, or after erection of forms or thoroughly wet form just prior to placing concrete.

      1) No form oil shall be permitted on the reinforcing steel.

   d. The Contractor shall be responsible for remedying any defects resulting from form use, inspection and prior acceptance by the Owner notwithstanding.

2. Plywood forms: Forms for all interior exposed concrete surfaces and designated areas of exterior exposed concrete surfaces shall be constructed of plywood not less than 5/8-inch thick for straight sections and 3/8-inch thick for curved sections. Plywood shall be Douglas Fir, 5-ply for 5/8-inch or thicker, and 3-ply for 3/8-inch, made with a waterproof glue and manufactured especially for concrete formwork. Edges shall be square in both directions, and adjoining panels shall match in thickness, width, and length. Full-size sheets of plywood shall be used. Forms shall be placed so that marking will be symmetrical. Plywood shall be thoroughly oiled on contact faces and edges with raw linseed oil or other accepted form of lacquer.

3. Steel forms: Construct forms accurately in modular sizes and in such minor multiple widths and lengths as will permit plates and filler to be erected to correct alignment.

   a. Coat steel forms prior to each use with a light, clear paraffin-base oil or other acceptable commercial preparation which shall not discolor concrete.

   b. Wire brush plates after each use.

B. Placing Concrete:

1. General: Place concrete only in presence of the Owner in forms which have been accepted by him. Where procedure is not specified, place concrete in accordance with ACI 304.

2. Continuous Operation: Concreting operations shall be continuous until the section, panel, or scheduled placement is completed. Should the concreting operations be unavoidably interrupted, construction joints shall be formed at proper locations as specified.

3. No Placement after Initial Set: No concrete shall be placed after its initial set has occurred, and no re-tempered concrete shall be used under any conditions.

4. Minimum Handling: Concrete shall be conveyed and placed with minimum handling and by means of buckets, buggies, chutes, pumps, or other approved equipment that will prevent segregation of the ingredients. The slope and length of chutes shall be subject to the acceptance of the Owner. Outlets of chutes, hoppers, and conveyor belts shall be

provided with suitable baffles to prevent segregation. Apparatus shall be kept clean and flushed with water before and after each run. Concrete shall be deposited in the forms as close as possible to its final position and, in no case, more than 5-feet in a horizontal direction therefrom. Re-handling of concrete will not be permitted.

5. Placement in Layers: Place concrete in layers shallow enough so that the previous layer is still soft when the next layer is added. The two layers can be vibrated together.
    a. The maximum layer depth shall not exceed 18-inches.
    b. The elapsed time between placing layers shall not exceed 45 minutes.
6. Elimination of Voids: Take special care to place concrete against the forms, particularly in angles, and corners in order to prevent voids, pockets and rough areas and to assure continuous contact of the entire surface of the reinforcing steel and inserts with concrete.
    a. Rod or spade concrete, if needed, to work coarse material away from forms.
7. Protection: Protect freshly placed concrete against damage from the elements or other sources.
8. Vibrating: Consolidate all concrete by means of mechanical internal vibrators applied directly into the concrete in a vertical position.
    a. The intensity and duration of vibration shall be sufficient to cause concrete to flow, to compact thoroughly and to embed reinforcement, pipes, conduits, and similar Work completely. Vibrators shall not, however, be used to cause concrete to move more than a short distance horizontally. Vibrators shall be inserted and withdrawn at points 18- to 30-inches apart, and vibration shall be stopped immediately when sheen of mortar first appears on the surface.
    b. Vibrators shall operate at a speed of not less than 4500 cycles per minute. Each tool shall weigh approximately 15 pounds and shall be capable of producing a visible effect upon concrete mixture with a 1-inch slump for a distance of at least 18-inches from the vibrator. A sufficient number of vibrators shall be on hand to assure that the incoming concrete can be properly compacted within 15 minutes after placing. Reserve vibrators shall be on hand for the time when others are being serviced. No placement of any concrete shall be made with a single vibrator on hand.

C. Special Requirements:

1. Hot Weather Requirements: Follow the requirements of ACI 305 and the following for placement of concrete during hot weather.
    a. Concrete in excess of 90 degrees F. at the time of placement shall not be used.
    b. A water reducing set retarding admixture may be used in accordance with the provisions of these Specifications when concrete temperature is consistently about 75 degrees F. and a noticeable decrease in slump or an increase in mixing water demands occur.
2. Cold Weather Requirements: Follow the requirements of ACI 306 and the following for placement of concrete during cold weather.
    a. Set accelerators shall not be permitted.
    b. Protect concrete placed in the Fall from the time of the first frost until mean daily temperature at the site falls below 40 degrees F. from freezing for a minimum period of 24 hours after it is placed.
    c. While mean daily temperatures are below 40 degrees F., the temperature of the concrete shall be not less than 50 degrees F. and shall be maintained at this temperature for at least 72 hours, or, if structural requirements are critical, until such

time as is required to develop the necessary compressive strength. The internal temperature for concrete at the time of placing during this period shall not exceed 60 degrees F.

d. Protect concrete, placed in the spring after mean daily temperature rises above 40 degrees F. from freezing in a similar manner to that described in the preceding sentences, until danger of freezing is past.

D. High-Early Concrete

1. When use of high-early strength hydraulic cement concrete is required, it shall conform to the requirements specified in Table II-17 in Section 217 of the VDOT Road and Bridge Specification, except that the 28-day strength shall be obtained in 7 days. Up to 800 pounds per cubic yard of Type I of Type II cement may be used to produce high-early strength concrete in lieu of using Type III modified cement.

2. Hydraulic cement concrete shall conform to the requirements of Section 217 for Class A3 paving concrete except that the compressive strength shall be at least 3,000 psi within 24 hours. The accelerated strength gain shall be achieved by the use of 800 +/-50 pounds per cubic yard of Type III cement conforming to the requirements of AASHTO M-85 and approved air-entraining, accelerating, and water-reducing admixtures conforming to the requirements of Section 215. If calcium chloride is permitted as an accelerating admixture, it shall be limited to 2 percent by mass. The air content shall be 6 +/- 2 percent. The water/cement ratio shall be not more than 0.42 by weight. The Contractor shall prepare a sufficient number of trial batches in the presence of the Owner to verify the strength and workability of the mixture design when required.

E. Curing:

1. General: Follow recommendations of ACI 318 and the following for curing concrete.

a. Protect concrete surfaces, which will normally be exposed to the atmosphere, against drying too rapidly for a minimum period of 7 days.

1) Refer to requirements of applicable subparagraphs on hot or cold weather curing.

b. Curing procedure shall begin immediately following placing the concrete.

1) If a delay in application of curing procedure occurs, cover concrete with moistened burlap held in complete contact with the surface or kept moist by continuous sprinkling.

c. Use one of the following methods, subject to approval of the Owner, for curing concrete.

2. Water Curing: Use quilted covers, wetted and applied to the concrete surface as soon as forms have been removed or, in the case of slabs, as soon as concrete has set sufficiently to prevent marring of finish.

a. Quilted covers shall consist of an outer covering of burlap or cotton, and a needled, punched or sandwiched inner layer of cotton batting, in all weighing a minimum of 20 ounces per square yard.

b. Maintain covering materials in a thoroughly saturated condition sufficient to show the presence of free water between mat and concrete surface at all times throughout curing period.

3. Sheet Curing: Sheet curing of concrete slabs is accomplished through use of sheet materials such as waterproof paper or polyethylene film, both meeting the requirements of ASTM C171, applied to the concrete surface as soon as it has set sufficiently to prevent marring.

a. Wet concrete surface thoroughly, then place sheet goods in direct contact and anchor in a manner which assures continuous contact during curing period.

b. Lap sheet materials a minimum of 3-inches, then tape, glue or cement seams.

c. Sheeting materials shall not discolor concrete surface.

4. Membrane Curing: Begin membrane curing immediately after removal of forms, or in the case of uniformed surfaces, as soon as water sheen is no longer visible on the concrete surface.

a. Coat the entire exposed surface with a liquid membrane forming compound containing a temporary color indicator.

b. Apply membrane coating by means of an approved pressure spray distributor at the rate of 1 gallon of material per 200 square feet of concrete surface.

1) Do not apply membrane curing to the faces of construction joints or other surfaces against which additional concrete will be placed. Keep those surfaces continuously wet by other means.

2) Do not apply membrane coating to surfaces which are to be covered with a coating material applied directly to the concrete or with a covering material bonded to the concrete, such as other concrete, liquid floor hardener, waterproofing, damp-proofing, membrane roofing, floor painting and other coatings and finish materials, unless otherwise specified.

5. Special Requirements:

a. During hot weather, protect concrete surfaces from drying by continuous moist curing for a period of at least 24 hours.

1) Start curing procedure as soon as concrete surface has hardened sufficiently to withstand surface damage.

2) If moist curing is not carried beyond 24 hours, cover surface, while damp, with a suitable heat-reflecting plastic covering or spray with a white pigmented curing compound.

b. During cold weather, protect concrete against freezing in accordance with ACI 306 and the following:

1) When protection against low temperatures is removed at the end of the required period, remove it in a manner such that the resulting temperature drop in any part of the concrete does not exceed 40 degrees F. during the first 24-hour period.

2) Do not permit concrete in heated enclosures to dry out.

F. Joints and Bonding: Make construction joints where indicated or permitted. Locate joints to assure stability, strength and watertightness.

