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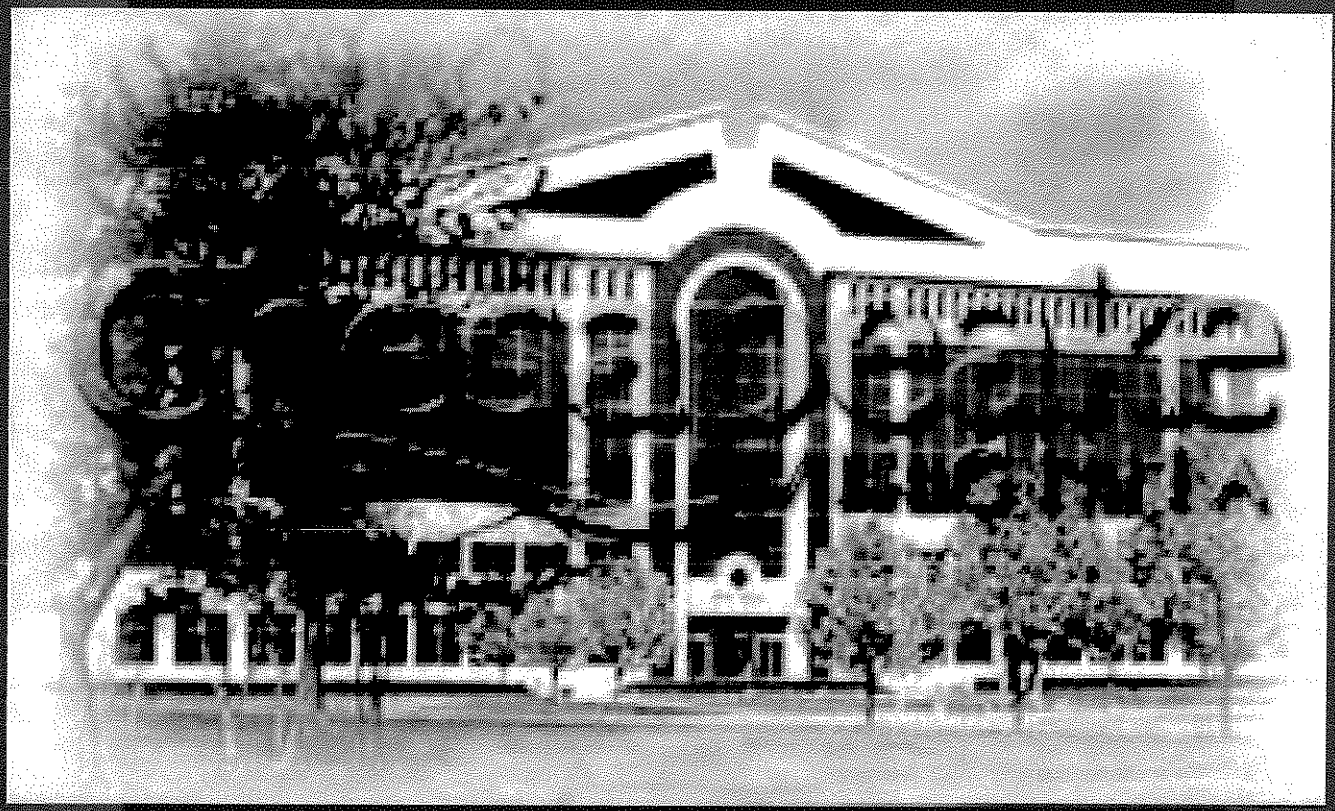
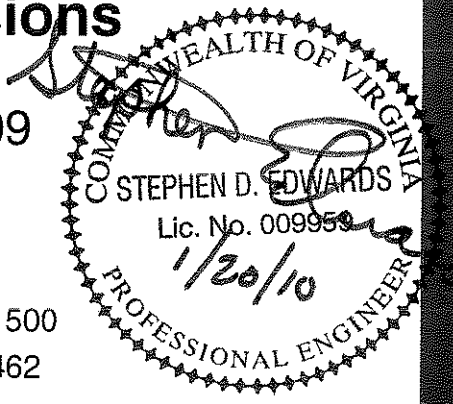
Water Project
Murray Drive & Whittamore Road

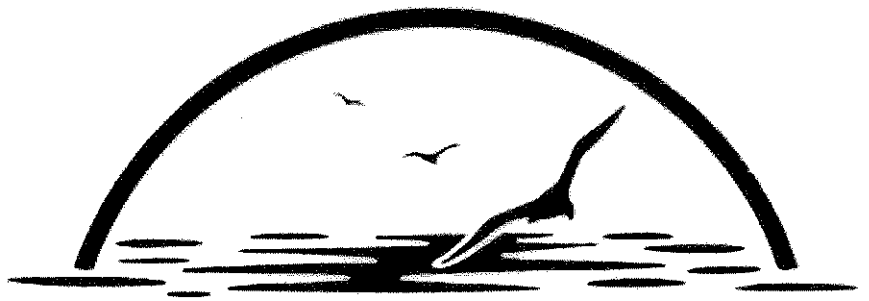


Contract Documents and Special Provisions

December 2009



URS
277 Bendix Road, Suite 500
Virginia Beach, VA 23462
757.499.4224



REGIONAL CONSTRUCTION STANDARDS

FOURTH EDITION

Publication Update #1

(Full Committee Approved Proposed Revision #2
As Publication Update #1)

May 8, 2008

URS

HAMPTON ROADS
PLANNING DISTRICT COMMISSION

REGIONAL CONSTRUCTION STANDARDS

FOURTH EDITION

Publication Update #2

(Full Committee Approved Proposed Revision #3
As Publication Update #2 with a Revised Date of 3/20/08)

May 8, 2008

URS

HAMPTON ROADS
PLANNING DISTRICT COMMISSION

REGIONAL CONSTRUCTION STANDARDS

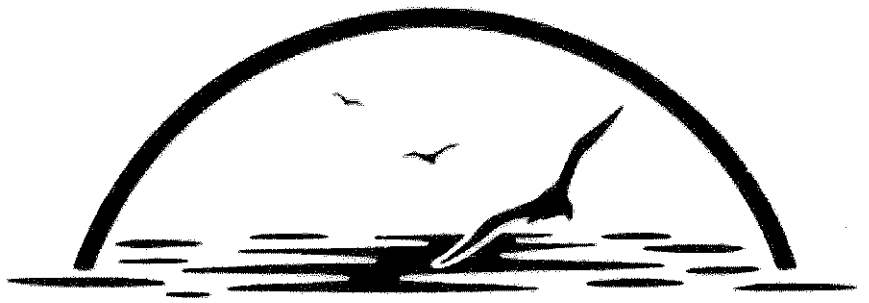
FOURTH EDITION

Publication Update #3

(Full Committee Approved Proposed Revision #5
As Publication Update #3, including Sections 302, 303, 309, 315A, 406, 414, 501, 502, and 505 & Standard Details RC_03 and RC_04)

October 17, 2008

URS



REGIONAL CONSTRUCTION STANDARDS

FOURTH EDITION

Publication Update #4

(Full Committee Approved Proposed Revision #4
As Publication Update #4)

April 28, 2009

URS

REGIONAL CONSTRUCTION STANDARDS
Fourth Edition

TABLE OF CONTENTS

Section 108 - Prosecution and Progress of Work

Section 109 - Measurement and Payment

Section 110 – Special Provisions

Section 807 – Corrosion Control

Appendix A

Appendix B

DIVISION 2 - PRODUCTS AND MATERIALS

DIVISION 3 - ROADWAY CONSTRUCTION

DIVISION 4 - MISCELLANEOUS

DIVISION 5 - INCIDENTAL CONSTRUCTION

DIVISION 6 - LANDSCAPING

Section

DIVISION 7 - TRAFFIC CONTROL DEVICES

Section

DIVISION 8 - WATER AND WASTEWATER UTILITIES

Section

STANDARD DETAILS

SECTION 101

DEFINITIONS OF TERMS

I. GENERAL DEFINITIONS

Wherever used in the Contract Documents, the following terms shall have the meanings indicated and shall be applicable to both the singular and plural thereof:

1.1 *Addenda* - Written or graphic instruments issued prior to the opening of Bids which clarify, correct or change the Bid Documents or the Contract Documents.

1.2 *Agreement* - The written agreement between the Owner and the Contractor covering the Work to be performed; other Contract Documents are attached to the Agreement and made a part thereof as provided therein.

1.3 *Application for Payment* - The form provided in the Contract Documents which is to be used by the Contractor in requesting progress and final payments and which is to include such supporting documentation as is required by the Contract Documents.

1.4 *Bid* - The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

1.5 *Bid Documents* - Documentation issued prior to the bid date, including documentation accompanying the Bid (Drawings, Project Specifications, HRPDC *Regional Construction Standards*, Addenda, and Special Provisions) and any post-Bid documentation submitted prior to the Notice of Award.

1.6 *Bidder* - Any person, firm or corporation submitting a Bid for the Work.

1.7 *Bonds* - Performance and Payment Bonds, furnished by the Contractor and the Contractor's surety in accordance with the Contract Documents.

1.8 *Bid Security* - Bid Bonds and other instruments of surety, furnished by the Contractor or the Contractor's surety in accordance with the Contract Documents.

1.9 *Change Order* - A written order to the Contractor authorizing an addition, deletion, or revision in the Work within the general scope of the Contract Documents that authorizes an adjustment in the Contract Price and/or Contract Time; issued on or after the Effective Date of the Agreement.

1.10 *Completion Date* - The date specified in the Notice to Proceed for final completion of the Work.

1.11 *Contract Documents* - The Agreement, including the Bid Documents, Notice of Award, Notice to Proceed, Field Orders, Change Orders, and modifications.

1.12 *Contract Price* - The total monies payable to the Contractor under the terms and conditions of the Agreement.

1.13 *Contract Time* - The number of calendar days stated in the Agreement for the completion of the

Work. Calendar days shall be understood to be consecutive.

1.14 *Contractor* - The person, firm or corporation with whom the Owner has executed the Agreement.

1.15 *Day* - A calendar day of twenty-four hours measured from midnight to the next midnight. Calendar days shall be understood to be consecutive.

1.16 *Defective* - An adjective, which when modifying the word Work, refers to Work that is unsatisfactory, faulty or deficient, or does not conform to 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 Owner's acceptance.

1.17 *Drawings* - The plans that show the character and scope of the Work to be performed.

1.18 *Effective Date of the Agreement* - The date indicated in the introductory paragraph of the Agreement.

1.19 *Engineer* -The person, firm or corporation named as such in the Agreement. In the event the Owner should not require the services of the Engineer, then the powers, duties, and responsibilities conferred in the Contract Documents to the Engineer shall be construed to be those of the Owner.

1.20 *Field Order* - A verbal or written order effecting a change in the Work not involving an adjustment in the Contract Price or an extension of the Contract Time, issued by the Engineer or Owner to the Contractor during construction.

1.21 *Final Completion* - All work, including punch list items noted at the final inspection, is complete to the satisfaction of the Owner.

1.22 *Laws and Regulations* - Any and all applicable laws, rules, regulations, ordinances, codes and orders of any and all governmental bodies, agencies, authorities and courts having jurisdiction.

1.23 *Liens* - Liens, charges, security interests or encumbrances upon real or personal property.

1.24 *May* - The term "may" is permissive.

1.25 *Notice* - All written notices, demands, instructions, claims, approvals, and disapprovals required to obtain compliance with the Contract Documents. Any written notice by either party to the Agreement shall be sufficiently given if delivered to or at the last known business address of the person, firm or corporation constituting the party to the Agreement, or to his, their, or its authorized agent, representative or officer, or when enclosed in a postage envelope addressed to such last known business address and deposited in a United States mailbox. Notice shall be deemed received within 3 business days of U.S. Mail Service postmark date.

1.26 *Notice of Award* - A written notice by the Owner to the apparent Successful Bidder stating that upon compliance by the apparent Successful Bidder with the conditions precedent enumerated therein, within the time specified, the Owner will sign and deliver the Agreement.

1.27 *Notice to Proceed* - A written notice given by the Owner to the Contractor (with a copy to the Engineer, if appropriate) fixing the date on which the Contract Time will commence to run and on which the Contractor shall start to perform its obligations under the Agreement.

1.28 *Owner* - The public body or authority, corporation, association, firm or person with whom the

Contractor has entered into the Agreement and for whom the Work is to be provided.

1.29 *Owner's Representative* - The person, firm or corporation named by the Owner to act as the Owner's agent.

1.30 *Partial Utilization* - Use by the Owner of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work.

1.31 *Project* - The entire Work as described in the Contract Documents, including Work that is necessary and incidental to the furnishing of all materials, services, equipment, labor and supplies required to install, perform, and complete all items of Work in accordance with Contract Documents

1.32 *Reference Standards* – Those bulletins, standards, rules, methods of analysis or test, codes, and specifications of other agencies, engineering societies, or industrial associations referred to in the Contract Documents. These refer to the latest edition, including amendments in effect and published at the time the Project was advertised, unless specifically referred to by edition, volume, or date.

1.33 *Regional Construction Standards* - The construction standards, published by the Hampton Roads Planning District Commission (HRPDC) as amended from time to time.

1.34 *Responsible Bidder* - A person or firm who, in the sole opinion of the Owner, has the capability in all respects, to fully perform the contractual requirements as well as the moral and business integrity and reliability to assure good faith performance.

1.35 *Responsive Bidder* - A person or firm who has submitted a bid that conforms in all material respects to the Bid Documents.

1.36 *Resident Project Representative* - The authorized representative of the Engineer or Owner who is assigned to the Project or any part thereof.

1.37 *Roadway Prism*- All of the land or area within the right of way that needs to be cut, filled, graded, or otherwise disturbed to produce the design cross section, including, but not limited to, areas for curbs, ditches, sidewalks, paths, and slopes to match existing grade.

1.38 *Rock* - Any indurated material with a minimum compressive strength of 200psi that requires drilling, wedging, blasting, or other methods of brute force for excavation.

1.39 *Shall* - The term "shall" is mandatory.

1.40 *Shop Drawings* - All drawings, diagrams, illustrations, schedules, specified design related submittals, 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.

1.41 *Special Provisions* - Requirements in addition to or modification of the HRPDC *Regional Construction Standards.*

1.42 *Specifications* - Those portions of the Contract Documents or HRPDC *Regional Construction Standards* consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative details applicable thereto.

1.43 *Standard Details* - Those portions of the HRPDC *Regional Construction Standards* consisting of drawings, explanatory of another drawing, indicating in detail and at a larger scale, the design, location, composition and correlation of elements and materials.

1.44 *Subcontractor* - A person, firm or corporation having a direct contract with the Contractor or with any other Subcontractor for the performance of a part of the Work at the site.

1.45 *Substantial Completion* - That date certified by the Owner when the construction of the Project or a specified part thereof is sufficiently completed in accordance with the Contract Documents, including completion of all tests, so that the Project or specified part can be utilized for the purpose for which it is intended.

1.46 *Successful Bidder* - The lowest, responsible and responsive Bidder to whom the Owner (on the basis of the Owner's evaluation as hereinafter provided) makes an award.

1.47 *Supplier* - Any person or organization that supplies materials or equipment for the Work, including that fabricated to a special design.

1.48 *Underground Facilities* - All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.

1.49 *Work* - All labor, materials, equipment, transportation, supervision, or other facilities, duties, or incidentals necessary for execution and completion of the Project in compliance with the Contract Documents.

1.50 *Workday* – Monday, Tuesday, Wednesday, Thursday, and Friday of the week.

End of Section

SECTION 102

BIDDING REQUIREMENTS AND CONDITIONS

I INVITATION FOR BIDS (IFB No. 10095)

1. Long Form

PROJECT: Battlefield Golf Club Water Project – Murray Drive & Whittamore Road
LOCATION: Chesapeake, Virginia
DATE: January 24, 2010

The City of Chesapeake, Virginia will receive sealed Bids for the above titled Project at the office of the Purchasing Division, located the 5th Floor, City Hall Building, 360 Cedar Road until 2:00 p.m. local time on March 2, 2010, at which time the Bids will be publicly opened and read aloud. Any Bids received after the specified time and date will not be considered.

The Work under this Project consists of installation of 3,834 linear feet (LF) of 10" Ductile Iron Pipe (DIP) water line and 3,400 linear feet (LF) of 10" Polyvinyl Chloride (PVC) water line along Murray Drive and 7,738 LF of 8" DIP water line and 300 LF of 8" PVC water line in Whittamore Road.
New water services will be installed up to the water meter. Construction services for the proposed water system shall include, but not be limited to, the furnishing of all materials, labor equipment, tools, excavation, restoration work and testing necessary to install the new water main and services, including pipe, valves, and related appurtenances.

Bid Documents may be examined at the offices of URS Corporation, located at 277 Bendix Road, Suite 500, Virginia Beach, Virginia 23452. Plans cannot be purchased from URS.

Electronic copies of the bid documents and drawings in pdf format are available for download on the City of Chesapeake web site at:
http://www.chesapeake.va.us/services/depart/purchas/solicitations.shtml#ifbrfp

Bidders are responsible for monitoring the site for any issued addenda.

The Hampton Roads Planning District Commission's *Regional Construction Standards, Fourth Edition,* October 2006 **and Updates #1 -4**, are hereby referenced and are part of the Bid Documents, except as may be modified by the Special Provisions of this Project or as may be shown by bold type for additions and strike-throughs for deletions. **Updates may be downloaded at the HRPDC website http://www.hrpdcva.gov/Regional Construction Stnds/REGCONST Pub Updates.asp.** Copies of the *Regional Construction Standards* may be purchased at the offices of the HRPDC, 723 Woodlake Drive, Chesapeake, VA 23320 (Telephone 757-420-8300) or Executive Tower, Suite 1-C, 2101 Executive Drive, Hampton, VA 23666 (Telephone 757-262-0094).

Bid Security in the amount of Five percent (5%) of the Bid shall be submitted with each Bid.

A [~~MANDATORY~~/NON-MANDATORY] PRE-BID CONFERENCE will be held on February 16, 2010, at 10:30 a.m./~~p.m.~~ Local Time at the southeast intersection of Murray Drive and Centerville Turnpike South, Chesapeake VA.

Contractor registration in accordance with Title 2.2 Chapter 43, Code of Virginia is required. The Bidder shall include in its Bid the following notation: "Licensed Virginia Contractor No. _____"

Withdrawal of Bids due to error shall be subject to and in accordance with Section 2.2-4330 of the Code of Virginia, **Chesapeake City Code Chapter 54**, and the Contract Documents.

The Owner reserves the right to waive minor non-substantive errors in the Bid, to reject any/or all Bids, to award any Bid in whole or in part and award the Bid considered to be in the best interest of the Owner. The Owner also reserves the right to negotiate with the lowest responsive, responsible Bidder should Bid exceed available funds **by no more than 5%, in accordance with Chesapeake City Code Section 54-63(7).**

The City of Chesapeake does not discriminate in the solicitation or awarding of contracts on the basis of race, religion, faith-based organizations, color, national origin, age, disability or any other basis prohibited by state or federal law.

By: Department of Public Utilities
City of Chesapeake, Virginia
Michael Thomas,
Interim Purchasing Agent

2. Short Form

(This is an abbreviated version of the IFB intended for newspaper advertisement.)

Invitation For Bids

The City of Chesapeake, Virginia

PROJECT: Battlefield Golf Club Water Project – Murray Drive & Whittamore Road
DATE: January 24, 2010

Sealed bids are to be received at the Purchasing Division, located the 5th Floor, City Hall Building, 360 Cedar Road until 2:00 pm on March 2, 2010 for the above titled Project.

The Work under this Project consists of installation of 7085 feet of 10-inch ductile iron (DI) water main along Murray Drive and 8065 feet of 8-inch DI water main in Whittamore Road. New water services will be installed up to the water meter. Construction services for the proposed water system shall include, but not be limited to, the furnishing of all materials, labor equipment, tools, excavation, restoration work and testing necessary to install the new water main and services, including pipe, valves, and related appurtenances.

A [~~MANDATORY~~/NON-MANDATORY] PRE-BID CONFERENCE will be held on February 16, 2010, at 10:30 a.m./~~p.m.~~ Local Time at the southeast intersection of Murray Drive an Centerville Turnpike South, Chesapeake VA.

The full Invitation For Bids is available at URS Corporation, located at 277 Bendix Road, Suite 500. Electronic copies of the bid documents and drawings in pdf format are available for download on the City of Chesapeake web site at: http://www.chesapeake.va.us/services/depart/purchas/solicitations.shtml#ifbrfp

Associated Bidding Documents are open to inspection as conditioned in the full Invitation For Bids, at the above-mentioned locations. For additional information concerning this project, please contact Stephen Edwards, P.E., URS Corporation at 757-499-4224.

II INSTRUCTIONS TO BIDDERS

1. Bid Documents

1.1. Complete sets of Bid Documents shall be used in preparing Bids. Neither the Owner nor the Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bid Documents.

1.2. The Owner, in making copies of the Bid Documents available on the above terms does so only for the purpose of obtaining Bids on the Work and does not confer or license or grant permission for any other use.

1.3. The Special Provisions for this Project as set forth in Section 110 were prepared by URS Corporation and are dated December 2009. Additional Special Provisions for this Project appear as modifications to the HRPDC *Regional Construction Standards* by strike-throughs for deletions and bold type for additions in Sections 100 through 109.

1.4. The Drawings for this Project, prepared by URS Corporation and dated December 2009, are defined as follows:

Sheet	***Number***	***Drawing Title***
T-1	1 of 22	Cover Sheet
T-2	2 of 22	Sheet Index
T-3	3 of 22	General Notes
T-4	4 of 22	Traffic Control Notes & Details
T-5	5 of 22	Traffic Control Plan
C-1	6 of 22	Plan & Profile-Murray Drive Sta. 11+33 to Sta. 23+00
C-2	7 of 22	Plan & Profile-Murray Drive Sta. 23+00 to Sta. 36+00
C-3	8of 22	Plan & Profile-Murray Drive Sta. 36+00 to Sta. 49+00
C-4	9of 22	Plan & Profile-Murray Drive Sta. 49+00 to Sta. 62+00
C-5	10 of 22	Plan & Profile-Murray Drive Sta. 62+00 to Sta. 75+00
C-6	11 of 22	Plan & Profile-Murray Drive Sta. 75+00 to Sta. 83+07
C-7	12 of 22	Plan & Profile-Whittamore Road Sta. 11+55 to Sta. 23+00
C-8	13 of 22	Plan & Profile-Whittamore Road Sta. 23+00 to Sta. 36+00
C-9	14 of 22	Plan & Profile-Whittamore Road Sta. 36+00 to Sta. 49+00
C-10	15 of 22	Plan & Profile-Whittamore Road Sta. 49+00 to Sta. 62+00
C-11	16 of 22	Plan & Profile-Whittamore Road Sta. 62+00 to Sta. 75+00
C-12	17 of 22	Plan & Profile-Whittamore Road Sta. 75+00 to Sta. 88+00

C-13 18 of 22 Plan & Profile-Whittamore Road
Sta. 88+00 to Sta. 92+53
D-1 19 of 22 Erosion and Sediment Control Notes
D-2 20 of 22 Pavement and Shoulder Details
D-3 21 of 22 Details
D-4 22 of 22 Corrosion Details

2. Examination of Contract Documents and Project Site.

2.1. It is the responsibility of each Bidder before submitting a Bid:

A. to examine thoroughly the Bid Documents;

B. to visit the site to become familiar with and satisfy the Bidder as to the general, local and site conditions that may affect cost, progress, performance, or furnishing of the Work;

C. to study and carefully correlate the Bidder's knowledge and observations with the Bid Documents and such other related data; and,

D. to promptly notify the Owner of all conflicts, errors, ambiguities or discrepancies which the Bidder has discovered in or between the Bid Documents and such other related documents or field/site conditions.

2.2 Reference is made to Sections 104 III and 104 IV, for information relating to reports, explorations, underground facilities, and easements. On request, at the discretion of the Owner, the Owner will provide each Bidder access to the site to conduct such examinations, investigations, explorations, tests and studies as each Bidder deems necessary for submission of a Bid. The Bidder shall fill all holes and clean up and restore the site to its former condition, including reseeding and/or resodding any disturbed areas upon completion of such explorations, investigations, tests and studies, and hold the Owner harmless from any damage to property or injury to persons resulting from or arising out of such exploration, investigation, tests, and studies. The Bidder shall obtain and comply with all local and state permitting requirements.

3. Interpretations and Addenda.

3.1. No oral explanation in regard to the meaning of the Contract Documents will be made, and no oral instructions will be given before the award of the Work. Discrepancies, omissions or doubts as to the meaning of the Contract Documents shall be communicated in writing to the Owner for interpretation. Bidders should act promptly and allow sufficient time for a reply to reach them before the submission of their Bids. Any interpretation made will be in the form of an addendum to the Contract Documents, which will be forwarded to all known Bidders, and its receipt shall be acknowledged on the Bid Form. All questions shall be received no later than 7 days prior to the date for opening of Bids.

3.2. Addenda may also be issued to modify the Contract Documents.

4. Bid Security.

4.1. Each bid shall be accompanied by a Bidder's bond issued by a company authorized and licensed to transact business as surety in the Commonwealth of Virginia, a certified check, or cash escrow, in an amount equal to not less than five (5) percent of the total amount of the bid, made payable to the City of Chesapeake, Virginia. Upon approval of the Owner's attorney, in accordance with Section 2.2-4338, Code of Virginia, 1950, as amended, and with Section 54-69 of the Code of the City of Chesapeake, Virginia, as amended, a Bidder may furnish a personal bond, property bond, or bank or savings and loan association's letter of credit on certain designated funds for the amount required for the Bid Security. The Bid Security shall be accompanied by a certified copy of the power of attorney for the surety attorney-in-fact. Said bid security shall be left with the Owner, subject to the conditions specified herein, as a guarantee of good faith on the part of the Bidder that if the bid is accepted, the Bidder shall execute the contract.

4.2. The Bid Security shall be returned to all except the three (3) lowest Bidders within ten (10) days after the date of Bid opening. The Bid Security will be returned to the three (3) lowest Bidders within five (5) days after the execution of an Agreement and Performance and Payment Bonds and Certificates of Insurance have been approved by the Owner. None of the three (3) lowest Bids shall be deemed rejected, notwithstanding acceptance of one of the Bids, until the Agreement has been executed by both the Owner and the Successful Bidder.

5. Liquidated Damages.

5.1. Provisions for liquidated damages are set forth in Section 108-X and in Section 102 III (Bid Form).

6. Preparation of Bid.

6.1. All blanks on the Bid Form shall be completed in ink.

6.2. Bids by corporations shall be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.

6.3. Bids by unincorporated organizations shall be executed in the organization's name and signed by an individual having authority to enter into a contract on behalf of such organization, whose title shall appear under the signature and the official address of the organization shall be shown below the signature. For example, if such organization is a Limited Liability Company, the Bid shall be signed by its manager, or if such organization is a Limited Partnership, the Bid shall be signed by a general partner.

6.4. All names shall be typed or printed in ink below the signature. All names shall be the legal name of the corporation, unincorporated organization and/or individual.

6.5. The Bid shall contain an acknowledgment of receipt of all Addenda (the numbers of which shall be filled in on the Bid Form).

6.6. The address, telephone number, e-mail address and fax number for communications regarding the Bid shall be provided.

6.7. It is understood and agreed that, in the event an Agreement is executed for the supplies, equipment or services included in the Bid, no indication of such sales or services to the Owner shall be used in any way in product literature or advertising without the written consent of the Owner.

7. Quantities and Unit Prices.

7.1. The Owner reserves the right to increase or decrease the amount of any class or portion of the Work. No such change in the Work shall be considered as a waiver of any condition of the Agreement nor shall such change invalidate any of the provisions thereof. Payment will be made at the unit or lump sum prices under the Agreement only for the work actually performed or materials furnished and accepted.

7.2 Bidders shall include in their Bid prices the entire cost of each item set forth in the Bid, and it is understood and agreed that there is included in each lump sum or unit price bid item the entire cost necessary or incidental to the completion of that portion of the work, unless such incidental work is expressly included in other lump sum or unit price bid items.

8. General Equipment or Material Specification.

8.1. When the Bid Documents specify one or more manufacturer's brand names or makes of materials, devices or equipment as indicating a quality, style, appearance or performance, with the statement "or equal," the Bidder shall base the Bid on either one of the specified brands or an alternate brand which the Bidder intends to substitute. Use of an alternate shall not be permitted unless it has been found to be equal or better by the Owner and at no additional cost to the Owner.

8.2. The burden of proof as to the comparative quality and suitability of alternative equipment, articles or materials shall be upon the Bidder. The Bidder shall furnish at its own expense, such information relating thereto as may be required by the Owner. The Owner shall be the sole judge as to the comparative quality and suitability of alternative equipment, articles or materials and the Owner's decisions shall be final. Any other brand, make or material, device or equipment which, in the opinion of the Owner is recognized to be the equal of that specified, considering quality, workmanship and economy of operation and is suitable for the purpose intended, shall be accepted. In the event of any adverse decision by the Owner, no claim of any sort shall be made or allowed against the Engineer or Owner. Samples, if requested by the Bidder, may be returned at the Bidder's expense.

9. Proprietary Material and Equipment Specification.

9.1 Where any item of equipment or material is specified by proprietary name, trade name, catalog reference, or name of one or more manufacturers, without the addition of such expressions as "or equal," it is to be understood that those items are so specified for reasons of standardization in maintenance and operation, or for reasons of obtaining desirable features best suited to the requirements of the Specifications. This specific equipment shall form the basis of the Bid and be furnished under the Agreement. Where two or more items of equipment or material are named, the Contractor has the option to use either.

10. Alternate Bids.

10.1. If alternate Bids are requested for a portion of all of the Work due to the character of the improvement and uncertainties which may be encountered during construction, Bidders shall submit

alternate Bids on all items as shown on the Bid Form. Alternate Bids shall be considered in the order listed in the Bid Form and in accordance with criteria defined in the Special Provisions.

10.2. Award shall be based on the lowest responsive and responsible Bid for base Bid plus alternatives selected.

11. Submission of Bids.

11.1. Bids shall be submitted at the time and place indicated in the Invitation for Bids and shall be sealed, marked with the Project title and name and address of the Bidder, and accompanied by the bid guarantee and other required documents. The Bid may not be changed by markings on the envelope. Only the amounts indicated on the Bid Form will be considered in determining the final Bid amount.

11.2. When a license is required, the Bidder shall include in its Bid over the Bidder's signature the following notation: "VIRGINIA LICENSED CONTRACTOR NO. _____" (Ref. Title 2.2, Chapter 43, Code of Virginia).

11.3. When a license is not so required and a person who is not the holder of a License enters a Bid, such person shall include in its Bid over the Bidder's signature the following notation: "LICENSING NOT REQUIRED UNDER VIRGINIA STATE CODE."

12. Receipt and Opening of Bids.

12.1. Bids will be opened publicly at the time and place and under the conditions stated in the Invitation for Bids. The Owner's Representative whose duty it is to open Bids will decide when the specified time has arrived. No responsibility will be attached to any such person for the premature opening of a Bid not properly addressed and identified. It is the responsibility of the Bidder to assure that the Bid is delivered to the designated place of receipt prior to the time set for the receipt of Bids. No Bid received after the time designated for receipt will be considered.

12.2. Bids will be opened and read aloud publicly.

13. Bids to Remain Subject to Acceptance.

13.1. All Bids shall remain subject to acceptance for 90 Days after the day of the Bid opening, but the Owner may, in its sole discretion, release any Bid and return the Bid Security prior to that date, or extend the acceptance period an additional 90 days with the consent of the apparent low bidder and surety.

14. Withdrawal of Bids.

14.1 Withdrawal of Bids filed with the Owner may be made only by a representative of the firm submitting the Bid, who shall appear in person prior to the deadline designated in the advertisement for receipt of Bids. Such representative shall furnish satisfactory identification and proof that they are authorized to withdraw the Bid. Telephone, e-mail, or facsimile notices will not be considered. Additions and/or deletions marked on the outside of the Bid envelope will not be considered.

14.2 If the Bid price was substantially lower than the other Bids 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 a bid, which unintentional

arithmetic error or unintentional omission can 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 and provided further the Bidder shall give notice in writing of his claim of right to withdraw within two (2) business days after the Bid opening, then the Bid may be withdrawn. **The Bidder shall, within the following two (2) business days provide the subjective data required in this section to satisfy the City's representative that the grounds for such withdrawal do exist.**

14.3 Should the Bidder refuse to enter into the Agreement after notification of award, the Bid Security shall be forfeited.

14.4 No Bid may be withdrawn under this section when the result would be the awarding of the Agreement on another Bid to the same Bidder or to another Bidder in which the ownership of the withdrawing Bidder is more than five percent.

14.5 If a Bid is withdrawn under the authority of this section, the remaining Bids shall be evaluated to determine the lowest responsive and responsible Bidder.

14.6 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 awarded, or otherwise benefit, directly or indirectly, from the performance of the Project for which the withdrawn Bid was submitted.

14.7 If withdrawal of any Bid is denied, the Bidder shall be notified in writing stating the reasons for this decision. Any Bidder who desires to appeal a decision denying withdrawal of Bid shall, as sole remedy, institute legal action provided by Section 2.2-4358 and Section 2.2-4364(B), Code of Virginia, 1950, as amended, or Section(s) 54-141 of the Code of the City of Chesapeake, Virginia, as amended.

15. Evaluation of Bids.

15.1. In evaluating Bids, the Owner shall consider the qualifications of the Bidders, whether or not the Bids comply with the prescribed requirements, unit and lump sum prices, and alternates if requested in the Bid Form.

15.2. The Owner may consider the qualifications and experience of subcontractors and other persons and organizations (including those who are to furnish the principal items of material or equipment) proposed for those portions of the Work for which the identity of Subcontractors and other persons and organizations shall be submitted as specified in the Bid Documents.

15.3. The Owner may conduct such investigations as deemed necessary to establish the responsibility, qualifications and financial ability of the Bidders, proposed Subcontractors and other persons and organizations to do the Work in accordance with the Bid Documents to the Owner's satisfaction within the prescribed time.

15.4. Bids will be based upon the estimated quantities shown in the Bid Form. Bids will be compared on the basis of a total computed price; arrived at by taking the sum of the estimated quantities of each Bid Item, multiplied by the corresponding unit price bid, and any lump sum Bids on the individual items. Discrepancies between the multiplication of units of work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and

figures will be resolved in favor of words. The right to reject any or all Bids or to accept any Bid considered of advantage to the Owner is reserved.

15.5. Unless all Bids are canceled or rejected, the Owner reserves the right granted by Section 2.2-4318 of the Code of Virginia and **Chesapeake City Code Section 54-63(7)**, as amended, to negotiate with the lowest responsible, responsive Bidder to obtain a Contract Price within the funds budgeted for the construction project. Negotiations with the lowest Bidder may include both modification of the Contract Price and the Scope of Work/Specifications to be performed. The Owner shall initiate such negotiations by Written Notice to the lowest responsible, responsive Bidder that its Bid exceeds the available funds and that the Owner wishes to negotiate a lower Contract Price. The Owner and the lowest responsive, responsible Bidder shall agree to the times, places, and manner of negotiations.

15.6. The acceptance of a Bid will be a notice in writing, signed by the Owner, and no other act shall constitute the acceptance of a Bid.

15.7 The Owner reserves the right to waive minor non-substantive errors in the Bid, to reject any/or all Bids, to award any Bid in whole or in part, and to award the Bid considered to be in the best interest of the Owner.

16. Qualifications of Bidders and Subcontractors.

16.1. The Contractor's Questionnaire is included in the Bid Documents and shall be submitted upon request within 72 hours. This information will assist the Owner in investigations and determination of the Contractor's qualifications to perform the Work.

16.2. To demonstrate their qualification to perform the Work, each Bidder shall be prepared to submit further written satisfactory evidence that the Bidder has sufficient experience, necessary capital, materials, machinery and skilled workers to complete the Work. If financial statements are required they shall be of such date as the Owner shall determine and shall be prepared on forms acceptable to the Owner. The Owner may make such investigations as deemed necessary to determine the ability of the Bidder to perform the Work. The Owner's decision or judgment on these matters shall be final, conclusive and binding.

16.3. The apparent low Bidder shall, within seven consecutive calendar days after the day of the Bid opening, submit to the Owner a list of all Subcontractors who will be performing work on the Agreement. Such list shall be accompanied by an experience statement with pertinent information as to similar projects and other evidence of experience and qualification for each such Subcontractor, person and organization. If the Owner, after due investigation, has reasonable objection to any proposed Subcontractor, other person or organization, the Owner may, before giving the Notice of Award, request the apparent low Bidder to submit an acceptable substitute without an increase in Bid price. If the apparent low Bidder declines to make any such substitution, the contract shall not be awarded to such Bidder, but his declining to make any such substitution will not constitute grounds for sacrificing his Bid Security. For any Subcontractors, other person or organization so listed and to whom Owner does not make written objection prior to the giving of the Notice of Award, it will be deemed the Owner has no objection.

16.4. By submitting their Bid, Bidders certify that they are not now debarred by the Federal Government or by the Commonwealth of Virginia or by any other state, or by any town, city, or county, from submitting Bids on contracts for construction covered by this solicitation, nor are they an agent of any person or entity that is now so debarred.

17. Sham or Collusive Bids.

17.1. The Bids of any Bidder or Bidders who engage in collusive bidding shall be rejected. Any Bidder who submits more than one Bid in such a manner as to make it appear that the Bids submitted are on a competitive basis from different parties shall be considered a collusive Bidder.

17.2. The provisions contained in Sections 2.2-4367 through 2.2-4377, Code of Virginia, as amended, and Section(s) 54-166 of the Code of the City of Chesapeake, Virginia, as amended, shall be applicable to all contracts solicited or entered into by Owner. By submitting their Bids, all Bidders certify that their Bids are made without collusion or fraud, and that they have not offered or received any kickbacks or inducements from any other Bidder, Supplier, manufacturer or subcontractor in connection with their Bid, and they have not conferred with any public employee having official responsibility for this procurement transaction, any payment, loan, subscription, advance, deposit of money, services or anything of more than nominal value, present or promised, unless consideration of substantially equal or greater value was exchanged.

18. Certification of Compliance with Immigration Laws and Regulations.

18.1. **All bidders must submit a completed Certification of Compliance with Immigration Laws and Regulations form (See Section 102.VIII) with their bid.**

III BID FORM

Bids to be opened:	2:00 p.m. Date: March 2, 2010.
Work to be Completed in:	240 Days
Liquidated Damages:	$ 500 per calendar day after time for Substantial Completion has expired. $ 250 per calendar day after time for Final Completion has expired.
Performance Bond:	100%
Payment Bond:	100%
Bid Security:	5%

To: City of Chesapeake
Purchasing Division
5th Floor
City Hall Building
306 Cedar Road
Chesapeake, Virginia

A. BID PRICE

OPTION A - LUMP SUM BID (NOT USED)

OPTION B - COMBINATION LUMP SUM AND UNIT PRICE BID (NOT USED)

OPTION C - UNIT PRICE BID

In compliance with the Bid Documents, titled Battlefield Golf Club Water Project, Murray Drive & Whittamore Road, and **HRPDC *Regional Construction Standards*, 4th Edition including Updates 1-4,** and all Addenda issued to date all of which are part of this Bid, the undersigned hereby proposes to furnish all items including materials, supervision, labor, and equipment in strict accordance with, said Contract Documents, for the sum of:

Battlefield Golf Club Water Project
Murray Drive & Whittamore Road Water Main

ITEM NO.	*ITEM DESCRIPTION*	*UNIT*	*QTY*	*UNIT COST*	*LINE ITEM COST*
	Whittamore Road				
1	8" DI Pipe (4' cover)	LF	7486		
2	8" C900 PVC Pipe (4' cover)	LF	300		
3	10" DI Pipe (4' cover)	LF	80		
4	4" DI Pipe (3' cover)	LF	154		
5	Blow Off Assembly	EA	1		

6	Automatic Blow Off (no installation)	EA	1		
7	Fire Hydrant Assembly (Including 6" DI Pipe & Fittings)	EA	12		
8	10" Gate Valve & Box	EA	1		
9	8" Gate Valve & Box	EA	9		
10	6" Gate Valve & Box	EA	12		
11	Connect to Existing Water Main (DI Long Body Sleeve)	EA	1		
12	8" Service Line & Plug	EA	1		
13	3/4" Copper Water Service Line & Meter Box (Open Cut)	EA	41		
14	Double Polyethylene Encasement of DI Pipe	LF	7566		
15	Tracer Wire Termination Box	EA	2		
16	VDOT aggregate Type 21A or 22 for Fire Hydrant access	TON	77		
17	15" RCP	LF	84		
18	24" RCP	LF	32		
19	Gravel Driveway	EA	9		
20	Undercut Excavation - Waterline	CY	73		
21	Pipe Bedding (for undercut excavation)	CY	73		
22	Pipe Bedding (Type II Detail) DI Pipe	CY	304		
23	Pipe Bedding (Type IV Detail) PVC Pipe	CY	48		
24	Select Backfill (CBR-15) Pipe Trench	CY	1907		
25	Water Line Stream Crossing	LS	1		
	Pavement Patching (Utility Installation)				
26	Sawcut and Remove Pavement	LF	8555		
27	Pavement Patching	LF	8555		
	Pavement Repair				
28	Pavement Demolition 14-inches for Proposed Pavement	SY	12720		
29	Undercut Excavation	CY	1060		
30	Select Material II, CBR 15 Backfill	CY	1060		
31	8-inches Aggregate Base Material	Ton	5420		
32	6-inches VDOT BM-2	Ton	4198		
	Final Surface				
33	Milling (2" Depth)	SY	178		
34	2" Surface (SM-2A)	Ton	2086		
35	Shoulders	LF	15250		
				Sub Total Whittamore:	
	Murray Drive				
36	10" DI Pipe (3' cover)	LF	3774		
37	10" C900 PVC Pipe (3' cover)	LF	3400		
38	Fire Hydrant Assembly (Including 6" DI Pipe & Fittings)	EA	14		
39	10" Gate Valve & Box	EA	10		

40	6" Gate Valve & Box	EA	14		
41	Connect to Existing Water Main (DI Long Body Sleeve)	EA	1		
42	Double Polyethylene Encasement of DI Pipe	LF	3774		
43	3/4" Copper Water Service Line & Meter Box (Jack and Pull)	EA	21		
44	3/4" Copper Water Service Line & Meter Box (Open Cut)	EA	21		
45	Tracer Wire Termination Box	EA	2		
46	Pipe Bedding (Type II Detail)	CY	176		
47	Pipe Bedding (Type IV Detail)	CY	634		
48	Curb	LF	80		
49	24" Curb and Gutter	LF	60		
50	Valley Gutter	LF	80		
51	Concrete Driveway	EA	19		
52	Permanent Pavement Patch	LF	140		
53	Sawcut and Remove Pavement	LF	140		
54	Milling (2" Depth)	SY	120		
55	Asphalt Concrete Surface Course (SM-2A)	Ton	13		
				Sub Total Murray:	
	General Construction				
56	Mobilization	LS	1		
57	Erosion and Sediment Control	LS	1		
58	Traffic Control	LS	1		
				Sub Total General:	
				Total:	

Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities provided, determined as provided in the Contract Documents. The prices quoted shall include without exception all materials, supervision, labor, equipment, appliances, clean-up, incidental items, applicable sales, use and other taxes, insurance, building permit or fees, and the Contractor's labor, overhead, profit, mobilization and other mark-ups, and in full accordance with the Contract Documents. Include allowance for waste where appropriate. The unit prices shall be maintained throughout the Contract Time. Unit prices shall be used in determining additions or deductions from the total Contract Price in the event of changes due to unforeseen conditions in the Work.

B. ADDENDA

The undersigned acknowledges receipt of the following addenda:

Addendum No._____ Dated:_____.

Addendum No._____ Dated:_____.

Addendum No._____ Dated:_____.

C. We agree to enter into an Agreement with the City of Chesapeake, Virginia within ten (10) days of the award of same to us for the price named in our Bid.

D. It is expressly agreed by us that the City of Chesapeake, Virginia shall have the right to reject any and all Bids and to waive any minor non-substantive errors in the Bid and accept the Bid in the City of Chesapeake's best interests.

E. In default of the performance on our part of the conditions of Bid, our failure to enter into an Agreement with the City of Chesapeake, Virginia, within the time above set, we herewith furnish a Bid Security in the amount of $_____, which shall be absolutely forfeited to the City of Chesapeake, Virginia, but otherwise the said Bid Security shall be returned.

F. We agree to begin Work at any time we may be notified by the Owner, and complete all of the Work embraced in the Agreement within 270 Days (Final Completion);

G. *[This applies to projects over $200,000 unless otherwise indicated].* I/We elect to utilize the Escrow Account Procedure described in the provision of this bid if determined to be the successful low Bidder. _____ (write "Yes" or "No").
_____ Bid total does not qualify for escrow account option

H. The undersigned has read all sections under "Instructions to Bidders."

I. By signing, each signatory acknowledges any strike-throughs contained herein, unless hand-written.

J. CONTRACTOR'S REGISTRATION AND SIGNATURE

Registered Virginia Contractor Class and No._____

(NOTE: FAILURE TO INCLUDE CONTRACTOR'S REGISTRATION NUMBER IS GROUNDS FOR REJECTION OF THE BID.)

Contractor_____ Signed_____

Date_____ Title_____

NOTE: If Bidder is a corporation, write state of incorporation under signature.

MAILING ADDRESS AND TELEPHONE NUMBER OF BIDDER:

_____

_____

_____

_____

(_____)_____[Telephone]

IF CORPORATION, PROVIDE NAME AND MAILING ADDRESS AS REQUIRED BELOW.

PRESIDENT	SECRETARY	TREASURER
_____	_____	_____
_____	_____	_____
_____	_____	_____

IF PARTNERSHIP, PROPRIETORSHIP, LIMITED LIABILITY COMPANY OR OTHER FIRM, PROVIDE NAME AND MAILING ADDRESS OF EACH PARTNER, PROPRIETOR, OR MEMBER OF FIRM.

_____

J. NON COLLUSION AFFIDAVIT

Chesapeake, Virginia project:

The Work under this Project consists of installation of approximately 3,834 linear feet (LF) of 10" Ductile Iron Pipe (DIP) water line, 3,400 linear feet (LF) of 10" Polyvinyl Chloride (PVC) water line, 7,738 LF of 8" DIP water line, and 300 LF of 8" PVC water line. New water services will be installed up to the water meter. Construction services for the proposed water shall include, but not be limited to, the furnishing of all materials, labor equipment, tools, excavation, restoration work and testing necessary to install the new sewer main and the new water main and services, including pipe, valves, and related appurtenances.

Bid Date:_____.

COMMONWEALTH OF VIRGINIA
(City/County)

This day personally appeared before the undersigned, a Notary Public in and for the City/County and State aforesaid,

_____ who having been first duly sworn according to law, did depose and aver as follows:

(a) That he/she is_____
(Owner, Partner, President, etc.)

of _____
(insert name of Bidder)

(b) That he/she is personally familiar with the Bid of _____
(Insert Company Name)
submitted in connection with the above captioned Owner's project.

(c) That said Bid was formulated and submitted in good faith as the true bid of said Bidder.

1. In preparation and submission of this Bid, the Bidder did not either directly or indirectly, enter into any combination or agreement with any person, firm or corporation or enter into any agreement, participate in any collusion, or otherwise take any action in the restraint of free, competitive bidding in violation of the Sherman act (15 U.S.C. Section 1) or sections 59.1-9.1 through 59.1-9.17 or sections 59.1-68.6 through 59.1-68.8 of the Code of Virginia.

2. The undersigned Bidder hereby certifies that neither this Bid nor any claim resulting therefrom, is the result of, or affected by, any act of collusion with, or any act of another person or persons, firm or corporation engaged in the same line of business

or commerce; and that no person acting for or employed by the Owner has any personal interest in this Bid.

3. The undersigned hereby further agrees that upon request of the Owner, the records and books pertaining to this Bid will be voluntarily supplied, furnished, and released to the Owner.

4. The undersigned hereby further certifies that the Bidder has not knowingly falsified, concealed, misled, or covered up by any trick, scheme, or device a material fact in connection with this bid. The undersigned also certifies that the Bidder has not made any false, fictitious or fraudulent statements or representations or made or used any false writing or documents knowing the same to contain any false, fictitious or fraudulent statement or entry in connection with this Bid.

5. The undersigned further agrees that the Bidder will comply with section 2.2-4374 of the Code of Virginia, 1950, as amended, and has not bought or purchased any equipment from any person employed by the Owner as an independent contractor to furnish architectural or engineering services for this Project, nor from any partnership, association or corporation in which such architect or engineer has a pecuniary interest.

6. The undersigned further agrees to inform and require compliance by the following persons and entities with this anti-collusion statement as a condition of payment: all subcontractors, consultants, subconsultants, or any person, corporation, or legal entities that provide or furnish labor, material, equipment, or work related to this project.

7. All Covenants and Agreements made by the Contractor are made by it on behalf of the Contractor and its successors, personal representatives and assigns, the same as if they had been specifically named in each instance.

And further this deponent saith not.

_____
Name of Company/Bidder

_____
Title (Owner, Partner, President)

Subscribed and sworn to before me this_____day of_____, 20___

My commission expires:_____, 20___

_____
Notary Public

IV. BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, _____
_____as Principal, and
_____as Surety, are hereby
held and firmly bound unto _____ as OWNER in the penal sum of _____
_____(Five Percent)
for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

Signed, this _____day of _____, 20__.

The Condition of the above obligation is such that whereas the Principal has submitted to the OWNER a certain BID, attached hereto and hereby made a part hereof to enter into an Agreement in writing, for the
_____
_____

NOW, THEREFORE,

(a) If said BID shall be rejected, or

(b) If said BID shall be accepted and the Principal shall execute and deliver an Agreement in the Form of Agreement attachment hereto (properly completed in accordance with said BID) and shall furnish a BOND for faithful performance of said Agreement, and for the payment of all persons performing labor or furnishing materials in connection therewith, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year set forth above.

_____
Principal

_____
Surety

By: _____
Attorney-in-Fact

IMPORTANT - Surety companies executing BONDS shall appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the Commonwealth of Virginia.

V QUESTIONNAIRE (IFB # 10095)

If requested by the Owner, the following questions shall be answered in full by the Bidder, and returned to the Owner within 72 hours.

1. Name of Company: _____
   Trade Name (if different from Company Name): _____
   Principal Office Address: _____
   _____
   Telephone No(s).: _____
   Fax No(s).: _____

   a. If a Corporation, answer the following:

      When Incorporated: _____

      In What State: _____

      Names and Addresses of Directors: _____
      _____
      _____

      Names and Addresses of Shareholders: _____
      _____
      _____

   b. If an Unincorporated Organization, answer the following:

      Date of Organization: _____

      Names and Addresses of Owners or Members: _____
      _____
      _____

      Type and State of Organization: _____

   c. If a Partnership, state whether Partnership is General or Limited: _____

      Names and Addresses of Owners or Partners:
      _____
      _____
      _____

2. a. How many years has this Bidder been in business as a Contractor under its present business name? _____

b. What are prior names of this Bidder, if any? _____

_____

3. How many years' experience in this type of construction work has this Bidder had:

1) As a Contractor _____ 2) As a Subcontractor _____

4. Provide a list of uncompleted Contracts at present held by this Bidder (attach supplemental sheet if necessary):

Contract	Type of Work	Amount	Percentage Completed

5. List the Bidder's crew foremen and supervisors proposed for this Project and their years of related experience:

Name	Years of Experience	Dates of Employment with Bidder

6. What construction equipment does this Bidder own that is available for the proposed work (attach supplemental sheet if necessary)?

_____

_____

_____

7. Does this Bidder plan to subcontract any part of this work? If so, list name, address, years experience, and type and amount of work to be performed by each subcontractor:

_____

8. Provide a list of projects similar in character and scope to the Work specified under this Contract which have been successfully completed by this Bidder during the past three years (attach supplemental sheet if necessary)`.

(The term "completed" means accepted and final payment received from the Owner or authorized representative).

Location & Type of Work	Owner's Name/ Address	Contact Person (Name and Telephone)	Date Completed	Contract Price

9. Have you ever performed work for a municipal corporation, local governing body, or similar agency previously? (If all such bodies are listed under 8, this question need not be completed).

10. a. Has this Bidder ever failed to complete any work awarded to it? _____ If yes, give name of Owner, name of Bonding Company and circumstances:

_____

_____

_____

b. Is this Bidder debarred by the Federal Government or by the Commonwealth of Virginia or by any other state, or by any town, city, or county?

Yes _____ No _____ If yes, please provide details:

_____

_____

c. Has this Bidder ever had any judgements entered against it for the breach of contract for construction? _____ If yes, please provide details:

_____

_____

d. Give a summary of your financial statement. (List assets and liabilities, use an insert sheet, if necessary).

_____

_____

_____

_____

_____

11. State approximate largest dollar volume of work performed by this Bidder in one year:

_____

12. Give two (2) Banking Institution References:

a. Name: _____

Address: _____

Credit Available: _____

b. Name: _____

Address: _____

Credit Available: _____

13. List three material suppliers and amount of credit available:

_____ _____

_____ _____

_____ _____

14. List insurance coverage and amount (or attach certificate of insurance):

_____ _____
Liability-Property

_____ _____
Liability-Personal Injury

_____ _____
Vehicle and Equipment

_____ _____
Other - Identify

15. Bonding reference - List surety company and highest coverage:

_____

16. Have you or your authorized representative, personally inspected the location of the proposed Work, and do you have a clear understanding of the requirements of the Bid Documents?

_____

_____

_____

The undersigned hereby authorizes and consents to any person, firm or corporation to furnish any information requested by the Owner in verification of this statement of contractor's qualifications. Also, if it is the apparent low Bidder, the undersigned hereby agrees to furnish the Owner upon request, a complete and current financial statement:

Contractor: _____

By: _____

Title: _____ Date: _____

VI CERTIFICATION REGARDING DEBARMENT

This is to certify that this person/firm/corporation is not now debarred by the Federal Government or by the Commonwealth of Virginia or by any other state, or by any town, city, or county, from submitting Bids on contracts for construction covered by this solicitation, nor are they an agent of any person or entity that is now so debarred.

_____
Name of Official

_____
Title

_____
Firm or Corporation

_____
Date

VII. STANDARD BID ITEMS AND UNITS

Section	Bid Item	Category	Unit
301	Clearing and grubbing	Clearing and Grubbing	ACRE or LS
301	Tree protection fencing	Clearing and Grubbing	LF or EA
302	Storm sewer pipe (diameter and type)	Drainage Structures	LF
302	Pipe culverts (waterway opening)	Drainage Structures	LF
302	Pipe reducers (larger diameter)	Drainage Structures	LF
302	Jacked pipe (diameter and type)	Drainage Structures	LF
302	Reinstalled pipe (diameter)	Drainage Structures	LF
302	End sections (standard and size)	Drainage Structures	EA
302	End walls	Drainage Structures	EA
302	Box culverts (waterway opening)	Drainage Structures	LF
302	Pipe grate	Drainage Structures	LF
302	Drop / yard inlets, catch basins, and intake boxes	Drainage Structures	EA
302	Base section (drop inlets and manholes)	Drainage Structures	LF
302	Manhole (0-6' depth) (4 or 5 foot diameter)	Drainage Structures	EA
302	Manhole (>6' depth) (4 or 5 foot diameter)	Drainage Structures	VF
302	Conflict manhole	Drainage Structures	EA
302	Concrete spring boxes	Drainage Structures	EA
302	Junction boxes	Drainage Structures	EA
302	Reconstructed manholes	Drainage Structures	EA
302	Precast Arches	Drainage Structures	LF
303	Regular excavation	Earthwork	CY
303	Pavement demolition (type and depth of pavement) [in proposed pavement]	Earthwork	SY
303	Pavement demolition (type and depth of pavement) [outside proposed pavement]	Earthwork	SY
303	Curb & gutter demolition	Earthwork	LF
303	Existing structure demolition	Earthwork	EA
303	Existing pipe demolition	Earthwork	LF
303	Undercut Excavation (regular)	Earthwork	CY
303	Select Material (min. CBR)	Earthwork	CY
303	Select Bedding (regular)	Earthwork	CY
303	Suitable Fill (regular)	Earthwork	CY
303	Backfill of Undercut Excavation (regular)	Earthwork	CY or TON
303	Surcharge placement and removal	Earthwork	CY
303	Settlement plate	Earthwork	EA
303	Geotextile fabric for Base Preparation	Earthwork	SY
303	Select Bedding/Backfill of Undercut Excavation (trenching)	Earthwork	CY or TON
303	Check dam (log or rock)	Earthwork	EA
303	Undercut Excavation (trenching)	Earthwork	CY
303	Sheeting, bracing, and shoring left in place (trenching)	Earthwork	LS
303	Rip-Rap for erosion control	Earthwork	TON

Section	Bid Item	Category	Unit
303	Baled straw check dam	Earthwork	EA
303	Temporary silt fence	Earthwork	LF
303	Geotextile fabric for Erosion Control	Earthwork	SY
303	Temporary filter barrier	Earthwork	LF
303	Slope drain	Earthwork	EA
303	Sediment basin excavation	Earthwork	CY
303	Siltation control excavation	Earthwork	CY
303	Inlet Protection (type of device)	Earthwork	EA
303	Construction entrance	Earthwork	EA
305	Select material - Type I	Subgrade and Shoulders	TON
305	Select material - Types II or III	Subgrade and Shoulders	CY
305	Gravel Driveway Replacement	Subgrade and Shoulders	EA
309	Aggregate material (base course)	Aggregate Base Course	CY or TON
309	Aggregate base material (base course for curb and gutter)	Aggregate Base Course	CY or TON
310	Tack coat	Tack and Prime Coat	GALLON
310	Prime coat	Tack and Prime Coat	GALLON
313	Asphalt surface treatment	Asphalt Surface Treatment	SY
315/ 315A	Asphalt concrete (type and class)	Asphalt Concrete Pavement	TON or SY
315/ 315A	Bituminous Leveling Course	Asphalt Concrete Pavement	TONS
315/ 315A	Edge clipping of shoulders	Asphalt Concrete Pavement	LF
317	Pavement Patch	Pavement Patching	LF
406	Reinforcing steel or welded wire mesh	Reinforcing Steel	POUND
406	Epoxy-coated reinforcing steel	Reinforcing Steel	POUND
414	Dry riprap (class and depth)	Riprap	SY or TON
414	Grouted riprap	Riprap	SY or TON
414	Stone riprap for foundation protection (depth)	Riprap	SY or TON
414	Dumped riprap	Riprap	SY or TON
414	Mortared riprap	Riprap	SY
414	Concrete riprap in bags	Riprap	CY
414	Erosion control rip rap	Riprap	SY or TON
501	Underdrain and combination underdrain	Underdrains	LF
502	Curb, combination curb and gutter (detail designation)	Concrete Items	LF
502	Gutter, standard, radial and entrance	Concrete Items	SY or LF
502	Paved ditch	Concrete Items	SY
502	Paved flume	Concrete Items	SY
502	Street Connection pavement	Concrete Items	SY
502	Bridge drainage aprons and chutes	Concrete Items	SY
502	Energy Dissipators	Concrete Items	EA
502	Sign island	Concrete Items	EA or SY
502	Median barriers (including delineators)	Concrete Items	LF

Section	Bid Item	Category	Unit
502	Median Strips	Concrete Items	LF or SY
502	Directional island curb	Concrete Items	LF
502	Hydraulic cement concrete sidewalks (thickness)	Concrete Items	SY
502	Concrete steps (concrete)	Concrete Items	CY
502	Handrails	Concrete Items	LF
502	Geotextile drainage fabric	Concrete Items	SY
502	Curb Cut Ramps	Concrete Items	SY
502	Composite Detectable Warning Panels	Concrete Items	SF
502	Concrete Driveway Replacement (Pipe Installation)	Concrete Items	EA
502	Concrete Driveway	Concrete Items	SY
505	Guardrail (Standard)	Guardrail and Steel Median Barriers	LF
505	Reuse guardrail (Standard)	Guardrail and Steel Median Barriers	LF
505	Radial guardrail (Standard)	Guardrail and Steel Median Barriers	LF
505	Guardrail terminal (Standard and type)	Guardrail and Steel Median Barriers	LF or EA
505	Intermediate anchorage assembly	Guardrail and Steel Median Barriers	EA
505	Median barrier (Standard)	Guardrail and Steel Median Barriers	LF
505	Radial median barrier (Standard)	Guardrail and Steel Median Barriers	LF
505	Median barrier terminal (Standard and type)	Guardrail and Steel Median Barriers	EA
505	Cable barricade (Standard)	Guardrail and Steel Median Barriers	EA
505	Fixed object attachment (Standard)	Guardrail and Steel Median Barriers	EA
505	Special design guardrail bridge attachment (B or Str. No.)	Guardrail and Steel Median Barriers	LS
505	Reuse guardrail terminal (Standard and type)	Guardrail and Steel Median Barriers	LF
505	Guardrail terminal site preparation (Standard)	Guardrail and Steel Median Barriers	EA
505	Bull nose barrier	Guardrail and Steel Median Barriers	EA
507	Fences (Standard and Height)	Fences	LF
507	Gate (Standard and Length)	Fences	EA
510	Remove, reset, relay, adjust, install, modify, reconstruct relocate, existing (Item or standard)	Relocating or Modifying Existing Miscellaneous Items	EA, LF, SY, CY or LS
510	Adjust structure heights	Relocating or Modifying Existing Miscellaneous Items	EA
511	Allaying dust	Allaying Dust	HR
512	Flagger Service (Certified)	Maintaining Traffic	HR
512	Flagger Service (Police-assisted))	Maintaining Traffic	HR
512	Pilot vehicle	Maintaining Traffic	HR
512	PDMS (Type)	Maintaining Traffic	DAY,WEEK or MONTH
512	TMA	Maintaining Traffic	HR, DAY, WEEK or MONTH
512	Electronic Arrow	Maintaining Traffic	HR, DAY, WEEK or MONTH

Section	Bid Item	Category	Unit
512	Warning Light	Maintaining Traffic	DAY, WEEK or MONTH
512	Group 2 Channelizing Devices	Maintaining Traffic	DAY, WEEK or MONTH
512	Traffic barrier service (per location) (Type and/or standard)	Maintaining Traffic	LF
512	Traffic barrier service guardrail termination (standard)	Maintaining Traffic	EA or LF
512	Impact attenuator service (Type)	Maintaining Traffic	EA
512	Temporary signalization	Maintaining Traffic	LS
512	Construction pavement marking (type and message)	Maintaining Traffic	LF
512	Construction pavement message marking (type and width)	Maintaining Traffic	EA
512	Eradication of existing pavement marking (per 6-inch width)	Maintaining Traffic	LF
512	Temporary Pavement marker ([ ]-way)	Maintaining Traffic	EA
512	Temporary Detour (standard and type)	Maintaining Traffic	LF
512	Crusher run aggregate (No. 25 or 21A)	Maintaining Traffic	TON
512	Type III Barricades	Maintaining Traffic	EA
512	Construction Signs	Maintaining Traffic	EA/DAY or SF
513	Mobilization (3 payments)	Mobilization & Demobilization	LS
515	Milling Pavement	Milling Pavement	SY
521	Pavers	Pavers	SF
521	Spare Pavers	Pavers	SF
530	Abandon Laterals and Cleanouts (on Abandoned Mains)	Abandonment of Existing Pipelines and Structures	LF or EA
530	Abandon Pipe, (diameter) < larger than 2-inch>	Abandonment of Existing Pipelines and Structures	LF
530	Abandon Meter Boxes	Abandonment of Existing Pipelines and Structures	EA
530	Abandon Laterals and Cleanouts (on Active Mains)	Abandonment of Existing Pipelines and Structures	EA
530	Abandon Manholes	Abandonment of Existing Pipelines	EA
530	Abandon Drainage Structures	Abandonment of Existing Pipelines and Structures	EA
530	Abandon Meter/Valve Vaults/Boxes	Abandonment of Existing Pipelines and Structures	EA
530	Abandon Metallic Structures	Abandonment of Existing Pipelines and Structures	EA
602	Topsoil (4-or 6-inch depth)	Topsoil	ACRE or SY
603	Lime, fertilizer, seed and mulch	Seeding	ACRE or SY
604	Sod, fertilizer and lime	Sodding	SY
605	Plants (Type and size)	Planting	EA
605	Mulching and remulching	Planting	100 SF
608	Mowing	Mowing	HR or LS
700	Concrete foundation (Standard, type and, size)	Traffic Control Devices	EA
700	Electrical service (Standard and type)	Traffic Control Devices	EA

Section	Bid Item	Category	Unit
700	Luminaire arm (Length)	Traffic Control Devices	EA
700	Lighting pole (Standard luminaire mounting height, and length of luminaire arm)	Traffic Control Devices	EA
700	Signal pole (Standard, length, number, and length of arms)	Traffic Control Devices	EA
700	Overhead sign structure	Traffic Control Devices	EA
700	Bridge-mounted sign structure (Location)	Traffic Control Devices	EA
700	Pedestal pole (Standard and length)	Traffic Control Devices	EA
700	Wood pole (Class and length)	Traffic Control Devices	EA
700	Conductor Cable (Size/number)	Traffic Control Devices	LF
700	Conduit (Type and size)	Traffic Control Devices	LF
700	Trench Excavation (Standard)	Traffic Control Devices	LF
700	Junction box (Standard)	Traffic Control Devices	EA
704	Pavement line marking (Type and/or class and width)	Traffic Control Devices	LF
704	Pavement message marking (Message)	Traffic Control Devices	EA
704	Pavement marker (Type, [ ]-way, and/or type pavement)	Traffic Control Devices	EA
801	Ductile iron water main (diameter)	Water Distribution Systems	LF
801	PVC water main (diameter)	Water Distribution Systems	LF
801	PVCO (diameter)	Water Distribution Systems	LF
801	HDPE (diameter)	Water Distribution Systems	LF
801	Fire hydrant assembly	Water Distribution Systems	EA
801	Water sampling stations	Water Distribution Systems	EA
801	Gate valves (diameter)	Water Distribution Systems	EA
801	Butterfly Valves (diameter)	Water Distribution Systems	EA
801	Water Meter Box	Water Distribution Systems	EA
801	Tapping sleeve/valve (diameter)	Water Distribution Systems	EA
801	Blowoff Assembly	Water Distribution Systems	EA
801	Manual air vent assembly	Water Distribution Systems	EA
801	Type K copper service lines (jack and pull)	Water Distribution Systems	LF or EA
801	Type K copper service lines (open cut)	Water Distribution Systems	LF or EA
801	Type K copper dual service lines (jack and pull)	Water Distribution Systems	LF or EA
801	Type K copper dual service lines (open cut)	Water Distribution Systems	LF or EA
801	Polyethylene encasement	Water Distribution Systems	LF
801	Connections to existing water mains	Water Distribution Systems	EA
801	Plugging Existing 2" Water Main	Water Distribution Systems	EA
801	Offset of Existing Water Main	Water Distribution Systems	LF
801	Cut in Tees	Water Distribution Systems	EA
801	Cut in Crosses	Water Distribution Systems	EA
801	Cut in Valves	Water Distribution Systems	EA
802	Gravity sewer pipe (diameter, type and depth 0-6, 6-8,	Sanitary Gravity Sewer Systems	LF

Section	Bid Item	Category	Unit
	8-10,10-12,12-14,14-16,16-18,18-20, >20')		
802	Sewer laterals (type and diameter)	Sanitary Gravity Sewer Systems	LF or EA
802	Manhole, 0' to 6' in depth (4-or 5-foot dia.)	Sanitary Gravity Sewer Systems	EA
802	Manhole extra depth (4-or 5-foot dia.)	Sanitary Gravity Sewer Systems	VF
802	Drop Manhole (inside or outside)	Sanitary Gravity Sewer Systems	EA
802	Standard manhole frame and cover	Sanitary Gravity Sewer Systems	EA
802	Watertight manhole frame and cover	Sanitary Gravity Sewer Systems	EA
802	Clean-out assemblies (mainline and service lateral)	Sanitary Gravity Sewer Systems	EA
802	Remote Camera/TV Inspection	Sanitary Gravity Sewer Systems	LF
802	Connections to existing manholes	Sanitary Gravity Sewer Systems	EA
802	Manhole and Mainline Cleanout adjustment rings	Sanitary Gravity Sewer Systems	EA
802	Manhole/Structure Coatings (Type A or B, 4- or 5-foot manhole diameter)	Sanitary Gravity Sewer Systems	VF or EA
803	Ductile iron force main (diameter)	Sanitary Force Main Systems	LF
803	HDPE force main (diameter)	Sanitary Force Main Systems	LF
803	PVC force main (diameter)	Sanitary Force Main Systems	LF
803	Manual air vent assembly	Sanitary Force Main Systems	EA
803	Gate valves (diameter)	Sanitary Force Main Systems	EA
803	Tapping sleeve/valve (diameter)	Sanitary Force Main Systems	EA
803	Connections to existing force mains or manholes	Sanitary Force Main Systems	EA
803	Interior Pipe Corrosion Lining (Diameter)	Sanitary Force Main Systems	LF
803	Offset of Existing Force Main	Sanitary Force Main Systems	LF
803	Cut in Tees	Sanitary Force Main Systems	EA
803	Cut in Crosses	Sanitary Force Main Systems	EA
803	Cut in Valves	Sanitary Force Main Systems	EA
804	Bore and jack casing (diameter)	Boring and Jacking	LF
806	Horizontal Directional Drill	Horizontal Directional Drilling	LS
	Sanitary Sewer Rehabilitation	**(Sections 810-822)**	
810	Light Cleaning (diameter)	Sewer Line Cleaning	LF
810	Heavy Cleaning (diameter and number of passes greater than 3)	Sewer Line Cleaning	LF
810	Manhole Cleaning	Sewer Line Cleaning	EA
811	Television Inspection (CCTV Only)	Television Inspection	LF
812	Bypass Pumping / Flow ~_____ MGD (Flow > 2 MGD)	Bypass Pumping	LS
813	CIPP Method/Wall Thickness=___mm (Diameter)	Pipe Rehabilitation By Cured-In-Place Method	LF
813	Removal of Intruding Service Lateral Connections (Ferrous or Non-Ferrous)	Pipe Rehabilitation By Cured-In-Place Method	EA
814	Fold and Form Method / Wall Thickness = SDR _____ (diameter)	Pipe Rehabilitation By Fold and Form Pipe Method	LF
814	Removal of Intruding Service Lateral Connections (Ferrous or Non-Ferrous)	Pipe Rehabilitation By Fold and Form Pipe Method	EA

Section	Bid Item	Category	Unit
816	Sewer Joint Testing (diameter)	Sewer Joint Testing	EA
817	Chemical Joint Sealing / Grouting	Chemical Grouting	GAL
818	Sewer Point Repair (diameter, material, and depth 0-6, 6-8, 8-10, 10-12, 12-14, 14-16,16-18, 18-20, >20')	Point Repair By Excavation	LF
819	Insitu Structural Point Repair / Wall Thickness = ____ mm 0-3 Foot Section Length (diameter)	Insitu Structural Point Repair	EA
819	Insitu Structural Point Repair / Wall Thickness = ____ mm 3-6 Foot Section Length (diameter)	Insitu Structural Point Repair	EA
819	Insitu Structural Point Repair / Wall Thickness = ____ mm 6-9 Foot Section Length (diameter)	Insitu Structural Point Repair	EA
819	Insitu Structural Point Repair / Wall Thickness = ____ mm 9-12 Foot Section Length (diameter)	Insitu Structural Point Repair	EA
819	Insitu Structural Point Repair / Wall Thickness = ____ mm 12-15 Foot Section Length (diameter)	Insitu Structural Point Repair	EA
820	Insitu Point Repair by Sectional Lining / Wall Thickness =___mm 6-9 Foot Section Length (diameter)	Insitu Point Repair By Sectional Lining	EA
820	Insitu Point Repair by Sectional Lining / Wall Thickness =___mm 9-12 Foot Section Length (diameter)	Insitu Point Repair By Sectional Lining	EA
820	Insitu Point Repair by Sectional Lining / Wall Thickness =___mm 12-15 Foot Section Length (diameter)	Insitu Point Repair By Sectional Lining	EA
821	Service Laterals (diameter and material)	Sanitary Sewer Service Reconnection	LF
822	Manhole Cementitious Coating, 0-6' depth (4- or 5-ft diameter)	Manhole Rehabilitation	EA
822	Manhole Cementitious Coating extra depth (4- or 5-ft diameter)	Manhole Rehabilitation	VF
822	Manhole Fiberglass Insert Liner, 0-6' depth (4- or 5-ft diameter)	Manhole Rehabilitation	EA
822	Manhole Fiberglass Insert Liner extra depth (4- or 5-ft diameter)	Manhole Rehabilitation	VF
822	Manhole Epoxy Coating, 0-6' depth (4- or 5-ft diameter)	Manhole Rehabilitation	EA
822	Manhole Epoxy Coating extra depth (4- or 5-ft diameter)	Manhole Rehabilitation	VF
822	Manhole Frame Seals	Manhole Rehabilitation	EA

CERTIFICATION OF COMPLIANCE WITH IMMIGRATION LAWS AND REGULATIONS

Section 54-72.2 of the Chesapeake City Code requires that any person or entity doing business with the City of Chesapeake, including its boards and commissions, shall include a sworn certification by the contractor or vendor of compliance with all federal immigration laws and regulations. These laws include the Federal Immigration Reform and Control Act, which makes it unlawful for a person or other entity to hire, recruit or refer for a fee for employment in the United States, an alien knowing the alien is unauthorized, and Section 40.1-11.1 of the Code of Virginia, which makes it unlawful for any employer to knowingly employ an alien who cannot provide documents indicating that he or she is legally eligible for employment in the United States. The state law, in particular, places an affirmative duty on employers to ensure that aliens have proof of eligibility for employment.

Accordingly this certification shall be completed and attached to all contracts and agreements for goods and services made by the City of Chesapeake or any of its boards and commissions. Failure to attach a completed certification shall render the contract or agreement void.

Type or print legibly when completing this form.

Legal Name of Contractor or Vendor:
(Note: This is your name as reported to the IRS. This should match your Social Security card or Federal ID Number.)

Type of Business Entity:

Sole proprietorship (Provide full name and address of owner):

Limited Partnership (Provide full name and address of all partners):

General Partnership (Provide full name and address of all partners):

Limited Liability Company (Provide full name and address of all managing members):

Corporation (Provide full name and address of all officers):

Doing Business As:
If Applicable (Note: This is the name that appears on your invoices but is not used as your reporting name.)

Name and Position of Person Completing this Certificate:

Physical Business Address:

Primary Correspondence Address (If different from physical address):

Number of Employees:

Are all Employees Eligible for Employment in the United States?

Under penalties of perjury, I declare on behalf of the contractor/vendor listed above that to the best of my knowledge and based upon reasonable inquiry, each and every one of the contractor's/vendor's employees are eligible for employment in the United States as required by the Federal Immigration Reform and Control Act of 1986 and Section 40.1-11.1 of the Code of Virginia. I further declare on behalf of the contractor/vendor shall use due care and diligence to ensure that all employees hired in the future will be eligible for employment in the United States. I affirm that the information provided herein is true, correct, and complete.

Sworn this ____ day of _____, 200_ on behalf of _____

_____ as evidenced by the following signature and seal:

Name of Contractor/Vendor: _____

Printed Name of Signatory:_____

Signature:_____

Date:_____

COMMONWEALTH OF VIRGINIA:
CITY OF CHESAPEAKE, to-wit:

The foregoing instrument was acknowledged before me this ___ day of _____, 2009, by _____.

_____
Notary Public

Registration No.:_____
My commission expires:_____

End of Section

SECTION 103

AWARD AND EXECUTION OF AGREEMENT

I AWARD AND EXECUTION OF AGREEMENT

1. Notice of Award.

1.1. A Notice of Award will be issued by the Owner, or the Bids rejected as soon as reasonably possible, but no later than 90 Days after the date of the opening of Bids. The Owner may, in its sole discretion, release any Bid and return the Bid Security prior to that date, or extend the acceptance period an additional 90 days with the consent of the apparent low bidder and surety.

1.2. The Owner reserves the right to waive any informality or technical defects, to reject any and all Bids in whole or in part, and may advertise for new Bids if, in its judgment, the best interests of the Owner will be served.

1.3. At the time of the issuance of the Notice of Award, the Owner shall publicly post an announcement of the award on the City's Website.

2. Signing of Agreement.

2.1. When the Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by 4 original copies of the Agreement, with all other written Contract Documents attached. Within 10 Days thereafter the Contractor shall sign and deliver all the original copies of the Agreement and attached documents to the Owner with the required Bid Security and Certificate of Insurance. Within 30 Days thereafter the Owner shall deliver one fully signed copy to the Contractor.

2.2. If the Successful Bidder fails to execute the Agreement within the time specified, the amount of Bid Security shall be paid to the Owner. In such case the Owner, at its discretion, may award the Work to the second Successful Bidder, or reject all Bids.

3. Performance and Payment Bonds.

3.1. The Successful Bidder shall execute and provide to the Owner, within 10 Days following Notice of Award, Performance and Payment Bonds with surety in an amount equal to 100% of the accepted Bid. The sureties of all Bonds shall be of such surety company or companies as are approved by the Owner and are authorized to transact business in the Commonwealth of Virginia. If the execution is by an attorney-in-fact, a power of attorney evidencing the authority of such attorney shall be attached to the Bond. Such power of attorney shall bear the same date as the Bond to which it is attached.