1. Corners: Build all corners monolithically. Concrete on either side of the corners shall be continuous to the points shown on the Drawings or as directed.

2. Placing Concrete in Beams, Girders, or Slabs: Allow a minimum of 2 hours to elapse after concrete in the columns or walls before depositing concrete in beams, girders, or slabs supported thereon.

3. Horizontal Keyways: Build horizontal keyways to facilitate the drainage of flushing water from the keyways.

4. Requirements for Joints: Provide joints with continuous straight and regular keys or grooves.

a. Bring exposed concrete surfaces to a true level line at the top of all horizontal construction joints.

b. In the case of exposed construction joints, locate a row of form ties in the concrete 4- to 6-inches from the joint to tighten the forms for subsequent sections of construction.

c. Install waterstops, where required, in accordance with the provision of these Specifications.

5. Continuous Placing between Construction Joints: The placing of concrete shall be carried on continuously between the construction joints shown on the Drawings or as directed by the Owner.

a. If, for any reason, it becomes necessary to stop placing concrete at locations other than those indicated, both the proposed location and method of making the joint shall be subject to the Owner's approval.

6. Placement against Existing Concrete: Concrete surfaces, against which the new concrete is to be placed, shall be thoroughly cleaned and wetted. Just prior to placing new concrete, horizontal surfaces and joints shall be slushed with at least 2-inches of cement grout of the same mixture as the concrete but with coarse aggregate omitted. Special care shall be used in placing and puddling concrete at vertical joints to ensure a bond with existing concrete. Vertical construction joints shall not be made in watertight construction, unless shown on the Drawings.

G. Finishing Concrete Surfaces:

1. General: Finish exposed exterior concrete surfaces to achieve neat and smooth architectural effects, except where textured surface is indicated.

a. Finish top edges of wall within a 1/2-inch radius, unless beveled edges or other details are shown.

b. Immediately after stripping the forms, without exception, inspect all concrete surfaces. Remove all fins, offsets, burrs, ridges or other unsightly marks from the concrete surfaces.

c. Tie holes, pour joints, voids, stone pockets, or other defective areas shall be patched, in accordance with the recommendations of the manufacturers of the various bonding compounds, before the concrete is thoroughly dry. Defective areas shall be chipped way or bush-hammered to a depth of not less than 1-inch with all edges perpendicular. Obtain a roughened dust-free surface. The areas to be patched, including at least 5-inches of the adjoining surface, shall be wetted continually for a minimum of 1 hour prior to placing the patching mortar. A bonding material or agent consisting of a mixture of cement, water and an additive, the amount as recommended by the manufacturer, such as EUCO liquid, Rhoplex 330 or approved substitute, shall then be scrubbed onto the surface, followed immediately by the patching mortar. The material for patching shall consist of the same material and of approximately the same proportions as used for the concrete, omitting the coarse aggregate and mixing with water and an additive as previously specified. For exposed concrete, white cement shall be substituted for part of the gray cement so that the patch will match the color of the surrounding concrete. The proportion of white and gray cement shall be as determined by the patches made on the sample panels. The amount of water shall be as little as consistent with the requirements of handling and placing. The mortar shall not be re-tempered. The mortar shall be thoroughly compacted and screed off so as to leave the patch slightly higher than the surrounding surface. It shall then be left undisturbed for a period of 1 to 2 hours to permit initial shrinkage before being finally finished. The patch shall be finished to match the adjoining surface and shall be cured as specified for the original concrete.

2. Exterior concrete surfaces: Exposed exterior concrete surfaces defined as architectural concrete, except in the case of textured concrete surfaces, shall be given a uniform light rubbed finish.

    a. After the patching has been completed, the surfaces shall be given a uniform rubbed finish as follows: Mix 1 part Portland Cement and 1-1/2 parts fine sand with sufficient water to make a grout having the consistency of thick paint. Wet the concrete surface, and brush the grout uniformly over the entire area, completely filling air bubbles and holes. Immediately after applying the grout, float the surface with a wood float, scouring the wall vigorously. Allow the cement to set for 1 or 2 hours, depending upon the weather.

    If hot and dry, keep the walls damp during this period using a fine fog spray. When the grout has hardened sufficiently so that it can be scraped from the surface with the edge of a steel trowel without removing the grout from the small air holes, cut off all that can be so removed. Allow the surface to dry thoroughly, and then rub it vigorously with burlap to remove completely all dried grout. There should be no visible film of grout remaining after this rubbing, and no grout shall be left on the surface overnight. Sufficient time shall be allowed for grout to dry after it has been cut with the trowel, so that it can be wiped off clean with the burlap. The finished surfaces shall have a uniform, fine sand finish.

H. Expansion Joints: Provide joint filler for all expansion joints; finish expansion joints with a joint sealant where shown or specified.

1. Placing joint filler: Place joint filler against the completed portion of the Work before concrete for next section is placed.

    a. Fasten filler to hardened concrete with a compatible adhesive in accordance with the manufacturer's instructions.

    b. Extend filler through the thickness of the wall or slab.

        1) Joint filler shall be flush with the finished surface, except where a joint sealant is shown.

    c. In joints having a waterstop, fit filler accurately on each side of the waterstop to prevent intrusion of concrete.

2. Joint prime and sealant application: Prepare joint surfaces by removing all foreign matter and concrete laitance so that concrete surfaces are free of all oil, grease, wax, waterproofing compounds or form release materials prior to application of primer and sealant.

    a. Prime all concrete joint surfaces without exceptions.

    b. Priming of other surfaces shall be according to the sealant manufacturer's recommendations and subject to Owner's approval.

    c. Apply primer by brushing or spraying on joint surfaces.

    d. Apply sealant within 2- to 24-hours after application of the primer.

    e. For horizontal joints, apply sealant by pouring directly from a suitably shaped container or by flowing from a bulk-loading gun.

    f. Fill vertical joints from a gun, beginning at the bottom to avoid bulging and the formation of air voids.

    g. Fill overhead joints from a gun, by laying a bead along each side of the joint and then filling the middle.

h. Immediately after application, tool sealant in accordance with manual instructions in order to establish contact with joint surfaces and to provide a smooth sealant face.

3. Joint Depth: Control joint depth with the use of joint fillers and backup materials.

a. Fillers and backup material in contact with sealant shall be non-impregnated and free from asphalt, creosote, oil or extractable plasticizer.

b. Backup material shall be closed-cell polyethylene foam, such as Sealtight Backer Rod or Sonofoam Backer Rod with a diameter 1/4-inch larger than the joint width.

c. Joint widths and sealant depths shall be as shown, except that sealant depth shall not exceed 1/2-inch.

I. Waterstops: Waterstops for corners and intersections shall be prefabricated so that only butt joints need to be made in the field.

1. Corners and Intersections: Field fabrication of corners and intersections requires the Owner's approval. Miter and assemble corners and intersections with approved equipment as described for field joints.

2. Field Joints: Make field joints by cutting the ends of the sections to be spliced so they will form a smooth, even butt joint.

a. Heat the cut ends with splicing tool until plastic melts. Press ends together until the plastic cools.

b. Splicing shall cause as little damage to the continuity of the ribbed strips as possible.

J. Unbonded Joints: Where removable concrete slabs are poured in place, slab must be prevented from bonding to walls or other rigid parts of the structure.

1. Preventing bonding: Prevent bonding by the use of membrane waterproofing material

a. Place material over the bearing surface of the wall or other supporting part of the structure in order to isolate it from the new concrete being placed.

b. Install material in layers as required to produce a total thickness of at least 1/8-inch.

2. Filling unbonded joints: Where removable concrete slabs are not poured in place, fill horizontal and vertical joints with self-leveling or non-sagging Colma joint sealer

K. Mass Concrete: Any concrete placement of 100 or more cubic yards with a minimum dimension of 3 feet will be considered mass concrete.

1. Provisions during Placement: Make special provision to lower the temperature of the concrete as it is placed and to limit the maximum temperature rise in the concrete during hydration.

a. The provisions may include pre-cooling the mix, reduction in cement content and substitution of possolan or blast furnace slag cement for part of the Portland Cement, as approved by the Owner.

2. Provisions after Placement: Make provisions to avoid thermal shock due to too rapid cooling of the concrete after the initial curing period.

3.03 FIELD TESTS

A. Slump Tests: Conduct slump tests in accordance with ASTM C143 and the following

1. Allowable Slump: Provide a concrete mixture which has a slump of 5-inches or less if placement is to be done by pumping and 4-inches or less if placement is to be accomplished by methods other than pumping.

2. Tolerances: A tolerance of up to 1-inch greater than these amounts shall be allowed for individual batches provided the average to all batches or the 10 most recent batches, whichever is fewer, does not exceed the maximum allowable slump.

3. Excessive Slump: Concrete with excessive slump shall be rejected and no additional concrete shall be delivered until the case of the deficiency is determined and corrected.

B. Air Content Tests: Tests to determine air content of fresh concrete shall be taken twice daily, at least 4 hours apart and shall be performed in accordance with the applicable ASTM Standards.

C. Number of tests required. Unless otherwise required, a minimum of one strength test shall be made for each 50 cubic yards or fraction thereof for each mix design of concrete placed in any one day, except that in case shall a given mix design be represented by less than 5 tests.

D. Sample collection and storage: Sampling of fresh concrete shall be in accordance with ASTM C172. Laboratory and field test cylinders shall be made and, for the first 24 hours, cured and stored in a tightly constructed, firmly braced wooden box, constructed to maintain the temperature immediately adjacent to the specimens in range of 60 degrees F. to 80 degrees F. and prevent loss of moisture from the specimens. The storage temperature shall be thermostatically controlled when necessary.

1. Loss of moisture shall be prevented by covering cylinders with wet burlap, damp sand or other approved means. Test cylinders cast in cardboard molds shall not be stored in contact with wet burlap, damp sand or any other material that will allow the outside surfaces of the mold to absorb water for the first 24 hours. Cylinders shall be removed from storage after 24 hours, and after removal of molds, the laboratory-cured cylinders shall be stored in a moist condition in the laboratory at a temperature of 65 degrees F. to 75 degrees F. until the time of the test. The field-cured cylinders shall be removed from storage after 24 hours and stored in the structure as near the point of sampling as practicable, with the same protection on all surfaces as the structure which they represent.

E. Testing: Cylinders shall be tested in accordance with ASTM C39. Each strength test will consist of 3 laboratory-cured and 1 field-cured cylinders. One laboratory-cured cylinder shall be tested at 7 days. Normally 2 laboratory-cured cylinders and 1 field cured cylinder shall be tested at 28 days. If the 7-day laboratory cured-cylinder is not satisfactory, one of the remaining laboratory-cured cylinders shall be tested at 7 days instead of 28 days. Testing requirements for High-Early strength concrete will be as directed by the Owner.

F. Testing Laboratory: The concrete testing laboratory will be employed directly by the Owner, which will pay all fees associated with concrete testing work. The Contractor shall assist the testing laboratory whenever necessary to accomplish the required tests.

G. Strength requirements: The average strength of the test cylinders for any portion of a structure shall be equal to or greater than the strength specified, and at least 90 percent of all tests shall indicate a strength equal to or greater than the strength specified. In cases where the average strength of the test specimens for any portion of the structure falls below the specified requirements, the Owner shall order a change in the mix proportions or water content for the remaining portion of the Work and shall require the Contractor to secure test specimens of the hardened concrete represented by these cylinders. The number of test cylinders for each concrete placement shall be as directed by the Owner. Specimens shall be secured and tested in accordance with ASTM C42.

H. Failure to achieve required strength: If the specimen tests further substantiate that the concrete represented by the cylinders and specimens is below the specified strength requirements, the concrete shall be removed and replaced at the expense of the Contractor.

3.04 CLEANING

A. Removal of Forms: Forms shall not be removed until the concrete has hardened sufficiently to support its own load plus any superimposed loads which may be placed thereon. Forms, form ties and bracing shall not be removed without the specific permission of the Contractor's licensed Professional Engineer.

1. Minimum shoring times: Leave forms in place at least the minimum length of time specified below. Removal can proceed only if the minimum specified strength for the given period of time has been achieved.

	MIN. TIME	MIN. STRENGTH (PSI)
Columns and Walls	2 days	1500
Side forms for girders and beams	2 days	1500
Bottom forms of slabs:		
Under 10-feet clear span	4 days	2300
10- to 20-feet clear snap	7 days	2700
Over 30-feet clear span	10 days	2900
Bottom forms of beams & girders:		
Under 10-feet clear span	7 days	2700
10- to 20-feet clear span	14 days	3200
Over 20-feet clear span	21 days	3600

   a. The preceding times may be decreased if field concrete strengths, determined from test cylinders made in accordance with the provisions of these Specifications, equal or exceed the strengths listed previously.

   b. Increase the minimum times if concrete temperature following placement is permitted to drop below 50 degrees F.

2. Re-shoring: The Contractor may elect to use re-shoring techniques where form panels are stripped in a pattern or sequence such that part of the original shores remain or re-shoring is simultaneously provided so that the partially cured concrete is not overstressed. Re-shoring shall not commence until the Contractor's licensed Professional Engineer has reviewed the re-shoring system and examined the concrete to satisfy himself that it has properly hardened and will not be damaged by re-shoring in any way.

3. Form ties: Withdraw the removable portion of the form ties from the concrete immediately after forms are removed.

   a. Fill holes with grout from a grout gun.

   b. Finish the surface with a steel spatula or by rubbing with sackcloth.

   c. On architectural concrete and on exposed interior surfaces of buildings where appearance is important, add white cement to patching grout.

4. Concrete finishing: Take care in removing forms, wales, shorings, supports and form ties to avoid spalling or marring the concrete. Start patching rubbed finish as required immediately following form removal without exception. Concrete placements shall be sequenced to minimize shrinkage cracks.

END OF SECTION 03300

SECTION 03400

PRECAST CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Precast Concrete Vaults

1.02 UNIT PRICES

A. Refer to Section 01200 - Measurement and Payment.

1.03 REFERENCES

A. ASTM C 857 Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.

B. ASTM C 858 Underground Precast Utility Structures

C. ASTM C 891 Installation of Underground Precast Concrete Utility Structures

D. ASTM C 1037 Inspection of Underground Precast Concrete Utility Structures

E. VDOT Road and Bridge Specifications

F. VDOT Road and Bridge Standards

1.04 DEFINITIONS

A. Class A Concrete: Refer to Section 03300 for definition

1.05 SUBMITTALS

A. Shop Drawings: Submit shop drawings, associated details, and design calculations for the following items in accordance with Section 01330 – Submittals.

1. Precast concrete vaults

B. Design Data: Submit design data, sealed and signed by a professional engineer, for the following items in accordance with Section 01330 – Submittals.

1. Precast concrete vaults

C. Test Reports: Submit test reports for the following in accordance with Section 01330 – Submittals.

1. Slump
2. Air content
3. Compressive strength

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fairfax Water publishes an “Approved Products List” which lists, by category, manufacturer’s products approved for use in Fairfax Water’s system. Manufacturers’ products covered by the categories included in this document which are not specifically listed are not approved for use. This document is available from Fairfax Water’s internet website: www.fairfaxwater.org.

2.02 MATERIALS

A. Materials shall be in accordance with the referenced specifications and standards.

2.03 MANUFACTURED UNITS

A. Precast Vaults: Precast vaults shall be made of Class A concrete as defined in Section 03300, and reinforcing steel in accordance with approved submittals.

B. Loading: Precast vaults shall accommodate the dead load corresponding to the earth cover shown on the Drawings and AASHTO HS 20-44 live load with impact.

C. Vault joints and openings shall be designed and manufactured to be watertight. Vertical seams will not be permitted. Three maximum number of joints allowed, to consist of base/wall section, middle section, and top/lid section. Wall of base/wall section to be a minimum of 1 foot above crown of pipe.

D. Joints shall be keyed and mastic type rope sealant applied, as manufactured by MultiSeal, Inc. or approved equal.

E. Vaults shall be non-buoyant when installed as shown on the Drawings and with water table at the ground surface. Calculations shall not include the weights of the piping or equipment installed and shall be sealed by a Professional Engineer licensed in the Commonwealth of Virginia

F. Provide water stops in accordance with the manufacturer's recommendations; and the requirements of Section 03300.

G. Provide wall openings and sleeves in accordance with vault details on Drawings.

H. Factory applied exterior bitumastic waterproofing, minimum dry thickness required 9 – 12 mils.

I. 12-inch minimum floor thickness with 10-inch deep by 16-inch diameter or 12-inch by 12-inch square minimum sump.

2.04 TESTS

A. Slump: Perform slump tests in accordance with the requirements of ASTM C143 and Section 03300.

B. Air Content: Perform tests for air content in accordance with the requirements of ASTM C138 or ASTM C173.

C. Strength: Perform strength tests in accordance with ASTM C39 for each mix design of 6 concrete cylinders at intervals as follows:

Test Intervals	Number of Cylinders
3 Days	Test 1 cylinder
7 Days	Test 2 cylinders
28 Days	Test 3 cylinders

2.05 VAULT DETAILS

A. Manufacture vaults to the dimensions shown on the Drawings and in accordance with approved submittals. Comply with ASTM C 857 and C 858.

2.06 INSPECTION DURING MANUFACTURE

A. Comply with ASTM C 1037.

B. Inspector shall be an individual assigned by the manufacturer.

2.07 PIPE AND FITTINGS

A. Pipe, fittings, and appurtenances shall be in accordance with Section 02510.

2.08 ACCESS HATCHES AND LADDER

A. Access hatches and ladder shall be in accordance with Section 05500.

PART 3 EXECUTION

3.01 GENERAL

A. Comply with ASTM C 891.

3.02 PREPARATION

A. Field Measurements: Verify that accuracy of survey benchmark and elevations are as intended.

B. Excavation for Precast Vaults: Excavate for precast vaults in accordance with the requirements of Section 02315 - Excavating, Backfilling and Compacting.

C. Preparation for Setting Vaults: Prepare subgrade in accordance with manufacturer's recommendations.

3.03 INSTALLATION

A. Installation of Precast Vaults: Install precast vaults in accordance with the manufacturer's recommendations and the requirements of these specifications.

B. Furnish and install a tight-fitting plug in unused vault openings.

END OF SECTION 03400

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SECTION 05500

METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal Fabrications

1. Access doors

2. Vault ladders

3. Safety posts

1.02 RELATED SECTIONS

A. Section 03400 - Precast Concrete Vault

1.03 REFERENCES

A. ASTM A27 Specification for Mild to Medium Strength Carbon-Steel Castings for General Application.

B. ASTM A47 Specification for Malleable Iron Castings

C. ASTM A48 Specification for Gray Iron Castings

D. ASTM A148 Specification for High-Strength Steel Castings for Structural Purposes.

E. ASTM B26 Specification for Aluminum-Alloy Sand Castings

F. ASTM B148 Specification for Aluminum-Bronze Sand Castings

G. AISC Steel Construction Manual, Latest Edition

1.04 SUBMITTALS

A. Product Certification: Submit manufacturer's certification in accordance with the requirements of Section 01330, showing the true weights of the castings or comply with the provisions of "Certification" Article of this Contract Document.