3.2. All Bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws and Regulations and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Government Financial Operations, U. S. Treasury Department.

3.3. Performance and Payment Bonds shall remain in full force during the warranty period defined in Section 107, VII.

4. Contractor's Insurance.

4.1. The Contractor shall provide and keep in full force and affect during the performance of the Work the kinds and amounts of insurance specified below and shall comply with all other provisions of this Section. Such insurance shall be provided and kept in full force by insurance companies authorized to do business in the Commonwealth of Virginia, and regulated by the Virginia Bureau of Insurance. All premiums and other costs of such insurance shall be paid by the Contractor. It will be assumed that the consideration paid or to be paid to the Contractor for the performance of the Work includes the premiums and other such costs of such insurance, and the Owner shall not be responsible therefore. Each insurance policy and certificate of insurance shall be signed by duly authorized representatives of such insurance companies in the State and shall be countersigned by duly authorized agents of such companies. The Contractor shall not be required to furnish the Owner with copies of the insurance contracts required by this Section unless requested from time to time by the Owner; but the Contractor shall provide on forms furnished by the Insurance Company or Owner a Certificate of Insurance issued by such Insurance Companies, in which the company shall irrevocably warrant that the insurance is provided to enable the Contractor to comply with and provide the required insurance; (provided, however, that in no event shall the insurance contract be expanded to afford coverage which is greater than the maximum coverage approved for writing in the Commonwealth of Virginia) and that it will not be canceled unless at least thirty days' prior written Notice to the effect is given to the Owner, anything in such insurance contract to the contrary notwithstanding, and that the insurance contract has been endorsed accordingly.

4.2. The Contractor shall provide the certificate of insurance to the Owner within 10 Days following the Notice of Award.

4.3. Insurance Requirements:

A. The Contractor shall purchase and maintain during the life of this Agreement such Comprehensive General Liability Insurance including product and completed operations liability insurance as will provide protection from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether such performance is by Contractor, or by Subcontractor, by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable and shall otherwise bear responsibility therefore. The Contractor further agrees that all limits will be made available which are excess of the amounts below:

(1) Workers Compensation and Employers Liability

Coverage A - Statutory
Coverage B - $100,000/$100,000/$500,000

A broad form of all states endorsement shall be attached.

(2) Commercial Auto Liability Including Hired and Non-Owned Car Liability Coverage

Limit of Liability - $1,000,000 Per Occurrence

The Contractor shall purchase and maintain during the life of this Agreement such commercial automobile liability insurance including employer's non-ownership liability and hired car liability insurance to protect him and any Subcontractors performing Work covered by this Agreement from claims for damages, whether such operations be by him or any Subcontractor, or by anyone directly or indirectly employed by either of them.

(3) Commercial General Liability Including Contractual and Completed Operations.

Limit of Liability - $1,000,000 Per Occurrence **per location**

(4) Excess Liability Including Employers Liability, Commercial Auto Liability and Commercial General Liability.

Limit of Liability - $1,000,000 Per Occurrence **per location**
~~$3,000,000~~ **$5,000,000** Aggregate

B. The Contractor shall be responsible for securing the Work site and shall assume all risk for vandalism or other damage that may occur, to project components, during construction.

C. The Owner shall be named as an additional insured on the Commercial General Liability per ISO 2010 on a primary basis. The Contractor shall obtain a waiver of subrogation from its insurers on Worker's Compensation and All Risk Insurance policies. This requirement may be satisfied by obtaining appropriate endorsements to any master or blanket policy of insurance maintained. Owner's Commercial General Liability shall not contribute in any loss payment insured under the Contractor's Commercial General Liability policy

D. Contingent liability and property damage insurance to protect the Owner (or his employees and agents, including the Engineer) shall be provided by endorsements to general liability or property damage policies. All aforesaid policies shall be endorsed to provide that the insurance company shall notify the Owner if policies are to be terminated or altered during the life of the contract.

E. The General Liability insurance shall carry a contractual liability endorsement covering the hold harmless agreements contained in the Owner standard contract and the certificates filed with the Owner shall show that the contractual liability coverage has been obtained.

F. Insurance coverage for personal injury and property damage, including insurance on vehicles and equipment, shall be in the same company.

G. The Contractor shall also be required to submit to the Owner evidence of insurance coverage or self-insurance for all claims arising under the Worker's Compensation Laws of the State of Virginia.

H. The Contractor will indemnify and hold harmless the Owner, and the Owner's officers, agents, employees, and other representatives, against any liability, loss or expense (including the loss of use of the Project), due to any act or omission of Contractor or any of their Subcontractors or of any of their respective employees in connection with the Work of the Contractor hereunder or due to any omissions or supervisory acts of the Owner in connection with the Work performed by the Contractor.

II NOTICE OF AWARD

TO: _____
_____
_____
_____

PROJECT TITLE: Battlefield Golf Club Water Project, Murray Drive & Whittamore Road

The Owner has considered the Bid submitted by you for the above described Work in response to its Invitation for Bids dated _____, 20___, and Instructions to Bidders.

You are hereby notified that your Bid has been accepted for the Work in the amount of $_____.

You are required by the terms of the Bid Documents to fully execute and return _____ copies of the Agreement along with the required Contractor's Performance Bond, Payment Bond, and Certificates of Insurance within __10__ Days from the date of this Notice of Award.

If you fail to execute the Agreement and to furnish said Bonds and Certificate of Insurance within _____ Days from the date of this Notice, said Owner will be entitled to consider all your rights arising out of the Owner's acceptance of your Bid as abandoned and as a forfeiture of your Bid Security. The Owner will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this Notice of Award to the Owner. The notice of award shall not be construed as notice to proceed.

Dated this _____ day of _____, 20___.

_____
Owner

By_____

Title _____

III AGREEMENT

This AGREEMENT, dated this _____ day of _____, 20___, by and between _____ hereinafter called the Owner; and _____
(a corporation or an unincorporated organization organized and existing under the laws of the State of _____ or, an individual trading under the above name) hereinafter called the Contractor.

WITNESSETH: The Owner and Contractor, for the consideration stated herein, agree as follows:

A. Scope of Work

The Contractor shall perform all required Work and shall provide and furnish all labor, materials, necessary tools, expendable equipment and utility and transportation service and all else required to complete the construction of the Battlefield Golf Club Water Project, Murray Drive & Whittamore Road project all in strict accordance with the Drawings and Specifications, including any and all Addenda, and in strict compliance with the Contract Documents, the terms of which are incorporated herein by reference.

It is understood and agreed that said labor, materials, tools, equipment and service shall be furnished and said Work performed and completed under the direction and supervision of the Contractor and subject to the approval of the Owner or its authorized representative.

B. Engineer

This Project has been designed by URS Corporation who is hereinafter called the Engineer and who is to act as the Owner's Representative, assume all duties and responsibilities, and have the rights and authority assigned to the Engineer in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents. In the event the Owner should not require the services of the Engineer for any or all parts of the project, the power, duties, and responsibilities conferred hereto to the Engineer shall be construed to be those of the Owner or its authorized representative.

C. Guarantee

All materials and equipment, furnished by the Contractor, and all construction involved in this Agreement are hereby guaranteed by the Contractor to be free from defects owing to faulty materials or workmanship for a period of one year after date of Substantial Completion of the Work. All Work that proves defective, by reason of faulty material or workmanship within said period of one year, shall be replaced by the Contractor free of cost to the Owner. These guarantees shall not operate as a waiver of any of the Owner's rights and remedies for default under or breach of the Agreement which rights and remedies may be exercised at any time within the period of any applicable statute of limitations.

D. Contract Price

The Owner shall pay the Contractor as just compensation for the satisfactory performance of the Work, subject to any additions or deductions as provided in the Contract Documents, the unit and/or lump sum price as contained in the Bid Schedule attached hereto.

The Contract Price is _____ ($_____) based upon unit and/or lump sum prices extended as herein contained.

E. Payments

The Owner will pay the Contract Price to the Contractor in the manner and at such times as set forth in Section 109 of the Hampton Roads Planning District Commission *Regional Construction Standards*, Fourth Edition, as referenced in Section I. below and as specifically revised for this Project.

F. Time

The undersigned Contractor agrees to commence Work within 30 Days after the date of Notice to Proceed and further agrees to substantially Complete all Work under this Agreement within 240 Days from the date of the Notice to Proceed and to reach Final Completion of all Work under this Agreement within 270 Days from the date of the Notice to Proceed.

G. Applicable Law/Compliance

(1) Applicable Law

This Agreement shall be deemed to be a Virginia contract and shall be governed as to all matters of validity, interpretations, obligations, performance, or otherwise, exclusively by the laws of the Commonwealth of Virginia, and all questions arising with respect thereto shall be determined in accordance with such laws. Regardless of where actually delivered and accepted, this Agreement shall be deemed to have been delivered and accepted by the parties in the Commonwealth of Virginia.

(2) Compliance with all Laws

Contractor shall comply with all federal, state and local statutes, ordinances, and regulations, now in effect or hereafter adopted, in the performance of Work set forth herein. Contractor represents that it possesses all necessary licenses and permits required to conduct its business and will acquire any additional license and permits necessary for performance of this Agreement prior to the initiation of Work. [If the Contractor is a corporation] Contractor further expressly represents that it is a corporation in good standing in the Commonwealth of Virginia and will remain in good standing throughout the term of the contract. Contractor shall at all times observe all health and safety measures and precautions necessary for the sanitary and safe performance of the contract Work.

(3) Venue

Any and all suits for any claims or for any breach or dispute arising out of these Contract Documents shall be maintained in the appropriate court of competent jurisdiction in the City of Chesapeake.

(4) Environmental Considerations

Any cost or expense associated with environmentally related violations of the law, the creation or maintenance of a nuisance, or releases of hazardous substance, including but not limited to, the cost of any clean up activities, removals, remediation, responses, damages, fines, administrative or civil penalties or charges imposed on the Owner, whether because of actions or suits by any governmental or regulatory agency or by any private party, as a result of the release of any hazardous substances, or any noncompliance with or failure to meet any federal, state or local standards, requirements, laws, statutes, regulations or the law of nuisance by the Contractor (or its agents, officers, employees, subcontractors, consultants, subconsultants, or any other persons, corporations, or legal entities employed, utilized, or retained by the Contractor) in the performance of this Agreement or related activities, shall be paid by the Contractor.

(5) Non-Discrimination/Drug-Free Workplace Provisions

(a) Employment discrimination by Contractor shall be prohibited. During the performance of this Agreement, Contractor agrees as follows:

(i) Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification/consideration reasonably necessary to the normal operation of Contractor. Contractor will conform to the provisions of the Federal Civil Rights Act of 1964, as amended, as well as the Virginia Fair Employment Act of 1975, as amended, where applicable, the Virginians With Disabilities Act, the Americans With Disabilities Act, and the Code of Virginia § 2.2-4311. If the award is made to a faith-based organization, the organization shall not discriminate against any recipient of goods, services, or disbursements made pursuant to the Agreement on the basis of the recipient's religion, religious belief, refusal to participate in a religious practice, or on the basis of race, age, color, gender or national origin and shall be subject to the same rules as other organizations that contract with public bodies to account for the use of the funds provided; however, if the faith-based organization segregates public funds into separate accounts, only the accounts and programs funded with public funds shall be subject to audit by the public body. Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

(ii) Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that Contractor is an equal opportunity employer.

(iii) Notices, advertisements and solicitations placed in accordance with federal law, rule or regulations shall be deemed sufficient for the purpose of meeting the requirements of this section.

(iv) Contractor will include the provisions of the foregoing subsections (i) and (ii), and (iii) in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

(b) During the performance of this Agreement, Contractor agrees as follows:

(i) Contractor will provide a drug-free workplace for Contractor's employees.

(ii) Contractor will 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 Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition.

(iii) Contractor will state in all solicitations or advertisements for employees placed by or on behalf of Contractor that Contractor maintains a drug-free workplace.

(iv) Contractor will include the provisions of the foregoing subsections (i), (ii) and (iii) in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

(v) For the purposes of this section, "Drug-free workplace" means a site for the performance of work done in connection with a specific contract awarded to a Contractor, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession, or use of any controlled substance or marijuana during the performance of the contract."

H. Liquidated Damages

The damage and loss to the Owner resulting from failure of the Contractor to complete the Work within the time specified in this Agreement, plus any extension of time granted, shall be stipulated in Section 108.X, and Section 102.III, Bid Form. Damage monies may be withheld on partial and final payment to the Contractor. (See Section 102.III Bid Form and Section 108.X for explanation and specified dollar amounts.)

I. Component Parts of the Contract

This Agreement includes all completed components of the Bid and Contract Documents as defined in Section 101 of the HRPDC *Regional Construction Standards* (Latest Edition indicated in the Invitation For Bids), as revised for this Project all of which are incorporated herein by reference.

J. Binding

This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.

K. Changes to the Agreement

No provision of this Agreement shall be changed, amended, modified, waived, or discharged except as agreed to in writing by the Owner and the Contractor.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed as of the day and first above written in (_____) counterparts each of which shall for all purposes be deemed an original.

OWNER

_____
Owner

By: _____
Name

Title: _____

Attest: _____

Address: _____

_____

_____

_____

CONTRACTOR

_____
Contractor

By: _____
Name

Title: _____

Attest: _____

Address: _____

_____

_____

_____

Contractor's Registration No.: _____

(If Contractor is a corporation or an unincorporated organization, attach evidence of authority to sign)

[Corporate Seal]

APPROVED AS TO FORM:

_____
City/County Attorney

IV PERFORMANCE BOND

Bond No._____
Amount: $_____

KNOW ALL PERSONS BY THESE PRESENTS, that _____ of _____, hereinafter called the Contractor and _____ a corporation duly organized and existing under and by virtue of the laws of the State of _____, hereinafter called the Surety, and authorized to transact business within the Commonwealth of Virginia as the Surety, are held and firmly bound unto _____ as Owner, in the sum of _____ dollars ($_____), lawful money of the United States of America, for payment of which, well and truly be made to the Owner, the Contractor and the Surety bind themselves and each of their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents as follows:

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH THAT:

WHEREAS, the Contractor has executed and entered into a certain Agreement, hereto attached, with the Owner dated _____, 20____, for _____

NOW THEREFORE, if the Contractor, and its successors and assigns, shall at all times duly, promptly, and faithfully perform the Work and any alteration in or addition to the obligations of the Contractor arising thereunder, including the matter of infringement, if any, of patents or other proprietary rights, and shall assure all guarantees against defective workmanship and materials, including the guarantee period following final completion by the Contractor and final acceptance by the Owner and comply with all the covenants therein contained in the Specifications, Drawings, and other Contract Documents required to be performed by the Contractor, in the manner and within the times provided in the Agreement, and shall fully indemnify and save harmless the Owner from all costs and damage which it may suffer by reason or failure to do so, and shall fully reimburse and repay it all outlay and expenses which it may incur in making good any default, and reasonable counsel fees incurred in the prosecution of or defense of any action arising out of or in connection with any such default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, HOWEVER, that the Surety, for value received, for itself and its successors and assigns, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the Contract Documents or to the Work to be performed thereunder, or payment thereunder before the time required therein, or waiver of any provision thereof, or assignment, subletting or transfer thereof or any part thereof, shall in any way affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration, addition to the terms of the Contract Documents or any such payment, waiver, assignment, subcontract or transfer.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

Whenever Contractor shall be declared by Owner to be in default under the Contract, the Owner having performed Owner's obligations thereunder, the Owner shall have the right, at its option, to require the Surety to promptly proceed to remedy the default within 30 days of notice by proceeding or procuring others to proceed with completing the Agreement with its terms and conditions; and all reserves, deferred payments, and other funds provided by the Agreement to be paid to Contractor shall be paid to Surety at the same times and under the same conditions as by the terms of that Agreement such fund would have been paid to Contractor had the Agreement been performed by Contractor; and Surety shall be entitled to such funds in preference to any assignee of Principal of any adverse claimant. Notwithstanding the above, the Owner shall have the right, with the approval of the Surety which shall not be unreasonably withheld, to take over and assume completion of the Agreement and be promptly paid in cash by the Surety for the cost of such completion less the balance of the Contract price.

IN WITNESS WHEREOF, all above parties bounded together have executed this instrument this _____ day of _____, 20___, the name and corporate seal of each corporate party being hereto affixed and those presents duly signed by its undersigned representative, pursuant to authority of its governing body.

CONTRACTOR

_____

By:_____(Seal)

Name:_____

Title: _____

_____
Attest

SURETY

_____

By:_____(Seal)

_____
Attest

APPROVED AS TO FORM:_____, 20____

_____
OWNER

NOTE: Date of Bond shall not be prior to the date of the Agreement. If the Contractor is a partnership, all partners shall execute the Bond.

IMPORTANT: The Surety named on this Bond shall be one who is licensed to conduct business in the Commonwealth of Virginia, and named in the current list of Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies, as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department. All Bonds signed by an agent shall be accompanied by a certified copy of the authority to act for the Surety at the time of signing of this Bond.

V PAYMENT BOND

Bond No._____
Amount: $_____

KNOW ALL PERSONS BY THESE PRESENTS, that _____ of _____ hereinafter called the Contractor and _____ a corporation duly organized and existing under and by virtue of the laws of the State _____, hereinafter called the Surety, and authorized to transact business within the Commonwealth of Virginia as the Surety, are held and firmly bound unto _____ as Owner, in the sum of_____ dollars ($_____), lawful money of the United States of America, for payment of which, well and truly be made to the Owner, the Contractor and the Surety bind themselves and each of their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents as follows:

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH THAT:

WHEREAS, the Contractor has executed and entered into a certain Agreement, hereto attached, with the Owner dated _____, 20___, for _____
_____
_____

NOW THEREFORE, if the Contractor shall promptly make payments to all persons, firms, subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the Work provided for in the Agreement, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, repairs on machinery, equipment, and tools consumed, used or rented in connection with the construction of the Work, and all insurance premiums on the Work, and for all labor performed in the Work, whether by Subcontractor or otherwise, then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, HOWEVER, that the Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the Contract Documents or to the Work to be performed thereunder, shall in any way affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the Contract Documents.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, all above parties bounded together have executed this instrument this ____ day of _____, 20___, the name and corporate seal of each corporate party being hereto affixed and those presents duly signed by its undersigned representative, pursuant to authority of its governing body.

CONTRACTOR

By:_____(Seal)

Name:_____

Title:_____

_____
Attest

SURETY

_____

By: _____(Seal)

_____
Attest

APPROVED AS TO FORM:_____, 20_____

_____
OWNER

NOTE: Date of Bond shall not be prior to the date of the Agreement. If the Contractor is a partnership, all partners shall execute the Bond.

IMPORTANT: The Surety named on this Bond shall be one who is licensed to conduct business in the Commonwealth of Virginia, and named in the current list of Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies, as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department. All Bonds signed by an agent shall be accompanied by a certified copy of the authority to act for the Surety at the time of signing of this Bond.

VI NOTICE TO PROCEED

TO: _____ DATE: _____

_____ PROJECT: _____

_____ _____

_____ _____

You are hereby notified to commence Work in accordance with the Agreement dated _____, 20___, on or before _____, 20___, and you are to substantially complete the Work within 240 Days thereafter and reach Final Completion of the Work within 30 Days thereafter. The date of Final Completion of all Work is therefore _____, 20___.

Liquidated damages as stipulated in the Bid Form, in the amount of $ 500 per Day for failure of the Contractor to substantially complete the Work by the date for Substantial Completion and $ 250 per Day for failure to complete the Work by the date for Final Completion, will be assessed by the Owner as stated above or as may be modified by duly executed Change Orders.

OWNER: _____

BY: _____

TITLE: _____

ACCEPTANCE OF NOTICE:

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by:

_____

this the _____ day of

_____, 20 ____

CONTRACTOR: _____

BY: _____

TITLE: _____

VII CONTRACTOR'S COMPLETED PROJECT EVALUATION REPORT (OPTIONAL)

(This form [two pages] may be used by the Contractor following the completion of the Project to provide feedback and suggestions for improvements to the Regional Construction Standards.)

Date: _____

Contractor: _____

Project Title: _____

Project Location: _____

_____

Owner: _____

Owner's Project Number: _____

Design Engineer: _____

Construction Engineer: _____

Contract Amount: _____ Date of Award: _____

Change Orders Amount: _____ Number of Change Orders: _____

Total Completed Contract Amount: _____

Original Completion Time: _____ Days

Actual Completion Time: _____ Days

Difference (+/-): _____ Days

Days Lost To Weather: _____ Days Allowed: _____

Days Lost To Conflicts: _____ Days Allowed: _____

cc: ***HRPDC***
(Locality)

Summation of Problems with Regional Construction Standards

Section(s)

Division 1 - General Provisions _____

Division 2 - Products and Materials _____

Division 3 - Roadway Construction _____

Division 4 - Miscellaneous _____

Division 5 - Incidental Construction _____

Division 6 - Landscaping _____

Division 7 - Traffic Control Devices _____

Division 8 - Water and Wastewater Utilities _____

Sheet No./ Detail Number

Standard Details _____

_____

Describe the problem in detail, proposed resolution, actual resolution, recommended changes, etc.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(Use additional pages if necessary)

End of Section

SECTION 104

SCOPE OF WORK

I INTENT OF AGREEMENT

1.1. The intent of the Agreement is to provide for completion of the Work specified therein.

1.2. If, during the performance of the Work, the Contractor finds a conflict, error or discrepancy in the Contract Documents, the Contractor shall so report to the Owner in writing at once and before proceeding with the Work affected thereby, except in the case of emergency or public safety, shall obtain a written interpretation or clarification from the Owner however, the Contractor shall not be liable to the Owner for failure to report any conflict, error or discrepancy in the Contract Documents unless the Contractor has actual knowledge thereof or should reasonably have known thereof.

II AMENDING AND SUPPLEMENTING CONTRACT DOCUMENTS

2.1. The Contract Documents may be amended to provide for additions, deletions and revisions in the Work or to modify the terms and conditions thereof by a Change or Field Order pursuant to Section 109 II.

III EXPLORATIONS AND REPORTS

3.1. Reference is made to the Special Provisions for identification of those reports of explorations and tests of subsurface conditions at the site that have been utilized by the Owner in preparation of the Contract Documents.

3.2. The Contractor shall visit the site of the proposed Work and make such explorations as the Contractor determines to be necessary.

IV UNDERGROUND FACILITIES

4.1. The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site is based on information and data furnished to the Owner or Engineer by the owners of such Underground Facilities or by others.

4.2. The Owner and Engineer shall not be responsible for the accuracy or completeness of any such information and data. The Contractor shall have full responsibility for reviewing and checking all such information and data, for locating all Underground Facilities shown or indicated in the Contract Documents, for coordination of the Work with the owner's of such Underground Facilities during construction, for the safety and protection of said facilities, and repairing any damage thereto resulting from the Work, the cost of all of which will be considered as having been included in the Contract Base Bid.

4.3. If an Underground Facility is uncovered or revealed at or contiguous to the site which was not shown or indicated in the Contract Documents and which the Contractor could not reasonably have been

expected to be aware of, the Contractor shall, promptly after becoming aware thereof and before performing any Work affected thereby, identify and immediately notify the owner of such Underground Facility and give written Notice thereof to that owner and to the Owner. The Owner will promptly review the Underground Facility to determine the extent to which the Contract Documents should be modified to reflect and document the consequences of the existence of the Underground Facility, and the Contract Documents will be amended or supplemented to the extent necessary. During such time the Contractor shall be responsible for the safety and protection of any such Underground Facility which is in service or which is to be placed in service. The Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, to the extent that they are attributable to the existence of any Underground Facility in service or which is to be placed in service, which directly and unavoidably impacts the installation of the Work, that was not shown or indicated in the Contract Documents and which the Contractor could not reasonably have been expected to be aware of.

4.4. If the existence of an Underground Facility described above unavoidably impacts the installation of the Work, the Contractor shall, to the fullest extent possible, continue the Work on other portions of the site. All delays must be shown by the Contractor to be directly attributable to said unforeseen conditions and limited to the time actually occasioned by such unforeseen conditions, and that the Contractor has prosecuted the other portions of the Work to the fullest extent possible.

4.5 The Contractor shall comply with the Underground Utility Damage Prevention Act, Section 56-265.14 through 56-26532, Code of Virginia of 1950, as enacted and amended, and shall be responsible for notifying the owners of utilities and requesting the locating and marking of all underground facilities before beginning any excavation.

4.6 The Contractor should be aware that in some instances buried cables, gas lines, sewer lines, and water lines 2-inches and smaller in diameter may have to be excavated by hand and slightly relocated to facilitate construction of the Work under this Agreement. This shall be considered incidental to the Work, and the Contractor will not be eligible for additional compensation.

V SUBSURFACE CONDITIONS

5.1. The Contractor shall promptly, and if possible, before such conditions are disturbed, except in the event of an emergency, notify the Owner by written Notice of:

A. subsurface or latent physical conditions at the site differing materially from those indicated in the Contract Documents; or

B. unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in the Contract Documents.

5.2. The Owner shall promptly investigate the conditions, and if it is confirmed that such conditions do so materially differ and cause an increase or decrease in the cost of, or in the time required for, performance of the Work, an equitable adjustment shall be made and the Agreement shall be modified by a Change Order. Any claim of the Contractor for adjustment hereunder shall not be allowed unless the Contractor has given the required written Notice; provided that the Owner may, if the facts so justify, consider and adjust any such claims asserted before the date of final payment.

5.3 All required written Notices shall be submitted to the Owner within 20 Days after occurrence of the event giving rise to such claim, or within 20 Days after the claimant recognizes the condition, whichever is later.

VI SITE SECURITY

6.1. The Contractor shall be responsible for the security and safety of all project facilities including, but not limited to, all equipment, materials, site structures, and construction thereon. All security measures deemed necessary by the Contractor to comply with this requirement shall be at the Contractor's expense at no additional cost to the Owner. The Contractor shall be responsible for all site security until final acceptance of the Work by the Owner.

VII CLEAN-UP, DISPOSAL AND RESTORATION

7.1. The Contractor shall maintain the site of the project in an orderly and clean condition and shall at intervals of no more than three (3) days and at its expense, remove and legally dispose of accumulations of rubbish or refuse materials, surplus concrete, mortar and excavated materials not required or suitable for backfill from public and private property and rights-of-way. Washings from concrete mixers or mixing boxes shall not be deposited directly or indirectly in the drainage or sewer system or on paved streets. The Contractor shall keep the site, inclusive of vehicular and pedestrian traffic routes through the site, free of dirt and dust by periodic blading, power brooming, watering or other approved means. Road surfaces adjacent to the work area shall be cleaned of soil with mechanical brooms or other approved methods at the end of each working day. Road shoulders and driveways shall be stabilized so as to allow traffic flow (including mail and paper delivery vehicles, school buses and emergency vehicles) by the end of each working day.

7.2. The Contractor shall confine all equipment, the storage of materials and equipment, and the operations of workmen to areas permitted by law, ordinances, permits, or the requirements of the Contract Documents, and shall not unreasonably encumber the premises with materials or equipment.

7.3. The Contractor shall not load nor permit any part of any structure to be loaded with weights that will endanger the structure, nor shall any part of the work be subjected to stresses or pressures that will endanger it.

7.4. Upon completion and before final acceptance of the Work performed under the Agreement, the Contractor shall remove and legally dispose of all rubbish, surplus or discarded materials, false work, forms, temporary structures, field offices, signs, temporary erosion and siltation control measures, and equipment and machinery, and shall leave the site and ground occupied in connection with the performance of the Work in the conditions existing before the Work was started, to the satisfaction of the Owner.

7.5. All waste materials, including but not limited to excavated materials, demolished pavement, arboreal (landscaping) waste and other debris, that are not suitable for Project related purposes (e.g., backfill) or are surplus to the needs of the Project, both as determined by the Owner, shall become the property of the Contractor. The Contractor shall dispose of all such material in accordance with his accepted Disposal Plan, as specified below, at no additional cost to the Owner.

A. The Contractor shall submit a Disposal Plan for review and acceptance by the Owner prior to performing any Work that might generate waste materials. The plan shall include a complete description of the materials that are expected to be encountered and their proposed disposal

site(s). The Contractor may change his Disposal Plan only by written notice to the Owner. The acceptance of a plan and/or any related notice to the Owner must be evidenced by a written response from the Owner.

B. The Contractor shall insure that all permits related to his disposal operations have been obtained, and the Contractor shall comply with all requirements of those permits. The Contractor shall show evidence that all required permits have been obtained for all disposal sites by submitting a copy of all such permits to the Owner as part of the Contractor's Disposal Plan.

End of Section

SECTION 105

CONTROL OF WORK

I REUSE OF CONTRACT DOCUMENTS

1.1. Neither the Contractor nor any Subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with the Owner shall have or acquire any title to or ownership rights in any of the Contract Documents (or copies thereof) prepared by or bearing the seal of the Engineer; and, they shall not reuse any of the Contract Documents on extensions of the Project or any other project without written consent of the Owner and Engineer and specific written verification by the Owner.

II COPIES OF CONTRACT DOCUMENTS

2.1. The Owner will furnish to the Contractor up to five (5) copies of the Contract Documents as are reasonably necessary for the execution of the Work. Additional copies will be furnished, upon request, at the cost of reproduction.

III CONTRACT DOCUMENTS

3.1. The Contract Documents will govern the Work set forth therein.

3.2. In cases of conflicts, Special Provisions shall govern over the *Regional Construction Standards*; Specifications shall govern over Drawings; figure dimensions shall govern over scaled dimensions; and, detailed Drawings shall govern over general Drawings; unless, the interpretation would result in a violation of any law or regulation applicable to the performance of the Work.

3.3. The Contractor shall, upon discovering any error, omission, or discrepancy in the Contract Documents, immediately notify the Owner.

IV SHOP DRAWINGS AND SUBMITTALS

4.1. The Contractor shall compile a complete and comprehensive schedule of all the submittals anticipated to be made during the progress of the Work. The schedule shall include a list of each type of item for which the Contractor's drawings, Shop Drawings, material affidavits, material samples, guarantees, or other types of submittals are required.

4.2. Prior to each submittal, the Contractor shall carefully review and coordinate all aspects of each item or sample submitted with any other item or sample being submitted and verify that each item and sample adheres in all respects with the requirements of the Contract Documents.

4.3. The Contractor shall certify that all materials used in the Work are in complete compliance with all specified provisions. Certification shall not be construed as relieving the Contractor from its responsibility of furnishing satisfactory materials. At the time of each submission, the Contractor shall in writing call the Owner's attention to any deviations that the Shop Drawings or samples may have from the requirements of the Contract Documents.

4.4. The Contractor shall submit four (4) copies, plus the number of copies desired to be returned, of Shop Drawings or submittals that are required by Section 105 or the Special Provisions. Each submission shall be accompanied by letter of transmittal in duplicate, listing the contents of the submission and identifying each item by reference to specification section or Drawing. The data shown on the Shop Drawings shall be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to show the Owner the materials and equipment the Contractor proposes to provide.

4.5. The Contractor shall also submit samples to the Owner for review and approval in accordance with the accepted schedule of submittals. Each sample shall be identified clearly as to material, supplier, pertinent data such as catalog numbers and the use for which intended and otherwise as the Owner may require for review. The review of a separate item or sample will not indicate approval of any assembly in which the separate item or sample functions.

4.6. The Contractor is responsible for submitting all Shop Drawings and schedules in a timely manner to avoid delaying the Work. The Owner shall within 14 days after receipt, return Shop Drawings and schedules to the Contractor indicating approval or disapproval.

4.7. Review and/or approval of Shop Drawings will be for general conformance with the Contract Documents and shall not relieve the Contractor from the responsibility of furnishing materials and equipment of proper dimension, size, quality, quantity, and all performance characteristics to efficiently perform the requirements and intent of the Contract Documents. Approval shall not be construed as permitting any departure from the Project requirements, authorization of any increase in price, or approval of departures from additional details or instructions previously furnished by the Owner.

4.8. Before submitting each Shop Drawing or sample, the Contractor shall have determined and verified:

A. All field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar information with respect thereto;

B. All materials with respect to the intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the work; and

C. All information relative to the Contractor's sole responsibility in respect of means, methods, techniques, sequences and procedures of construction and safety precautions and progress incident thereto.

4.9. Each Shop Drawing and sample submission shall bear a stamp or specific written indication that the Contractor has satisfied Contractor's obligation under the Contract Documents with respect to the Contractor's review and approval of that submission. The Contractor's Shop Drawing stamp shall be as follows (or as otherwise approved by the Owner and Engineer):

City of Chesapeake

Battlefield Golf Club Water Project, Murray Drive and Whittamore Road

Shop Drawing No.: _____

Specification Section: _____

With respect to this Shop Drawing or Sample, I have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect thereto and reviewed or coordinated this Shop Drawing or Sample with other Shop Drawings and samples and with the requirements of the Work and the Contract Documents.

_____ *No variation from Contract Documents*

_____ *Variation from Contract Documents as shown*

(Contractor's Name and Address)

By: _____

Date: _____

4.10. The Engineer will review and approve or disapprove or return as incomplete Shop Drawings and samples in accordance with the schedule of submittals submissions accepted by the Engineer. The Engineer's review and approval or disapproval will not extend to means, methods, techniques, sequences or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The Contractor shall make corrections required by the Engineer, and shall return the requested number of copies of Shop Drawings and samples for review and approval. The Contractor shall direct specific attention in writing to revisions other than the corrections called for by the Engineer on previous submittals. Upon approval, two marked copies will be returned to the Contractor.

4.11. No progress payments will be made to the Contractor until the schedules are submitted to and acceptable to the Engineer. The progress schedule shall be acceptable to the Engineer as being the Contractor's schedule for the orderly progression of the Work to completion within any specified Contract Times, but such acceptance will neither impose on the Engineer responsibility for the sequencing, scheduling or progress of the Work nor interfere with or relieve the Contractor from the Contractor's full responsibility therefor.

4.12. The Engineer will record time required by the Engineer or Engineer's consultants for excessive submittal review occasioned by the Contractor's re-submission, in excess of one re-submission of a required submittal, caused by unverified, unchecked or un-reviewed, incomplete, inaccurate or erroneous, or nonconforming submittals. The Engineer's costs will be an estimated average billing rate for labor plus related expenses.

4.13. Within ten (10) days after the Effective Date of the Agreement, the Contractor shall submit to the Engineer for approval a schedule listing the manufacturer of the items of equipment and materials proposed for the construction. Following approval of the schedule, no changes in material or equipment from those listed will be allowed except in unusual or extenuating circumstances. When such circumstances arise, the Contractor shall request, in writing, the Owner's approval of the proposed change, stating the circumstances necessitating such a change. The intent of this schedule is to name the manufacturers of material specified by a product standard and to designate which manufacturer will be used when more than one has been named for an item. The schedule shall not be interpreted as allowing any change from base Bid items or those substitute items offered with the Bid and accepted in the Agreement.

V RECORD DRAWINGS

~~5.1 The Contractor shall keep one record copy of all Special Provisions, Specifications, Drawings, Addenda, Written Amendments, Change Orders, Shop Drawings, Owner-approved submittals, and samples at the site in good order and annotated to show all changes made during the construction process. These documents shall be available to the Owner for examination and shall be submitted to the Owner upon completion of the Work. As built information (including dimensions, materials, existing utilities) shall also be included on the Drawings. Progress payments may be withheld for failure to keep neat, accurate and complete record drawings.~~

~~5.2 The Contractor shall include any field changes, deviations from the Drawings due both to field conditions and Change Orders.~~

~~5.3 Record information for projects shall include the following as a minimum:~~

~~A. Size, horizontal and vertical location of all existing utilities uncovered during the course of the work. This shall include telephone cables and conduits, TV cables and conduits, electrical cables and conduits, gas lines, water line, sewer force mains, sanitary sewers, storm sewers and the like.~~

~~B. Horizontal and vertical location of the water, force main, sanitary and storm sewer installed at every 100 foot station, at interconnections, and at fittings, tees, bends and offsets. The frequency and location of survey shots will match the proposed grade elevations shown on the Drawings.~~

~~C. Location of lines plugged or capped, blowoffs, and air vents.~~

~~D. Location of all restraining devices used; for example, thrust blocks, retainer glands, tie rods, etc.~~

~~E. Location of all valves, ends of all lines and other fittings shall be accurately located by triangulation from two permanent structures, which will be visible on the ground surface.~~

~~H. Location and size of all taps and service line connections made, including corporation stops (if any) used for testing purposes.~~

~~I. Size (if greater than ¾"), material, depth and location of both ends of the water service lines are required.~~

J. Rim elevations of manholes and invert elevations of pipes entering and exiting the manhole.

K. Size, material, depth and location of sewer laterals including:

1. Measurements taken from the nearest downstream manhole, then measure over perpendicular from that point on the main to the end of the lateral. All measurements are taken from the center of the manhole cover.

2. If lateral comes out of a manhole in a cul-de-sac; triangulation from that manhole will be required.

3. Measured depth from the finished grade at the end of the lateral.

L. Information required for public storm drain systems:

1. Size, material and location of all storm sewer lines.

2. Elevations shall be provided for all ditch, pipe and structure inverts and rims.

5.4 The Record Drawings shall include the following minimum accuracy for survey measurements and field measurements.

A. Horizontal accuracy:

1. Both surface and subsurface gravity sanitary sewer systems shall be measured in a survey to +/- 1.0 foot at the structure location.

2. Both surface and subsurface pressure systems shall be measured in a survey to +/- 1.0 foot at the structure location.

3. Curb/curb and gutter shall be measured in a survey to +/- 1.0 foot at high points, low points, curb returns, and various other positions following good engineering, construction and surveying practices.

4. Storm Water Management Facilities (SWMF) shall be measured in a survey to +/- 1.0 foot, including the top of bank, bottom of bank, edge of water, pipes, structures, and setback distances to property lines and/or right of way lines and any unusual feature of each SWMF.

5. Utility system components including, but not limited to, fire hydrants, meter vaults, meter boxes, water services, corporation stops, fittings, thrust restraint, laterals, cleanouts, valves, blowoff assemblies, air vent assemblies, water sampling stations, etc. shall be measured in a survey to +/- 1.0 foot.

6. Project landscaping shall be measured in a survey to +/- 1.0 foot. Only large significant features, such as trees, will be surveyed. The species and caliper (size) shall be noted.

7. Street signs and light poles shall be measured in a survey to +/- 1.0 foot.

~~B. Vertical accuracy:~~

	~~Survey Accuracy~~	~~Field Measurement~~
~~Manhole Rim~~	~~+/- 0.01 ft.~~	
~~Manhole Invert~~	~~+/- 0.01 ft.~~	
~~Gravity Sewer Slope~~	~~+/- 0.02%~~	
~~Valve Depth~~	~~+/- 0.1 ft.~~	
~~Pressure/vacuum systems~~	~~+/- 0.05 ft.~~	
~~SWMF~~	~~+/- 0.01 ft.~~	
~~Curb/curb and gutter~~	~~+/- 0.01 ft.~~	
~~Offset~~		~~+/- 1.0 ft.~~
~~Lateral Depth~~		~~+/- 0.25 ft.~~

5.1 **The Contractor shall lend assistance to the Engineer and Inspector in the collection of information required to prepare the drawings of record.**

VI ACCESS TO PROJECT

6.1. The Owner, the Owner's Representatives, the Engineer, testing agencies and governmental agencies with jurisdictional interests shall have access to the Project at all times for their observations, inspecting, and testing. The Contractor shall provide proper and safe conditions for such access.

VII SURVEYS AND REFERENCE POINTS

7.1. The Owner shall furnish all necessary Drawings showing property lines and/or easements and the location of the Work. The Contractor shall provide a land surveyor licensed in the Commonwealth of Virginia to execute the Work in accordance with the Contract Documents and shall be responsible for the accuracy of this Work.

7.2. The Owner has established or will establish such general reference and control points and benchmarks on or about the Project site as will enable the Contractor to proceed with the Work. Prior to issuance of the Notice to Proceed, if the Contractor finds that any previously established reference points have been destroyed or misplaced, the Contractor shall promptly notify the Owner, and the Owner shall replace such general reference points and benchmarks at the Owner's expense.

7.3. The Contractor shall protect and preserve the established control points, bench marks and monuments and shall make no changes in locations without the written approval of the Owner. Any of these which may be lost or destroyed or which require shifting because of necessary changes in grades or locations shall, subject to prior approval of the Owner, be replaced and accurately located by the Contractor, at no expense to the Owner.

VIII WORKING HOURS

8.1. Normal working hours shall be 7 a.m. to 6 p.m., Monday through Friday, except that Work shall not start any earlier than one-half hour after sunrise or continue beyond one-half hour prior to sunset. If the Contractor desires to perform Work outside the normal working hours, on Holidays, or on weekends, the Contractor shall request permission, in writing, 48-hours in advance to allow

arrangements to be made. The Contractor may be charged an inspection fee by the Owner if such work is approved. Where the Owner specifically directs the Contractor to work outside of normal working hours, no inspection fee will be imposed. The Owner may refuse the Contractor permission to work outside the normal working hours. The Contractor shall make reasonable efforts to avoid undue noise during the night and on weekends, including, but not limited to, fireproof covering necessary to dampen excessive noise from engines or pumps which operate before 7:00 a.m. and after 9:00 p.m., if it is necessary to work at those times.

8.2. The Contractor shall designate a representative and furnish a telephone number at which the representative may be contacted at any time after working hours. This representative shall be empowered and authorized to provide such personnel and equipment as may be required to remedy emergency situations that may develop after normal working hours, or on weekends and holidays.

8.3. The Contractor shall receive approval of the Owner, in advance, of any work to be performed on Holidays. The Owner reserves the right to deny permission to work on Sundays and/or Holidays without cause.

Holidays are as listed below:

New Years Day	1st day of January
Martin Luther King's Birthday	3rd Monday in January
President's Day	3rd Monday in February
Memorial Day	Last Monday in May
Independence Day	4th day in July
Labor Day	1st Monday in September
Veteran's Day	11th day of November
Thanksgiving Day	4th Thursday in November
Friday after 4th Thursday in November	4th Friday in November
Christmas Eve	24th day of December
Christmas Day	25th day of December

If January 1, July 4, Veterans Day or Christmas fall on a Sunday, the following Monday shall be considered the Holiday. If these dates fall on a Saturday, the previous Friday shall be considered the Holiday.

The Contractor's attention is called to Section 109-1.5.C.1.d. regarding Owner compensation by the Contractor for overtime work performed outside normal working hours.

IX PROJECT COORDINATION

9.1 Coordination with Owner

A. The Contractor shall coordinate all construction activities with the Owner and shall obtain the Owner's approval as to schedule of Work, permits, temporary work, and traffic control.

B. Progress meetings shall be held monthly on a date to be set by the Owner. The Contractor shall be present at all progress meetings. If progress is not made as scheduled, or if the Owner desires to discuss revised progress schedules or the quality of workmanship or other aspects of the work, additional progress meetings can be required.

C. The Owner may construct or reconstruct any utility service in the highway or street or grant a permit for the same at any time. The Contractor shall not be entitled to any damages occasioned thereby other than a consideration of an extension of time.

D. When authorized by the Owner, the Contractor shall allow any person, firm, or corporation to make an opening within the limits of the Project upon presentation of a duly executed permit from the Owner. When directed by the Owner, the Contractor shall satisfactorily repair portions of the Work disturbed by the openings. The necessary Work will be paid for as extra Work in accordance with these specifications and shall be subject to the same conditions as the original Work performed.

9.2 Coordination with Utilities

A. The Owner and Contractor agree that disruption to public services shall be avoided whenever possible and minimized when it is not avoidable. In cases where the disruption of existing facilities could adversely impact public service delivery, acceptable duration(s) and time(s) of the outages shall be coordinated between the Contractor and Owner, so as to explicitly minimize disruption to public service delivery.

B. Before the initiation of any excavation, the Contractor shall locate all existing utilities, culverts, and other structures. Work shall be coordinated with affected utility companies. Prior to excavation, the Contractor shall contact MISS UTILITY at (800) 552-7001 and comply with all MISS UTILITY requirements.

C. All existing utilities, both public and private (including sewer, gas, water, electrical services, etc.), shall be protected and their operation shall be maintained throughout the course of the Work. Any temporary shutdown of an existing service shall be arranged by the Contractor between the Contractor and the responsible agency. The Contractor shall assume full responsibility and defend and hold the Owner harmless from the result of any damage that may occur as a result of the Contractor's activities.

D. If any utility service is interrupted as a result of accidental breakage or of being exposed or unsupported, the Contractor shall promptly notify the proper authority and shall cooperate with the authority in the restoration of service. If utility service is interrupted, repair work shall be continuous until service is restored. The Contractor shall be responsible for any damage to utilities that are attributable to his neglect or methods of performing the work.

E. The Owner shall provide Utility companies with copies of the construction plans and or scope of work prior to construction. If requested by the Owner, the Contractor shall provide each affected utility company with a copy of the proposed schedule of progress prior to commencing work.

F. Existing facilities (such as water and sewer valves) shall be operated only by the facility owner or under the direct supervision of the facility owner's personnel. The Contractor shall inform the owner at least 48-hours in advance of the need for the operation of existing facilities.

G. At points where the Contractor's operations are adjacent to the properties of any utility, including railroads, and damage to which might result in considerable expense, loss, or inconvenience, Work shall not commence until arrangements necessary for the protection thereof have been completed.

H. The Contractor shall cooperate with owners of utilities so that location, removal and adjustment operations may progress in a reasonable manner; duplication of adjustment work may be reduced to a minimum; and, services rendered by those parties will not be unnecessarily interrupted.

I. The Contractor should be aware that in some instances buried cables, gas lines, water lines, etc., two inches and smaller in diameter may have to be excavated by hand and slightly relocated to facilitate construction of the Work under this contract. This shall be considered incidental to the Work, and shall be performed at no additional cost to the Owner.

J. Should the location of any pipe or conduit greater than two-inches in diameter, pole, or other structures, above or below the ground be such that in the opinion of the Owner or his representative its removal, realignment, or change will be required due to work to be performed under this Contract, the removal, realignment, or change will be done as a Change Order, or will be done by the Owner of the obstructions, without cost to the Contractor. The Contractor shall maintain at his own expense the structures until such removal and before and after such realignment or change. The Contractor shall not be entitled to any claim for damages or extra compensation because of the presence of said structure, or because of any delay in the removal or relocation of the same.

X SUPERVISION

10.1. The Contractor shall supervise and direct the Work, and shall be solely responsible for the means, methods, techniques, sequences and procedures of construction. The Contractor shall employ and maintain on the Project a qualified supervisor who shall have been designated in writing by the Contractor as the Contractor's representative at the site. The supervisor shall have full authority to act on behalf of the Contractor and all communications given to the supervisor shall be the same as if mailed to the business address of the Contractor. The supervisor or a designated representative shall be present on the site at all times as required to perform adequate supervision and coordination of the Work. The Contractor shall notify the Owner in writing prior to any change of supervisor, and receive the Owner's approval for the replacement.

10.2. Upon notification to the Contractor, the Owner reserves the right to suspend the Work until such time as a supervisor satisfactory to the Owner is assigned to the project. Contract Time shall not be extended for such suspension nor shall the Contractor be entitled to any additional payment of any kind whatsoever as a result of such suspended work.

10.3. Any employee of the Contractor or Subcontractor who is deemed unsuitable may be removed from the job site by the Owner, provided that Written Notice and just cause is given to the Contractor. Said employee shall be removed immediately upon receipt of said Notice.

XI UNCOVERING WORK

11.1. If any work has been covered or concealed without the Owner's approval prior to being covered or concealed, the Owner may request to see such work and it shall be exposed by the Contractor. The Contractor shall pay the cost of opening or uncovering and replacement and shall, in addition, at no cost to the Owner, make the necessary corrections to bring the work into accord with the Contract Documents.

11.2. Uncovering work shall be at the Contractor's expense unless the Contractor has given the Owner timely notice of the Contractor's intention to cover the same and the Owner has not acted with reasonable promptness in response to such notice.

11.3. If the Owner considers it necessary or advisable that covered Work previously approved be re-inspected or tested by others, the Contractor, at the Owner's request, shall uncover, expose or otherwise make available for observation, inspection or testing as the Owner may require, that portion of the Work in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such Work is defective, the Contractor shall bear all the expenses of such uncovering, exposure, observation inspection and testing and of satisfactory reconstruction. If, however, such Work is not found to be defective, the Contractor will be allowed an increase in the Contract Price or an extension of the Contract Time or both directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction and an appropriate Change Order shall be issued.

XII REMOVAL OF UNACCEPTABLE WORK

12.1. All Work that does not conform to the requirements of the Contract Documents shall be unacceptable.

12.2. The Contractor shall remove or correct all unacceptable and defective Work or materials. The replacement of Work and materials shall conform to the Contract Documents or be in a manner acceptable to the Owner. The Contractor shall bear all costs of such correction and/or removal and replacement.

12.3. Work done contrary to or regardless of the instructions of the Owner, Work done beyond the lines shown or as directed, except as herein provided, or any extra Work done without authority, will be considered unauthorized and will not be paid for under the provisions of the Agreement. Work so done may be ordered removed or replaced at no cost to the Owner.

12.4 If the Work is defective, or the Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, the Owner may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Owner to stop the Work shall not give rise to any duty on the part of the Owner to exercise this right for the benefit of the Contractor or any surety or other party. If the Contractor does not remedy, remove, or replace the rejected or condemned Work as instructed by the Owner within the time period stated by the Owner but in no case to exceed 30 Days after receiving written Notice, such remedy, removal, or replacement may be accomplished by the Owner at the Contractor's expense.

XIII SUBSTANTIAL COMPLETION

13.1. Prior to Final Payment, but following completion of all required tests and inspections, the Contractor may request in writing that the Owner certify that the entire Project or any phase of the Project is Substantially Complete and request the Owner issue a Certificate of Substantial Completion. Within fourteen (14) working days the Owner will conduct an inspection of the Project with the Contractor and either issue a Certificate of Substantial Completion or notify the Contractor in writing of the incomplete items. The Certificate and attachments shall include the following:

A. A listing of responsibilities for the security, operation, safety, maintenance, utilities and insurance on the substantially completed portion;

B. A tentative list of items to be completed or corrected prior to final payment; and,

C. The maximum time for items to be completed or corrected prior to final payment.

13.2. The Owner shall have the right to exclude the Contractor from the Project or phase of the Work certified to be Substantially Complete; however, the Owner will allow the Contractor reasonable access to complete or correct the Work.

XIV USE OF COMPLETED PORTIONS

14.1. The Owner shall have the right to take possession of and use any completed or partially completed portions of the Work, not-withstanding that the time for completing the entire Work or such portions may not have expired, but such taking possession and use shall not be deemed an acceptance of any Work not completed in accordance with the Contract Documents. If such prior use increases the cost of or delays the Work, the Contractor shall be entitled to such extra compensation or extension of time or both as the Owner and the Contractor may agree.

XV FINAL INSPECTION

15.1. Upon receiving written Notice from the Contractor that the entire Work or an agreed upon portion is complete, the Owner will make a final inspection with the Contractor, and will notify the Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. The Contractor shall immediately take such measures as are necessary to complete such work or remedy such deficiencies.

15.2. This procedure shall be repeated until all items are corrected to the satisfaction of the Owner. Only written notification to the Contractor from the Owner will constitute final acceptance of any part of the Work under the Agreement.

XVI CLAIMS

16.1. All claims, disputes, demands and other matters in question arising out of or relating to the Contract Documents, except for claims which have been waived by the Contractor's acceptance of final payment, will be addressed in accordance with the provisions of the Virginia Public Procurement Act and as stated herein; provided, however, the provisions of Section 2.2-4366 of that Act will not be applicable without the separate express written consent of the Owner.

16.2. Early or prior knowledge by the Owner of an existing or impending claim for damages could alter the plans, scheduling, or other action of the Owner or result in mitigation or elimination of the effect of the act objected to by the Contractor. Therefore, a written statement describing the act of omission or commission by the Owner or its agents that allegedly caused damage to the Contractor and the nature of the claimed damage shall be submitted to the Owner at the time of occurrence or beginning of the Work upon which the claim and subsequent action are based. If such damage is deemed certain in the opinion of the Contractor to result from his acting on an order from the Owner, he shall immediately take written exception to the order. Submission of a notice of claim as specified shall be

mandatory. Failure to submit such notice shall be a conclusive waiver to such claim for damages by the Contractor. An oral notice or statement will not be sufficient nor will a notice or statement after the event.

If the Contractor's claim contains data that cannot be verified by the Owner's records, the data shall be subject to a complete audit by the Owner or its authorized representative if they are to be used as a basis for claim settlement.

If the Contractor wishes to make claim for an increase in the Contract Price or Contract Time, he shall submit all supporting data to the Owner and Engineer within twenty (20) Days from the time of initial occurrence. Failure to submit such data within twenty (20) Days shall be a conclusive waiver to such claim by the Contractor.

16.3 Claims, disputes, and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the Work and claims in respect to changes in the Contract Price or Contract times will be referred ~~initially~~ to the **Owner and** Engineer in writing. ~~with a request for a formal decision in accordance with this paragraph.~~ Written Notice of each such claim, dispute or other matter shall be delivered by the Contractor to the Engineer and the Owner promptly (but in no event later than twenty (20) days) after the start of the occurrence or event giving rise thereto, and written supporting data shall be submitted to the Engineer and the Owner promptly, (but not later than twenty (20) days) after the start of such occurrence or event and monthly thereafter for continuing events unless the ~~Engineer~~ **Owner and Contractor mutually agree to extend the time required to submit the written notice to allow** for the submission of additional accurate data in support of such claim, dispute or other matter. The Owner shall submit any response to the Engineer and the Contractor within ~~ten (10)~~ **twenty (20)** days after receipt of the Contractor's last submittal (unless **Owner and** the Engineer ~~allows~~ **agree to** additional time).

~~The Engineer shall render a written decision within twenty (20) days of receipt of the Owner's response. The Engineer's written decision on such claim, dispute, or other matter shall be final and binding upon the Owner and Contractor unless, within twenty (20) days after issuance of the Engineer's written decision, either party appeals the decision by giving the other party and the Engineer written notice of a request for negotiation.~~

Within ten (10) days of the delivery of said Notice, senior representatives of the Owner and the Contractor, having authority to settle the dispute, and the Engineer, shall meet at a mutually acceptable time and place, and thereafter as often as they reasonably deem necessary, to exchange relevant information and to **exercise their reasonable and good faith efforts** ~~attempt~~ to resolve the dispute. The Owner's **and Contractor's** representatives will participate in good faith during the negotiation and will **each** have authority to approve changes in the Contract Time and Price.

In the event a mutually acceptable ~~decision~~ **agreement** cannot be reached through negotiation within twenty (20) days of the ~~appealing party's~~ **Contractor's** Notice, (or mutually agreeable longer period), or if the party receiving such Notice will not meet within ten (10) days, the Owner or Contractor may declare, by written Notice, delivered to the other party and to the Engineer, that the negotiation was unsuccessful. ~~and may initiate further appeal.~~

~~Any further appeal shall be initiated by written Notice of the appeal by the Owner or Contractor to the Engineer and non-appealing party within twenty (20) calendar days of receipt of the Notice of unsuccessful negotiation. Failure to issue a Notice of appeal within said period will result in the Engineer's decision being final and binding to the fullest extent allowed by law. If a written Notice~~

~~of appeal is issued, the claim or dispute may be submitted for non-binding mediation at the discretion of Owner. If Owner chooses non-binding mediation, it shall be a condition precedent to the institution of any further administrative, legal or equitable proceedings by either party~~

If the Owner requests mediation ~~upon issuance of the Notice of appeal~~, the parties shall endeavor to agree to a single mediator to mediate the dispute in a session not to exceed one-half day in length, unless extended by the agreement of both parties. If the parties cannot agree on a single mediator, they shall request the chief judge of the local state circuit court to designate a mediator. Unless the parties mutually agree otherwise, the mediation shall occur within ten (10) days of the mediator's selection. The costs of the mediation shall be paid by the parties on a pro rata basis.

The results of successful mediation will be implemented by a Change Order. Should the mediation be unsuccessful, it shall be terminated by written Notice to all involved by the mediator or Owner or Contractor. ~~The dispute resolution process shall then proceed in accordance with paragraph 16.4.~~

~~16.4. A formal proceeding may then be instituted by the appealing either party in a forum of competent jurisdiction within the Owner's locality, to exercise such rights or remedies as the appealing party may have with respect to such claim, dispute or other matter in accordance with applicable state and city laws and regulations.~~

All disputes arising out of or relating to this Agreement, the Contract Documents, or the performance obligations of the parties shall be brought in the Circuit Court of the City of Chesapeake, Virginia. The Agreement and the Contract Documents shall be governed by, enforced and interpreted pursuant to the laws of the Commonwealth of Virginia. ~~In the event of any litigation between the parties arising out of this Agreement, the prevailing party will be entitled to recover its attorneys' fees and expert fees, as well as all other costs and expenses of such litigation.~~ **This Agreement shall be interpreted, enforced, and governed by the laws of the Commonwealth of Virginia.**

16.5. The Contractor shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with the Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as the Owner and the Contractor may otherwise agree in writing.

XVII ENGINEER'S STATUS

17.1. All Work shall be performed under the general observation of the Engineer (if specified in the Special Provisions, otherwise, the Owner shall serve as the Engineer at its discretion). The Contractor shall carry out the Work in accordance with the Contract Documents. The construction means, methods, techniques, sequences of procedures, and safety precautions and programs in connection with the Work shall be at the direction and the responsibility of the Contractor. The Engineer shall have authority to and shall reject any and all Work whenever it is necessary to do so in order to insure the proper execution of the Work in accordance with the Contract Documents. The Engineer shall have no authority to approve or order changes in the Work that alter the terms or conditions of the Agreement. The Owner shall confirm by written Notice within fourteen (14) calendar Days any oral order, direction, requirement or determination.

17.2. In case of the termination of the employment of the Engineer, the Owner may appoint a capable and reputable Engineer as a replacement. The status under the Agreement of the Engineer shall be that of the former Engineer.

17.3. Approval by the Engineer of any materials, plans, equipment or drawings proposed by the Contractor, shall be construed only to constitute an approval of general design. Such approval shall not relieve the Contractor for any responsibility for the accurate and complete performance of the work in accordance with Contract Documents, or from any duty, obligation, performance guarantee or other liability imposed upon him by the provisions of the Agreement.

~~**XVIII NOTICE TO COMPLY ORDER**~~

~~*See page 105-15.*~~

~~**XIX STOP WORK ORDER**~~

~~*See page 105-16.*~~

End of Section

SECTION 106

CONTROL OF MATERIAL

I TESTS AND INSPECTIONS

1.1. All material and workmanship shall be subject to inspection, examination and test by the Owner at any time during manufacture and/or construction. The Owner shall have the right to reject defective material and workmanship or require their correction.

1.2. The Contractor shall provide at its expense the testing and inspection services required by the Contract Documents. The Owner will provide at his expense all inspection and testing services not required by the Contract Documents; provided, however, the Contractor will be responsible for the payment of all failing tests.

1.3. The Contractor shall furnish promptly without additional charge all reasonable facilities, labor, and materials, necessary and convenient for making such tests as may be designated in the Contract Documents. The Contractor shall work with the Owner and the Engineer in scheduling and coordinating Owner provided testing or inspection services.

1.4. If the Contract Documents, laws, ordinances, rules, regulations or orders of any public body having jurisdiction require any Work (or part thereto) specifically to be inspected, tested, or approved by someone other than the Owner, the Contractor shall assume full responsibility for arranging and obtaining such inspections, tests or approvals, pay all costs in connection therewith, and furnish the Owner the required certificates of inspection, or approval. The Contractor shall also be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests or approvals required for the Owner's acceptance of materials or equipment to be incorporated in the Work, or of materials, mix designs, or equipment submitted for approval prior to the Contractor's purchase thereof for incorporation in the Work.

1.5. Inspections, tests or approvals by the Owner shall not relieve the Contractor from its obligations to perform the Work in accordance with the requirements of the Contract Documents.

1.6. The failure of the Owner to reject or condemn materials and workmanship not conforming to the Contract Documents shall not prevent the Owner from rejecting materials and workmanship found not to be in accordance with the Contract Documents at any time prior to the acceptance of the completed Work, nor shall it be considered as a waiver of any nonconformance with the Contract Documents which may be discovered later, or as preventing the Owner at any time prior to the expiration of the guarantee period or of the expiration of any applicable statutory limitation period for legal actions for Contractor default from recovering damages for work not in accordance with the Contract Documents.

II LABOR, MATERIALS AND EQUIPMENT

2.1. The Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. The Contractor shall at all times maintain good discipline and order at the site.

2.2. Unless otherwise specified, the Contractor shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities and all facilities and incidentals necessary for the furnishing, performance, testing, start-up, and completion of the Work.

2.3. All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. If required by the Owner, the Contractor shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable Supplier except as otherwise provided in the Contract Documents.

2.4 It shall be the responsibility of the Contractor to legally dispose of all excess material at his expense unless otherwise indicated on the Drawings and/or noted in the Specifications.

2.5 No material that is not required for the Work on this Project may be stored on site or within the Project boundaries or on land designated for Project use, unless approved by the Owner in writing prior to placement.

III WORK BY OWNER

3.1. The Owner may perform other work related to the Project at the site by the Owner's own forces, have other work performed by utility owners, or let other direct contracts for Work at the site. If the fact that such other work is to be performed was not noted in the Contract Documents, Written Notice will be given to the Contractor prior to starting any such other work.

End of Section

SECTION 107

LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

I PERMITS AND REGULATIONS

1.1. The Contractor shall procure all permits and licenses, pay all charges, fees and taxes and give all notices necessary and incidental to the due and lawful prosecution of the Work except those provided by the Owner, and specified in the Special Provisions.

1.2. The Contractor shall be fully responsible for knowledge of and shall abide by each and every law, rule or regulation of all public bodies having political jurisdiction over the Project and in force at the time of the Contract; including, the safety of persons or property and the protection of persons and property form damage, injury or loss. The Contractor shall erect and maintain all necessary safeguards for such safety and protection and hold harmless the Owner and its agents, officers, or employees against any claim for liability arising from or based on any violation, whether by himself, his agents, his employees or subcontractors. If the Contractor observes that the Contract Documents are at variance with any such law, he shall promptly notify the Owner in writing. The Contractor shall execute and file the documents, statements, and affidavits required under any applicable federal or state law or regulation affecting his Bid or Agreement or prosecution of the Work thereunder. The Contractor shall permit examination of any records made subject to such examination by any federal or state law or by regulations promulgated thereunder by any state or federal agency charged with enforcement of such law. The Contractor shall not be entitled to claim any damages for delay occasioned by compliance with such laws. Where such laws are changed during the course of the Agreement, and where such changes create additional costs to the Agreement or affect the time of the Agreement, such changes shall be made effective through Change Orders prepared in accordance with the Contract Documents.

1.3. The Contractor shall comply fully with the U.S. Department of Labor Safety and Health Regulation promulgated under the Occupational Safety and Health Act of 1970, as amended, and under Section 107 of the Contract Work Hours and Safety Standards Act, as amended. The Contractor shall also comply fully with the Overhead High Voltage Act as set forth in Chapter 30, Title 59.1 of the Code of Virginia; Subpart P - "Elevations, Trenching and Shoring", of the Virginia Occupational Safety and Health Standards for Construction Industry; the Virginia Confined Space Standard 1910.146 of the Virginia Occupational Safety and Health Standards for General Industry; and the "Underground Utility Damage Prevention Act" as set forth in Chapter 10.3, Title 56 of the Code of Virginia, 1950, as amended. The above listing of safety laws and regulations is for informational purposes and in no way alters or limits Contractor's responsibility to comply with the safety laws of all public bodies having jurisdiction as set forth in Section 107-1.2 above.

II LAND, EASEMENTS, AND RIGHTS-OF-WAY

2.1. Prior to issuance of Notice to Proceed, the Owner shall obtain all land, easements, and rights-of-way necessary for carrying out and for the completion of the work to be performed and pursuant to the Contract Documents, unless otherwise specified herein or otherwise mutually agreed. A land surveyor licensed in the Commonwealth of Virginia must perform the layout. Easements for temporary uses and detours requested by the Contractor and approved by the Owner in lieu of a detour within the right of way or easement area shall be acquired by the Contractor without the Owner being a party to the Agreement.

2.2. The Owner shall provide to the Contractor information that delineates and describes the lands owned, rights-of-way, or easements acquired, and permits obtained.

2.3. The Contractor shall provide at its own expense and without liability to the Owner any additional land and access thereto that the Contractor may desire for temporary construction facilities, or for storage of materials. The Contractor shall not use private property in connection with the Work unless prior written permission is obtained from the property owner. A copy of the written permission indicating the name, address, and phone number of the property owner shall be furnished to the Owner. Upon completion of the use of the property, the Contractor shall also furnish the Owner a release signed by the property owner indicating that the property has been satisfactorily restored.

2.4. The Contractor shall acquire all necessary and appropriate Permit(s) from the locality, VDOT, or both, for entrance(s) to off-site storage or lay-down yard(s) and shall abide by all conditions required by the Permit. The Contractor shall be solely responsible for all costs incurred in acquiring the Permit and all costs associated with the efforts necessary to comply to Permit requirements.

The Contractor shall utilize the most direct means of access to the Work area and shall not access the Work area through adjacent neighborhoods, parking areas, etc. Any and all damages to adjacent areas resulting from the Contractor's activities shall be the sole responsibility of the contractor and shall be repaired at the Contractor's expense, to the complete satisfaction of the Owner, locality/VDOT, and the affected property owner(s).

III PROTECTION OF WORK, PROPERTY & PERSONS

3.1. The Contractor will be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. The Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to all employees on the Work and other persons who may be affected thereby, all the Work and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction. The Contractor shall provide and maintain all necessary watchmen, barricades, lights, and warning signs, and take all necessary precautions for the protection and safety of the public.

3.2. The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. The Contractor shall erect and maintain, as required by the conditions and progress of the Work, all necessary safeguards for safety and protection, and shall notify owners of adjacent utilities when prosecution of the Work may affect them. The Contractor shall remedy all damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by the Contractor, any Subcontractor, or anyone for whose acts any of them will be liable.

3.3. The Contractor shall designate a responsible member of its organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated in writing by the Contractor to the Owner.

3.4. In accordance with generally accepted construction practices, and the requirements of OSHA, the Contractor shall be solely and completely responsible for conditions of the Project site. This requirement shall apply continuously and not be limited to normal working hours. The Contractor

shall comply with Federal and State safety regulations, at the site of the Work and provide such equipment and medical facilities as necessary to supply first aid service to anyone who may be injured. The Contractor shall promptly report in writing to the Owner all accidents whatsoever arising out of, or in connection with, the performance of the Work whether on, or adjacent to, the site and which caused death, personal injury or property damages, giving full details and statement of witnesses. In addition, if death or serious injuries or serious damages are caused, the accidents shall be reported immediately to both the Engineer and the Owner. If any claim is made by anyone against the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts, in writing, to the Owner.

3.5. Until final acceptance of the Work by the Owner, the Contractor shall have charge and care thereof and shall take every precaution against damage to the Work or to any part thereof by action of the elements or from any other cause whether installed, in storage, or off-site. The Contractor shall rebuild, repair, restore, and make good damage to any portion of the Work occasioned by any of the foregoing causes before final acceptance and shall bear the expense thereof. The Owner may reimburse the Contractor for repair of damage to Work attributable to unforeseeable causes beyond the control of and without the fault or negligence of the Contractor. In case of suspension of work, the Contractor shall be responsible for the Project and shall take such precautions as may be necessary to prevent damage to the Work, provide for erosion and environmental control and drainage control, and erect any necessary temporary structures, signs, or other facilities at his own expense. During the suspension of Work, the Contractor shall properly and continuously maintain in an acceptable growing condition all living material in newly established plantings, seedings, and soddings furnished under the Contract and shall take adequate precautions to protect new tree growth and other important vegetation against damage.

3.6. Emergency traffic such as police, fire and disaster units shall be provided reasonable access to the work area at all times. The Contractor shall coordinate partial or full street closures with all emergency services, such as police, fire and disaster units, and shall bear the responsibility of notification to same of all closures, blockages and re-openings.

3.7. The Contractor shall, during the progress of the Work and as directed by the Owner, remove from the Owner's property and from all public and private property and rights-of-way, at its own expense, all temporary structures, rubbish, debris, piles of earth, foreign matter, and waste materials resulting from his operations. The site of the Work shall be restored to the conditions existing before the Work was started, to the satisfaction of the Owner. Lawns, pavements, sidewalks, and other surfaces shall be preserved where practicable, but if damaged, shall be fully restored.

3.8. The Owner may take corrective action if the Contractor fails to perform cleanup and restoration in an orderly, continuous, and expeditious manner. The Owner may take corrective action three days after delivery of notice to do so to the Contractor and deduct the cost from any monies due the Contractor.

3.9. The Contractor shall preserve property and improvements along the lines of and adjacent to the Work unless their removal or destruction is called for by the Contract Documents. The Contractor shall use suitable precautions to prevent damage to such property.

3.10. When the Contractor finds it necessary to enter on private property, he shall secure from the property owner or lessee a written permit for such entry prior to moving thereon. An executed copy of this permit shall be furnished to the Owner.

3.11. The Contractor shall be responsible for damage or injury to property during the prosecution of the Work resulting from any act, omission, neglect, or misconduct in the method of executing the Work

or attributable to defective Work or materials. This responsibility shall not be released until final acceptance of the Project.

3.12. When direct or indirect damage is done to property by or on account of any act, omission, neglect or misconduct in the method of executing the Work or in consequence of the non-execution thereof on the part of the Contractor, the Contractor shall restore such property to a condition substantially equal to that existing before such damage was done by repairing, rebuilding or restoring, as may be directed by the Owner, or making settlement with the property owner. The Contractor shall secure from the property owner a release from any claim against the Owner without additional compensation therefor. A copy of this release shall be furnished to the Owner.

3.13. All property boundary markers shown on the Drawings or discovered during the course of construction shall be protected. All property boundary markers disturbed due to construction activities shall be replaced by the Contractor at no expense to the Owner. Property boundary markers shall be restored by a surveyor licensed in the State of Virginia and all restored property boundary markers shall be shown on the Record Drawings.

3.14. The Contractor shall employ a licensed Plumbing Contractor, who shall obtain the necessary permits and shall do all Work on private property in accordance with the International Plumbing Code, latest edition. The Owner will obtain the permission of the property owner to work on private property. No payment will be made for work done on private property until all restoration work is complete to the satisfaction of the Owner and the homeowner.

3.15. The Contractor will notify the affected property owners, in writing 30 calendar Days prior to commencement of Work. "Affected Property Owners" shall be those property owners whose properties are affected by construction on the Project in the following manner: (i) restrained access to and from residences and business locations; (ii) interference with the right to enjoy one's residence or business free of disturbing and unusual environmental changes as a result of the Project, such as excessive noise, dust, light, as well as unusual working hours and odors; and (iii) the relocation of personal property, such as trees, shrubs, plants and flowers, play equipment, portable buildings, fences and automobiles, which must be moved as a result of the Project. Such Notice shall be deemed properly given if mailed by first class, postage prepaid, to the address for the property owners shown in the local tax records.

3.16. It shall be the Contractor's paramount responsibility to additionally notify each residence and business that construction adjacent to their property is imminent. This notification will be given and noted no less than 48 hours prior to Work commencing adjacent to the affected property. The Notice from the Contractor shall be written and may be hand delivered to each affected residence and business. A separate Notice shall be delivered each time the entrance to each residence and business will be blocked or inaccessible.

A. If this Notice is mailed, time is to be allowed such that receipt by the addressee is at least 48 hours prior to Work commencement. Such Notice shall be deemed properly given if mailed by first class, postage prepaid, to the address for the property owners shown in the local tax records. A duplicate copy of each mailed Notice is to be forwarded to the Owner.

B. If this Notice is hand delivered, a duplicate copy of each Notice is to be forwarded to the Owner indicating the date of delivery and if personal contact was achieved.

IV ENVIRONMENTAL STIPULATIONS

4.1. Any cost associated with violations of the law including, but not limited to, remediations, clean up cost, fines, administrative or civil penalties or charges, and third party claims imposed on the Owner by any regulatory agency or by any third party as a result of the Contractor's noncompliance with federal, state, or local environmental laws and regulations or nuisance statutes by the Contractor or by Subcontractors, consultants, sub-consultants, or any other persons, corporations or legal entities retained by the Contractor for this Agreement, shall be paid by the Contractor.

No separate payment will be made for the Work or precautions described herein except where provided for as a specific item in the Agreement or except where provision has been made for such payment in these specifications.

4.2. Pollution:

A. Water

The Contractor shall exercise every reasonable precaution throughout the duration of the project to prevent pollution of rivers, streams, and impoundments. Pollutants such as chemicals, fuels, lubricants, bitumens, raw sewage, paints, sedimentation, and other harmful material shall not be discharged into or alongside rivers, streams, or impoundments or into channels leading to them.

Construction discharge water shall be filtered to remove deleterious materials prior to discharge into state waters. During specified spawning seasons, discharges and construction activities in spawning areas of state waters shall be restricted so as not to disturb or inhibit aquatic species that are indigenous to the waters. Neither water nor other effluence shall be discharged onto wetlands or breeding or nesting areas of migratory waterfowl. When used extensively in wetlands, heavy equipment shall be placed on mats. Temporary construction fills and mats in wetlands and flood plains shall be constructed of approved non-erodible materials and shall be removed by the Contractor to natural ground when the Owner so directs.

If the Contractor dumps, discharges, or spills any oil or chemical that reaches or has the potential to reach a waterway, he shall immediately notify all appropriate jurisdictional state and federal agencies and shall take immediate actions to contain, remove, and properly dispose of the oil or chemical.

Excavation material shall be disposed of in approved areas above the mean high water mark shown on the plans in a manner that will prevent the return of solid or suspended materials to state waters. If the mark is not shown on the plans, the mean high water mark shall be considered the elevation of the top of stream banks.

Construction operations in rivers, streams, or impoundments shall be restricted to those areas where channel changes are shown on the plans and to those that shall be entered for the construction of structures. Rivers, streams, and impoundments shall be cleared of false-work, piling, debris, or other obstructions placed therein or caused by construction operations.

The Contractor shall prevent stream constriction that would reduce stream flows below the minimum, as defined by the State Water Control Board, during construction operations.

If it is necessary to relocate an existing stream or drainage facility temporarily to facilitate construction, the Contractor shall design and provide temporary channels or culverts of adequate size to carry the normal flow of the stream or drainage facility. The Contractor shall submit a temporary relocation design to the Owner for review and acceptance in sufficient time to allow for discussion and correction prior to beginning the work the design covers. Costs for the temporary relocation of the stream or drainage facility shall be included in the Contract Price for the related pipe or box culvert.

When a live watercourse must be crossed by construction vehicles more than twice in any six month period, a temporary vehicular stream crossing constructed of nonerodible material shall be provided.

Contractor shall comply with all provisions of the latest edition of the Virginia Erosion and Sedimentation Control Handbook.

B. Air

The Contractor shall comply with the provisions of the State Air Pollution Control Law and Rules of the State Air Pollution Control Board, including notifications required therein.

Burning shall be performed in accordance with applicable local laws and ordinances and under the constant surveillance of watchpersons. Care shall be taken so that the burning of materials does not destroy or damage property or cause excessive air pollution. The Contractor shall not burn rubber tires, asphalt, used crankcase oil, or other materials that produce dense smoke. Burning shall not be initiated when atmospheric conditions are such that smoke will create a hazard to the motoring public or airport operations. Provisions shall be made for flagging vehicular traffic if visibility is obstructed or impaired by smoke. At no time shall a fire be left unattended.

Asphalt mixing plants shall be designed, equipped, and operated so that the amount and quality of air pollutants emitted will conform to the Rules of the State Air Pollution Control Board.

Emission standards for asbestos incorporated in the EPA's National Emission Standards for Hazardous Air Pollutants apply to the demolition or renovation of any institutional, commercial, or industrial building, structure, facility, installation, or portion thereof that contains friable asbestos.

C. Noise

The Contractor's operations shall be performed so that exterior noise levels measured during a noise-sensitive operation shall not be more than 80 decibels within 100 feet from the point of origin or within ten (10) feet of a noise-sensitive facility. Noise-sensitive facility is any facility for which lowered noise levels are essential if the facility is to serve its intended purpose. Such facilities include, but are not limited to, those associated with residences, hospitals, nursing homes, churches, schools, libraries, parks and recreational areas.

The Owner may monitor construction-related noise. If construction noise levels exceed the specified limits, the Contractor shall take corrective action before proceeding with operations. The Contractor shall be responsible for costs associated with the abatement of

construction noise and the delay of operations attributable to noncompliance with these requirements.

The Owner may prohibit or restrict to certain portions of the project any work that produces objectionable noise between 9 P.M. and 7 A.M. If other hours are established by local ordinance, the local ordinance shall govern.

Equipment shall in no way be altered so as to result in noise levels that are greater than those produced by the original equipment.

When feasible, the Contractor shall establish haul routes that direct his vehicles away from developed areas and ensure that noise from hauling operations is kept to a minimum.

These requirements are not applicable if the noise produced by sources other than the Contractor's operation at the point of reception is greater than the noise from the Contractor's operation at the same point.