B. Submit shop drawings and installation instructions for access doors, safety posts and ladders.

1.05 CERTIFICATION

A. Weighing Facilities: Provide facilities for weighing castings in the presence of the Owner if weight certification from the manufacturer is not available.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fairfax Water publishes an “Approved Products List” which lists, by category, manufacturer’s products approved for use in Fairfax Water’s system. Manufacturers’ products covered by the categories included in this document which are not specifically listed are not approved for use. This document is available from Fairfax Water’s internet website: www.fairfaxwater.org.

2.02 MATERIALS

A. Standards: Metal castings shall meet the requirements of the following standards:

1. Gray Iron: ASTM A48

2. Malleable Iron: ASTM A47
3. Carbon Steel: ASTM A27
4. Alloy Steel: ASTM A148
5. Aluminum: ASTM B26
6. Aluminum Bronze: ASTM B148
7. Silicon Bronze: Navy Specification 46B28
8. Manganese Bronze: Federal Specification QQ-B-726d

2.03 CASTINGS

A. Castings: Castings shall be made accurately to the dimensions shown on the Drawings.

B. Grinding: Grind or plane castings where necessary to secure perfectly flat and true surfaces.

C. Thicknesses: Make allowances in patterns needed so that specified thicknesses are not reduced.

D. Defective Castings: Plugging of defective castings shall not be permitted. Defective castings shall be replaced at the Contractor's expense.

2.04 VAULT ACCESS DOORS

A. Access doors shall be double door aluminum and as shown on the Drawings. Doors shall have a gasket and a recessed padlock hasp, and shall conform to the following requirements:

1. Door leaf shall be ¼-inch aluminum diamond pattern reinforced to withstand an HS-20 loading.
2. Channel frame shall be ¼-inch aluminum with an anchor flange around the perimeter.
3. Each door leaf shall be equipped with the following:
    a. Heavy forged brass hinges
    b. Automatic hold-open arm with release handle
    c. Snap lock with removable handle and a recessed hasp covered by a hinged lid flush with surface
    d. Recessed locking device.
4. Frame shall have 1½-inch drainage coupling located in the front right corner of channel frame.
5. Hardware shall be zinc plated and chromate sealed.
6. Factory finish shall be mill finish with bituminous coating applied to exterior of the frame.
7. Manufacturer shall guarantee against defects in workmanship.

B. Provide a Model 2 "LadderUp" safety post with each access door. Device shall be manufactured of high strength steel with telescoping tubular section that locks automatically when fully extended. Upward and downward movement shall be controlled by a stainless steel spring balancing mechanism. Finish shall be hot dip galvanized. Unit shall be completely assembled with fasteners for securing to the ladder rungs in accordance with the manufacturer's instructions.

C. Each door shall be provided with insulation. Insulation shall be semi-rigid, 1½-inch thick with a minimum R value of 6.5. Maximum water absorption shall be less than 0.1% by volume of insulation. Insulation shall be bonded to door and factory installed. Vault insulation shall be covered with 18 gauge aluminum sheet for mechanical protection.

2.05 ACCESS LADDERS

A. Provide aluminum vault ladders with fully-welded construction and tread-grip rungs, in accordance with Fairfax Water’s Approved Products List.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install products as indicated on the Drawings and in accordance with manufacturer's instructions.

END OF SECTION 05500

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SECTION 09900

SPECIAL COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Damp-proofing concrete vaults

B. Painting ferrous metals above grade

C. Painting ferrous metals in vaults

D. Coating aluminum surfaces in contact with cementitious materials

E. Interior vault piping

F. Safety striping for concrete vaults

1.02 UNIT PRICES

A. Refer to Section 01200 – Measurement and Payment

1.03 SUBMITTALS

A. Submit all product information for each coating system, in accordance with Section 01330.

1.04 COLORS

A. The Owner shall select colors to be used, unless denoted otherwise herein.

1.05 SURFACES TO RECEIVE COATINGS

A. Ferrous metal at or above the ground

B. Ferrous metal inside vaults below the ground

C. Aluminum in contact with cementitious materials

D. Interior vault piping

E. Interior vault entryways, as shown on Drawings

F. The following items shall not be field coated, but shop coated by the manufacturer as specified for each item.

1. Buried Butterfly and Gate Valves

2. Buried Ductile Iron Pipe

3. Fire Hydrants

1.06 QUALITY ASSURANCE

A. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise required by the Contract Documents.

1. ASTM D3276-00 Standard Guide for Painting Inspectors (Metal Substrates)

2. ASTM D4285-83 Standard Test Method for Indicating Oil or Water in Compressed Air

3. ASTM D4417-14 Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel

4. ASTM 7091-13 Standard Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals

5. AWWA C600 Installation of Ductile-Iron Water Mains and Appurtenances

6. 29 CFR 1910.134 Respiratory Protection.
7. 29 CFR 1910.1000 Air Contaminants
8. 29 CFR 1910.1200 Hazard Communication
9. STANDARD RP0287 Field Measurement of Surface Profile of Abrasive Blast-Cleaned Steel Surfaces Using a Replica Tape
10. SSPC-SP COM Commentary on Paint Application
11. SSPC-SP 1 Solvent Cleaning
12. SSPC-SP 2 Hand Tool Cleaning
13. SSPC-SP 3 Power Tool Cleaning
14. SSPC-PA 1 Paint Application Specification No.1, Shop, Field and Maintenance Painting
15. SSPC-PA 2 Measurement of Dry Paint Thickness with Magnetic Gauges
16. SSPC-VIS 1 Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning
17. NACE No.1/SSPC-SP 5 White Metal Blast Cleaning
18. NACE No. 2/SSPC-SP 10 Near-White Metal Blast Cleaning
19. NACE No. 3/SSPC-SP 6 Commercial Blast Cleaning
20. NACE No. 4/SSPC-SP 7 Brush-Off Blast Cleaning
21. NACE No. 8/SSPC-SP 14 Industrial Blast Cleaning

B. Air Quality Regulations: All paint shall conform to the applicable air quality regulations at the point of application. Any paint material which cannot be guaranteed by the manufacturer to comply, whether specified by product designation or not, shall not be used.

C. Compatibility: It shall be the responsibility of the Contractor to ensure the compatibility of the field painting products which will be in contact with each other or which will be applied over shop painted or previously painted surfaces. Paint used in successive field coats shall be produced by the same manufacturer and be system compatible per manufacturer. Paint used in the first field coat over shop painted or previously painted surfaces shall cause no wrinkling, lifting, or other damage to underlying paint.

D. Field Priming: In general, surfaces of equipment, steel, and cast iron are specified to be shop primed. Any such surfaces which have not been shop primed shall be field primed. Shop coatings that are damaged or have failed, and have been determined unsuitable by the Owner, shall be removed and the surfaces field primed. Galvanized, stainless steel, and insulated surfaces shall be field primed. Primers used for field priming, unless otherwise required for repair of shop primers, shall be as specified in Part 2 below.

E. Contractor shall follow all appropriate safety rules, including those defined at the Pre-Job Conference. Safety rules shall include, but not be limited to:

1. Use of all applicable Personal Protective Equipment (Respirators, Protective Clothing, etc.)
2. All Confined Space, Lock-out Tag-out, Fall Restraint, etc., programs and procedures should be in place.

PART 2 PRODUCTS

2.01 PAINTS

A. All coatings shall be of the type as manufactured for the purpose intended and shall be applied in accordance with the manufacturer's Product Data Sheet.

B. All coatings shall be brought to the job-site in the manufacturer's originally sealed containers bearing the manufacturer's labels identifying the paint type, color and batch number.

C. All materials used on the project shall be from the same manufacturer. For 3 multi-coat systems, each coat shall be of a contrasting color. The color of the final top-coat shall be chosen to ensure that the last coat achieves adequate hiding power and provides a solid and consistent visual appearance.

D. Materials shall be stored in a designated space with temperatures of no less than 40 degrees F (4.5 degrees C) and no more than 110 degrees F (43 degrees C).

E. No adulterant, unauthorized paint thinner/reducer or other material not included in the paint formulation shall be added to the paint for any reason.

F. Air Quality Regulations: All paint shall conform to the applicable air quality regulations at the point of application. Any paint material which cannot be guaranteed by the manufacturer to comply, whether specified by product designation or not, shall not be used.

G. Hydrants

1. Primer: Hydrant Manufacturer's Shop Primer
2. Finish (Barrel): Kennedy Safety Red or Mueller Red No. 10, shop-applied by hydrant manufacturer
3. Finish (Top and Caps): Kennedy Silver or Mueller Silver No. 18, shop-applied by hydrant manufacturer
4. Where indicated by Fairfax Water or in the Drawings, the top shall be Red and the barrel and caps shall be Silver.