D. Forest Fires

The Contractor shall take all reasonable precautions to prevent and suppress forest fires in any area involved in construction operations or occupied by him as a result of such operations. The Contractor shall cooperate with the proper authorities of the state and federal governments in reporting, preventing, and suppressing forest fires. Labor, tools, or equipment furnished by the Contractor upon the order of any forest official issued under authority granted the official by law shall not be considered a part of the Contract. For fires originating by no fault of the Contractor, the Contractor may negotiate with the proper forest official for compensation for such labor, tools, or equipment.

4.3. Archeological, Paleontological, and Rare Mineralogical Findings:

In the event of the discovery of prehistoric ruins, Indian or early settler sites, burial grounds, skeletal remains, relics, artifacts, fossils, stone tools, meteorites, or other articles of archeological, paleontological, or rare mineralogical interest during the prosecution of work, the Contractor shall act immediately to suspend work at the site of the discovery and notify the Owner. The Owner will immediately notify the proper state authority charged with the responsibility of investigating and evaluating such finds. The Contractor shall cooperate and, upon request by the Owner, assist in protecting, mapping, and removing the findings. Findings shall become the property of the Owner unless they are located on federal lands, in which event they shall become the property of the U.S. government.
When such work delays the progress of the Work, the Owner will give consideration to adjustments in the Contract Time limit.

V TEMPORARY FACILITIES

5.1. The Contractor shall provide and maintain in a neat, sanitary condition such accommodations for the use of employees as may be necessary to comply with the requirements of any governing body and regulatory agency having jurisdiction.

5.2. The Contractor shall pay for and furnish temporary facilities (such as light, power, and water) complete with connecting piping, wiring, lamps, and similar equipment as necessary. The Contractor

shall install, maintain, and remove temporary facilities upon completion of the Work. The Contractor shall obtain all permits and bear all costs in connection with temporary facilities at no expense to the Owner. The use of temporary facilities shall be in compliance with the requirements of the facility owner.

VI EMERGENCIES

6.1. In emergencies affecting the safety of persons, or the Work, or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the Owner, shall act to prevent threatened damage, injury or loss. The Contractor shall give the Owner prompt Written Notice of any significant changes in the Work or deviations from the Contract Documents caused thereby. Any compensation, claimed by the Contractor on account of emergency work, shall be determined by agreement between the Owner and the Contractor, and a Change Order shall be issued to document the changes.

VII WARRANTY AND GUARANTEE

7.1. The Contractor shall warrant and guarantee to the Owner that all Work is in accordance with the Contract Documents and is not defective. Prompt notice of all defects shall be given to the Contractor. The Contractor shall promptly correct all defective Work performed and replace defective materials or items found deficient during the final inspection, in a manner satisfactory and at no additional cost to the Owner for a period of one (1) year following the date of Substantial Completion; provided, however, if the local ordinances or code regarding warranties and guarantees, or if any provision in the local ordinances or code regarding the timing of performance or defect bonds conflicts with such one (1) year period, the local ordinance or code shall control. This warranty and guarantee shall not operate as a waiver of any of the rights and remedies of the Owner for default under or breach of the Agreement which rights and remedies may be exercised at any time within the period of any applicable statute of limitations.

7.2. Where defective Work (and damage to other Work resulting therefrom) has been corrected, removed or replaced under this Article, the correction period hereunder with respect to such Work will be extended for an additional period of one (1) year after such corrections or removal and replacement has been satisfactorily completed. Repetitive malfunction of an equipment or product item shall be cause for replacement and an extension of the correction period to a date one (1) year following acceptable replacement. A repetitive malfunction shall be defined as the third failure of an equipment or product item following original acceptance.

7.3. If the Contractor does not promptly correct the defective Work or replace defective materials, the Owner may have the defective Work corrected or the rejected Work removed and replaced, and all costs of such removal and replacement shall be paid by the Contractor.

7.4. Certain equipment or items may be required in the Contract Documents to be warranted for periods longer than one year.

7.5. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Contract Documents or by Change Order.

VIII OPENING SECTIONS OF PROJECTS TO TRAFFIC

8.1. When specified in the Contract or when directed by the Owner, certain sections of the Work may be opened to traffic.

8.2. On any section of the Work opened by order of the Owner where the Contract Documents do not provide for traffic to be carried through the Work and the Contractor has not been dilatory in prosecuting the Work, the Contractor will not be required to assume any expense entailed in maintaining the road for traffic. Such expense will be borne by the Owner or will be compensated for by Change Order. Repair of slides and repair of damage attributable to traffic will be compensated for by Change Order. The cost of all other repairs shall be borne by the Contractor.

8.3. On any section of the Work opened by the order of the Owner where the Contract Documents do not provide for traffic to be carried through the Work, any additional cost for the completion of other items of Work that are occasioned because of the changed working conditions will be compensated by Change Order.

8.4. If the Contractor is dilatory in completing the Work, he shall not be relieved of the responsibility for maintenance during the period the section is opened to traffic prior to final acceptance. Any expense resulting from the opening of such portions under these circumstances, except for slides, shall be borne by the Contractor. The Contractor shall conduct the remainder of the construction operations so as to cause the least obstruction to traffic.

IX NO WAIVER OF LEGAL RIGHTS

9.1. The Owner shall not be precluded or stopped by any measurement, estimate, or certificate made either before or after final acceptance of the Work and payment therefor from showing (1) the true amount and character of the Work performed and materials furnished by the Contractor, (2) that any such measurement, estimate, or certificate is untrue or incorrectly made, or (3) that the Work or materials do not conform with the provisions of the Contract. The Owner shall not be precluded or stopped, notwithstanding any such measurement, estimate, or certificate, and payment in accordance therewith, from recovering from the Contractor or his surety, or both, such damage as it may sustain by reason of his failure to comply with the terms of the Contract. Neither the acceptance by the Owner or any representative of the Owner, nor any payment for or acceptance of the whole or any part of the Work, nor any extension of time, nor any possession taken by the Owner shall operate as a waiver of any portion of the Contract or of any power herein reserved or of any right to damages. A waiver of any breach of the Contract shall not be held to be a waiver of any other or subsequent breach.

End of Section

SECTION 108

PROSECUTION AND PROGRESS OF WORK

I PATENT FEES AND ROYALTIES

1.1. The Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of the Owner its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by the Owner in the Contract Documents.

1.2. To the fullest extent permitted by Laws and Regulations, the Contractor shall indemnify and hold harmless the Owner, the Engineer, the Engineer's Consultants and the officers, directors, employees, agents and other consultants of each and any of them from and against all claims, costs, losses and damages arising out of or resulting from any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product or device not specified in the Contract Documents.

II TAXES

2.1. The Contractor shall pay all sales, consumer, use and other similar taxes required to be paid by the Contractor in accordance with the Laws and Regulations of the Project that are applicable during the performance of the Work. (The Contractor may apply to the Virginia Department of Environmental Quality for tax exempt status for certain wastewater products.)

III NOTICE TO PROCEED

3.1. Written Notice to Proceed will be given after the Agreement has been executed and the required Bid Security and insurances have been filed with and approved by the Owner.

3.2. The Contractor shall notify the Owner and all other governing bodies having jurisdiction, of the time and location that work will begin at least 48 hours prior to beginning Work.

IV PRE-CONSTRUCTION CONFERENCE

4.1. Within ten (10) Days of the Effective Date of the Agreement, a conference attended by the Contractor, the Owner, and others as appropriate will be held to discuss the Project, and to discuss procedures relating to Shop Drawings, submittals, Applications for Payment, and other Project issues, and to establish a working relationship among the parties as to the Work.

V CONSTRUCTION PROGRESS SCHEDULE

5.1. Within ten (10) Days after the Effective Date of the Agreement, the Contractor shall submit a written

schedule to the Owner showing the proposed order of Work and indicating the time required for completion of major items of Work. This schedule shall take into account the passage or handling of traffic with the least practicable interference and the orderly, timely and efficient prosecution of the Work. The schedule will be used as an indication of the sequence of the major construction operations and as a check on the progress of the Work.

5.2. The Contractor shall update the progress schedule monthly to reflect any schedule changes required to complete the remaining Work in accordance with the requirements of the Contract Documents. The updated schedule shall be submitted to the Owner for acceptance with the monthly application for progress payment; no payment will be made if the updated schedule is not submitted. All proposed adjustments in the progress schedule shall generally conform to the progress schedule then in effect and will comply with any provisions of the general requirements applicable thereto.

VI SUBCONTRACTS

6.1. Except as otherwise noted, contract Work, the cost of which is at least fifty percent (50%) of the total Contract Price shall be performed by the Contractor's own organization.

6.2. No part of the Work shall be transferred or subcontracted without prior written consent of the Owner, and no such consent or approval shall release the Contractor from any obligations to the Owner or persons employed by the Subcontractors, or to those supplying materials to the Subcontractors.

6.3. The Contractor agrees that it is as fully responsible to the Owner for the acts and omissions of its Subcontractors and persons either directly or indirectly employed by the Subcontractors as it is for the acts or omissions of persons directly employed.

6.4. Nothing contained in the Agreement shall create any contractual relation between any Subcontractor and the Owner.

VII COMMENCEMENT AND PROSECUTION OF WORK

7.1. The Contractor shall commence Work within ten (10) Days of the date specified in the Notice to Proceed. Time being of the essence of this Project, the Contractor shall prosecute the Work diligently, using such means and methods of construction as will secure its full completion within the time period specified in the Agreement. No Work shall be done at the site prior to the date specified in the Notice to Proceed.

7.2. The Contractor shall proceed with the Work at such rate of progress to insure full completion within the Contract Time. It is expressly understood and agreed, by and between the Contractor and the Owner, that the Contract Time for the completion of the Work as specified in the Agreement is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the Project.

7.3. The Contract Time will commence on the date indicated in the Notice to Proceed.

7.4. Once the Contractor has commenced Work, it shall be prosecuted continuously and to the fullest extent possible except for interruptions caused by weather or delays authorized or ordered by the Owner.

7.5. Gifts, gratuities, or favors shall not be given or offered by the Contractor to personnel of the Owner.

7.6. The Contractor shall not employ any personnel of the Owner or the Engineer for any services without the prior written consent of the Owner.

7.7. Workers shall have sufficient skill and experience to perform properly the Work assigned to them. Workers engaged in special or skilled work shall have sufficient experience in such work and in the operation of equipment required to perform it properly and satisfactorily. Any person employed by the Contractor or any subcontractor who, in the opinion of the Owner, does not perform his work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the Owner, be removed forthwith by the Contractor or subcontractor employing the person and shall not be employed again on any portion of the work without the approval of the Owner.

7.8. Equipment shall be of sufficient size and in such mechanical condition as to meet the requirements of the Work and produce a satisfactory quality of work. Equipment **and the contractor's methods and means** shall be such that no damage to the roadway, adjacent property, or other highways will result from **the construction** ~~its use~~. The Owner may order the removal and require replacement of unsatisfactory equipment.

7.9 The contractor shall develop a work plan and carry out the work to avoid damage to the adjacent pavement outside of the trench limits detailed on the construction drawings. Damaged pavement beyond the limits shown on the construction drawings shall be repaired at no additional cost to the owner. The Contractor's work plan shall be presented at the pre-construction meeting.

VIII SUSPENSION OF WORK

8.1. The Owner may, at any time and without cause, suspend the Work or any portion thereof for a period of not more than 90 Days or such further time as agreed upon by the Contractor, by Written Notice to the Contractor. Such Notice shall specify the date on which Work shall be resumed and the Contractor shall resume the Work on the date so specified. The Contractor will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if the Contractor makes a claim in accordance with the Contract Documents, except that no such increase or extension shall be allowed if the suspension was due to a failure by the Contractor to perform the Work in accordance with the Agreement.

IX TERMINATION OF AGREEMENT

9.1. Termination for the Convenience of the Owner

The performance of Work under this Agreement may be terminated by the Owner in accordance with this section in whole, or in part(s), whenever the Owner shall determine that such termination is in the best interest of the Owner. Any such termination shall be effected by delivery to the Contractor of a notice of termination specifying the extent to which performance of Work under the Agreement is terminated, and the date upon which such termination becomes effective.

After receipt of a notice of termination, and except as otherwise directed by the Owner, the Contractor shall:

A. Stop Work under the Agreement on the date and to the extent specified in the notice of termination.

B. Place no further orders or subcontracts for materials, services, or facilities, except as may be necessary for completion of such portion of the Work under the Agreement that is not terminated.

C. Terminate all orders and subcontracts to the extent that they relate to the performance of the Work terminated by the notice of termination.

D. Assign to the Owner, and as directed by the Owner, all of the right, title and interest of the Contractor under the orders and subcontracts so terminated. The Owner shall have the right and discretion to settle or pay any and all claims arising out of the termination of such orders and subcontracts.

E. Settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with the approval or ratification of the Owner. This approval or ratification will be final for all purposes of this section.

F. Transfer title and deliver to the Owner, as directed by the Owner, the fabricated or unfabricated parts, Work in process, completed Work, supplies, and other materials produced as a part of or acquired in connection with the performance of the Work terminated by the notice of termination, and the completed or partially completed plans, drawings, information and other property which, if the Agreement has been completed, would have been required to be furnished to the Owner.

G. Use his best efforts to sell as directed or authorized by the Owner, property of the type referred to in Paragraph F above; provided, however, that the Contractor shall not be required to extend credit to any purchaser. The proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the Owner to the Contractor under this Agreement or shall otherwise be credited to the Contract price or cost of the Work covered by this Agreement or paid in such manner as directed by the Owner. The Contractor may acquire any such property under the conditions prescribed and at a price or prices approved by the Owner.

H. Complete performance of that Work which was not terminated by the Owner.

I. Take such action as may be necessary, or as the Owner may direct, for the protection and preservation of the property related to this Agreement which is in the possession of the Contractor and in which the Owner has, or may acquire, an interest.

J. Within 30 Days after the receipt of the Notice of termination, the Contractor may submit a list to the Owner for approval, certified as to quantity and quality of any or all items of, inventory not previously disposed of, exclusive of items, the disposition of which has been directed or authorized by the Owner, and may request the Owner to remove such approved items or enter into a storage agreement covering the same. Not later than 15 Days thereafter, the Owner will accept title to such approved items and remove them or enter into a storage agreement covering same. The list submitted shall be subject to final verification by the Owner upon removal of the items, or if the items were stored within 45 Days from the date of submission of the list. Any necessary adjustment to correct the list as submitted shall be made prior to final settlement.

K. Within 30 Days after receipt of the notice of termination, the Contractor shall submit to the Owner his termination claim. Such claim shall be submitted in writing. Upon failure of the Contractor to submit its termination claim within the time allowed, the Owner may, at its discretion, reject such termination claim. Such termination claim shall include the cost of the following:

1. The cost of supplies accepted by the Owner and not previously paid for by the Owner, appropriately adjusted for any saving of freight or other charges.

2. The cost incurred in the performance of the Work terminated, including Initial cost and preparatory expense allocable thereto, but exclusive of any cost attributable to supplies paid or to be paid for by the Owner.

3. The cost of settling and paying claims arising out of the termination of Work under subcontracts or orders which are properly chargeable to the terminated portion of the Agreement, exclusive of amounts paid or payable on account of supplies or materials delivered or services furnished by subcontractors or vendors prior to the effective date of notice of termination and previously paid for by the Owner.

4. A reasonable amount of profit or commission, which will be determined based on the Project's specific overhead and expense data at the rate computed in the original Contract Price or, at the discretion of the Owner, as determined by an audit. The cost of the audit will be borne by the Contractor.

5. Cost of accounting, legal, clerical and other expenses reasonably necessary for the termination and settlement of subcontracts or orders thereunder, together with reasonable storage, transportation and other costs incurred in connection with the protection or disposition of property allocable to this termination portion of the Agreement.

6. The total sum to be paid to the Contractor shall not exceed the Contract Price as reduced by the amount of payments previously made and its further reduced by the Contract Price of Work not terminated. Said total sum shall also be reduced by the reasonable value, as determined by the Owner, of property which is destroyed, lost, stolen, or damaged so as to become undeliverable to the Owner or to a buyer.

9.2. Termination with Cause/Default

In the event that the Contractor shall for any reason or through any cause be in default of the terms of this Agreement, the Owner may give the Contractor written Notice of such default by certified mail/return receipt requested at the address set forth herein.

Unless otherwise provided, Contractor shall have ten (10) Days from the date such notice is mailed in which to cure the default. Upon failure of the Contractor to cure the default, the Owner may immediately cancel and terminate this Agreement as of the mailing date of the default notice.

Upon termination, the Contractor shall withdraw its personnel and equipment, cease performance of any further Work under this Agreement, and turn over to the Owner any Work in process for which payment has been made.

In the event of violations of law, safety or health standards and regulations, this Agreement may be immediately canceled and terminated by the Owner and provisions herein with respect to opportunity to cure default shall not be applicable.

9.3. Contractor's Right to Terminate the Agreement

Should the Work be stopped for a period of 90 Days or more, through no fault of the Contractor, or should the Owner fail to pay the Contractor any payment within a reasonable length of time after said payment shall become due, the Contractor may, upon seven (7) Days written notice to the Owner, stop Work, or terminate the Agreement and recover from the Owner payment for all Work executed, plus any loss actually sustained, plus reasonable profit and damage; provided, however, the total recovery from Owner shall not exceed the Contract Price.

X LIQUIDATED DAMAGES

10.1. It is mutually understood and agreed by and between the Contractor and Owner that in the execution of the Work, time is an essential element of the Agreement, and it is important that the Work proceed vigorously to completion.

10.2. The Owner has the right to deduct *any* liquidated damages from any money in the Owner's hands, otherwise due, or to become due, to the Contractor, and to sue for and recover any additional compensation for damages for non-performance of the Work or failure to complete the Work within the Contract Time.

10.3. The assessment of liquidated damages for failure to complete the Work within the Contract Time shall not constitute a waiver of the Owner's right to collect any additional damages that the Owner may sustain by failure of the Contractor to carry out the terms of the Agreement.

10.4. In the event of delay in the completion of the Work as specified beyond the Completion Date as adjusted by Change Orders, it would be difficult to determine the exact amount of the loss or damages suffered by the Owner due to delays in completion of the Agreement. Therefore, for every - Day of delay past Completion Date of this Agreement as adjusted by Change Orders, the Contractor and the Contractor's Surety will be liable to the Owner, as liquidated damages for delay and not as a penalty, in the sum designated in Section 102, III. Bid Form, and in paragraph H of the Agreement between Contractor and Owner as set forth in Section 103, for each and every calendar Day the Contractor shall be in default, as follows:

A. If Substantial Completion has not been achieved by the scheduled Substantial Completion date, the Substantial Completion liquidated damages shall accrue each day until Substantial Completion is achieved.

B. If neither Substantial Completion nor Final Completion has been achieved by the scheduled Final Completion date, only Substantial Completion liquidated damages shall occur each day until Substantial Completion is achieved and, thereafter, Final Completion liquidated damages shall accrue each day until Final Completion is achieved.

C. If Substantial Completion has been achieved but Final Completion has not been achieved by the Final Completion date, Final Completion liquidated damages shall accrue each day until Final Completion is achieved.

D. Substantial Completion liquidated damages and Final Completion liquidated damages shall not run concurrently.

E. The scheduled Final Completion date shall not be extended, in any case, solely because Substantial Completion was not achieved by the scheduled Substantial Completion date.

F. This paragraph will not apply to delays in completion of the Work due to acts of God, acts of the Public Enemy, acts of the Government (in either its sovereign or contractual capacity), fires, floods, strikes, or unusually severe weather, provided, that the Contractor shall, within five (5) days from the end of the month in which such delay occurred, notify the Owner in writing of the causes of delay and the facts relating thereto; and, provided that such delay occurs prior to the Substantial Completion date or, if Substantial Completion has been achieved, such delay occurs prior to the Final Completion date. Failure to provide such notice shall preclude the Contractor from claiming that delays resulted from the acts of God, acts of the Public Enemy, acts of the Government (in either its sovereign or contractual capacity), fires, floods, strikes, or unusually severe weather.

G. Nothing in the above clause shall be interpreted as limiting in any way, the Owner's right to proceed against the Contractor for additional damages or losses. Liquidated damages are for delay only and are in addition to any other rights available to the Owner by contract or law. To the fullest extent permitted by Laws and Regulations, the Contractor shall waive any defense as to the validity of such liquidated damages as set forth herein on the grounds that such liquidated damages are void as penalties or are not reasonably related to actual damages.

10.5. Weather shall be considered "unusually severe", only if a weather condition (or any combination of weather conditions) prevents the Contractor from working a number of workdays during a calendar month, which number exceeds the number of workdays listed below for that calendar month. Delays will only be allowed for the amount of lost work days in excess of the following:

January	6	July	4
February	4	August	3
March	4	September	3
April	3	October	3
May	4	November	3
June	4	December	5

10.6. The Contractor shall anticipate the potential loss of the number of workdays listed above for each calendar month due to weather, and shall schedule the Work accordingly. Any schedules submitted shall include the above number of days each month as lost days. The Owner shall determine, upon examination of submitted evidence, whether or not weather prevented the Contractor from performing Work on the days claimed by the Contractor. The Owner's determination shall be final and binding upon the parties.

10.7. The Work shall be considered complete when the following criteria have been met; all items of the Work have been constructed, inspected and accepted by the Owner and further that all punch list items have been corrected and the Owner has issued a letter of acceptance.

XI SEPARATE CONTRACTS BY OWNER

11.1. The Owner reserves the right to award other contracts in connection with the Project, the work under which may proceed simultaneously with the execution of this Agreement. The Contractor shall afford other separate contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and the Contractor shall take all reasonable action to coordinate its Work with theirs. If the work performed by the separate contractor is defective or so

performed as to prevent the Contractor from performing the Work, the Contractor shall immediately notify the Owner upon discovering such conditions. Upon receiving notification, the Owner shall take such appropriate steps as are necessary to allow the Contractor to perform Work under the Agreement, and appropriate extensions of time and change orders will be given to the Contractor, pursuant to the Agreement, to compensate for any delays and extra costs caused by separate contractor's performance.

XII INDEMNIFICATION

12.1. To the fullest extent permitted by Laws and Regulations, the Contractor shall indemnify and hold harmless the Owner, the Engineer, the Engineer's Consultants and officers, directors, employees, agents and other consultants of each and any of them from and against all claims, costs, losses and damages (including, but not limited to all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs) caused by, arising out of or resulting from the performance of the Work, provided that any such claim, cost, loss or damage: (i) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, and (ii) is caused in whole or in part by any negligent act, errors, omissions, recklessness, or intentionally wrongful conduct of the Contractor, any Subcontractor, any supplier, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not caused in part by any negligence or omission of a person or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws and Regulations regardless of the negligence of any such person or entity.

12.2. In any and all claims against the Owner or any of the Owner's consultants, agents, officers, directors, or employees by any employee (or the survivor or personal representative of such employee) of the Contractor, any Subcontractor, any supplier, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Contractor or any such Subcontractor, supplier or other person or organization under workers' compensation acts, disability benefit acts or other employee benefit acts.

12.3. The indemnification obligations of the Contractor shall not extend to the damages caused by the Owner and the Owner's consultants, officers, directors, employees or agents resulting from the negligent preparation or approval of, Drawings, or Specifications.

End of Section

SECTION 109

MEASUREMENT AND PAYMENT

I. PAYMENT PROCEDURES

1.1. Incidental Items

A. There are numerous incidental items of work that are required to complete the Project. While these items may not be specifically mentioned or illustrated by the Contract Documents and there may be no specific pay items listed for them, the Contractor will be required to perform those incidental tasks that can be anticipated through inspection of the Contract Documents, inspection of the construction area, and experience in this class of construction.

B. Items considered incidental work shall not be measured for payment or paid for as such unless specified as unit price by items on the bid form. These items and their costs shall be included in the unit prices or lump sum bid for the pay items unless bid separately. Incidental items include but are not limited to the following:

1. Allaying dust and mud
2. Daily cleanup
3. Excavation and dewatering
4. Furnishing, hauling, placing, manipulating, and compacting material
5. Location of existing utilities
6. Material royalties
7. Mobilization and demobilization
8. Offsite disposal of excess excavated, surplus and remnant excavated materials
9. Permits, unless provided by the Owner
10. Removal and replacement of existing signs, fences, mail boxes, and similar existing improvements
11. Site restoration and cleanup
12. Site security
13. Stakeout and surveying
14. Traffic control
15. Minor relocation of buried cables, gas lines, water lines, sewer lines, or similar utility lines 2 inches and smaller in diameter
16. Construction entrances
17. Pavement marking
18. Final Surface restoration
19. Top soil and seeding
20. Clearing and grubbing
21. Protection of existing utilities and other facilities.

1.2 Schedule of Values for Lump Sum Bid Items

A. Within fourteen (14) days after the Effective Date of the Agreement, the Contractor shall submit a schedule of values for all of the Work which shall include quantities and prices of items aggregating the Contract Price and shall subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices

shall include an appropriate amount of overhead and profit applicable to each item of Work. The Owner shall review the schedule and shall respond in writing to the Contractor within ten (10) Days either approving or disapproving the schedule. If the schedule of values is disapproved, the Contractor shall resubmit the schedule with revised value or additional substantiating data and the Owner shall either approve or disapprove the revised schedule within ten (10) Days. No payments shall be processed or approved until the schedule of values is approved by the Owner.

1.3 Application for Progress Payment by Contractor

A. Unless otherwise provided in this Section, the Owner shall make monthly progress payments to the Contractor on the basis of a duly certified and approved Application for Payment for Work performed during the preceding calendar month as approved by the Owner.

B. At least ten (10) Days before each partial progress payment (but not more often than once a month), the Contractor shall submit to the Owner an Application for Payment filled out and signed by the Contractor for the Work completed during the period covered by the partial progress payment estimate and supported by such data as is required by the Contract Documents.

C. The schedule of values for lump sum items established as provided in Section 109-1.2 shall serve as the basis for progress payments and shall be incorporated into a form of Application for Payment acceptable to the Owner.

1.4 Payment for Material on Hand

If payment is requested on the basis of materials and equipment not incorporated in the Work, but delivered and suitably stored at the site or at another location agreed to in writing, the Application for Payment shall be accompanied by a bill of sale, invoice or other instrument documenting that the materials and equipment are free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance, all of which will be satisfactory to the Owner. The Owner, at its sole discretion, may not pay for stored materials without prejudice and without cause.

1.5 Review of Applications for Progress Payments

A. The Owner shall, within ten (10) Days after receipt of each Application for Payment, make such investigations as deemed necessary to verify the accuracy of the Application for Payment and either accept the application as accurate and suitable for payment or return the Application to the Contractor indicating in writing the Owner's reasons for refusing payment. If payment is refused, the Contractor shall make the necessary corrections and resubmit the Application and the Owner shall have an additional ten (10) Days after receipt of the corrected Application for Payment from the Contractor to determine whether this Application is accurate and suitable for payment.

B. The Owner shall, within 30 Days after acceptance of the Application for Payment, make payment to the Contractor. The Owner may refuse to make payment of the full amount because claims have been made against the Owner on account of the Contractor's performance or furnishing of the Work, or because Liens have been filed in connection with the Work, or because there are other claims entitling the Owner to a set-off against the

payment. The Owner shall give the Contractor immediate written Notice stating the reasons for its failure to make payment.

C. The Owner may also refuse to make payment of the full amount because there are other items entitling the Owner to retain set-offs from the amount recommended, including but not limited to:

1. Owner compensation to the Engineer for actual costs for extra personnel hours for labor plus expenses because of the following Contractor caused events:

   a. Witnessing re-testing of corrected or replaced defective work.

   b. Return visits to manufacturing facilities to witness factory testing or re-testing.

   c. Evaluation of proposed substitutes and in making changes to Contract Documents occasioned thereby.

   d. Overtime worked by the Contractor necessitating the Engineer, Resident Project Representative (and support staff, if any), to work overtime.

2. Liability for liquidated damages incurred by the Contractor as set forth in the Agreement.

3. Loss to Owner caused by Contractor acts or omissions including, but not limited to:

   a. Defective Work not remedied;

   b. Claims filed or reasonable evidence indicating probable filing of claims against the Contractor;

   c. Failure of the Contractor to make payments properly to subcontractors or for materials or labor;

   d. A reasonable doubt that the Project can be completed for the balance then unpaid;

   e. Failure to maintain (each month) the record set of Drawings and Specifications. Failure to provide the Owner with record Drawings and Specifications within thirty (30) calendar Days from the date of the Substantial Completion;

   f. Failure to periodically remove and dispose of accumulated debris, rubbish, and discarded/damaged materials;

   g. Persistent failure to carry out the Work in accordance with the Contract Documents;

   h. A reasonable doubt that the Work will be completed within the Contract Time.

4. Failure of the Contractor to submit an updated progress schedule or other required supporting documentation (if requested by the Owner) to the Owner with the monthly application for progress payment.

1.6 Retained Funds

A. The Owner shall retain five percent (5%) of the total amount of each partial progress payment to assure faithful performance of the Agreement by the Contractor. The Owner will release all retainage upon Final Payment.

B. Pursuant to and in accordance with Section 2.2-4334 of the Code of Virginia, the Contractor may exercise the option to use the escrow account utilization procedure with respect to retained funds. The Contractor may do so by indicating its preference for this procedure in the appropriate space provided on the Bid Form.

1. Should this option be selected, the Contractor shall execute the Escrow Agreement and shall submit same to the Owner in the manner prescribed by law. If the Escrow Agreement form is not submitted as noted, the Contractor shall forfeit such rights to the use of the escrow account utilization procedure.

2. In order to have retained funds paid to an escrow account, the Escrow Agreement shall be executed by the Contractor, the escrow agent, and the surety, and shall be submitted by the Contractor to the Owner for approval by the Owner's attorney. The Contractor's escrow agent shall be a trust company, bank or savings institution with its principal office located in the Commonwealth of Virginia. The Escrow Agreement shall contain the complete address of the escrow agent and surety, and the executed Escrow Agreement will be authority for the Owner to make payment of retained funds to the Escrow Agent. After approving the Escrow Agreement, the Owner shall pay to the escrow agent the funds retained as provided herein except that funds retained for lack of progress or other deficiencies on the part of the Contractor shall not be paid to the Escrow Agent. The Escrow Agent may, in accordance with the terms of the Escrow Agreement, invest the funds paid into the escrow account and pay earnings on such investments to the Contractor or release the funds to the Contractor provided that such funds are fully secured by approved securities.

3. Retained funds invested and securities held as collateral for retainage may be released only as and when directed by the Owner. When the Final Payment is paid, the Owner shall direct to the Contractor monies due as determined by the Owner. The Owner reserves the right to recall retained funds and to release retained funds to the surety upon receipt of written request from the Contractor or in the event of default.

4. The escrow account procedure shall apply to any contract for the sum of Two Hundred Thousand Dollars ($200,000), or more, for construction of highways, roads, streets, bridges, parking lots, demolition, clearing, grading, excavating, paving, pile driving, miscellaneous drainage structures, and the installation of water, gas, sewer lines, and pumping stations.

1.7 Conditions of Payment to Contractor

A. All material and Work covered by partial progress payments shall thereupon become the sole property of the Owner, but this provision shall not be construed as relieving the Contractor from the sole responsibility for the safety and protection of all materials and Work upon which payments have been made or the restoration or replacement of any damaged or stolen Work or property or as a waiver of the right of the Owner to require the fulfillment of all the terms of the Agreement

B. Prior to Substantial Completion, the Owner, with the concurrence of the Contractor, may use any completed or substantially completed portions of the Work. Such use shall not constitute an acceptance of such portions of the Work.

C. The Owner shall have the right to enter the premises for the purpose of doing work not covered by the Contract Documents. This provision shall not be construed as relieving the Contractor of the sole responsibility for the care and protection of the Work, or the restoration of any damaged Work except such as may be caused by agents or employees of the Owner.

D. The Contractor shall indemnify and save the Owner or the Owner's agents harmless from all claims growing out of the lawful demands of Subcontractors, laborers, workmen, mechanics, material men, and furnishers of machinery and parts thereof, equipment, tools and all supplies, incurred in the furtherance of the performance of the Work. The Contractor shall, at the Owner's request, furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged, or waived. If the Contractor fails to do so the Owner may, after having notified the Contractor, either pay unpaid bills or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the Contractor shall be resumed, in accordance with the terms of the Contract Documents but in no event shall the provisions of this Section be construed to impose any obligations upon the Owner to either Contractor, the Surety, or any third party. In paying any unpaid bills of the Contractor, any payment so made by the Owner shall be considered as a payment made under the Contract Documents by the Owner to the Contractor and the Owner shall not be liable to the Contractor for any such payments made in good faith.

E. The Contractor shall take one of the two following actions within seven (7) days after receipt of amounts paid to the Contractor by the Owner for Work performed by the Subcontractor under the Agreement:

1. Pay to the Subcontractor the proportionate share of the total payment received attributable to the Work performed by the Subcontractor under the Agreement; or

2. Notify the Owner and Subcontractor, in writing, or his intention to withhold all or a part of the Subcontractor's payment with the reason for nonpayment.

F. All contracts awarded by the Contractor to a Subcontractor for any portion of the Work shall include:

1. An interest clause that obligates the Contractor to pay interest to the Subcontractor on all amounts owed by the Contractor that remain unpaid after seven (7) days following receipt by the Contractor of payment from the Owner for Work performed by the Subcontractor under that contract, except for amounts withheld as allowed.

2. An interest rate clause stating, "Unless otherwise provided under the terms of this contract, interest shall accrue at the rate of one percent per month."

3. A payment clause that requires (i) individual contractors to provide their social security numbers and (ii) proprietorships, partnerships, limited liability companies and corporations to provide their federal employer identification numbers.

G. The Contractor shall include in each of its subcontracts a provision requiring each Subcontractor to include or otherwise be subject to the same payment and interest requirements as specified in Section 1.7 above, with respect to each lower-tier Subcontractor.

H. A Contractor's obligation to pay an interest charge to a Subcontractor pursuant to the payment clause in this section may not be construed to be an obligation of the Owner. A contract modification may not be made for the purpose of providing reimbursement for such interest charge. A cost reimbursement claim may not include any amount for reimbursement for such interest charge.

1.8 Final Payment

After the Contractor has completed all corrective Work as determined by a final inspection to the satisfaction of the Owner and has delivered all maintenance and operations manuals, schedules, guarantees, bonds, certificates of inspection, and other documents as required by the Contract Documents, the Contractor may make application for final payment following the procedure for partial progress payments. Within thirty (30) days after approval, the Owner shall pay to the Contractor the amount stated, less all prior payments and advances to or for the account of the Contractor. All prior estimates and payments including those relating to extra Work shall be subject to correction by this payment, which is called the Final Payment. The Contractor's obligation to perform the Work and complete the Project in accordance with the Contract Documents shall be absolute. Neither approval of any progress or Final Payment by the Owner nor the issuance of a Certificate of Substantial Completion, nor any payment by Owner to Contractor under the Contract Documents, nor any use or occupancy of the Project or any part thereof by Owner, nor any act of acceptance by Owner nor any failure to do so, nor any correction of defective Work by Owner shall constitute an acceptance of Work not in accordance with the Contract Documents.

1.9 Acceptance of Final Payment Constitutes Release

The acceptance by the Contractor of the Final Payment shall be and operate as a release to the Owner of all claims and of all liability to the Contractor for all things done or furnished in connection with this Work excepting the Contractor's claims for interest upon Final Payment, should this payment be improperly delayed. No payment, final or otherwise, or partial or entire use or occupancy of the Work by the Owner, shall constitute an acceptance of any Work or materials not in accordance with the Contract Documents, nor shall the same relieve the Contractor of responsibility for faulty materials or workmanship or operate to release the Contractor or his Surety from any obligation under the Contract, the Performance Bond and Payment Bond.

1.10 Assignments

Neither party to the Agreement shall sell, transfer, assign or otherwise dispose of the whole or any parts of the Agreement or of the right, title or interest therein without the prior written consent of the

other, nor shall the Contractor assign any monies due or to become due hereunder, without the previous written consent of the Owner.

II CHANGE ORDERS AND FIELD ORDERS

2.1. The Owner may at any time, as the need arises, order changes within the scope of the Work without invalidating the Agreement. If such changes increase or decrease the amount due under the Contract Documents, or in the time required for performance of the Work, an equitable adjustment shall be authorized by Change Order.

2.2. The Contract Price and Contract Time may be changed only by a Change Order, approved by the Owner prior to the performance of the Work by the Contractor or granted by the Owner upon written Notice by Contractor submitted in accordance with Section 104-5.2 and 5.3 or Section 105-16.2. The value of any Work covered by a Change Order or of any claim for increase or decrease in the Contract Price or Contract Time shall be established in accordance with the following methods in the order of precedence listed below:

A. established contract unit prices;

B. an agreed lump sum or unit price established by direct negotiation between the Contractor and the Owner; or,

C. In the event that any changes in the Work are not settled under A. and B. above, the Contract Price shall be adjusted in accordance with the following:

1. In any case such change involves extra Work which is performed by the Contractor, the Contract Price shall be increased by (a) the direct cost of such Work, as mutually agreed upon or otherwise as determined in accordance with the Contract Documents, and (b) ten percent (10%) of the amount of (a) to cover Contractor's additional job (field and home office) overhead, and (c) five percent (5%) of the sum of (a) and (b) to cover Contractor's additional job profit.

2. In any case such change involves extra Work which is performed by a Subcontractor, the Contract Price shall be increased by (a) the amount paid by the Contractor to the Subcontractor for such extra Work, and (b) seven and one-half percent (7-1/2%) of the amount paid to the Subcontractor to cover the Contractor's additional job (field and home office) overhead and (c) five percent (5%) of the sum of (a) and (b) to cover Contractor's additional job profit. On Work performed by the Subcontractor, the Subcontractor shall be allowed overhead and profit in accordance with paragraph C(1) above.

3. In the case of either subparagraph 1 or 2 above, the Contract Price shall also be increased by the corresponding increase in the cost of the Contractor's performance bond.

2.3. It is the Contractor's responsibility to notify his Surety of any change affecting the general scope of the Work or change in the Contract Price and/or Contract Time so that the amount of the applicable Bonds shall be adjusted accordingly. The Contractor shall furnish proof of such adjustment to the Owner.

2.4. Whenever changes, alterations, additions, omissions, or revisions are called for by the Owner for which the necessary Drawings and details have been completed and submitted to the Contractor, or when changes, alterations, additions or omissions are clearly given in writing to the Contractor, the Contractor is to submit an itemized statement of quantities and prices incidental to such revisions, changes, additions and omissions.

2.5. The Owner may at any time order minor changes within the scope of Work and by issuing a Field Order. The Contractor shall proceed with the performance of any changes in the Work so ordered by the Owner unless the Contractor believes that such Field Order entitles the Contractor to a change in Contract Price or Time or both, in which event the Contractor shall give the Owner written Notice thereof within seven (7) calendar days after the receipt of the ordered change. The Contractor shall not execute such changes pending the receipt of an executed Change Order or further instruction from the Owner. The Owner shall respond to such written Notice from Contractor within twenty-one (21) calendar days after receipt.

2.6. If any item in the Agreement is determined to be unnecessary for the proper completion of the Work contracted, the Owner may, upon written Notice to the Contractor, eliminate such item from the Agreement. Payment will not be made for such item except that the Contractor shall be compensated for the actual cost of any Work performed for the installation of such item and the net cost of materials purchased, including freight and tax costs, as evidenced by invoice. No additional compensation will be made for overhead or anticipated profit.

2.7. The Contractor shall not be entitled to any adjustment in the Contract Price or Contract Time due to any condition or alleged condition if:

A. The Contractor knew of the existence of such conditions at the time the Contractor made a final commitment to the Owner in respect of Contract Price and Contract Time by the submission of a Bid; or

B. The existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test or study of the site and contiguous areas required by the Contract Documents to be conducted by or for the Contractor prior to the Contractor making such final commitment; or

C. The Contractor failed to give the written Notice within the time and as required by Section 104-5.2 and 5.3 or Section 105-16.2.

III CHANGE ORDER

No._____

DATE OF ISSUANCE _____ EFFECTIVE DATE_____

OWNER _____
CONTRACTOR _____
Contract _____
Project _____
OWNER'S Contract No. _____ ENGINEER'S Contract No. _____
ENGINEER_____

You are directed to make the following changes in the Contract Documents:

Description:

Reason for Change Order:

Attachments: (List documents supporting change)

CHANGE IN CONTRACT PRICE:
Original Contract Price $ _____
Net Increase (Decrease) from previous Change Orders No._____ to _____: $ _____ Contract Price prior to this Change Order: $ _____ Net increase (decrease) of this Change Order: $ _____
Contract Price with all approved Change Orders: $ _____

CHANGE IN CONTRACT TIMES:
Original Contract Times: Final Completion:_____ (days or dates)
Net change from previous Change Orders No._____ to No._____: Final Completion: _____ (days) Contract Times prior to this Change Order: Final Completion: _____ (days or dates) Net increase (decrease) of this Change Order: Final Completion: _____ (days)
Contract Times with all approved Change Orders: Final Completion: _____ (days or dates)

RECOMMENDED:

By: _____
ENGINEER(Authorized Signature)

Date: _____

APPROVED:

By: _____
OWNER(Authorized Signature)

Date: _____

ACCEPTED:

By: _____
CONTRACTOR(Authorized Signature)

Date: _____

IV APPLICATION FOR PAYMENT

PROJECT SUMMARY

Date:_____ Contractor's Name:_____
Project Name:_____ Project Number:_____

Original Contract Amount: $_____
Original Contract Time: _____ days
Adjusted Contract Amount (by approved Change Orders): $_____
Adjusted Contract Time (by approved Change Orders): _____ days
Adjusted Contract Completion Date: _____

STATUS OF WORK PERFORMED

Total Value of Original Work Performed to Date: $_____
Total Value of Change Order Work Performed to Date (with attachment): $_____
Total Value of All Work Performed to Date: $_____
Value of Materials Stored (Attach Statement): $_____
Less _____% Retained by Owner: $_____
Net Amount Earned on Contract to Date: $_____
Less Amount of Previous Payments Approved: $_____

BALANCE DUE THIS PAYMENT: **$_____**

Value of Work Remaining to be Completed: $_____
Percentage Complete to Date (Value/Time): _____% _____%

CERTIFICATION OF CONTRACTOR

I certify to the best of my knowledge and belief that all items and amounts on the face of the attached estimate and invoice and this Application for Payment are correct; that all Work has been performed and/or material supplied in full accordance with the terms and conditions of the Contract Documents, including all duly authorized deviations, substitutions, alterations, additions and/or deletions; that the foregoing is a true and correct statement of the Contract Price up to and including the last day of the period covered by this estimate and Application for Payment; that no part of the "BALANCE DUE THIS PAYMENT" has been received; that all previous Progress Payments received on this Agreement have been applied by the undersigned to discharge in full all obligations of the undersigned incurred in connection with the Work covered by prior applications for payment under this Agreement; and that all materials and equipment incorporated in said payment or otherwise listed in or covered by this Application for Payment are free and clear of all liens, claims, security interest and encumbrances.

APPROVALS

This Application for Payment has been checked, verified and approved for payment by:

Contractor	By	Title	Date
Resident Project Rep.	By	Title	Date
Engineer	By	Title	Date
Owner	By	Title	Date

V ESCROW AGREEMENT

THIS ESCROW AGREEMENT, made and entered into this_____day of _____, 20__, by, between and among the _____ (Owner) and _____(Contractor), and_____ (Bank), a trust company, bank, or savings and loan institution with its principal office located in the Commonwealth and _____ (Surety), provides:

5.1. The Owner and the Contractor have entered into an Agreement with respect to a Project titled _____ (the Agreement). This Escrow Agreement is pursuant to, but in no way amends or modifies the Agreement. Payments made hereunder or the release of funds from escrow shall not be deemed approval or acceptance of performance by the Contractor.

5.2. In order to assure full and satisfactory performance by the Contractor of its obligations under the Agreement, the Owner is entitled to retain certain amounts otherwise due the Contractor, known as retainage. The Contractor has, with the approval of the Owner, elected to have such retainage held in escrow by the Bank. This document 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 Agreement or any other instrument or agreement between the Owner and the Contractor.

5.3. The Owner shall from time to time pursuant to its Agreement pay to the Bank amounts retained by it under the Agreement. Except as to amounts actually withdrawn from escrow by the Owner, the Contractor shall look solely to the Bank for the payment of funds retained under the Agreement and paid by the Owner to the Bank.

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

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

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

A. Unites States Treasury Bonds, United States Treasury Notes, Unites States Treasury Certificates of Indebtedness or United States Treasury Bills;

B. Bonds, notes and other evidences of indebtedness unconditionally guaranteed as to the payment of principal and interest by the United States.

C. Bonds or notes of the Commonwealth of Virginia;

D. 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,

E. Certificates of deposit issued by commercial banks located within the Commonwealth, including, but not limited to, those insured by the Bank and its affiliates.

F. Any bonds, notes, or other evidences of indebtedness listed in Paragraphs A through C 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 on the date of the repurchase agreement 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.

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.

5.6. The Contractor may from time to time withdraw the whole or any portion of the escrowed funds by depositing with the Bank securities approved, in writing, by the Owner 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 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 chief administrative and financial official of the Owner, the Bank shall pay the principal of the fund, or any specified amount thereof, to the Owner. Such payment shall be made as soon as is practicable after receipt of the direction.

Upon receipt of a direction signed by either the chief administrative or the chief financial official on behalf of the Owner, the Bank shall pay and deliver the principal of the fund, or any specified portion thereof, to the Contractor, in cash or in kind, as may be specified by the Contractor. Such payment and delivery shall be made as soon as is practicable after receipt of the direction.

5.7. 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 Escrow Agreement shall be paid from the income earned upon the escrow fund and, if such income is not sufficient to pay the same, by the Contractor.

Under no circumstances shall the Owner be responsible to the Bank for any fee or costs of administering this Escrow Agreement, account, or escrow fund.

5.8. The net income earned and received upon the principal of the escrow fund shall be paid over to the Contractor in quarterly or more frequent installations. 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. All income earned shall be reported by the Bank to the Internal Revenue Service and other taxing authorities on the Contractor's Tax. I.D. Number, except for interest withdrawn by the Owner pursuant to paragraph IV.

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

WITNESS the following signatures, all as of the day and year first above written.

OWNER:

_____
Name of Owner

By: _____
Name

_____
Title

CONTRACTOR:

_____
Name of Contractor

_____
Contractor's Tax I.D. Number

By: _____
Officer, Partner, or Owner

BANK:

_____
Name of Bank

_____
Mailing Address for Payments

_____
Account Number

By: _____
President/Vice-President

SURETY:

_____
Name of Surety

By _____
Attorney-in-Fact

VI AFFIDAVIT OF PAYMENT OF CLAIMS

BY: _____(Contractor)

_____

_____

THIS DAY _____ personally appeared before me, _____, a Notary Public in and for the City/County/State of Virginia, and being by me first duly sworn states that all Subcontractors and suppliers of labor and materials have been paid all sums due them to date for work performed or materials furnished in the performance of the Agreement between:

_____(Owner)

and_____(Contractor)

dated _____, 20___, for the construction of _____

_____ or arrangements have been made by the Contractor satisfactory to such Subcontractors and suppliers with respect to the payments of such sums as may be due them by the Contractor.

_____
CONTRACTOR

BY: _____

TITLE: _____

DATE: _____

_____
SEAL OF CONTRACTOR

Subscribed and sworn to before me this
_____ day of _____, 20___.

My commission expires on the
_____ day of _____, 20___.

_____
NOTARY PUBLIC

_____
NOTARY SEAL

VII CERTIFICATE OF SUBSTANTIAL COMPLETION

Project Description: _____ Project No _____
_____ Other: _____
Location: _____ Completion Date: _____
_____ Contract Date: _____
Contract For: _____ Contractor: _____
Owner: _____

This Certificate of Substantial Completion applies to all Work under the Contract Documents or to the following specified parts thereof:

_____
_____
_____
_____

TO WIT: The Owner and Contractor are hereby advised that the work to which this certificate applies has been inspected by authorized representatives of the Owner, Contractor, and Engineer, and that all Work is hereby declared to be substantially complete in accordance with the Contract Documents on:

_____
Date of Substantial Completion

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive and the failure to include an item in it does not alter the responsibility of the CONTRACTOR to complete all items of the Work in accordance with the Contract Documents. When this certificate applies to a specified part of the Work, the items in this tentative list shall be completed or corrected by the CONTRACTOR within _____ days of the above date of substantial completion. The date of substantial completion is the date which all guarantees and warranties begin, except as follows:

_____
_____
_____
_____
_____

This certificate is issued, accepted, and acknowledged by:

_____	_____	_____	_____
Engineer	By	Title	Date
_____	_____	_____	_____
Contractor	By	Title	Date
_____	_____	_____	_____
Owner	By	Title	Date

VIII STATEMENT OF SURETY COMPANY

IN ACCORDANCE with the provisions of the AGREEMENT dated_____, 20___,

BETWEEN _____
(OWNER)

AND _____
(CONTRACTOR)

THE _____
(SURETY)

SURETY on the Material and Labor Payment BOND of:

_____
(CONTRACTOR)

after a careful examination of the books and records of said CONTRACTOR or after receipt of an affidavit from CONTRACTOR, which examination of affidavit satisfies SURETY that all claims for labor and materials have been satisfactorily settled, hereby approves of the final payment to the said _____, CONTRACTOR, and by these presents witnesseth that payment to the CONTRACTOR of the final estimates shall not relieve SURETY of any of its obligations to

_____
(OWNER)

as set forth in the said SURETY COMPANY'S BOND.

IN WITNESS WHEREOF, said SURETY has hereunto set its hand and seal this _____ day of _____, 20___.

ATTEST:

(SEAL) _____ BY _____
PRESIDENT

_____

NOTE: This statement, if executed by any person other than the President or Vice President of the Company, shall be accompanied by a certificate of even date showing authority conferred upon the person so signing to execute such instruments on behalf of the Company represented.

IX CONTRACTOR'S RELEASE

KNOW ALL MEN BY THESE PRESENTS THAT:

_____(Contractor)_____of _____ County/City and State of _____ does hereby acknowledge that he has received this day from the _____(Owner)_____the sum of One Dollar ($1.00) and other valuable consideration in full satisfaction and payment of all sums of money owing, payable and belonging to _____(Contractor)_____Dated _____, 20___.

NOW, THEREFORE, the said _____(Contractor)_____(for myself, my heirs, executors and administrators; for itself, its successors and assigns) do by these presents remise, release, quitclaim and forever discharge the said _____, Owner, its successors and assigns, of and from all claims and demands arising from or in connection with the said Agreement dated _____, 20____, and of and from all, and all manner of action and actions, cause and causes of action and actions, suits, debts, dues, duties, sum and sums of money accounts, reckonings, bonds, bills, specialties, covenants, contracts, agreements, promises, variances, damages, judgements, extents, executions, claims and demand, whatsoever in law or equity, or otherwise which against the said _____, Owner, its successors and assigns ever had, now have, or which (I, my heirs, executors, or administrators; it, its successors and assigns) hereafter can, shall or may have, for upon or by reason for any matter, cause or thing whatsoever, from the beginning of the world to the date of these presents.

IN WITNESS WHEREOF _____(Contractor)_____has caused these presents to be duly executed this _____ day of _____, 20____.

Signed, Sealed and Delivered
in the Presence of:

_____ CONTRACTOR_____
(SEAL)

BY:_____

_____
Title

_____
ATTEST:

_____
SECRETARY

X. MANHOLE/STRUCTURE PROTECTIVE COATING POST INSTALLATION CERTIFICATION

(Submit prior to Substantial Completion)

Project Name _____

Owner _____

Contractor _____

Agreement No. _____

Applicator _____

Company Name: _____

Address: _____

_____

Telephone: _____

I certify that the coating system identified below was installed in conformance with the manufacturer's recommendations at the conditions listed below.

_____ _____

Applicator Date

This applicator is certified by _____, Coatings Manufacturer, located at

_____

(Address)

and approved in the proper application of the specified coating system. The materials and workmanship for Type B (80 mil) coatings systems are warranted for a period of five (5) years from the date of Substantial Completion of the project.

_____ _____

Coatings Manufacturer Authorized Representative/Title Date

Coating System: _____

(Use Separate Form For Each Coating System Applied)

Date Applied	Manhole/ Structure Number	Actual Substrate Conditions			Ambient Air Conditions		Min/Max Recoat	Dry Film Thickness	
		CSP Rating	Temp. (°F)	Moisture (Yes/No)	Temp. (°F)	Humidity (%)	(Hrs/Hrs)	(Avg)	(Min)

Date Applied	Manhole/ Structure Number	Actual Substrate Conditions			Ambient Air Conditions		Min/Max Recoat	Dry Film Thickness	
		CSP Rating	Temp. (°F)	Moisture (Yes/No)	Temp. (°F)	Humidity (%)	(Hrs/Hrs)	(Avg)	(Min)

End of Section

SECTION 110

SPECIAL PROVISIONS

I. CONSTRUCTION DRAWINGS

Plans are the property of the City of Chesapeake, Virginia and shall not be used for any purposes other than those specified in these Contract Documents.

II. CHESAPEAKE CITY CODE REFERENCES

Certain sections of these Contract Documents contain references to the Chesapeake City Code. These shall refer to the *Chesapeake City Code* as adopted by Chesapeake City Council on March 22, 1994, with all amendments thereto through to the date of advertisement. Some references to the City Code may be by the Section Numbers in the previous 1970 edition. The corresponding section of the current edition may be found by consulting the "CODE COMPARATIVE TABLES" at the end of the Code. In any case, any such references to a section by its priorities (1970) number shall mean the corresponding section as numbered in the current code.

III. OTHER DATA

Appendix A includes a geotechnical report titled "Geotechnical Engineering Services, Battlefield Golf Club Water Project, Murray and Whittamore Roads, Chesapeake, Virginia" dated June 30, 2009, prepared by Schnabel Engineering, LLC. Appendix B includes a corrosion report titled "Corrosion Control Engineering Study, Battlefield Golf Club Water project, Murray and Whittamore Rd., Chesapeake, Virginia" dated October 2009, prepared by System Protection Services, Inc. These reports are for informational purposes only and should not be considered part of the contract documents. The opinions expressed represent the Geotechnical Engineer's and Corrosion Engineer's interpretation of the subsurface conditions, tests and results of analyses conducted. The Owner and Engineer shall not be responsible for the accuracy or completeness of the information. The Contractor shall be fully responsible for independent field test to verify the information and/or provide additional information the Contractor requires.

SECTION 807-CORROSION CONTROL is made a part of these specifications and is included after section 110

IV. MODIFICATIONS TO HAMPTON ROADS PLANNING DISTRICT COMMISSION (HRPDC) *REGIONAL CONSTRUCTION STANDARDS, FOURTH EDITION*

Prior to Construction, the Contractor is required to obtain a copy of the Hampton Roads Planning District Commission *Regional Construction Standards* (Fourth Edition), including Updates #1-4, from the Hampton Roads Planning District Commission located in Chesapeake, Virginia.

The following modifications, additions, or deletions to the HRPDC *Regional Construction Standards* are hereby incorporated into the contract documents.

MODIFICATIONS TO REGIONAL CONSTRUCTION STANDARDS				
Section	**Title**	**Page**	**Subsection**	**Modification**
101	General Definitions	101-3	1.28	References to "Owner" shall be construed to mean "The City of Chesapeake, Department of Public Utilities"
101	General Definitions	101-3	1.29	References to "Owner's Representative" shall be construed to mean "URS Corporation."
200	Products and Materials	200-1	II. 2.2	Add the following reference "City of Chesapeake Public Facilities Manual, Volume I, II, and III: PFM"
200	Products and Materials	200-20	5.2.B Tack Coat	Add the following: "Asphalt for tack coat shall consist of an emulsion and shall conform to the provisions of ASTM D-8 and VDOT Road And Bridge Specifications."
200	Products and Materials	200-21	5.3.B.2 Carrier Pipe	Replace B.2. with the following: "2. Skids and casing spacers shall be in accordance with Chesapeake Public Facilities Manual, Volume III, Division 56."
200	Products and Materials	200-21	5.4.B Clearing and Grubbing	Delete paragraph B
200	Products and Materials	200-46	5.9.H RipRap	Add the following: "H. Sand cement riprap in bags shall conform to the requirements of City of Chesapeake Public Facilities Manual, Volume II, Division 17.
200	Products and Materials	200-63	5.19.F.1.c Gate Valves	Add the following to paragraph c: "Brass Gate Valves (2") - For use on meter assemblies, 2-inch mains, and blow offs shall be NIBCO Model T113-T or approved equal. Valve shall be of the non-rising stem, solid wedge, "T"-handle type. Valve shall open left (counter-clockwise)."
200	Products and Materials	200-65	5.19.H.6 Fire Hydrants	Replace H.6 with: "6. Fire hydrants shall be Mueller Centurion - A421, American Darling Mark-73, Kennedy Guardian K-81, or M&H Reliant Style 929, Metropolitan 4-1/2"."
200	Products and	200-65	5.19.H	Add the following to H.:

MODIFICATIONS TO REGIONAL CONSTRUCTION STANDARDS				
Section	**Title**	**Page**	**Subsection**	**Modification**
	Materials		Fire Hydrants	"7. The hydrant shall be painted with an aluminum finish coat. 8. Operating nut shall turn clockwise to open hydrant. 9. Steamer nozzle shall be 4 ½ -inch."
200	Products and Materials	200-65	5.19.I.4 Appurtenances	Replace "4. Corporation Stops" with: "4. Corporation and Curb Stops" a. Corporation Stops: The corporation stops shall conform to the O.D. of the copper tubing of the required size service line. Inlet threads shall be AWWA standard inlet threads and conform to AWWA C800. The following Ford pack joint or Mueller compression type fittings to match service line O.D. shall be used. (1). Ford pack joint No. F-l000 for service lines 3/4 inch to 2 inch. (2). Mueller compression fitting No. H-15008 for service lines 3/4 inch to 1 inch and No. H-l5013 for service lines l-l/2 inch to 2 inch. b. Angle Curb Stops: The following types shall be used: (1). 5/8" x 3/4" x 3/4" Ford pack joint No. KV43-332 with 3/4" inlet and coupling nut for 3/4" meter or Mueller compression fitting No. H-14253 with 3/4" inlet and coupling for 3/4" meter. (2). 5/8" x 3/4" x 1" Ford pack joint No. KV43-342 with 1" inlet and coupling for 3/4" meter or Mueller compression fitting No. H-14253 with 1" inlet and coupling for 3/4" meter. c. Angle Flanged Valves: The following types shall be used: (1). 1-l/2" x l-l/2" x l-l/2" Ford No. FV43-66w with pack joint inlet or Mueller compression No. H-l4277 with compression inlet to match

MODIFICATIONS TO REGIONAL CONSTRUCTION STANDARDS				
Section	**Title**	**Page**	**Subsection**	**Modification**
				O.D. of l-l/2" tubing. (2). 2" x 2" x l-l/2" and 2" Ford No. FV43-777w with pack joint inlet or Mueller No. H-l4277 with compression inlet to match O.D. of 2" tubing."
200	Products and Materials	200-67	5.19.K1 Joint Restraint Devices	Replace K.1.2a and b., with the following: " 2a. Push-On Joints 1. 16" and Larger The restrained joint system shall be a manufacturer's standard restrained joint system as follows: a. Griffin Pipe SnapLock b. U.S. Pipe TR Flex c. American Pipe Flex Ring 2. Less then 16" The restrained joint system shall be the use of mechanical joint pipe with Megalug ductile iron glands (EBBA iron inc.) or Stargrip Series 3000 (Star Pipe Products 2b. Fittings Restrained Fittings shall be mechanical joint fittings with Megalug ductile iron glands (EBBA iron inc.) or Stargrip Series 3000 (Star Pipe Products).
200	Products and Materials	200-67	5.19.K.3 Joint Restraint Devices	Replace 3a with the following: " a. Bell and Spigot PVC Joints The restraint system shall be Series 1600/2800 ductile iron retainers as manufactured by EBBA Iron, Inc. or Stargrip Series 4000 manufactured by Star Pipe Product).
200	Products and	200-66	5.19.I.6	Add

MODIFICATIONS TO REGIONAL CONSTRUCTION STANDARDS				
Section	**Title**	**Page**	**Subsection**	**Modification**
	Materials		Appurtenances	"6. Automatic Blow-off Hydro-Guard Model HG-5-Air as manufactured by Environmental Enhancement & Technologies USA Inc. with self activating thermal control valve and declorination device."
200	Products and Materials	200-68	5.19.L Tapping Valves and Sleeves	Modify paragraph L as follows: L.2 Replace the second sentence with: "Valves shall be tapping flange mechanical joint bell unless shown otherwise on the plans. With the exception of seat rings and body flange, all other features of the valve shall be in accordance with the requirements for double disc gate valves." L.3 Replace second sentence with: "Cast sleeves for tapping cast iron pipe, shall be of gray cast iron meeting ASTM A126 Grade B, or ductile iron meeting ASTM A536 Grade 65-42-12. Cast tapping sleeves for use on all pipes shall be as manufactured by American Darling, Mueller Co., or approved equal." L.4 Add the following: "4. Exterior Coatings Exterior coatings shall be asphaltic varnish per Federal Specification TT-V-51, Military Specification MIL C-450, or the manufacturer's standard or optional coating as stated herein."
200	Products and Materials	200-69	5.19.M.7 Sleeves and Couplings	Add the following to M.: "7. Exterior Coatings Exterior coatings shall be asphaltic varnish per Federal Specification TT-V-51, Military Specification MIL C-450, or the manufacturer's standard or optional coating as stated herein."

MODIFICATIONS TO REGIONAL CONSTRUCTION STANDARDS				
Section	**Title**	**Page**	**Subsection**	**Modification**
200	Products and Materials	200-116	V.5.26.B.4 Aggregate	Replace paragraph B.4 with the following: 4. Subgrade Stabilization "Geotextile fabrics for roadbed stabilization. A woven polypropylene, polyethylene, or polyamide geotextile fabric meeting the following minimum properties shall be used: Tensile Strength 300 lbs.. (ASTM D-4632) Percent Elongation 15-35% (ASTM D-4632) Coefficient of Water Permeability 0.1 cm/sec (ASTM D-4491) Mullen Burst Strength 425 psi (ASTM D-3786) Puncture Strength 120lbs. (ASTM D-3787) Trapezoidal Tear Strength 100lbs. (ASTM D-4533) Abrasion Resistance 85 lbs. (ASTM D-4533) Each role of fabric must meet or exceed the above criteria."
301	Clearing and Grubbing	301-4	2.4.F Burning	Add 3., as follows: "3. This work shall be done in strict accordance with local, state, and federal laws controlling open burning. Prior approval and coordination must be handled by the Contractor with the City of Chesapeake Fire Department."
302	Drainage Structures	302-9	III. 3.2.F Measurement of Quantities	Replace 3.2.F with: "F. Reinstalled drainage pipe will not be measured and will be considered incidental to the cost of other bid items."
302	Drainage Structures	302-10	III. 3.3. Pay Items	Delete pay item for reinstalled pipe.
303	Earthwork	303-3	II.2.1.G. Undercut Excavation for Roadway	Add the following: "4. Undercut Excavation must conform to the following requirements for removal, disposal, replacement and compaction of select material:

MODIFICATIONS TO REGIONAL CONSTRUCTION STANDARDS				
Section	**Title**	**Page**	**Subsection**	**Modification**
			Excavation	A. When unsuitable material must be removed from an area of the project where undercut is not shown on the plans, unsuitable material removed after regular excavation will be measured as undercut excavation. Payment for undercut excavation will not be approved in roadway areas where materials encountered are consistent with properties reflected in the soil borings. B. The select Borrow II used to replace the unsuitable excavated material will be placed in uniform layers and must be mechanically compacted to a minimum density of ninety-five percent (95%) of its theoretical maximum density as per the plans and VTM-1 within the right-of-way at plus or minus twenty percent (20%) of its optimum moisture."
303	Earthwork	303-4	II.2.1.H. Demolition of Pavement, Structures and Base Removal for Areas in the Proposed Pavement.	Add the following: "3. Concrete driveways must be saw-cut as straight as possible prior to removal. 4. Those construction methods to be used in demolishing the existing pavement structure and to obscure the old roadway must be in accordance with VDOT Road and Bridge Specifications Section 508.02."
303	Earthwork	303-12	II.2.3.B. Tolerances	Replace paragraph B with "B. Slopes for the roadway, intersections, and entrances shall be graded to conform to the lines, grades, and typical cross section shown on the plans within the following tolerances: 1. Slopes less than or equal to 3:1 shall be grooved and shall not deviate from the plan surface by more than 0.5'. 2. Slopes greater than 3:1 shall be constructed to within an average deviation of 0.5' from the cross-sections for the side slopes. 3. All ditches must be graded to within 0.2' of its proposed invert as shown on the construction plans."
303	Earthwork	303-16	III.3.1.F. Measurement of Quantities	Add : "F. Saw Cut and Remove Pavement 1. Saw Cut and Removed Pavement will be measured in linear feet along the

MODIFICATIONS TO REGIONAL CONSTRUCTION STANDARDS				
Section	**Title**	**Page**	**Subsection**	**Modification**
				centerline of the utility the pavement is being removed to install. 2. Saw Cutting of the pavement, whether on both sides or on one side of the trench, will not be measured. 3. Pavement shall be removed to sub grade. 4. Aggregate base material can be incorporated into the trench backfill once backfill and compaction has progressed to at least 12-inches above the top of the utility. 5. Asphalt and concrete removed shall be legally disposed off site by the Contractor."
305	Subgrade and Shoulders	305-4	III. 3.2 Measurement of Quantities	Replace "A" with the following: "A. Shoulders will be measured for payment based on linear foot measured parallel to the roadway."
305	Subgrade and Shoulders	305-5	III. 3.3 Pay Items	Add: "D. Shoulders will be paid for at the contract bid price per linear foot to include all excavation, material, and compaction."
315	Asphalt Concrete Pavement Nonsuperpave	315-14	III. 3.2 Measurement of Quantities	Add: "I. Asphalt associated with Pavement Patching and Asphalt Overlay will be considered incidental. The cost will be included in the price for other appropriate pay items. J. Asphalt Driveway Replacement will be measured for **each** driveway that is open cut for pipeline installation. The limits of replacement will be as shown on the plans"
315	Asphalt Concrete Pavement Nonsuperpave	315-14	III. 3.3 Pay Items	Replace "A. Asphalt concrete (Type and Class):" with: "A. Asphalt Driveway Replacement." Replace A.2. "…ton or per square yard of the specified thickness in inches" with: "… for each asphalt driveway open cut for pipeline installation. The unit price bid shall include all excavation, removal of existing driveway, disposal of material off site, compaction, 6" of aggregate base material and 1 ½" of asphalt surface "
414	RIPRAP	414-4	II.2.5.B.	Replace " B. Dry Mixture", with:

MODIFICATIONS TO REGIONAL CONSTRUCTION STANDARDS				
Section	**Title**	**Page**	**Subsection**	**Modification**
			Concrete Rip in Bags	"B. Sand and Cement Riprap in Bags: 1. Shall be dry-mix in accordance with VDOT Road and Bridge Specifications Section 414.03(g)2. 2. Shall be installed at locations and in accordance with City Standard EC-2 of the Public Facilities Manual, Volume II. 3. All widening, regrading, and cutting of slopes to existing ditches will be at the locations and in accordance with the cross-sections and limits shown on the plans. 4. All erosion and sediment controls must be in place in accordance with Division 23 of Public Facilities Manual. 5. In Site Plan or Subdivision Development all existing interior and perimeter ditches shall be cleaned and graded to provide a positive grade and prevent standing water prior to acceptance."
502	Concrete Items	502-10	III. 3.4 Pay Items	Replace "J" with: "Concrete Walk Replacement will be incidental to the work and no payment will be made."
510	Relocating or Modifying Existing Miscellaneous Items	510-1	I. 1.2 Materials	Add: "E. Material Salvage: The disposal of all materials abandoned as a result of this work is the Contractor's responsibility; however, the Department of Public Utilities retains salvage rights to the following items: Water meters, meter boxes and lids, valve boxes and lids, fire hydrants and valve boxes. These items shall be delivered at the Contractor's expense, to: Department of Public Utilities Maintenance and Operations Division 906 Executive Blvd. Chesapeake, Virginia 23320"
512	Maintaining	512-10	II.2.1.K.	Add K.18 and K.19, as follows:

MODIFICATIONS TO REGIONAL CONSTRUCTION STANDARDS				
Section	**Title**	**Page**	**Subsection**	**Modification**
	Traffic		Procedures	"18. Contractor shall provide noise abatement measures to ensure compliance with the City noise ordinance, Chapter 16A. 19. Surface tolerance shall be installed and maintained in accordance with City of Chesapeake Standard PC-1 or until final acceptance of public improvements by the City."
530	Abandonment of Existing Pipelines and Structures	530-4	II.2.1. Procedures	Add: "H. Fire Hydrants All fire hydrants shall be removed from the abandoned line."
530	Abandonment of Existing Pipelines and Structures	530-5	III. 3.3 Pay Items	Replace paragraph A with: "A. Pipelines (Larger than 2-inch Diameter) Abandonment of existing pipe in place will be considered incidental to pipeline installation, and as such, no direct payment will be made."
530	Abandonment of Existing Pipelines and Structures	530-6	III. 3.3 Pay Items	Replace paragraph D with: "D. Meter Boxes: Abandonment of existing meter boxes will be considered incidental to pipeline installation, and as such, no direct payment will be made."
530	Abandonment of Existing Pipelines and Structures	530-6	III. 3.3 Pay Items	Add H: "H. Fire Hydrants Abandonment of existing fire hydrants will be considered incidental to pipeline installation, and as such, no direct payment will be made."
602	Topsoil	602-1	II. 2.1 Procedures	Add: "D. Topsoil shall be stripped from the areas to be excavated or graded and may be stockpiled in approved locations. Upon completion of backfilling or grading,

MODIFICATIONS TO REGIONAL CONSTRUCTION STANDARDS				
Section	**Title**	**Page**	**Subsection**	**Modification**
				topsoil shall be spread over disturbed areas as indicated on the plans to a minimum depth of two (2) inches. Where topsoil does not exist, the Contractor shall furnish an amount sufficient to cover the site to a minimum depth of two (2) inches. Topsoil available within excavated areas may be used."
704	Pavement Markings and Markers	704-6	III.3.1.	Replace A, B, and C with: "A. Pavement line markings and markers, including pavement marking material, surface preparation, daily log, guarding devices, primer sealer, glass beads, prismatic retroreflectors, pavement cutting, adhesive, and castings will be considered incidental to the price of the overlay and will not be measured for payment."
704	Pavement Markings and Markers	704-6	III.3.2 Pay Items	Replace 3.2 with: "Pavement line markings and markers will be considered incidental to the price of the overlay and will not be measured for payment."
801	Water Distribution Systems	801-2	I. 1.2 Submittals	Add: "D. Flushing sequence to be used prior to disinfection. In those cases where the installation or procedure proposed is not detailed on the plans or in the specifications; or a significant modification is required, the Contractor shall submit the following for review and approval by the Engineer: 1. Procedures and equipment to be used for pressure testing, leakage testing, and disinfection. 2. Detailed drawings and method of joint or pipe restraint. 3. Method of installing polyethylene tube or sheet material for pipe encasement 4. Detailed drawings of proposed modifications, off-sets or special fittings and method of installation."
801	Water Distribution	801-3	II. 2.2 Pipe Installation	Replace "D. Alignment and Grade" with:

MODIFICATIONS TO REGIONAL CONSTRUCTION STANDARDS				
Section	**Title**	**Page**	**Subsection**	**Modification**
	Systems			"D. Line and Grade: All pipes shall be laid to line and grade as shown on the plans and as specified herein. Normally, the grade at the top of the proposed pipeline is determined by surface grade and cover requirements. 1. Careful attention shall be given to the depth of new pipelines at points where tie-ins to existing mains are to be made. The existing main shall be uncovered in the presence of the Engineer and the new pipeline set to proper elevation to provide for a perpendicular and level tie-in. Obstructions within the tie-in length may require special offsets by the Contractor. 2. The Contractor shall investigate the proposed location of the main far enough in advance of the work to determine where conflicts will occur and to determine joint deflections necessary to clear any obstructions. The Engineer's approval is required if obstructions require the pipeline to be laid at a depth other than that specified on the plan for greater than 162 feet or outside of the range of 24" to 48". 3. PVC Pipe (C900) shall not be utilized if the depth of cover will be less than 30 inches unless otherwise specified on the plans."
801	Water Distribution Systems	801-4	II. 2.4.E Hydrant Installation	Add: "E. In addition to restrained joints, the fire hydrant assembly is to have tie-rods installed from mainline tee to hydrant. F. The tie-rods shall be coated with mastic compound. G. The entire assembly to receive the double polyethylene encasement."
801	Water Distribution Systems	801-6	II. 2.7.G Tapping Existing Mains Under Pressure	Modify G as follows: Replace G.5 with: "5. When, in the opinion of the Engineer, offsets or modifications to new pipeline alignment are required, sub-surface investigations, submittals for modifications, etc., shall be in accordance with the other requirements of this Division." Add:

MODIFICATIONS TO REGIONAL CONSTRUCTION STANDARDS				
Section	**Title**	**Page**	**Subsection**	**Modification**
				"8. Pressure Testing: In addition to pressure testing of newly installed pipelines, each tapping sleeve and valve assembly shall be tested prior to making the tap. Water shall be injected into the body of the sleeve, to a pressure of 125 psig, through the test plugs. If test plugs are not provided in the sleeve, a tapped mechanical joint plug shall be assembled to the valve for testing purposes. Pressure shall be maintained for a one-hour period without evidence of leakage. The Engineer must witness this test. A satisfactory test shall be completed before beginning the tapping (cutting) operation. 9. Restraint: Concrete buttresses shall restrain all installed tapping sleeves. Concrete dimensions for a tapping sleeve and valve shall be as tabulated for a tee fitting with like nominal diameters of run and branch. Fasteners and glands shall be coated with a bituminous coating or shielded with polyethylene film to prevent a bond between the concrete and the sleeve components. 10. Upon completion of the tie-in, it shall be flushed to remove the highly chlorinated water. One sample for bacteriological examination shall be collected from the point of discharge of the flushing water."
801	Water Distribution Systems	801-7	II. 2.7.I Offsets to Existing Water Main	Replace I.4 with: "4. Shut Down For Main Adjustment or Tie-ins: Main adjustment work shall be permitted only between eleven (11) p.m. and five (5) a.m. from Tuesday through Thursday. Contractor must coordinate this work with the Departments of Public Works, Public Utilities and Fire Department, and provide forty-eighty (48) hours notice prior to doing any such work. Contractor must notify the affected customers at least twenty-four (24) hours before the shut down of the water system. All fittings and pipe work necessary to complete the adjustment must be assembled and finished above ground prior to the shut down of the water system, unless otherwise approved by the Engineer."