H. Interior Vault Piping

If surface temperature is equal to or greater than 40 degrees F:

1. Base Coat: Sherwin-Williams Macropoxy 646 Fast Cure Epoxy – Meadow Green (Item# B58W610) (#52300049563)
2. Intermediate Coat: Sherwin-Williams Macropoxy 646 Fast Cure Epoxy – Mill White (Item# B58W610)
3. Top Coat: Sherwin-Williams Macropoxy Fast Cure Epoxy 646 – Meadow Green (Item# B58W610) (#52300049563)

If surface temperature is less than 40 degrees F:

1. Base Coat: Sherwin-Williams Duraplate 235 Multi-Purpose Epoxy – Haze Gray (Item# B67A235)
2. Intermediate Coat: Sherwin-Williams Duraplate 235 Multi-Purpose Epoxy – Mill White (Item# B67W235)
3. Top Coat: Sherwin-Williams Duraplate 235 Multi-Purpose Epoxy – Haze Gray (Item# B67A235)

I. Guard Posts (Bollards)

1. Primer: Sherwin-Williams DTM Wash Primer
2. Top Coat (2 coats are required): Sherwin-Williams Sher-Cryl High Performance Acrylic – Robotic Blue (SW 4063)

J. Safety Striping for Concrete Vaults

1. Primer: Sherwin-Williams Loxon Concrete & Masonry Primer (#A24W8300)
2. Finish: Sherwin-Williams Industrial Enamel (B54 Series) – Safety Yellow (#B54Y37)

2.02 ASPHALTIC COATINGS AND DAMP-PROOFING OF VAULTS

A. Carboline Bitumastic 50 or functional equal approved by the Owner

PART 3 EXECUTION

3.01 GENERAL

A. Pre-Job Conference: Prior to the coating portion of any project, there will be a Pre-Job Conference in which representatives from Fairfax Water, General Contractor, and Subcontractors shall be present to discuss the following:

1. Job specific health, environment, safety requirements and emergency procedures
2. Scope of work
3. Chain of command, points of contact, communication
4. Any areas of concern in the project's specification
5. Critical hold points for inspections
6. Method of conflict resolution between the inspector and applicators
7. Procedures for change orders
8. Work schedule, site access/accommodations
9. Work access for inspection (scaffolding, ladders, etc.)
10. The Pre-Job Conference shall be held at a time to be mutually agreed upon

B. All Coatings shall be applied in strict accordance with the paint manufacturer's Product Data Sheet. All work shall be performed by skilled workmen in a safe and workmanlike manner that is satisfactory to the Owner.

C. Environmental Testing: Immediately prior to, during, and after (when applicable) any coating application, environmental testing shall be performed by the Inspector to ensure that the surface temperature of the substrate is at least 5 degrees F greater than the dew point in the immediate area where coating is to take place in accordance to ASTM D3276-00 Standard Guide for Paint Inspectors (Metal Substrates).

D. Environmental Controls/Enclosures: In the event that any environmental controls (heaters, dehumidifiers, enclosures, etc.) are needed in order to obtain acceptable conditions for coating, acceptable environmental conditions shall be maintained during the coating's drying time. These controls shall be at no additional cost to Fairfax Water.

E. Paint Mixing: All Coatings should be mixed and thinned/reduced in strict accordance with the manufacturer's Product Data Sheet and all sweat-in/induction and pot-life times should be strictly adhered to. All paint containers shall be tightly closed except when paint is being withdrawn.

F. Stripe Coating: A "Stripe Coat" is a brushed coat of paint that is applied prior to a full coat of paint being applied to an entire surface. A "Stripe Coat" application must be applied prior to the Prime Coat, Intermediate Coat and Top Coat. Areas that must have a "Stripe Coat" application prior to each coat:

1. Edges
2. Weld Seams
3. Outside Corners
4. Nuts and Bolts (heads and threads)
5. Crevices

G. Dry Film Thickness (DFT): The application of each coat shall be at the rate required to achieve at least the minimum, but not more than the maximum, dry film thickness specified in the manufacturer's Product Data Sheet and inspected in accordance to SSPC-PA 2 Measurement of Dry Paint Thickness with Magnetic Gauges and/or DT 7091-13 Standard Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals.

H. Drying Time: No subsequent coating shall be applied until the previous coat has dried according to the drying schedule on the manufacturer's Product Data Sheet. Certain conditions such as temperature, humidity, etc. can increase drying times. Adequate ventilation shall be maintained at all times.

I. Apply coating to all exposed ferrous metal whether below ground within vaults, or above ground. Items to be painted include cast or ductile iron piping, fasteners, valves, valve operators, cover, guard posts, etc.

J. All coatings shall be brought to the job site in originally sealed and labeled containers of the paint manufacturer and shall be subject to inspection by the Owner.

1. Store paint inside, protect against freezing.

2. No adulterant, unauthorized paint thinner or other material not included in the paint formulation shall be added to the paint for any reason.

K. Prior to applying coatings, surfaces shall be cured, dry, and clean, free of grease or foreign material, and properly sandblasted, ground, pores filled and sanded, in accordance with Paragraph 3.02 below.

L. Coatings shall be applied in accordance with the manufacturer's Product Data Sheet. If dew or moisture conditions are prevalent, delay application until the temperature of the surface to be painted is 5 degrees F above the dew point and the surfaces are dry. The Contractor shall provide dehumidifying or heating equipment, at no additional cost to the Department or the Owner, if needed, to prevent sweating.

M. Thoroughly mix paint each time any is withdrawn from the container. Keep paint containers tightly closed except when paint is being withdrawn.

N. Coatings shall be applied in strict accordance with the manufacturer's Product Data Sheet and shall be performed in a manner satisfactory to the Owner. The application of each coat shall be at the rate required to achieve at least the minimum, but not more than the maximum, dry film thickness specified in the manufacturer's Product Data Sheet.

O. No new coat shall be applied until the previous coat has dried. Under no condition shall additional coats be applied until the preceding coat has dried at least the minimum time called for. Drying time shall be construed to mean "under normal conditions" and within the range of application stated by the manufacturer. Where conditions other than normal exist because of the weather, such as with high humidity, or when damp-proofing and painting is done in confined spaces, a longer drying time will be necessary. Adequate ventilation shall be maintained at all times.

P. It shall be the Contractor's responsibility to ensure that all surfaces are properly prepared, the proper primer applied to the correct film thickness, and the finish coat is compatible with the primer coat and applied to the correct film thickness. This applies to all material, whether the total process is done in the shop or in the field, or partially in shop and partially in the field.

3.02 SURFACE PREPARATION

A. PRE-CLEANING

1. Contaminants such as oil, grease, dirt, etc., on the substrate shall be removed in accordance with SSPC-SP 1 Solvent Cleaning.

2. All weld seams shall be cleaned of rust, slag and adherent mill scale, and all weld spatter shall be removed in accordance with SSPC-SP 2 Hand Tool Cleaning and/or SSPC-SP 3 Power Tool Cleaning.

B. DRY-ABRASIVE BLASTING

1. All surfaces to be painted or coated shall be prepared in a workmanlike manner and in accordance with the manufacturer's Product Data Sheet, with the objective of obtaining a clean and dry surface that is properly prepared for coating.

2. Prepare the clean, dry substrate by dry-abrasive blasting in accordance with surface preparation standard NACE No.2/SSPC-SP 10 Near-White Metal Blast Cleaning.

3. Any material specified to be painted that has an existing Bitumastic coating or a priming system coating that is not specified shall have the existing coating removed by dry-abrasive sand blasting in accordance with surface preparation standard NACE No.2/SSPC-SP 10 Near-White Metal Blast Cleaning. Any material that is properly shop-primed does not need to be field primed or sandblasted unless the shop primer is damaged, in which case, the damaged area shall be properly cleaned and the indicated field primer applied.

4. After dry-abrasive blasting, all grit, dust and other surface contaminants shall be removed and the prime-coat shall be applied within four (4) hours of completion of blasting or before any detrimental corrosion or recontamination occurs.

5. No coating shall be applied prior to the inspection and approval by the Owner.

3.03 DAMP-PROOFING

A. Exterior walls of all concrete vaults from finished grade down to the top of the bottom slabs shall be damp-proofed on the exterior surface with two (2) coats of a Bitumastic/Asphaltic/Coal Tar coating in accordance with the manufacturer's Product Data Sheet.

B. All structural joints of all concrete vaults shall be coated in the field after installation of the precast concrete structure with damp-proofing as specified above. Any damage to the damp-proofing coating as a result of shipping, installation, or any other reason shall receive two (2) touch-up coats of damp-proofing coating as specified above.

3.04 ASPHALTIC COATINGS

A. All aluminum/metal surfaces that are to be embedded in or fastened to cementitious materials shall receive two (2) coats of a Bitumastic/Asphaltic/Coal Tar coating.

B. Apply in accordance with the manufacturer's Product Data Sheet.

3.05 PAINTING

A. Apply paint to exposed ferrous metals whether below ground within vaults, or above ground. Items to be painted include cast or ductile iron piping, fasteners, valves, valve operators, covers, guard posts, fire hydrants, etc.

B. Paint shall be of the type as manufactured for the purpose intended and shall be applied in accordance with the manufacturer's instructions in such a manner as indicated on the manufacturer's Product Data Sheet. Any material that is properly shop primed does not need to be field primed unless the shop primer is damaged, in which case the damaged area shall be properly cleaned and the indicated field primer applied.

3.06 REPAIR AND REMEDIAL WORK

A. Upon inspection, all damaged coatings shall be feathered around the damaged area for a minimum distance that is deemed acceptable to the Owner and accordance with SSPC-SP 2 Hand Tool Cleaning.