MODIFICATIONS TO REGIONAL CONSTRUCTION STANDARDS				
Section	**Title**	**Page**	**Subsection**	**Modification**
801	Water Distribution Systems	801-9	II. 2.8. B Pressure Test	Add the following to 4: "4. …Water for pressure tests will be charged to the Contractor. The charge will be calculated using current rates for water consumption and will be metered at the source of supply."
801	Water Distribution Systems	801-10	II. 2.8. C Leakage Test	Replace C with: "C. Leakage Test: The leakage test shall be conducted concurrently with the pressure test. No leakage shall be allowed in order to pass the leakage test."
801	Water Distribution Systems	801-11	II. 2.8. D Disinfection	Modify D as follows: Add 1.c.: "c. Flushing shall progress in a logical sequence (approved by the Engineer) from the source of water to the end of the installation, without flushing dirty water through portions that have already been flushed. Water supply for the initial flushing and flushing after chlorination shall be furnished from the City water system, with charges to the Contractor rendered as noted above." Add: "8. Sampling Taps: The Contractor shall provide sampling taps as specified in Section 9.2 of AWWA Specification C-651. A minimum of two (2) sampling taps shall be located as directed for any pipe being sterilized less than l000 feet. For pipe installation greater than l000 feet the Contractor shall provide one (l) tap for each l000 feet of, or fraction thereof, plus one (l) tap. The standpipes with wheel valves or cut offs attached to the water mains to facilitate testing shall not be exposed above ground at any time. They should be

MODIFICATIONS TO REGIONAL CONSTRUCTION STANDARDS				
Section	**Title**	**Page**	**Subsection**	**Modification**
				enclosed in a box below ground. After completion of the tests the wheel valve and the standpipe shall be removed. The standpipe shall be removed by cutting off at the corporation tap."
801	Water Distribution Systems	801-13	II. 2.8. D.5 Bacteriological Tests	Replace "5. Bacteriological Tests", with: "5. Bacteriological Tests: The Contractor shall provide all equipment and materials for disinfection and testing for chlorine residual. Chlorine residual testing shall be done by either the DPD or Amperometric Titration methods. A minimum of two samples taken 24 hours apart shall be collected from each section of pipeline and delivered to the Department of Public Utilities for testing purposes. All samples must successfully pass bacteriological testing prior to placing the pipeline in service. If additional testing is required, the Contractor is responsible for the water main and testing at no additional cost to the City until the samples pass the above requirements. Chlorine residual measurements shall be taken and recorded at the time each sample is collected. If the line is not activated within three weeks of the date of the final sample passed, the line shall be re-sampled in accordance with above. If any sample fails, the entire pipeline shall be re-disinfected in accordance with this Section."
801	Water Distribution Systems	801-14	3.2.D Measurement of Quantities	Modify D as follows: "Measurement of service lines (Single or Dual; Open Cut or Jack-and-Pulled Type Construction) will be based upon each service line installed including the meter box."
801	Water Distribution Systems	801-14	3.2. F Measurement of Quantities	Add F, as follows: "Reconnections made to existing private water services at the meter box shall be considered incidental to other items of work."
801	Water Distribution	801-15	3.3. B Pay Items	Add 20:

MODIFICATIONS TO REGIONAL CONSTRUCTION STANDARDS				
Section	**Title**	**Page**	**Subsection**	**Modification**
	Systems			"20. Tie rods coated with mastic compound and double polyethylene encasement from mainline tee to hydrant."
801	Water Distribution Systems	801-16	III. 3.3.G Water Meter Box	Delete " G. Water Meter Box, installed complete in place." Combine payment for the installation of each water service line and the meter box installed as a single bid item. (See below)
801	Water Distribution Systems	801-16	III. 3.3.I Type K Copper Service Lines (Jack and Pull Construction)	Replace I., as follows: "I. Type K Copper Service Lines (Jack and Pull Construction) and Water Meter Box, installed complete in place. Payment will be made at the unit price bid for each service line and meter box installed and will include the cost of the following: 1. Backfill, compaction, and compaction testing 2. Dewatering 3. Disinfection 4. Excavation of jacking and receiving pits 5. Jack and pull operation 6. Sampling and flushing 7. Temporary sheeting and bracing 8. Testing 9. Type K Copper service lines and all fittings to connect to water main including angle meter valve and corporation stop at each separate service. 10. Meter box, meter yoke and all required appurtenances. The water meter shall not be included."
801	Water Distribution Systems	801-17	III. 3.3.J Type K Copper Service Lines (Open Cut Construction)	Replace J, as follows: "J. Type K Copper Service Lines (Open Cut Construction) and Water Meter Box, installed complete in place. Payment will be made at the unit price bid for each service line and meter box

MODIFICATIONS TO REGIONAL CONSTRUCTION STANDARDS				
Section	**Title**	**Page**	**Subsection**	**Modification**
				installed and will include the cost of the following: 1. Backfill, compaction, and compaction testing 2. Dewatering 3. Disinfection 4. Excavation 5. Sampling and flushing 6. Temporary sheeting and bracing 7. Testing 8. Type K Copper service lines and all fittings to connect to water main including angle meter valve, tapping saddle, and corporation stop at the end of each separate service line. 9. Meter box, meter yoke and all required appurtenances. The water meter shall not be included."
801	Water Distribution Systems	801-18	III.3.3.Q Private Service Relocations	Add: " Q. Private Service Relocations Private service relocations will use the same pipeline materials (Type K Copper or approved equal) as contained in the right of way for "public" water service lines and will be installed in accordance with the International Building Code. Measurement and payment will be performed in the same manner (per Each basis)."
801	Water Distribution Systems	801-18	III.3.3.R Automatic Blow-off	Add: "R. Automatic Blow-off Payment will be made at the unit price bid per each delivered to the Department of Public Utilities Maintenance & Operations Division 906 Executive Boulevard Chesapeake, VA 23320
801	Water	801-18	III.3.3.S	Add:

MODIFICATIONS TO REGIONAL CONSTRUCTION STANDARDS				
Section	**Title**	**Page**	**Subsection**	**Modification**
	Distribution Systems		Water Line Stream Crossing	"S. Water Line Stream Crossing Payment will be made at the lump sum bid for the stream crossing from station 65+53 to station 67+75 installed. The lump sum bid shall include the cost of the following: 1. Excavation 2. Sheeting and Shoring 3. Dewatering and controlling water in stream 4. Ductile Iron pipe and all fittings 5. Double Polyethylene Encasement of pipe 6. Bedding 7. Backfill and compaction 8. Stream restoration 9. Seeding 10. Disposal offsite of Surplus Material
802	Sanitary Gravity Sewer Systems	802-13	II. 2.5 Sewer Laterals	2.5 Sewer Laterals, as follows: "Sewer laterals shall be installed per Section 821, Sanitary Sewer Service Reconnections, for reconnections on replacement segments."
802	Sanitary Gravity Sewer Systems	802-16	III. 3.3.G. Pay Items	Replace G with the following: "G. Manhole Frame and Cover, installed complete in place Frame and cover assembly, including manhole stainless steel insert ("Rainstopper" or equal), and riser as required, shall be paid at the unit price bid for each."
802	Sanitary Gravity Sewer Systems	802-16	III. 3.3.J Pay Items	Replace J with the following: "J. Remote Camera/TV Inspection Where required to satisfy the testing requirements where other methods of testing

MODIFICATIONS TO REGIONAL CONSTRUCTION STANDARDS				
Section	**Title**	**Page**	**Subsection**	**Modification**
				are not feasible, the Owner may permit remote camera/TV inspection, in accordance with Section 811, to substitute for testing of the gravity sewer system. Remote camera/TV inspection will not be measured and will be considered incidental to the cost of other bid items, therefore, no direct payment will be made."
821	Sanitary Sewer Service Reconnections	821-6	III.3.2	Replace 3.2 Measurement of Quantities, A. and B., with "Measurements shall be per Section 802.III.3.2"
822	Manhole Rehabilitation	822-7	II.2.6 Manhole Frame Sealing	Add: "Additional Contract Document details for Manhole Frame Sealing includes the following: A. Internal Manhole Frame Sealant: Internal manhole frame sealant shall be Flex-Seal, or equal, and shall be composed of a corrosion resistant aromatic flexible urethane resin coating to be applied to the internal wall of the adjustment ring area. 1. The Aromatic Urethane Resin Liner Primer shall have the following minimum requirements: **Test** — **Property** — **Results** ASTM-D-1004 — Tear Resistance — 210 lb. l/in ASTM-D-903 — Adhesive Strength — 400 lb. l/in ASTM-D-412 — Tensile Strength — 3,200 psi ASTM-D-442 — Elongation — 400% ASTM-D-2240 — Hardness — 85 2. The Aromatic Urethane Resin Liner Final Coat shall have the following minimum requirements: **Test** — **Property** — **Results** ASTM-D-1004 — Tear Resistance — 155 lb. l/in

MODIFICATIONS TO REGIONAL CONSTRUCTION STANDARDS				
Section	**Title**	**Page**	**Subsection**	**Modification**
				ASTM-D-903 Adhesive Strength 175 lb. l/in ASTM-D-412 Tensile Strength 1,150 psi ASTM-D-442 Elongation 800% ASTM-D-2240 Hardness 75 B. Application of Manhole Frame Sealant: 1. The Contractor shall be certified by the sealant manufacturer. 2. The adjustment ring area under the casting shall receive a thickened flexible urethane to achieve a minimum thickness of 120 mils. 3. The liner shall be applied by spray, brush, or trowel 3 inches above the bottom of the frame, and shall cover the entire adjustment ring area to 3 inches below the bottom adjustment ring."

HRPDC REGIONAL CONSTRUCTION STANDARDS DETAILS

The pertinent HRPDC Standard Details below (with modifications, if any) shall apply. If not included below, refer to the City's PFM.

DETAIL	*NAME*	*NOTES*
RC_01	Pavement Patching Detail for Flexible Pavement	1. "Surface Per Design" to be 1.5" SM-2A and 4" BM-2 [See Plan Detail Sheet] 2. "Base Per Design" to be 6" Aggregate No. 21 or 21A [See Plan Detail Sheet] 3. Backfill to be Select Fill from top of Bedding to Bottom of Base Material 4. Reference Detail EW_03 for Trench Width 5. Reference Detail EW_01 for Pipe Bedding.
RC_02	Utility Locations	
EW_01	Pipe Bedding Details (Type II Required)	The width of select bedding stone will be based on the inside pipe diameter plus two (2) feet. The depth required will be six (6) inches for pipes less than forty-eight (48) inches and one (1) foot for larger pipe sizes or as determined by the Engineer. (PFM Volume II/Division 16 – Bidding Material (Drainage and Utility Pipe).
CI_01	24" Curb and Gutter	1. Expansion joints to be installed at ends of returns, at inlets, entrances, at the ends of all radial curbs (curbs having a radius of 300' or less), and at intervals not exceeding 100', pre-molded ½" joint filler is to be used. 2. Any aspects of the curb and gutter construction not covered hereon is to be per the current VDOT Road and Bridge Specifications, Sec. 316 and 502.

WD_01	Single and Dual Service Connections	1. Detail applies for meters up to 1 inch. 2. Water meters to be set between curb and sidewalk in areas where they are provided. 3. All ¾" taps on ductile iron mains 4" and larger, and PVC mains 6 inch and larger must be tapped without a tapping saddle. 1" taps are to be direct tapped on ductile iron and PVC water mains 6" and larger. Tapping saddles are required for taps on 4 inch PVC mains and all AC mains, and must conform to the specifications. 1 ½" taps are to be direct tapped on ductile iron mains 16" and larger and 2" taps are to be direct tapped on ductile iron mains 20" and larger. All other 1 ½" taps must use a saddle that conforms with the specifications. 4. Service piping to be appropriate for the size meters being installed. 5. Dual service installations to be used only in townhouse projects.
WD_02	Water Service Installation	1. All ¾" taps on ductile iron mains 4" and larger, and PVC mains 6 inch and larger must be tapped without a tapping saddle. 1" taps are to be direct tapped on ductile iron and PVC water mains 6" and larger. Tapping saddles are required for taps on 4 inch PVC mains and all AC mains, and must conform to the specifications. 1 ½" taps are to be direct tapped on ductile iron mains 16" and larger and 2" taps are to be direct tapped on ductile iron mains 20" and

		larger. All other 1 ½" taps must use a saddle that conforms with the specifications. 2. Minimum service depth to be 30 inches.
WD_03	Water Meter Box (Type I)	1. Only Type 1 meter boxes to be used. 2. Bricks to be installed at each end of the meter box but shall not come in contact with the copper service line. Tracer wire to be wrapped twice around service connections.
WD_05	Blow Off Assembly	3. Three inch nipple between check valve and blow off assembly to be 2-inches in diameter. 4. Blow off assembly to be supplied by Kupferle Foundry (Mainguard No. 78), not Gil Industries. 5. Fire Hydrants installed as blow offs shall be installed as shown on detail WD_06, WD_07, or WD_08 as shown on the plans.
WD_06	Fire Hydrant Setting (Type I)	1. No thrust block to be installed on the tee for the hydrant. 2. Valves to be MJ X MJ and located 3 feet from the water main. 3. Minimum distance behind curb to be 18 inches. 4. 90° bend to be MJ X MJ. Foster Adaptors may be used at each end.
SS_01	Standard Precast Concrete Manhole w/ Extended Monolithic Base	Replace note 6 and add the following notes: 1. No laterals allowed in cone section without approval of the Utility Engineer. 2. A minimum of one 4 inch adjustment ring to be added at time of construction to allow for future adjustments.

		3. Casting to be placed over the outlet pipe. 4. Watertight insert to be provided with casting in accordance with Volumes I & III of PFM.
SS_02	Precast Concrete Shallow Manhole	1. A minimum of one 4 inch adjustment ring to be added at time of construction to allow for future adjustments. 2. After grouting lift holes they shall be field coated as noted in note 3. 3. Casting to be placed over the outlet pipe. 4. Special designs required for manholes less than 30 inches from rim to invert. 5. Watertight insert to be provided with casting in accordance with Volumes I & III of PFM.
SS_04	Sanitary Sewer Interior Drop Manhole	1. ½ pipe diameter PVC cap to be placed in the location shown.
SS_08	Connection Into Existing Manholes	
SS_09	Sanitary Sewer Manhole Casting (24")	1. Watertight insert to be provided with casting in accordance with Volumes I & III of PFM.
SS_10	Sanitary Sewer Manhole Cover (24")	
SS_14	Sanitary Sewer Service Connection	1. The wye shall be located at the property line. 2. Lateral pipe material shall be in accordance with Volume I & III PFM.
SS_16	Deep Sanitary Sewer Service Connection	Replace note 1 and add note 2: 1. Lateral material to be the same as the mainline pipe. 2. The remainder of the service lateral shall conform to the requirements of SS-14.
SS_19	Manhole Insert (Update #4)	
WS_01	Standard Valve Box Frame and Cover	
WS_02	Valve Setting Detail	1. Delete note 1. 2. Two bricks are to be placed under the riser for the valve to provide support.

		3. Remove stone bedding from around valve and replace with sand. 4. Replace the #57 stone under the valve box frame with #26A stone. 5. The riser pipe shall be centered over the valve nut and installed perpendicular to the pipeline. 6. All valves are to be set so that the valve stem is plumb.
WS_03	Manual Air Vent Assembly	1. An 8" gap shall be provided between the main and the bottom of the riser pipe. 2. Two bricks are to be placed under the riser pipe for the valve to provide support. 3. Replace the #57 stone above the main with sand. 4. Replace the #57 stone under the valve box frame with #26A stone. 5. The air vent pipe shall be set plumb. 6. All ductile iron mains and PVC mains 6" and larger must be tapped without a tapping saddle. Tapping saddles are required for taps on 4" PVC mains and must conform to the specifications.
WS_06	Obstruction Bypass Uniform Offset	

SECTION 807
Corrosion Control Specifications

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 protection of the proposed pipelines.

B. Installation of corrosion control components shall be in accordance with the following Specifications and the Plans. The Engineer or authorized Chesapeake, VA representatives shall approve all installation practices and components.

1.02 SUBMITTALS

A. First Product Data: Submit manufacturer catalog cuts or other descriptive information for the specific materials required on this project for approval.
   1. Electrical Separator
   2. Dielectric Coating
   3. Polyethylene Encasement
   4. Heat Shrink Sleeve

PART 2 PRODUCTS

2.01 EXTERNAL COATING FOR MECHANICAL JOINTS

A. General Requirements
   1. All coatings used on the project shall be from the same manufacturer and as specified herein, unless otherwise approved by the Engineer prior to bidding. All products comprising the completed coating system shall be compatible and the same products shall be used throughout the project.

B. Field Applied Heat Shrink Sleeves – Mechanical Joints (Ductile Iron Pipeline System)
   1. Approved Manufacturers: CANUSA, The Woodlands, Texas

2. Materials: High performance cross-linked polyolefin wraparound shrink sleeve and closure seal.

C. Trenton Wax Coating – (PVC Pipeline System)
1. Approved Manufacturer: Trenton Wax Corporation

2.02 DIELECTRIC COATING

A. Approved Manufacturers
1. Royston Company, Pittsburgh, PA: Roskote A938
2. Carboline, Pittsburgh, PA: Bitumastic No. 50

B. Materials: The field-applied external coating shall be a fast drying (within 2 hours) cold applied mastic with high electrical resistivity (2.12 X 1013 ohms-cm) and 58.6% solids by volume. The coating system shall include a compatible primer, as required by the manufacturer. The external coating shall be applied as follows:

1. Harnesses, tie rods, saddles, iron and steel anchors, and other connecting hardware.
2. Pipe embedded in concrete anchor blocks or otherwise in contact with concrete, extending through concrete, and adjacent 6 inches in both directions.

2.03 POLYETHYLENE ENCASEMENT

A. Approved manufacturers:
1. Van Leer/REPCOR
2. AA Thread Seal Tape, Inc.

B. Materials: ANSI/AWWA C105/A21.5, Class B, Seamless 4 mils thick high-density cross-laminated polyethylene. Flat tube form, minimum width based on nominal pipe diameter in accordance with recommendations by Ductile Iron Pipe Research Association.

2.18 ELECTRICAL SEPARATOR

A. Stuart Rock Stop

B. Approved Manufacturer
   1. Stuart Steel Corporation

2.19 HEAT SHRINK SLEEVES

A. Approved Manufacturers

   1. Canusa-CPS, The Woodlands, TX

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 the pipe shall be on padded 12-inch wide (minimum) skids or selected 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 the 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.

H. Clearance of Piping to Other Structures

1. Twelve (12) inches of natural clearance shall be maintained between the Ductile Iron piping and other metallic structures, where possible. When twelve (12) inches of clearance cannot be maintained, install a high density Rock Stop electrical separator secured with non-metallic tape to the water main and between the foreign metallic structures.

I. Concrete Buttresses, Support Blocks, Thrust Anchors

1. Reinforcing rods shall be positioned in the construction of support blocks, anchor blocks and other concrete structures so that they are not in contact with the piping. A minimum of two (2) inches of spacing shall be maintained between all reinforcing steel and the pipe and any pipe anchors.
2. When placing concrete in direct contact with ductile iron piping, apply the Dielectric 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 Dielectric coating and apply a coat of approximately 12 mils of coating to the piping surface. Coating shall be applied to all pipe areas coming in contact with concrete. Also the coating shall extend 6 inches beyond the concrete in both directions. Allow the coating to dry to touch (approximately 20 minutes) and apply a second coat of mastic of approximately 12 mils in thickness. Allow the second coating to dry (approximately 20 minutes) before placing the concrete.

J. Polyethylene Encasement (for ductile iron pipe) shall be in accordance with AWWA C105.

1. High-density cross laminated polyethylene film (minimum 4 mil thickness) or linear low density polyethylene film (minimum 8 mil thickness).
2. Polyethylene flat tube: meet appropriate width for size of pipe installed following AWWA C105, Method A.

3. Flat sheet polyethylene shall be used for wrapping odd shaped appurtenances following AWWA C105, secured with polyethylene compatible adhesive tape.
4. All ductile iron buried water main and fittings, including sleeves and valves shall be wrapped with polyethylene encasement.

Appendix A

Geotechnical Engineering Services
Battlefield Golf Club Water Project
Murray and Whittamore Roads
Chesapeake, Virginia

Project 08330106.00.03
June 30, 2009

Schnabel

Schnabel Engineering, LLC

Schnabel Engineering, LLC

300 Ed Wright Lane, Suite I
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June 30, 2009

Mr. Robert Sciacchitano, P.E.
URS Corporation
277 Bendix Road, Suite 500
Virginia Beach, Virginia 23452

Subject: 08330106.00.03 Geotechnical Engineering Services, Battlefield Golf Club Water Project, Murray and Whittamore Roads, Chesapeake, Virginia

Dear Robert:

Schnabel Engineering, LLC is pleased to submit this report concerning subsurface exploration and soils laboratory testing for the Murray and Whittamore Roads site. This letter report addresses Phase II in our proposal dated September 16, 2008 and our Proposal Addendum No. 3 dated March 23, 2009.

PROJECT DESCRIPTION

The project includes the design of a new water pipeline along the south side of Murray Road and either in the right of way or along the south side of Whittamore Road in Chesapeake, Virginia. Existing grades along the south shoulder of Murray Road vary from about El 14.0 near Centerville Turnpike to El 9.8 near Whittamore Road. Existing grades along Whittamore Road vary from about El 15.8 to El 8.2. The new water pipeline along Murray Road may be installed to a depth up to about 4 ft below existing grades and a depth up to about 5 ft on Whittamore Road. This study consisted of test borings, hand auger probes, soil sampling, water observation well installation and soil laboratory testing.

SUBSURFACE EXPLORATION

Geology

We reviewed existing geologic data and information in our files. Based on this review, the site is underlain by Pleistocene Age alluvial soils of the Lynnhaven member of the Tabb Formation to the depths investigated. These formations typically consists of interlayered fine- and coarse-grained soils. The fine-grained soils generally consist of clays and silts containing varying amounts of sand. These soils are generally normally to slightly preconsolidated. Poorly graded sands, silty sands and clayey sands usually make up the coarse-grained soils. The coarse-grained soils may contain gravel.

Data Collection Techniques

A total of nine soil test borings were drilled at the Whittamore Road site on June 16, 2009. Each test boring was drilled in the right of way through asphalt paving. The test borings were advanced to depths of 10 ft. A total of 17 hand auger probes were performed along Murray and Whittamore Roads. Eight hand auger probes (HA-1 through HA-8) were excavated along the south shoulder of Murray Road and nine hand auger probes (HA-9 through HA-17) were excavated along the south shoulder of Whittamore Road along the proposed water line alignment. The locations for the hand augers were provided by URS. The hand auger probes were excavated from the existing ground surface. Data collected from the test borings and hand auger probes were used to evaluate the existing subgrade soils in the alignment of the proposed water line. Test boring and hand auger logs and the Boring and Hand Auger Location Plans are included in Appendix A.

Generalized Subsurface Strata

We have characterized the following generalized subsurface soil stratigraphy based on the test boring data presented in Appendix A:

Surface Materials: Approximately 0.2 to 0.4 ft of asphalt and 0.2 to 0.6 ft of base course was encountered at the ground surface of the borings. Approximately 0.1 to 0.6 ft of rootmat and topsoil was encountered at the hand auger probes.

Stratum A: Existing FILL soils, designated as Stratum A, were encountered in Borings B-1, B-2, B-3 and B-9 from below the asphalt paving and base course to depths of about 0.8 to 2 ft and at Hand Augers HA-1 and HA-3 through HA-10, HA-13, HA-16 and HA-17 from below the rootmat and topsoil to depths of about 0.8 to 2.4 ft. These soils consist of loose to firm density, fine to

coarse silty sand FILL, loose to compact density fine coarse poorly graded sand with silt FILL, firm density fine to medium clayey sand FILL and very soft to medium consistency lean clay with sand FILL. The fill also contained a small amount of crushed stone.

Stratum B: Stratum B soils consist of fine and coarse grained soils of the TABB FORMATION. Stratum B soils were encountered below the fill material, asphalt and base course, and rootmat and topsoil to the full depth of exploration, 10 ft.

Stratum B1: The fine grained soils of Stratum B1 consist of medium stiff to stiff consistency FAT CLAY with sand (CH), medium stiff to very stiff consistency LEAN CLAY (CL) with varying amounts of sand, medium to stiff consistency ELASTIC SILT with sand (MH) and soft to stiff consistency sandy SILT (ML).

Stratum B2: The coarse grained soils of Stratum B2 consist of loose to compact density fine to medium SILTY SAND (SM), firm density fine to medium and fine to coarse POORLY GRADED SAND WITH SILT (SP-SM), firm to compact density fine to medium POORLY GRADED SAND (SP) and firm density fine to medium CLAYEY SAND (SC).

Groundwater

The logs note groundwater level readings obtained in the borings during and after completion. Groundwater was initially encountered in each test boring at depths of about 2.0 to 8 ft. Groundwater was encountered in the majority of the hand auger probes at depths from 0.0 to 4.8 ft. Water Observation Wells (W.O.W.s) were installed in twelve of the hand auger probes. Groundwater measurements obtained from the W.O.W.s are indicated in the table below. Water levels were referenced to the existing ground surface. The W.O.W.s were removed from the ground once the static water levels were obtained.

GROUNDWATER TABLE

Well Number	Date	Water Depth (ft)	Approximate Elevation	Time
HA-1	6-25-09	2.8	9.2	10:08
HA-3	6-25-09	2.9	6.1	10:02
HA-4	6-25-09	3.0	6.0	10:00
HA-5	6-25-09	3.5	6.0	9:58
HA-6	6-25-09	3.4	5.6	9:55
HA-8	6-25-09	3.1	6.9	9:52

Well Number	Date	Water Depth (ft)	Approximate Elevation	Time
HA-9	6-25-09	1.6	11.9	9:30
HA-11	6-25-09	0.8	9.7	9:38
HA-13	6-25-09	4.4	5.1	9:41
HA-14	6-25-09	DRY	----	9:43
HA-15	6-25-09	4.9	4.1	9:48
HA-17	6-25-09	2.2	8.0	9:51

SOIL LABORATORY TESTING

Soil samples were collected from 1 to 4 ft at Hand Augers HA-1 through HA-8 and from 2 to 5 ft at HA-9 through HA-17 for Corrosion Potential Series testing. This testing included: natural moisture content, pH, oxidation reduction potential, resistivity and sulfides. Bulk samples were collected from approximately 0.7 to 5 ft below the ground surface from Borings B-2, B-7 and B-9 for laboratory testing. The bulk soil samples were tested for natural moisture content, Atterberg Limits, and gradation Standard Proctor and California Bearing Ratio (CBR). Test results for the bulk samples were not completed for this report and will be issued in about one week. Thirty-two additional samples were tested in the soils laboratory for one or more of the following tests; natural moisture content, Atterberg Limits and gradation. The summary of soil laboratory test results, including corrosion potential testing and laboratory test curves are included in Appendix B. Natural moisture content values of samples tested are also shown on the respective hand auger and test boring logs in Appendix A.

GEOTECHNICAL RECOMMENDATIONS

Subgrade Preparation

The pipeline subgrades generally appear to be firm, and only limited undercutting in the trench is anticipated. If soft or loose subgrades are encountered during excavation, undercut may be needed. Because the depth of undercut needed at any given location may vary from the recommended average, the Geotechnical Engineer should evaluate the actual undercut depths. The excavated materials may be replaced with crushed stone or crushed concrete meeting the gradation requirements of VDOT No. 57 open-graded aggregate. We recommend evaluating undercut volumes by cross sectioning (if necessary). Other methods of calculating volumes of undercut, such as counting trucks, are less accurate and generally result in additional expense. All excavated soils should be placed a suitable distance from the trench sidewall to reduce the potential for caving of the sidewalls.

The natural sands of Stratum B1 encountered in the test borings are generally of firm density. These sands may exhibit characteristics of "running sands" when excavated below the water table. The contractor should be prepared to work with running sand conditions. This condition may also affect horizontal drilling and bore-and-jack techniques.

Recompaction of disturbed or loose soils in place is expected to be difficult near or below the water table. The excavated soils may need to be scarified and dried before they can be reused as compacted backfill. The natural moisture content values of the soils tested ranged from about 6.0 to 28.5 percent.

Once the subgrade of the bottom of the trench is prepared, the pipe should be bedded according to manufacturer's specifications. Backfill should also be placed according to manufacturer's recommendations.

Compacted Structural Backfill

The non-organic, coarse grained, on-site soils will generally be considered suitable for reuse as compacted structural backfill for pipelines in roadways, driveways, sidewalks and in non-structural areas such as grassed and wooded areas, provided the in-place moisture is within the optimum moisture range. If off-site borrow soils are needed, they should classify SC, SM, SP, SW, GC, GM, GP or GW per ASTM D 2487. Stratum A soils may also be reused as compacted structural backfill provided they are free of deleterious materials, such as root fragments, burnt wood, organic matter, etc. The Geotechnical Engineer should evaluate the fill soils before they are placed.

For the "direct bury" waterline, successful reuse of the excavated soils as compacted fill will depend on the natural moisture contents encountered during excavation. Natural moisture contents of the fine grained Stratum B1 soils recorded in the laboratory were generally above estimated optimum moisture contents for the soil types tested.

We recommend compacted structural fill be placed as pipe backfill in roadway, driveway and sidewalk areas. Compacted structural fill should be placed in maximum 8-inch thick horizontal, loose lifts and be compacted to at least 95 percent of maximum dry density per ASTM D 698, Standard Proctor. Where the pipe manufacturer's backfill requirements differ than those recommended in this report, the manufacturer's requirements shall govern.

CONSTRUCTION CONSIDERATIONS

Earthwork

The soils along the pipeline route are susceptible to moisture changes and may be difficult to compact during wet weather. We recommend performing the earthwork phases of this project during the warmer, drier times of the year. Drying of these soils may result in some delay, and drying may not be possible during late fall and winter. Therefore, we recommend performing the earthwork during the warmer, drier times of the year.

The Contractor should provide site drainage to maintain subgrades free of water and to avoid saturation and disturbance of the subgrade soils before placing fill. This will be important during all phases of the construction work. We expect the subgrade soils to be wet and easily disturbed. The Contractor should recompact, or remove and replace, any weakened or wet subgrade soils as recommended by the Geotechnical Engineer.

We anticipate that the Contractor will encounter groundwater during pipeline installation. Groundwater was encountered in each of the test borings drilled along the pipeline route with long term readings at depths of about 1.6 to 5 ft below the ground surface. Perched groundwater may be encountered along areas of the pipeline where the low permeability soils of Stratum B1 are encountered near the ground surface. Accordingly, the Contractor should anticipate groundwater during excavation for the "direct bury" water line. We anticipate that sump pits within the excavation or well points may be able to control the groundwater. Dewatering should be the responsibility of the Contractor.

Since running sands may be encountered during the excavation, a trench box will likely be required to maintain the open trench.

Engineering Services During Construction

The nature and extent of variations between borings may not become evident until construction. To account for this variability, professional observation, monitoring and testing of actual subsurface conditions during construction should be provided as an extension of our engineering services. These services will also help in evaluating the Contractor's conformance with the plans and specifications. Because of our unique position to understand the intent of the geotechnical engineering recommendations, retaining us for these services will allow us to provide consistent service through the project construction.

General Specification Recommendations

An allowance should be established to account for possible additional costs that may be required to during pipeline installation. Additional costs may be incurred for various reasons, including variation of soil between test borings, greater than anticipated unsuitable soils, need for borrow fill material, wet on-site soils, obstructions, temporary dewatering, etc.

We recommend that the construction contract include add/deduct unit prices and allowances for the following:

- Scarifying and drying of wet soils along the proposed pipeline route.
- Undercutting soft or loose near-surface soils and replacing with compacted structural fill.

The project specifications should indicate the Contractor's responsibility for providing adequate site drainage during construction. Inadequate drainage will most likely lead to disturbance of soils during trench excavation and increased volume of undercut.

Specifications should indicate the Contractor's responsibility for reworking of subgrades and compacted fill initially considered suitable, but later disturbed by equipment and/or weather. This report may be made available to prospective bidders for informational purposes. We recommend that the project specifications contain the following statement:

> "A geotechnical engineering report has been prepared for this project by Schnabel Engineering, LLC. This report is for informational purposes only and should not be considered part of the contract documents. The opinions expressed represent the Geotechnical Engineer's interpretation of the subsurface conditions, tests and the results of analyses conducted. Should the data contained in this report not be adequate for the Contractor's purposes before bidding, the Contractor may make independent exploration, tests and analyses. This report may be examined by bidders at the office of the Owner."

LIMITATIONS

The analyses and recommendations submitted in this report are based on the information revealed by our subsurface exploration. An attempt has been made to provide for normal contingencies, but the possibility remains that unexpected conditions may be encountered during construction.

This report has been prepared to aid in the evaluation of this site and to assist in the design of the project. It is intended for use concerning this specific project. Our recommendations are based on information on the site and proposed construction as described in the beginning of this report. Substantial changes in locations or grades should be brought to our attention so we can modify our recommendations as needed. We would appreciate an opportunity to review the plans and specifications as they pertain to the recommendations contained in this report and to submit our comments to you based on this review.

We have endeavored to complete the services identified herein in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality and under similar conditions as this project. No other representation, express or implied, is included or intended, and no warranty or guarantee is included or intended in this report or other instrument of service.

We appreciate the opportunity to be of service on this project. If you have any questions, please do not hesitate to contact us.

Very truly yours,
SCHNABEL ENGINEERING, LLC

Russell W. Rountree

Russell W. Rountree
Senior Staff Scientist

Gilbert T. Seese, P.E.
Principal

COMMONWEALTH OF VIRGINIA
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PROFESSIONAL ENGINEER

RWR:GTS:dah

Appendices:

Appendix A – Subsurface Exploration Data
Appendix B – Soil Laboratory Test Data

APPENDIX A

Subsurface Exploration Data

Subsurface Exploration Procedures
General Notes for Subsurface Exploration Logs
Identification of Soils
Hand Auger Logs (HA-1 through HA-17)
Test Boring Logs (B-1 through B-9)
Location Plans (13 Sheets)

SUBSURFACE EXPLORATION PROCEDURES

Boring Procedures

Drillers advanced the borings using mud rotary drilling techniques. Driller's mud is used to maintain an open bore hole. The hole was advanced by using a nominal 3-inch O.D. tri-cone roller bit. At the designated depth, drillers removed the roller bit and performed the Standard Penetration Test. Water level data indicated on the logs may not be indicative of actual groundwater levels because of the presence of drilling fluid in the borehole.

Standard Penetration Test Results

The numbers in the Sampling Data column of the boring logs represent Standard Penetration Test (SPT) results. Each number represents the blows needed to drive a two-inch O.D., 1⅜ inch I.D. split-spoon sampler six inches, using a 140-pound hammer falling 30 inches. The sampler is typically driven a total of 18 or 24 inches. The first six-inch interval usually represents a seating interval. The total of the number of blows for the second and third six-inch intervals is the SPT "N value." When the blow count reaches 100 before the full driving distance, we determine the SPT N value based on extrapolation of the blows recorded. The SPT is conducted according to ASTM D 1586.

Hand Augers

Our personnel drilled the hand augers using a three-inch O.D. auger. We visually classified the soils encountered according to ASTM D 2488. Geostick penetrometer readings were taken during excavation. Geostick penetrometer readings give a general indication of the soil's in-place density or consistency. Geostick penetrations are shown in the Remarks columns as "GP=."

Soil Classification Criteria

The group symbols on the logs represent the Unified Soil Classification System Group Symbols (ASTM D 2487) based on visual observation and limited laboratory testing of the samples. Criteria for visual identification of soil samples are included in this appendix. Some variation may be expected between samples visually classified and samples classified in the laboratory.

Pocket Penetrometer Results

The values following "PP= " in the "Tests" column of the logs represent pocket penetrometer readings. Pocket penetrometer readings provide an estimate of the unconfined compressive strength of fine-grained soils.

Water Observation Wells

Temporary water observation wells were installed in Hand Auger Nos. HA-1, HA-3, HA-4, HA-5, HA-6, HA-8, HA-9, HA-11, HA-13, HA-14, HA-15 and HA-17 by inserting a hand-slotted 0.75 inch PVC pipe in each of these hand augers. Each pipe was capped, and the area surrounding the pipe was backfilled with cuttings from the hand auger.

Boring Locations and Elevations

Our personnel staked the test borings by taping from existing features. Figures 1 through 13 show the approximate test boring locations. We scaled ground surface elevations at the test boring locations from the site plans by URS dated March 20, 2009. Project planning should consider these locations and elevations no more accurate than the methods and plans used to obtain them.

SCHNABEL ENGINEERING
GENERAL NOTES FOR SUBSURFACE EXPLORATION LOGS

1. Numbers in sampling data column next to Standard Penetration Test (SPT) symbols indicate blows required to drive a 2 inch O.D., 1-3/8 inch I.D. sampling spoon 6 inches using a 140 pound hammer falling 30 inches. The Standard Penetration Test (SPT) N value is the number of blows required to drive the sampler 12 inches, after a 6 inch seating interval. The Standard Penetration Test is performed in general accordance with ASTM-1586.

2. Visual classification of soil is in accordance with terminology set forth in "Identification of Soil." The ASTM D-2487 group symbols (e.g. CL) shown in the classification column are based on visual observations.

3. Estimated ground water levels indicated on the logs are only estimates from available data and may vary with precipitation, porosity of the soil, site topography, and other factors.

4. Refusal at the surface of rock, boulder, or other obstruction is defined as an SPT resistance of 100 blows for 2 inches or less of penetration.

5. The logs and related information depict subsurface conditions only at the specific locations and at the particular time when drilled or excavated. Soil conditions at other locations may differ from conditions occurring at these locations. Also, the passage of time may result in a change in the subsurface soil and ground water conditions at the subsurface exploration location.

6. The stratification lines represent the approximate boundary between soil and rock types as obtained from the subsurface exploration. Some variation may also be expected vertically between samples taken. The soil profile, water level observations and penetration resistances presented on these logs have been made with reasonable care and accuracy and must be considered only an approximate representation of subsurface conditions to be encountered at the particular location.

7. Key to symbols and abbreviations:

S-1, SPT - Sample No., Standard Penetration Test
5+10+1 - Number of blows in each 6-in increment

UD-1, UNDIST - Sample No., 2" or 3" Undisturbed Tube Sample
REC=24", 100% - Recovery in inches, Percent Recovery

C-1, CORE - Core No., Rock Core
Run = 5.0 ft - Run Length in feet
REC = 60" 100% - Recovery in inches, Percent Recovery
RQD = 60" 100% - RQD in inches, Percent RQD

MC - Moisture Content

PP - Pocket Penetrometer Reading (tsf)

FID - Flame Ionization Detector Reading (ppm)

PID - Photoionization Detector Reading (ppm)

GP - Geostick Penetration Reading (inches)

LL - Liquid Limit

PL - Plastic Limit

TPH - Total Petroleum Hydrocarbons

SCHNABEL ENGINEERING
IDENTIFICATION OF SOILS

I. DEFINITION OF SOIL GROUP NAMES (ASTM D-2487)

			SYMBOL	GROUP NAME
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels – More than 50% of coarse fraction retained on No. 4 sieve Coarse, ¾" to 3" Fine, No. 4 to ¾"	Clean Gravels Less than 5% fines	GW	WELL GRADED GRAVEL
			GP	POORLY GRADED GRAVEL
		Gravels with fines More than 12% fines	GM	SILTY GRAVEL
			GC	CLAYEY GRAVEL
	Sands – 50% or more of coarse Fraction passes No. 4 sieve Coarse, No. 10 to No. 4 Medium, No. 40 to No. 10 Fine, No. 200 to No. 40	Clean Sands Less than 5% fines	SW	WELL GRADED SAND
			SP	POORLY GRADED SAND
		Sands with fines More than 12% fines	SM	SILTY SAND
			SC	CLAYEY SAND
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays – Liquid Limit less than 50 Low to medium plasticity	Inorganic	CL	LEAN CLAY
			ML	SILT
		Organic	OL	ORGANIC CLAY
				ORGANIC SILT
	Silts and Clays – Liquid Limit 50 or more Medium to high plasticity	Inorganic	CH	FAT CLAY
			MH	ELASTIC SILT
		Organic	OH	ORGANIC CLAY
				ORGANIC SILT
Highly Organic Soils	Primarily organic matter, dark in color and organic odor		PT	PEAT

II. DEFINITION OF SOIL COMPONENT PROPORTIONS (ASTM D-2487)

			Examples
Adjective Form	GRAVELLY SANDY	>30% to <50% coarse grained component in a fine-grained soil	GRAVELLY LEAN CLAY
	CLAYEY SILTY	>12% to <50% fine grained component in a coarse-grained soil	SILTY SAND
"With"	WITH GRAVEL WITH SAND	>15% to <30% coarse grained component in a fine-grained soil	FAT CLAY WITH GRAVEL
	WITH GRAVEL WITH SAND	>15% to <50% coarse grained component in a coarse-grained soil	POORLY GRADED GRAVEL WITH SAND
	WITH SILT WITH CLAY	>5% to <12% fine grained component in a coarse-grained soil	POORLY GRADED SAND WITH SILT

III. GLOSSARY OF MISCELLANEOUS TERMS

SYMBOLS ..... Unified Soil Classification Symbols are shown above as group symbols. A dual symbol "-" indicates the soil belongs to two groups. A borderline symbol "/" indicates the soil belongs to two possible groups.

FILL ..... Man-made deposit containing soil, rock and often foreign matter.

PROBABLE FILL ..... Soils which contain no visually detected foreign matter but which are suspect with regard to origin.