B. All coatings found to be of an unacceptable dry-film thickness, shall be repaired to an acceptable dry-film thickness.

C. All areas to be repaired shall use the same coating materials and system as were used in the original coating application.

3.07 MEASUREMENT AND PAYMENT

A. Special coatings, including painting, damp-proofing and other similar applications will not be measured for separate payment, but shall be included in the respective per linear foot and/or lump sum costs for water main piping, hydrants, etc.

END OF SECTION 09900

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SECTION 13110

CATHODIC PROTECTION

PART 1 GENERAL

1.01 DESCRIPTION

A. These specifications define materials and installation practices to minimize corrosion and to provide facilities for long-term corrosion monitoring of the proposed pipelines.

B. Installation of corrosion control components shall be in accordance with the following specifications, accompanying design drawings, and Fairfax Water's Standard Details. All installation practices and components shall be approved by representatives of the Owner.

C. The corrosion control system shall include electrical continuity (joint bonding), insulated flanges, insulated unions, and corrosion control test facilities.

1.02 SUBMITTALS

A. Product Data: Submit manufacturer catalog cuts or other descriptive information for the specific materials required on this project for approval.

1. Packaged Magnesium Anodes
2. Test Stations and Terminal Boards
3. Shunt
4. Shorting Bars (Grounding Mats)
5. Wire and Cable
6. Thermite Welding Equipment
7. Coating for Thermite Welds
8. Insulated Flanges
9. Insulated Unions
10. External Coating for Insulated Flanges and Mechanical Couplings
11. Insulated Flange Internal Coating
12. Mastic Coating
13. Wire Connectors and Terminations
14. Electrical Tape
15. Field Test Equipment and Calibration Sheets
16. Warning Tape
17. Survey Markers
18. Steel Hand Stamp
19. Test Station Concrete
20. Guard Post
21. Solder
22. Separator Mesh
23. Zinc Anode Ribbon (Grounding Mats)

24. Polyethylene Encasement

25. PVC or HDPE Insert

B. Quality Assurance: Submit in conjunction with product data:

1. Installation and Test Personnel Qualifications for Pipe Joint Bonding and Corrosion Control Hardware

2. Qualifications of NACE International Certified Corrosion Specialist

3. Proposed Test Data Forms

C. Close-Out: Submit no later than 10 working days before application for beneficial use:

1. Letter of Compliance

2. Record Drawings

3. Test Report

1.03 QUALITY ASSURANCE

A. Qualifications: Installation, quality assurance, and testing personnel must have demonstrated experience with similar work.

1. Must be specifically named in qualification submittal and have completed at least three successful corrosion control systems within last three years for underground pipelines of similar type, similar size and equal complexity.

2. Must be full-time contractor or subcontractor employees. Part-time or contract personnel hired only for this work will not be permitted.

3. Only personnel approved by the Owner are permitted. Personnel changes during course of project must be minimized and submitted to the Owner at least two weeks prior to planned implementation.

B. Supervision: Employ a Corrosion Specialist certified by NACE International to perform the following:

1. Oversee and certify installation and related testing. Including pipe joint bonding, magnesium anodes groundbeds, and corrosion control equipment. Individual must participate in field activities to extent required by work.

2. Issue letter of compliance indicating all corrosion control measures are satisfactorily installed and comply with contract documents. The letter of compliance shall be signed by the NACE International Corrosion Specialist.

3. Provide results from Acceptance testing and pictures of test stations, concrete pads, and terminal board connections to Fairfax Water in the Test Report.

1.04 RECORD DRAWINGS:

A. General: Document installed location and configuration of each test station and each insulating device using Fairfax Water as-built sketch plate, including:

1. Test station number per schedule and installed pipeline station number.

2. Measurements (ties) between test station and 3 existing physical objects.

3. Distance from test station to guard post, where installed.

4. Wire routing, size, insulation color and termination configuration on terminal board.

5. Pipeline station numbers for wire attachments to pipe.

6. Anode locations, where installed, including pipeline station number, depth and distance

from pipe.

7. Pipeline station number and arrangement of interconnecting fittings for each insulating device, including insulated flanges and insulated mechanical couplings.

PART 2 PRODUCTS

2.01 MAGNESIUM ANODES

A. Approved Manufacturers: Fairfax Water publishes an “Approved Products List” which lists, by category, manufacturer’s products approved for use in Fairfax Water’s system. Manufacturers’ products covered by the categories included in this document which are not specifically listed are not approved for use. This document is available from Fairfax Water’s internet website: www.fairfaxwater.org.

B. Materials: Packaged high potential type comprised of magnesium ingot, wire, and prepared backfill.

1. Each anode shall have the following nominal weight and dimensions:

a. 32 lb. – minimum 19 inches long and D-shaped (5 inches by 5 inches)

b. Composition of anode

i. Aluminum 0.010% maximum

ii. Manganese 0.50 to 1.3%

iii. Copper 0.02% maximum

iv. Nickel 0.001% maximum

v. Zinc 0.05% maximum

vi. Iron 0.03% maximum

vii Silicon 0.05% maximum

viii. Other 0.05% each or 0.030% maximum total

ix. Magnesium remainder

c. Anode backfill (minimum 40 pounds)

i. Hydrated Gypsum 75%

ii. Bentonite 20%

iii. Sodium Sulfate 5%

d. Anode Lead Wire

i. Minimum of 10 feet of AWG No. 12 solid copper wire with TW insulation (black) shall be attached to anode. Wire anode attachment shall be by silver solder and sealed to prevent a moisture penetration. Length to meet specific field conditions with no splices other than common header cable, where indicated.

2.02 TEST STATIONS AND TERMINAL BOARDS

A. Flush Mount Valve Box Type

1. Approved Manufacturers: See Fairfax Water’s Approved Products List.

B. Materials:

1. The test station shall be a standard Fairfax Water cast iron valve box (upper section only) with custom logo on lid.

2. "FAIRFAX WATER CP TEST" shall be cast into the cast iron lid in 1 inch high letters.

3. The lid shall be coated with two coats of shop applied OSHA safety blue polyurethane or

epoxy paint.

4. The terminal board shall be 4 inch by 6 inch by 0.25 inch thick phenolic board, 7 terminals, with 0.25 inch diameter nickel plated brass hardware. Terminal numbers to be engraved on terminal board. One 0.01 ohm (8 ampere) shunt and two copper shorting bars to be provided as indicated on details.

2.03 CURRENT MEASURING SHUNT

A. Materials:

1. Test station shunts shall be constructed to fit the terminal posts for the specified test station. The resistance shall be 0.01 ohm with a current capacity of 8 amperes. The shunt shall be as manufactured by Cott Manufacturing Company Model "Yellow" or approved equal.

2.04 SHORTING BARS (GROUNDING MATS)

A. Materials:

1. Shorting bars shall be constructed of copper to fit terminal posts for the specified test station. The shorting bars shall be 0.5 inch wide by 0.03 inch thick by 1.5 inches long, with 2 holes predrilled for mounting, as manufactured by CP Test & Valve Products, Inc. or approved equal.

2.05 WIRE AND CABLE

A. Materials:

1. All wiring shall be stranded copper wire of the AWG wire size and color shown on the Drawings and details.

2. Wire for bonded joints shall be AWG No. 4 single conductor stranded copper wire with high molecular weight polyethylene (HMWPE) insulation (Black).

3. Wire for test stations shall be single conductor, stranded copper wire with 600-volt THWN or HMWPE insulation (colors, size and insulation as shown on details).

4. Wire for anode header cable shall be AWG No. 8 single conductor stranded copper wire with HMWPE insulation (Black).

2.06 THERMITE WELDING EQUIPMENT

A. Approved Manufacturers: See Fairfax Water’s Approved Products List.

B. Materials: Mold, weld metal, other material and equipment per manufacturer's recommendations for particular pipe/cable material and size. Only material and equipment from same manufacturer is allowed. Adapter sleeves shall be utilized for all thermite welds.

2.07 THERMITE WELD COATING MATERIALS

A. Approved Manufacturers: See Fairfax Water’s Approved Products List.

B. Materials:

1. Thermite welds shall be coated with a prefabricated assembly specially designed for covering cathodic protection wire connections to piping and fittings. The prefabricated assembly shall consist of the following components: 1) top plastic sheet formed with an igloo shaped dome and entry tunnel for the lead wire; 2) a special elastomeric compound in the plastic dome firm enough to resist flow at normally encountered application and operating temperatures, but soft enough to mold itself around and completely cover the irregular welded profile; 3) a double row of parallel, flexible serrations on either side of the dome to assist with conforming around small diameter pipe; 4) a base of black unbacked elastomeric tape with exceptional adhesive properties for bonding firmly to a surface when used with the appropriate primer.

2.08 INSULATED FLANGES

A. Approved Manufacturers: See Fairfax Water's Approved Products List.

B. Materials:

1. Insulating Gasket: Shall be NSF 61 certified and constructed of G10 Epoxy Glass with EPDM seals. Inside diameter shall be 3/32 inch less than net inside diameter of pipe and any internal coating or lining.

2. Insulating Sleeves: G-10 Epoxy/Glass

3. Insulating Washers: G-10 Epoxy/Glass. Provide two washers for each bolt.

4. Steel Washers: 1/8 inch thick plated hot rolled steel. Provide two washers for each bolt.

2.09 INSULATED UNIONS

A. Approved Manufacturers: See Fairfax Water's Approved Products List.

B. Material: Nylon insulator skirt.

2.10 EXTERNAL COATING FOR INSULATED FLANGES AND MECHANICAL COUPLINGS

A. General Requirements:

1. All coatings used on project shall be from same manufacturer and as specified herein. All products comprising completed coating system shall be compatible and the same products shall be used throughout the project. Pipe surfaces that will come in contact with potable water inside the pipeline (e.g. spigot ends of bell and spigot joints) shall be coated with materials having NSF-61 certification.

B. Field Applied Petrolatum Tape:

1. Approved Manufacturers: See Fairfax Water's Approved Products List.

2. Materials: Compatible primer; mastic for profiling around joints, bolts and other irregular shapes; petrolatum impregnated fabric tape; outer protective wrap. All materials shall be by the same manufacturer.

2.11 INTERNAL PIPE COATING FOR INSULATED FLANGES

A. Approved Manufacturers: See Fairfax Water's Approved Products List.

B. Materials:

1. NSF-61 approved coating for use in potable water systems.

2. Two component, high or 100% solids epoxy.

2.12 MASTIC COATING

A. Approved Manufacturers: See Fairfax Water's Approved Products List.

B. The field applied external coating shall be a cold applied mastic with high electrical resistivity (2.12×10^{13} ohms-cm^3) and 58.6% solids by volume. The external coating shall be applied only where noted on:

1. Buried mechanical joints, buried bolts, nuts, coupling harness tie rods, saddles, iron and steel anchors, and other connecting hardware.

2. Service clamps other transition fittings between copper services and ductile iron pipe.

2.13 WIRE CONNECTORS AND TERMINATIONS

A. Terminal Lugs

1. Approved Manufacturers: See Fairfax Water's Approved Products List.

2. Materials: One-hole, non-insulated compression terminal lugs for 0.25 inch bolt size.

B. Butt Splices:

1. Approved Manufacturers: See Fairfax Water's Approved Products List.
2. Materials: Non-insulated type.

2.14 ELECTRICAL TAPE

A. Vinyl Plastic

1. Approved Manufacturers: See Fairfax Water's Approved Products List.

B. Rubber Splicing

1. Approved Manufacturers: See Fairfax Water's Approved Products List.

2.15 FIELD TEST EQUIPMENT

A. As determined by Contractor to meet specific requirements. All electrical instruments must bear evidence of calibration within 1 year of testing.

2.16 UTILITY WARNING TAPE

A. Approved Manufacturers: See Fairfax Water's Approved Products List.

B. Materials: Minimum 3 inches or 6 inches wide detectable warning tape, red or yellow in color, marked "Caution Cathodic Protection Cable Buried Below" at maximum intervals of 36 inches.

2.17 SURVEY MARKERS

A. Materials: 2-inch diameter flat head brass survey disk with ribbed shank.

2.18 STEEL HAND STAMP

A. Materials: Steel hand stamp with 3/8 inch letter/numeral height.

2.19 TEST STATION CONCRETE

A. Materials: Class D Concrete in accordance with Section 03300.

2.20 GUARD POST

A. Steel pipe (4 inches in diameter) with welded cap on top in accordance with details.

2.21 SOLDER

A. Materials: 0.062 inch diameter 60/40 Solder with 3.5 percent type RMA rosin core.

2.22 SEPARATOR MESH/UTILITY CROSSINGS

A. Approved Manufacturers: See Fairfax Water's Approved Products List.

B. Materials

1. The separator mesh shall be a medium density flexible polyethylene webbing pad (mesh pattern), nominal thickness 0.156 inch.

2.23 ZINC ANODE RIBBON (GROUNDING MATS)

A. Approved Manufacturers
1. Platt Brothers and Co. – Plattline Zinc Ribbon Anodes
2. American Carbon Co. – Badgercord Zinc Ribbon

B. Materials
1. Cross Section ½" X $^{9}/_{16}$"
2. Diameter of Wire Core 0.130 Inches
3. Standard Coil Length 500-Feet

2.24 POLYETHYLENE ENCASEMENT

A. Approved Manufacturers: See Fairfax Water's Approved Products List.

B. Materials: in accordance with Section 02510.

2.25 PVC OR HDPE INSERT

A. Approved Manufacturers: See Fairfax Water's Approved Products List.

B. Materials: in accordance with Section 02510.

PART 3 EXECUTION

3.01 INSTALLATION

A. Handling of Pipe

1. At the project site, the pipe shall not be handled with metal chains, cables, unpadded tongs, forklifts or other equipment likely to cause damage to the pipe shop coating or score the pipe surface.

2. Storing of the pipe shall be on padded 12-inch wide (minimum) skids or select loamy or sand dirt berms, where possible. In urban areas, pipe should be suspended on padded skids. Where skid chucks are used in contact with the pipe, they should be padded with several layers of padding material. Padded chucks should be placed such that pipe is nested on the skid rather than the chuck. The coated pipe shall not be laid on pavement without benefit of padding at contact points.

3. If cables or chains are used during transportation, they must be properly padded with approved, suitable material as required to protect the pipe surface from damage while in transit. Use of a padded horizontal separator strip between successive rows of pipe is necessary to prevent damage to the pipe surface.

4. At all times during construction of the pipeline, the Contractor shall take every precaution to prevent damage to the protective shop coating and scoring of the pipe surface. No metal tools or heavy objects shall be permitted to come into contact unnecessarily with the pipe surface.

B. Thermite Welding: Attach test wires and bond cables to the piping by thermite welding.

1. General: All thermite welds shall be made as shown on the Drawings and details and in accordance with the manufacturer's recommendations using the proper combination of equipment for the pipe and wire size being welded. All welding materials and equipment shall be the product of a single manufacturer.

2. Area Preparation: Assure that the area where the attachment is to be made is absolutely dry. Remove mill coating, dirt, grime and grease from the pipe or fitting surface at the weld location by wire brushing or by the use of suitable safety solvents. Clean an area (two inches square) of the pipe or fitting surface at the weld location to a bright shiny surface, free of all serious pits and flaws by use of a mechanical grinder.

3. Cable Preparation: Prepare the wire for welding by assuring that the cable is absolutely dry. The cable shall be free of dirt, grease and other foreign products. Cut the cable in such a way as to avoid flattening or forcing out of round. To prevent deformation of the cable, cut the cable with cable cutters. Remove the insulation in a manner that will avoid damage to strands. Install adapter sleeves for all bonds and test wires in accordance with the manufacturer's recommendations prior to welding. Either prefabricated factory sleeved joint bonds or bond wire with formed sleeves made in the field is acceptable. Hold the cable at an approximate 30 degree angle to the pipe surface when welding.

4. Installation: Install thermite welds in accordance with the manufacturer's written instructions. Deliver packaged weld charges to job site in new, unopened dry containers.

Replace completed welds having burnt wire strands and wire strands not completely covered with weldment.

5. Testing: When the weld has cooled, remove the weld slag and test the weldment for strength by striking a sharp blow with a two pound hammer while pulling firmly on the wire in direction parallel to pipe. Replace unsound welds and retest weldments.

    a. Documentation: Record adequacy of each bond cable and test wire weld based on the above procedure and visual inspection before and after coating welds area. Data recorded for each bond cable and test wire to include date of inspection, name of inspection personnel, pipeline station number, quantity and gauge of wire installed, and simple statement (e.g. "satisfactory") regarding proper installation. Provide field sketches where tabular data alone is not sufficient to document pipe alignment and bonding configuration.

6. Cleaning and Replacing Molds: Thoroughly clean mold and mold covers after completion of each weld to assure that no slag will penetrate into the next weld. Replace molds periodically and where there is pitting or other wear conditions.

7. Coating Thermite Welds: After soundness of the weld has been verified, thoroughly clean with a stiff wire brush and coat with an elastomeric cap. The elastomeric cap shall extend on all four sides beyond the cleaned area onto the pipe surface. Apply primer over the entire weld area and over the entire area where the elastomeric cap will be placed. Allow primer to dry. Push the dome of the prefabricated cap containing elastomeric material firmly into weld area. Lift the wire away from the pipe and apply the elastomeric material completely around and underneath the wire. Push the wire back down on the pipe.

C. Bonded Joints: Install bond cables across each joint in accordance with the limits indicated in the Drawings using the thermite weld process.

1. All new pipeline joints, including those on pipe, fittings, valves and branch connections including hydrants. Do not bond across insulating devices including PVC inserts. Do not bond between new ductile iron and prestressed concrete pipe.

D. Test Stations: Includes terminal box, concrete pad, guard post, survey marker, wire leads, PVC conduit, utility warning tape and monitoring equipment.

1. General: Type of test station; number, size and color of wires; and wire routing are shown on the Drawings. Unless otherwise noted or approved by the Owner, test stations for pipelines buried under pavement shall be located outside paving limits. Test stations shall be sufficiently set back from vehicle traffic lanes so that they can be accessed for maintenance without extensive traffic control or other special safety precautions.

2. Wire Routing: Install test and monitoring equipment wires in a wiring harness arrangement routed along the bottom of the pipe trench where practical. Form harness by taping wires together at intervals of 10 feet. Install wires leaving the pipe trench in PVC conduit when terminal box is not installed over water main.

3. Utility Warning Tape: Install 1 foot above PVC conduit.

4. Guard Post and Concrete Pad:

    a. Guard Post: Provide with concrete anchor at locations required by test station schedule. Coat portion not buried in accordance with Section 09900.

    b. Concrete Pad: Provide for each flush mount test station. Non-reinforced concrete pad formed around test station shall be 24 inches by 24 inches by 8 inches sloped away from terminal box.

    c. Survey Marker: Mount flush with concrete during pad construction. Stamp test station number in accordance with Fairfax Water’s standards.

E. Insulated Flanges: Unless noted otherwise, install with a test station and two test wires

attached to pipe on each side of flange.

1. Preparation: Clean mud, dirt, grease, oil and other contaminants from flange surfaces. Check flange face and bolt hole tolerances and verify clearances prior to installing insulating materials.
2. Internal Coating: Two coats dielectric internal pipe coating, minimum dry film thickness per coat - 10 Mils. Surface preparation, coating application and cure times per manufacturer. Unless noted otherwise, apply internal coating 3 feet or to nearest fitting from flange face in both directions.
3. Installation: Install insulated flange gasket, sleeves and washers under clean and dry conditions in accordance with manufacturer's written instructions. Two insulating washers required for each bolt (one for each side of flange). Properly torque bolts per insulating material manufacturer's instructions to avoid damage to insulating components and otherwise ensure electrical separation between flange faces and between each bolt and each flange. Do not use conductive grease or other material to facilitate flange assembly which could compromise electrical integrity of insulating materials.
4. Initial Testing: After assembly, directly measure electrical resistance between each bolt and one flange using an ohm meter or other approved low voltage resistance meter. Resistances less than 10 megohm are not acceptable and require insulator replacement, cleaning and drying of insulator surfaces, and/or other corrective action. If any bolt fails the 10 megohm minimum resistance requirements, all bolts must be retested after corrections are made. Tests shall also be performed across the insulated flange to assure that the central gasket is providing effective insulation between the flanged faces prior to coating.
5. External Coating: Coat buried insulated flanges with approved petrolatum tape coating. Surface preparation and coating application shall be as specified by manufacturer, including use of filler material to provide smooth contour around bolts and from transition between pipe and flange.
6. Final Testing before Backfilling: A final test of the insulated flange shall be made from the attached test wires prior to backfilling. Tests shall be repeated from the insulated flange test wires after backfilling and after the test wires have been brought to grade.

F. Insulated Unions:

1. General: Insulated unions shall be installed to isolate all metallic pipe connections to the ductile iron water main that are 2 inches or smaller in diameter. Plastic pipe connections do not require the installation of an insulated union.

2. Preparation: Clean mud, dirt, grease, oil and other contaminants from piping surfaces. Check union, condition of insulator and verify clearances prior to installing insulating materials.

3. Installation: Install insulated union under clean and dry conditions in accordance with manufacturer's written instructions. Properly torque union per insulating material manufacturer's instructions to avoid damage to insulating components and otherwise ensure electrical separation between pipe faces. Do not use conductive grease or other material to facilitate union assembly which could compromise electrical integrity of insulating materials.

4. Testing: After assembly the insulator shall be tested for effectiveness with an approved insulator test instrument. If the insulator is found to be defective corrective action should be taken which may include replacement of the insulated union.

5. After the union is tested to be properly isolated, the insulator and adjacent piping shall be coated. Clean all dirt, moisture, oil, grease, and other contaminants from the pipe and union surfaces. Thoroughly mix the mastic coating and apply a coat of approximately 12 mils of

coating to the pipe and union surfaces. The coating shall extend a minimum of 12 inches on either side of the insulator. Allow the coating to dry to touch (approximately 20 minutes) and apply a second coat of mastic of approximately 12 mils in thickness. The total thickness of the final dry coating shall be a minimum of 20 mils. Allow to dry before backfilling.

G. Clearance of Piping to Other Structures

1. 12 inches of natural clearance shall be maintained between the piping and other metallic structures, where possible. When 12 inches of clearance cannot be maintained, install a medium density flexible polyethylene mesh pattern webbing pad, nominal thickness 0.156 inch, around piping and secure with non-metallic tape.

H. Concrete Buttresses, Support Blocks, Anchor Blocks

1. Position reinforcing rods used in the construction of support blocks, anchor blocks and other concrete structures so that they are not in contact with the piping. Maintain a minimum 2 inches of spacing between all reinforcing steel and the pipe and any pipe anchors.

2. When placing concrete in direct contact with ductile iron piping, apply the mastic coating to the external surface of the ductile iron piping prior to placing the concrete. Clean all dirt, moisture, oil, grease, and other contaminants from the piping surface. Thoroughly mix the mastic coating and apply a coat of approximately 12 mils of coating to the piping surface. Allow the coating to dry to touch (approximately 20 minutes) and apply a second coat of mastic of approximately 12 mils in thickness. Allow to dry before placing the concrete.

I. Polyethylene Encasement: Install in accordance with Section 02510.

J. PVC or HDPE Inserts: Install in accordance with Section 02510.

3.02 TESTS

A. General: The Owner’s representative will witness test to ensure proper operation and compliance of test stations installation in accordance with contract requirements and plan details of the Cathodic Protection system. The Contractor shall coordinate with the Owner to schedule field test, at least two weeks in advance. Note: In the event field tests indicate deficiencies in the system, the Contractor will be responsible for all costs associated with correcting deficiencies, re-testing the Cathodic Protection system, including payment for additional site visits by the Owner’s representative, at no additional cost to the Owner.

1. Test Data Forms: Record test data in a uniform format pre-approved by the Owner. Include test data, personnel, and instrumentation used on each sheet.

2. Testing Summary:

a. Pre-Backfill Tests:

1) Bonded joint and test wire integrity

2) Insulated joint effectiveness

b. Post-Backfill Tests:

1) Pipe continuity test

2) Pipe-to-soil AC and DC potential measurements

3) Anode potential and current measurements

4) Insulated joint effectiveness

c. Improper materials or installation determined by Contractor performed tests, and/or tests performed by the Owner, shall be corrected by the Contractor.

3. Schedule:

a. Pre-Backfill Tests: Complete as work progresses.

b. Post-Backfill Tests: Start no sooner than 2 months before scheduled application for Beneficial Use.

c. Test Report: Letter of Compliance; Record Drawings: Submit no later than 10 working days before application for Beneficial Use.

4. Test Report:

a. Raw test data for all pre-backfill and post-backfill tests.

b. Test set-ups and schematics.

c. Summary tabulations and theoretical calculations.

d. Letter of Compliance.

e. Record Drawings.

B. Pre-Backfill Test Procedures:

1. Bonded joint and test wire integrity tests:

a. Conduct visual inspection and hammer test including required documentation per installation section of this Specification.

2. Insulated joint effectiveness tests:

a. Test electrical effectiveness of each buried dielectric insulated joint after installation into pipe system and no sooner than two days before backfilling.

b. Perform initial resistance tests between each bolt and flange in accordance with installation section of this Specification.

c. Perform tests for completed insulators by a) use of a high-frequency isolation tester manufactured specifically for this purpose, and by b) measuring electrical potential between mating flanges before, during and immediately after application of a direct test current to the pipe on one side of the flange of no less than 1 ampere. Documented data for test b) shall include all potentials and applied test current.

d. Acceptance Criteria:

1) High frequency isolation tester: "Acceptable", "Satisfactory" or other similar direct meter reading, and

2) Electrical potential/applied current: Apply test current to one side of the flange insulator; a positive potential shift on the side of the flange where current is applied, and a negative potential shift on the side of the flange opposite of where current is applied indicates that the insulator is effective.

C. Post-Backfill Test Procedures:

1. Pipe Continuity Tests:

a. Measure and record longitudinal resistance of pipe between consecutive test stations, and between test stations and intermediate hydrant laterals. Determine resistance using Ohm's Law by impressing a direct test current across pipe span and measuring resultant voltage drop across same span. Use of temporary test points at locations other than test stations and hydrants require approval by the Owner.

b. Documentation: Include applied test current, measured voltage before application of current, with current applied and immediately after interrupting test current, calculated resistance and corresponding theoretical resistance (Paragraph C below) in test report.

c. Acceptance Criteria: Maximum acceptable span resistance - 110% of the sum of:

1) Number of pipe joints multiplied by theoretical resistance of a joint bond, determined by number of bond wires per joint and wire gauge.

2) Length of pipe multiplied by theoretical resistance per unit length, determined by pipe diameter, wall thickness and resistivity.

2. Pipe-to-Soil Potential Measurements:

   a. Record at all test stations and hydrants used for post-backfill continuity measurements, and on both sides of all insulating devices.

   b. Collect using a temporary copper/copper sulfate reference electrode placed on grade within one foot of test station.

   c. Collect at all locations prior to connecting anodes at test stations, and then after anodes have been connected at all test stations for a minimum of 2 hours.

3. Anode Potential and Current Measurements:

   a. Measure and record open-circuit potential between each anode cable at each test station and a temporary copper/copper sulfate reference electrode placed on grade within one foot of test station. Collect open circuit potential data with no other influencing anodes connected to main.

   b. Measure and record anode current at each test station using permanently installed current measuring shunt. Document shunt voltage drop, shunt resistance, and calculated current.

   c. Acceptance Criteria:

      1) Open-Circuit Potential: Magnitude 1.6 volts or greater.

      2) Anode Current: Minimum 0.02 ampere per anode, adjusted to account for number of anodes included in circuit at any given location (e.g. 15 anodes - minimum 0.30 ampere).

4. Insulated Joint Effectiveness Tests: Test each joint. Procedures and acceptance criteria in accordance with pre-backfill insulated joint effectiveness tests.

END OF SECTION 13110