DISINTEGRATED ROCK (DR) ..... Residual materials with a standard penetration resistance (SPT) between 60 blows per foot and refusal. Refusal is defined as a SPT of 100 blows for 2" or less penetration.

PARTIALLY WEATHERED ROCK (PWR) ..... Residual materials with a standard penetration resistance (SPT) between 100 blows per foot and refusal. Refusal is defined as a SPT of 100 blows for 2" or less penetration.

BOULDERS & COBBLES ..... Boulders are considered rounded pieces of rock larger than 12 inches, while cobbles range from 3 to 12 inch size.

LENSES ..... 0 to ½ inch seam within a material in a test pit.

LAYERS ..... ½ to 12 inch seam within a material in a test pit.

POCKET ..... Discontinuous body within a material in a test pit.

MOISTURE CONDITIONS ..... Wet, moist or dry to indicate visual appearance of specimen.

COLOR ..... Overall color, with modifiers such as light to dark or variation in coloration.

Schnabel Engineering, LLC

HAND AUGER LOG

Project: Battlefield Golf Club Water Project - Centerville Turnpike

Location: Murray and Whittamore Roads, Chesapeake, Virginia

Project No: 08330106.00.03

SEI Representative: Russell Rountree **Hand Auger No:** HA-1

Date: 6/19/09 **Ground Surface Elevation:** 12.0 ±

Time: 2:40 PM **Groundwater Elevation:** 9.2

Equipment: Hand Auger

Depth (ft)	Elev. (ft)	Strata Description	Stratum	Remarks
		Rootmat and topsoil		
~0.3	~11.7	FILL sampled as firm density, fine to medium silty sand (SM), contains roots, moist - grayish brown	A	FILL GP @ 1 ft = 1/2"
~1.2	~10.8	Firm density, fine to medium silty sand (SM), moist - light brown do, orangish brown below 1.5 ft	B2	Soil samples collected from 1 to 4 ft for Corrosion Potential Series testing. GP @ 2 ft = 1/2" MC= 17.2% TABB FORMATION
~2.8	~9.2	Firm density, fine to medium poorly graded sand with silt (SP-SM), wet - orangish brown do, light brown below 3.6 ft		GP @ 3 ft = 1"
~4.0	~8.0			GP @ 4 ft = 1/2"
		Hand Auger Terminated at 4.0 ft		

Comments:
3/4" PVC Water Observation Well (W.O.W.) Installed to 4 ft Upon Completion.
Water Level Reading 6/25/09: 2.8 ft (El 9.2)

Reviewed By: GTS Date: 06/30/09

Schnabel Engineering, LLC

HAND AUGER LOG

Project: Battlefield Golf Club Water Project - Centerville Turnpike

Location: Murray and Whittamore Roads, Chesapeake, Virginia

Project No: 08330106.00.03

SEI Representative: Russell Rountree **Hand Auger No:** HA-2

Date: 6/19/09 **Ground Surface Elevation:** 9.5 ±

Time: 3:08 PM **Groundwater Elevation:** 6.6

Equipment: Hand Auger

Depth (ft)	Elev. (ft)	Strata Description	Stratum	Remarks
		Rootmat and topsoil	B1	Soil samples collected from 1 to 4 ft for Corrosion Potential Series testing. MC=19.0% GP @ 1 ft = 1" TABB FORMATION
~0.2	~9.3	Stiff consistency, LEAN CLAY (CL), moist - grayish brown		
~2.1	~7.4	Stiff consistency, fine to medium sandy silt (ML), moist - light orangish gray		GP @ 2 ft = 1"
		do, wet below 2.9 ft		GP @ 3 ft = 1-1/2"
~4.0	~5.5			GP @ 4 ft = 2"
		Hand Auger Terminated at 4.0 ft		

Comments:
Hand Auger Hole Backfilled Upon Completion.

Reviewed By: GTS Date: 06/30/09

Schnabel Engineering, LLC

HAND AUGER LOG

Project: Battlefield Golf Club Water Project - Centerville Turnpike

Location: Murray and Whittamore Roads, Chesapeake, Virginia

Project No: 08330106.00.03

SEI Representative: Russell Rountree **Hand Auger No:** HA-3

Date: 6/19/09 **Ground Surface Elevation:** 9.0 ±

Time: 3:29 PM **Groundwater Elevation:** 5.6

Equipment: Hand Auger

Depth (ft)	Elev. (ft)	Strata Description	Stratum	Remarks
		Rootmat and topsoil		
~0.3	~8.7	FILL sampled as stiff consistency, lean clay with sand (CL), contains roots, moist - orangish brown do, contains crushed stone below 0.8 ft	A	FILL GP @ 1 ft = 1"
~1.2	~7.8	Firm density, fine to medium silty, clayey sand (SC-SM), moist - orangish gray	B2	Soil samples collected from 1 to 4 ft for Corrosion Potential Series testing. GP @ 2 ft = 1" MC=21.6% TABB FORMATION GP @ 3 ft = 1"
~3.4	~5.6	Medium stiff consistency, lean clay with sand (CL), wet - orangish gray	B1	
~4.0	~5.0	Hand Auger Terminated at 4.0 ft		GP @ 4 ft = 1-1/2"

Comments:
3/4" PVC Water Observation Well (W.O.W.) Installed to 4 ft Upon Completion.
Water Level Reading 6/25/09: 2.9 ft (El 6.1)

Reviewed By: GTS Date: 06/30/09

Schnabel Engineering, LLC

HAND AUGER LOG

Project: Battlefield Golf Club Water Project - Centerville Turnpike

Location: Murray and Whittamore Roads, Chesapeake, Virginia

Project No: 08330106.00.03

SEI Representative:	Russell Rountree	**Hand Auger No:**	HA-4
Date:	6/19/09	**Ground Surface Elevation:**	9.0 ±
Time:	3:57 PM	**Groundwater Elevation:**	8.4
Equipment:	Hand Auger		

Depth (ft)	Elev. (ft)	Strata Description	Stratum	Remarks
		Rootmat and topsoil		
~0.3	~8.7	FILL sampled as medium stiff consistency, lean clay with sand (CL), moist - brown	A	FILL MC=18.7%
		do, wet below 0.6 ft		
~1.1	~7.9	Medium stiff consistency, fine to medium sandy silt (ML), contains roots, moist - orangish brown		GP @ 1 ft = 3" Soil samples collected from 1 to 4 ft for Corrosion Potential Series testing. GP @ 2 ft = 2"
			B1	TABB FORMATION
		do, wet below 2.9 ft		
		do, soft consistency below 3 ft		GP @ 3 ft = 8"
~4.0	~5.0			GP @ 4 ft = 7"
		Hand Auger Terminated at 4.0 ft		

Comments:
3/4" PVC Water Observation Well (W.O.W.) Installed to 4 ft Upon Completion.
Water Level Reading 6/25/09: 3.0 ft (El 6.0)

Reviewed By: GTS Date: 06/30/09

Schnabel Engineering, LLC

HAND AUGER LOG

Project: Battlefield Golf Club Water Project - Centerville Turnpike

Location: Murray and Whittamore Roads, Chesapeake, Virginia

Project No: 08330106.00.03

SEI Representative: Russell Rountree **Hand Auger No:** HA-5

Date: 6/19/09 **Ground Surface Elevation:** 9.5 ±

Time: 4:18 PM **Groundwater Elevation:** 6.6

Equipment: Hand Auger

Depth (ft)	Elev. (ft)	Strata Description	Stratum	Remarks
		Rootmat and topsoil		
~0.3	~9.2	FILL sampled as firm density, fine to medium clayey sand (SC), contains roots, moist - brown	A	FILL
~1.1	~8.4	Firm density, fine to medium silty sand (SM), moist - light orangish brown	B2	GP @ 1 ft = 1/2" Soil samples collected from 1 to 4 ft for Corrosion Potential Series testing. GP @ 2 ft = 1" TABB FORMATION
~2.9	~6.6	Medium stiff consistency, fine to medium sandy silt (ML), wet - light orangish brown	B1	GP @ 3 ft = 1-1/2"
~4.0	~5.5			GP @ 4 ft = 1-1/2"
		Hand Auger Terminated at 4.0 ft		

Comments:
3/4" PVC Water Observation Well (W.O.W.) Installed to 4 ft Upon Completion.
Water Level Reading 6/25/09: 3.5 ft (El 6.0)

Reviewed By: GTS Date: 06/30/09

Schnabel Engineering, LLC

HAND AUGER LOG

Project: Battlefield Golf Club Water Project - Centerville Turnpike

Location: Murray and Whittamore Roads, Chesapeake, Virginia

Project No: 08330106.00.03

SEI Representative:	Russell Rountree	**Hand Auger No:**	HA-6
Date:	6/19/09	**Ground Surface Elevation:**	9.0 ±
Time:	4:30 PM	**Groundwater Elevation:**	8.1
Equipment:	Hand Auger		

Depth (ft)	Elev. (ft)	Strata Description	Stratum	Remarks
		Rootmat and topsoil		
~0.3	~8.7	FILL sampled as firm density, fine to medium clayey sand (SC), contains roots, moist - brown	A	FILL
		do, wet below 0.9 ft		GP @ 1 ft = 1"
~1.2	~7.8	Stiff consistency, fine to medium sandy silt (ML), wet - orangish brown	B1	Soil samples collected from 1 to 4 ft for Corrosion Potential Series testing. GP @ 2 ft = 1" TABB FORMATION
~2.9	~6.1	Firm density, fine to medium silty sand (SM), wet - orangish brown	B2	GP @ 3 ft = 1-1/2"
~4.0	~5.0			GP @ 4 ft = 1"
		Hand Auger Terminated at 4.0 ft		

Comments:
3/4" PVC Water Observation Well (W.O.W.) Installed to 4 ft Upon Completion.
Water Level Reading 6/25/09: 3.4 ft (El 5.6)

Reviewed By: GTS Date: 06/30/09

Schnabel Engineering, LLC

HAND AUGER LOG

Project: Battlefield Golf Club Water Project - Centerville Turnpike

Location: Murray and Whittamore Roads, Chesapeake, Virginia

Project No: 08330106.00.03

SEI Representative: Russell Rountree **Hand Auger No:** HA-7

Date: 6/19/09 **Ground Surface Elevation:** 9.5 ±

Time: 4:47 PM **Groundwater Elevation:** 8.6

Equipment: Hand Auger

Depth (ft)	Elev. (ft)	Strata Description	Stratum	Remarks
		Rootmat and topsoil		
~0.3	~9.2	FILL sampled as firm density, fine to medium clayey sand (SC), contains roots, moist - gray	A	FILL MC=19.3%
~0.9	~8.6	Stiff consistency, fine to medium sandy silt (ML), wet - light orangish brown		GP @ 1 ft = 1" TABB FORMATION
			B1	GP @ 2 ft = 1" MC=20.7%
				GP @ 3 ft = 1" Soil samples collected from 1 to 4 ft for Corrosion Potential Series testing.
~3.4	~6.1	Firm density, fine to medium silty sand (SM), wet - light orangish brown	B2	
~4.0	~5.5			GP @ 4 ft = 1", MC=22.7%
		Hand Auger Terminated at 4.0 ft		

Comments:
Hand Auger Hole Backfilled Upon Completion.

Reviewed By: GTS Date: 06/30/09

Schnabel Engineering, LLC

HAND AUGER LOG

Project: Battlefield Golf Club Water Project - Centerville Turnpike

Location: Murray and Whittamore Roads, Chesapeake, Virginia

Project No: 08330106.00.03

SEI Representative: Russell Rountree **Hand Auger No:** HA-8

Date: 6/19/09 **Ground Surface Elevation:** 10.0 ±

Time: 2:18 PM **Groundwater Elevation:** 7.8

Equipment: Hand Auger

Depth (ft)	Elev. (ft)	Strata Description	Stratum	Remarks
		Rootmat and topsoil		Soil samples collected from 1 to 4 ft for Corrosion Potential Series testing.
~0.2	~9.8	FILL sampled as firm density, fine to medium silty sand (SM), contains roots, moist - grayish brown	A	GP @ 1 ft = 1/2" FILL GP @ 2 ft = 1/2"
~2.2	~7.8	Stiff consistency, silt with sand (ML), wet - light orangish brown	B1	TABB FORMATION GP @ 3 ft = 1"
~3.4	~6.6	Firm density, fine to medium silty sand (SM), wet - orangish brown	B2	
~4.0	~6.0	Hand Auger Terminated at 4.0 ft		GP @ 4 ft = 1"

Comments:
3/4" PVC Water Observation Well (W.O.W.) Installed to 4 ft Upon Completion.
Water Level Reading 6/25/09: 3.1 ft (El 6.9)

Reviewed By: GTS Date: 06/30/09

Schnabel Engineering, LLC

HAND AUGER LOG

Project: Battlefield Golf Club Water Project - Centerville Turnpike

Location: Murray and Whittamore Roads, Chesapeake, Virginia

Project No: 08330106.00.03

SEI Representative: Russell Rountree **Hand Auger No:** HA-9

Date: 6/19/09 **Ground Surface Elevation:** 13.5 ±

Time: 9:50 AM **Groundwater Elevation:** 11.0

Equipment: Hand Auger

Depth (ft)	Elev. (ft)	Strata Description	Stratum	Remarks
		Rootmat and topsoil		Soil samples collected from 2 to 5 ft for Corrosion Potential Series testing. MC=17.5%
~0.2	~13.3	FILL sampled as firm density, fine to medium silty sand (SM), contains crushed stone, moist - brown	A	
~0.9	~12.6	FILL sampled as firm density, fine to medium poorly graded sand with silt (SP-SM), contains silty sand pockets and wood, moist - gray		GP @ 1 ft = 1" FILL
~1.6	~11.9	Stiff consistency, silty clay (CL-ML), contains roots, moist - dark gray	B1	GP @ 2 ft = 1" MC=21.3% TABB FORMATION
~2.5	~11.0	Firm density, fine to medium poorly graded sand with silt (SP-SM), est. <5% fine gravel, wet - brown	B2	GP @ 3 ft = 1/2" MC=24.5% GP @ 4 ft = 1/2"
~5.0	~8.5			GP @ 5 ft = 1/2"
		Hand Auger Terminated at 5.0 ft		

Comments:
3/4" PVC Water Observation Well (W.O.W.) Installed to 5 ft Upon Completion.
Water Level Reading 6/25/09: 1.6 ft (El 11.9)

Reviewed By: GTS Date: 06/30/09

Schnabel Engineering, LLC

HAND AUGER LOG

Project: Battlefield Golf Club Water Project - Centerville Turnpike

Location: Murray and Whittamore Roads, Chesapeake, Virginia

Project No: 08330106.00.03

SEI Representative: Russell Rountree

Hand Auger No: HA-10

Date: 6/19/09

Ground Surface Elevation: 11.0 ±

Time: 10:20 AM

Groundwater Elevation: 10.2

Equipment: Hand Auger

Depth (ft)	Elev. (ft)	Strata Description	Stratum	Remarks
		Rootmat and topsoil		Soil samples collected from 2 to 5 ft for Corrosion Potential Series testing.
~0.2	~10.8	FILL sampled as very soft consistency, lean clay with sand (CL), est. <5% shells, moist - brownish gray do, contains wood, wet below 0.8 ft	A	GP @ 1 ft = 10" FILL GP @ 2 ft = 3"
~2.4	~8.6	Medium stiff consistency, fat clay with sand (CH), wet - brownish gray	B1	GP @ 3 ft = 2" TABB FORMATION
~3.8	~7.2	Firm density, fine to coarse poorly graded sand with silt (SP-SM), wet - brownish gray	B2	GP @ 4 ft = 1"
~5.0	~6.0			GP @ 5 ft = 1"
		Hand Auger Terminated at 5.0 ft		

Comments:
Hand Auger Hole Backfilled Upon Completion.

Reviewed By: GTS Date: 06/30/09

Schnabel Engineering, LLC

HAND AUGER LOG

Project: Battlefield Golf Club Water Project - Centerville Turnpike

Location: Murray and Whittamore Roads, Chesapeake, Virginia

Project No: 08330106.00.03

SEI Representative: Russell Rountree **Hand Auger No:** HA-11

Date: 6/19/09 **Ground Surface Elevation:** 10.5 ±

Time: 10:45 AM **Groundwater Elevation:** 10.5

Equipment: Hand Auger

Depth (ft)	Elev. (ft)	Strata Description	Stratum	Remarks
		Rootmat and topsoil		Ponded water in area - adjacent ditch flooded due to recent rain event.
~0.2	~10.3	Soft consistency, fine to medium sandy lean clay (CL), est. <5% fine gravel, wet - gray		
~0.9	~9.6	Stiff consistency, fat clay with sand (CH), wet - brownish gray		GP @ 1 ft = 4"
			B1	GP @ 2 ft = 3"
				TABB FORMATION
				GP @ 3 ft = 1"
~3.4	~7.1	Stiff consistency, fine to medium sandy lean clay (CL), wet - orangish gray		GP @ 4 ft = 1"
~4.6	~5.9	Firm density, fine to medium silty sand (SM), wet - orangish gray	B2	Soil samples collected from 2 to 5 ft for Corrosion Potential Series testing.
~5.0	~5.5			GP @ 5 ft = 1"
		Hand Auger Terminated at 5.0 ft		

Comments:
3/4" PVC Water Observation Well (W.O.W.) Installed to 5 ft Upon Completion.
Water Level Reading 6/25/09: 0.8 ft (El 9.7)

Reviewed By: GTS Date: 06/30/09

Schnabel Engineering, LLC

HAND AUGER LOG

Project: Battlefield Golf Club Water Project - Centerville Turnpike

Location: Murray and Whittamore Roads, Chesapeake, Virginia

Project No: 08330106.00.03

SEI Representative: Russell Rountree **Hand Auger No:** HA-12

Date: 6/19/09 **Ground Surface Elevation:** 10.2 ±

Time: 11:12 AM **Groundwater Elevation:** 6.0

Equipment: Hand Auger

Depth (ft)	Elev. (ft)	Strata Description	Stratum	Remarks
		Rootmat and topsoil		Soil samples collected from 2 to 5 ft for Corrosion Potential Series testing.
~0.2	~10.0	Stiff consistency, fine to medium sandy lean clay (CL), est. <5% fine gravel, moist - gray		GP @ 1 ft = 1/2"
~1.2	~9.0	Stiff consistency, lean clay with sand (CL), moist - orangish gray	B1	MC=25.0% GP @ 2 ft = 1"
~2.6	~7.6	Stiff consistency, fine to medium sandy lean clay (CL), moist - orangish gray		TABB FORMATION GP @ 3 ft = 1"
				GP @ 4 ft = 1"
~4.2	~6.0	Firm density, fine to medium silty sand (SM), wet - orangish gray	B2	
~5.0	~5.2			GP @ 5 ft = 1"
		Hand Auger Terminated at 5.0 ft		

Comments:
Hand Auger Hole Backfilled Upon Completion.

Reviewed By: GTS Date: 06/30/09

Schnabel Engineering, LLC

HAND AUGER LOG

Project: Battlefield Golf Club Water Project - Centerville Turnpike

Location: Murray and Whittamore Roads, Chesapeake, Virginia

Project No: 08330106.00.03

SEI Representative: Russell Rountree **Hand Auger No:** HA-13

Date: 6/19/09 **Ground Surface Elevation:** 9.5 ±

Time: 11:31 AM **Groundwater Elevation:** 4.8

Equipment: Hand Auger

Depth (ft)	Elev. (ft)	Strata Description	Stratum	Remarks
		Rootmat and topsoil	A	Soil samples collected from 2 to 5 ft for Corrosion Potential Series testing. FILL GP @ 1 ft = 1/2"
~0.6	~8.9	FILL sampled as firm density, fine to medium silty sand (SM), contains asphalt fragments, moist - brown		
~1.4	~8.1	Stiff consistency, fine to medium sandy silt (ML), moist - light orangish brown	B1	GP @ 2 ft = 1" TABB FORMATION
~2.8	~6.7	Stiff consistency, elastic silt with sand (MH), moist - light orangish brown		GP @ 3 ft = 1"
~3.6	~5.9	Stiff consistency, fine to medium sandy silt (ML), moist - light orangish brown		GP @ 4 ft = 1"
~5.0	~4.5	do, wet below 4.7 ft		GP @ 5 ft = 1"
		Hand Auger Terminated at 5.0 ft		

Comments:
3/4" PVC Water Observation Well (W.O.W.) Installed to 5 ft Upon Completion.
Water Level Reading 6/25/09: 4.4 ft (El 5.1)

Reviewed By: GTS Date: 06/30/09

Schnabel Engineering, LLC

HAND AUGER LOG

Project: Battlefield Golf Club Water Project - Centerville Turnpike

Location: Murray and Whittamore Roads, Chesapeake, Virginia

Project No: 08330106.00.03

SEI Representative: Russell Rountree **Hand Auger No:** HA-14

Date: 6/19/09 **Ground Surface Elevation:** 8.0 ±

Time: 11:58 AM **Groundwater Elevation:** Not Encountered

Equipment: Hand Auger

Depth (ft)	Elev. (ft)	Strata Description	Stratum	Remarks
		Rootmat and topsoil		Soil samples collected from 2 to 5 ft for Corrosion Potential Series testing.
~0.1	~7.9	Stiff consistency, fine to medium sandy lean clay (CL), est. <5% shells, contains roots, moist - brown		
~0.9	~7.1	Stiff consistency, silty clay with sand (CL-ML), moist - orangish gray		GP @ 1 ft = 1/2"
				MC=19.6%
				GP @ 2 ft = 1/2"
			B1	TABB FORMATION
				GP @ 3 ft = 1"
		do, dark orangish brown below 3.5 ft		
				GP @ 4 ft = 1"
~4.4	~3.6	Stiff consistency, lean clay with sand (CL), moist - brownish gray		
~5.0	~3.0			GP @ 5 ft = 1"
		Hand Auger Terminated at 5.0 ft		

Comments:
3/4" PVC Water Observation Well (W.O.W.) Installed to 5 ft Upon Completion.
Water Level Reading 6/25/09: DRY

Reviewed By: GTS Date: 06/30/09

Schnabel Engineering, LLC

HAND AUGER LOG

Project: Battlefield Golf Club Water Project - Centerville Turnpike

Location: Murray and Whittamore Roads, Chesapeake, Virginia

Project No: 08330106.00.03

SEI Representative: Russell Rountree **Hand Auger No:** HA-15

Date: 6/19/09 **Ground Surface Elevation:** 9.0 ±

Time: 12:31 PM **Groundwater Elevation:** 4.2

Equipment: Hand Auger

Depth (ft)	Elev. (ft)	Strata Description	Stratum	Remarks
		Rootmat, topsoil and asphalt fragments	B2	Soil samples collected from 2 to 5 ft for Corrosion Potential Series testing.
~0.4	~8.6	Firm density, fine to medium silty sand (SM), moist - light orangish brown		MC=12.3% GP @ 1 ft = 1"
~1.2	~7.8	Stiff consistency, fine to medium sandy lean clay (CL), moist - orangish brown	B1	GP @ 2 ft = 1" TABB FORMATION GP @ 3 ft = 1"
~3.3	~5.7	Firm density, fine to medium silty sand (SM), moist - light orangish gray	B2	MC=15.4% GP @ 4 ft = 1"
~4.8 ~5.0	~4.2 ~4.0	Stiff consistency, fine to medium sandy silt (ML), wet - orangish gray	B1	GP @ 5 ft = 1"
		Hand Auger Terminated at 5.0 ft		

Comments:
3/4" PVC Water Observation Well (W.O.W.) Installed to 5 ft Upon Completion.
Water Level Reading 6/25/09: 4.9 ft (El 4.1)

Reviewed By: GTS Date: 06/30/09

Schnabel Engineering, LLC

HAND AUGER LOG

Project: Battlefield Golf Club Water Project - Centerville Turnpike

Location: Murray and Whittamore Roads, Chesapeake, Virginia

Project No: 08330106.00.03

SEI Representative: Russell Rountree | **Hand Auger No:** HA-16

Date: 6/19/09 | **Ground Surface Elevation:** 9.5 ±

Time: 12:54 PM | **Groundwater Elevation:** 5.9

Equipment: Hand Auger

Depth (ft)	Elev. (ft)	Strata Description	Stratum	Remarks
		Rootmat and topsoil		
~0.1	~9.4	FILL sampled as firm density fine to coarse silty sand (SM), est.<5-10% fine to coarse gravel, moist-brown	A	FILL MC=6.0%
~0.8	~8.7	Firm density, fine to medium silty sand (SM), moist - light orangish gray	B2	GP @ 1 ft = 1" MC=18.1% GP @ 2 ft = 1"
~2.8	~6.7	Stiff consistency, fine to medium sandy silt (ML), moist - orangish gray	B1	TABB FORMATION GP @ 3 ft = 1" MC=14.9%
~3.6	~5.9	Firm density, fine to medium silty sand (SM), wet - grayish orange	B2	GP @ 4 ft = 1" Soil samples collected from 2 to 5 ft for Corrosion Potential Series testing.
~5.0	~4.5	Hand Auger Terminated at 5.0 ft		GP @ 5 ft = 1"

Comments:
Hand Auger Hole Backfilled Upon Completion.

Reviewed By: GTS Date: 06/30/09

Schnabel Engineering, LLC

HAND AUGER LOG

Project: Battlefield Golf Club Water Project - Centerville Turnpike

Location: Murray and Whittamore Roads, Chesapeake, Virginia

Project No: 08330106.00.03

SEI Representative: Russell Rountree **Hand Auger No:** HA-17

Date: 6/19/09 **Ground Surface Elevation:** 10.2 ±

Time: 1:57 PM **Groundwater Elevation:** 8.8

Equipment: Hand Auger

Depth (ft)	Elev. (ft)	Strata Description	Stratum	Remarks
		Rootmat and topsoil		Soil samples collected from 2 to 5 ft for Corrosion Potential Series testing.
~0.3	~9.9	FILL sampled as firm density, fine to medium silty sand (SM), contains roots, moist - orangish gray	A	FILL GP @ 1 ft = 1"
~1.4	~8.8	Firm density, fine to medium clayey sand (SC), wet - brownish gray		GP @ 2 ft = 1"
~2.5	~7.7	Firm density, fine to medium silty sand (SM), wet - light orangish gray	B2	TABB FORMATION GP @ 3 ft = 1" GP @ 4 ft = 1"
~5.0	~5.2			GP @ 5 ft = 1"
		Hand Auger Terminated at 5.0 ft		

Comments:
3/4" PVC Water Observation Well (W.O.W.) Installed to 5 ft Upon Completion.
Water Level Reading 6/25/09: 2.2 ft (El 8.0)

Reviewed By: GTS Date: 06/30/09

Schnabel Engineering

TEST BORING LOG

Project: Battlefield Golf Club Water Project
Murray and Whittamore Road
Chesapeake, Virginia

Boring Number: B-1
Contract Number: 08330106.00.03
Sheet: 1 of 1

Contractor: Fishburne Drilling, Inc.
Chesapeake, Virginia
Contractor Foreman: J. Raasio
Schnabel Representative: R. Rountree
Equipment: CME-75
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 6/16/09 **Finished:** 6/16/09

Ground Surface Elevation: 16± (ft) **Total Depth:** 10.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	6/16	10:52 AM	2.0'	---	---
Completion ▼	6/16	11:03 AM	7.5'	---	---
Casing Pulled	6/16	11:04 AM	Dry	---	4.6'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.9	Asphalt; 5" Asphalt and 7" Base Course		15.1	A		S-1 14+19+9 REC=18", 100%	MC = 14.6%	FILL
2.0	FILL, sampled as poorly graded sand, fine to medium grained sand; moist, light brown, estimated <5% silt	FILL	14.0			S-2 7+4+3+4 REC=24", 100%	PP =0.25 tsf	TABB FORMATION
	SANDY LEAN CLAY; wet, brownish gray	CL		B1			MC = 25.7%	
4.0	CLAYEY SAND, fine to medium grained sand; wet, dark brown, estimated <5% fine gravel	SC	12.0		5	S-3 2+2+4+8 REC=24", 100%	MC = 19.0%	Boring offset 18 ft east due to overhead power lines.
6.0	POORLY GRADED SAND, fine to medium grained sand; wet, light brown, estimated <5% silt	SP-SM	10.0	B2		S-4 10+15+13+11 REC=24", 100%	MC = 21.4%	
10.0			6.0		10	S-5 9+10+10+11 REC=24", 100%		

Bottom of Boring at 10.0 ft.
Boring backfilled upon completion.

Schnabel Engineering

TEST BORING LOG

Project: Battlefield Golf Club Water Project
Murray and Whittamore Road
Chesapeake, Virginia

Boring Number: B-2
Contract Number: 08330106.00.03
Sheet: 1 of 1

Contractor: Fishburne Drilling, Inc.
Chesapeake, Virginia
Contractor Foreman: J. Raasio
Schnabel Representative: R. Rountree
Equipment: CME-75
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 6/16/09 **Finished:** 6/16/09

Ground Surface Elevation: 12± (ft) **Total Depth:** 10.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	6/16	11:15 AM	2.0'	---	---
Completion ▼	6/16	11:26 AM	7.1'	---	---
Casing Pulled	6/16	11:28 AM	Dry	---	3.9'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.0	Asphalt; 4" Asphalt and 6" Base Course		11.1	A		S-1 3+2+3 REC=3", 17%		FILL
0.9	FILL, sampled as poorly graded sand with silt, fine to medium grained sand; moist, dark brown, contains crushed stone	FILL	10.0	B1		S-2 3+3+5+8 REC=24", 100%	PP =0.75 tsf	TABB FORMATION
2.0	SANDY LEAN CLAY; wet, gray	CL	8.3					
3.7	POORLY GRADED SAND WITH SILT, fine to medium grained sand; wet, brown	SP-SM	8.0		5	S-3 6+9+12+12 REC=24", 100%		Bulk sample collected from 0.9 to 5 feet.
4.0	POORLY GRADED SAND, fine to medium grained sand; wet, brown, estimated <5% silt Changes to gray	SP		B2		S-4 15+19+18+20 REC=24", 100%		
10.0			2.0		10	S-5 19+20+20+24 REC=24", 100%		

Bottom of Boring at 10.0 ft.
Boring backfilled with cuttings upon completion.

Schnabel Engineering

TEST BORING LOG

Project: Battlefield Golf Club Water Project
Murray and Whittamore Road
Chesapeake, Virginia

Boring Number: B-3
Contract Number: 08330106.00.03
Sheet: 1 of 1

Contractor: Fishburne Drilling, Inc.
Chesapeake, Virginia
Contractor Foreman: J. Raasio
Schnabel Representative: R. Rountree
Equipment: CME-75
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 6/16/09 **Finished:** 6/16/09

Ground Surface Elevation: 11± (ft) **Total Depth:** 10.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	6/16	11:44 AM	4.0'	---	---
Completion	6/16	11:53 AM	Dry	---	---
Casing Pulled	6/16	11:55 AM	Dry	---	4.0'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.5	Asphalt; 3" Asphalt and 3" Base Course	FILL	10.0	A				FILL
0.8	FILL, sampled as silty sand, fine to medium grained sand; moist, gray		9.7			S-1 11+6+4 REC=18", 100%	PP =2.50 tsf	TABB FORMATION
	SILT; moist, gray	ML		B1		S-2 4+4+4+6 REC=24", 100%	MC = 24.7% PP = 1.50 tsf	
	Changes to brownish gray							
4.0	POORLY GRADED SAND WITH SILT, fine to medium grained sand; wet, gray	SP-SM	6.5		5	S-3 2+5+7+9 REC=24", 100%		
6.0	POORLY GRADED SAND, fine to medium grained sand; wet, gray, estimated <5% silt	SP	4.5	B2		S-4 7+8+12+14 REC=24", 100%		
						S-5 8+18+16+19 REC=24", 100%		
10.0			0.5		10			

Bottom of Boring at 10.0 ft.
Boring backfilled with cuttings upon completion.

Schnabel Engineering

TEST BORING LOG

Project: Battlefield Golf Club Water Project
Murray and Whittamore Road
Chesapeake, Virginia

Boring Number: B-4
Contract Number: 08330106.00.03
Sheet: 1 of 1

Contractor: Fishburne Drilling, Inc.
Chesapeake, Virginia
Contractor Foreman: J. Raasio
Schnabel Representative: R. Rountree
Equipment: CME-75
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 6/16/09 **Finished:** 6/16/09

Ground Surface Elevation: 10± (ft) **Total Depth:** 10.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	6/16	12:08 PM	4.0'	---	---
Completion ▼	6/16	12:17 PM	7.4'	---	---
Casing Pulled	6/16	12:19 PM	---	---	4.2'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.6	Asphalt; 4" Asphalt and 3" Base Course		9.5					TABB FORMATION
	SILTY SAND, fine to medium grained sand; moist, gray, estimated <5% fine gravel, contains roots	SM				S-1 9+4+5 REC=18", 100%		
2.0	CLAYEY SAND, fine to medium grained sand; wet, gray	SC	8.1			S-2 3+4+4+5 REC=24", 100%	MC = 21.6% PP <0.25 tsf	
4.0	SILTY SAND, fine to coarse grained sand; wet, gray, contains trace gravel	SM	6.1	B2	5	S-3 5+6+5+7 REC=24", 100%	MC = 16.9%	
6.0	POORLY GRADED SAND, fine to medium grained sand; wet, light brown, estimated <5% silt	SP	4.1			S-4 10+11+11+12 REC=24", 100%		
	Changes to estimated <5% fine gravel					S-5 12+18+19+18 REC=24", 100%		
10.0			0.1		10			

Bottom of Boring at 10.0 ft.
Boring backfilled with cuttings upon completion.

TEST BORING LOG 08330106.00.03.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 6/30/09

Schnabel Engineering

TEST BORING LOG

Project: Battlefield Golf Club Water Project
Murray and Whittamore Road
Chesapeake, Virginia

Boring Number: B-5
Contract Number: 08330106.00.03
Sheet: 1 of 1

Contractor: Fishburne Drilling, Inc.
Chesapeake, Virginia
Contractor Foreman: J. Raasio
Schnabel Representative: R. Rountree
Equipment: CME-75
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 6/16/09 **Finished:** 6/16/09

Ground Surface Elevation: 11± (ft) **Total Depth:** 10.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	6/16	12:30 PM	2.0'	---	---
Completion ▼	6/16	12:47 PM	7.1'	---	---
Casing Pulled	6/16	12:50 PM	Dry	---	3.8'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.9	Asphalt; 4" Asphalt and 6" Base Course		9.6	B2		S-1 29+22+12 REC=16", 89%	MC = 10.1%	TABB FORMATION
2.0	SILTY SAND, fine to medium grained sand; moist, light orangish gray ▽	SM	8.5			S-2 6+8+9+8 REC=24", 100%	PP =0.50 tsf	
	SANDY LEAN CLAY; wet, light orangish brown	CL		B1	5	S-3 3+3+4+7 REC=24", 100%	MC = 23.1% MC = 28.1% PP =0.25 tsf	Boring offset 22 ft east due to overhead power lines.
6.0	POORLY GRADED SAND, fine to medium grained sand; wet, light brown, ▼ estimated <5%, estimated <5% fine gravel	SP	4.5	B2		S-4 4+3+8+12 REC=24", 100%		
	Changes to light gray				10	S-5 11+15+19+20 REC=24", 100%		
10.0			0.5					

Bottom of Boring at 10.0 ft.
Boring backfilled with cuttings upon completion.

Schnabel Engineering

TEST BORING LOG

Project: Battlefield Golf Club Water Project
Murray and Whittamore Road
Chesapeake, Virginia

Boring Number: B-6
Contract Number: 08330106.00.03
Sheet: 1 of 1

Contractor: Fishburne Drilling, Inc.
Chesapeake, Virginia
Contractor Foreman: J. Raasio
Schnabel Representative: R. Rountree
Equipment: CME-75
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 6/16/09 **Finished:** 6/16/09

Ground Surface Elevation: 10± (ft) **Total Depth:** 10.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	6/16	1:02 PM	4.0'	---	---
Completion ▼	6/16	1:14 PM	6.6'	---	---
Casing Pulled	6/16	1:16 PM	Dry	---	4.4'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.8	Asphalt; 4" Asphalt and 5" Base Course		9.2					TABB FORMATION
	SILTY SAND, fine to medium grained sand; moist, gray Changes to light gray, contains organics	SM		B2		S-1 29+16+11 REC=18", 100% S-2 7+9+10+7 REC=24", 100%		
4.0 ▽	SANDY LEAN CLAY; wet, light gray	CL	6.0		5	S-3 2+4+4+5 REC=24", 100%	MC = 20.4% PP =0.25 tsf	
6.0 ▼	SILTY CLAY; wet, gray and orangish brown	CL-ML	4.0	B1		S-4 4+5+4+4 REC=24", 100%	MC = 28.5%	
8.0	POORLY GRADED SAND WITH SILT, fine to coarse grained sand; wet, yellowish brown Changes to brownish gray	SP-SM	2.0	B2		S-5 6+8+14+16 REC=24", 100%		
10.0			0.0		10			

Bottom of Boring at 10.0 ft.
Boring backfilled with cuttings upon completion.

Schnabel Engineering

TEST BORING LOG

Project: Battlefield Golf Club Water Project
Murray and Whittamore Road
Chesapeake, Virginia

Boring Number: B-7
Contract Number: 08330106.00.03
Sheet: 1 of 1

Contractor: Fishburne Drilling, Inc.
Chesapeake, Virginia
Contractor Foreman: J. Raasio
Schnabel Representative: R. Rountree
Equipment: CME-75
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 6/16/09 **Finished:** 6/16/09

Ground Surface Elevation: 9± (ft) **Total Depth:** 10.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	6/16	1:40 PM	8.0'	---	---
Completion	6/16	1:42 PM	Dry	---	---
Casing Pulled	6/16	1:44 PM	Dry	---	5.1'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.9	Asphalt; 4" Asphalt and 6" Base Course		7.6	B2		S-1 46+10+5 REC=18", 100%		TABB FORMATION
2.0	SILTY SAND, fine to medium grained sand; moist, light orangish brown	SM	6.5			S-2 7+9+9+11 REC=24", 100%	PP =2.75 tsf	
4.0	SANDY LEAN CLAY; moist, light orangish brown	CL	4.5		5	S-3 10+11+9+10 REC=24", 100%	PP =1.50 tsf	
6.0	SANDY SILT; moist, light orangish brown	ML	2.5	B1		S-4 5+5+4+2 REC=24", 100%	PP =1.25 tsf	Bulk sample collected from 0.9 to 5 feet.
10.0	ELASTIC SILT WITH SAND; moist, light orangish gray, contains roots ▽ Changes to wet	MH	-1.5		10	S-5 3+4+3+2 REC=24", 100%	PP <0.25 tsf	

Bottom of Boring at 10.0 ft.
Boring backfilled with cuttings upon completion.

TEST BORING LOG 08330106.00.03.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 6/30/09

Schnabel Engineering

TEST BORING LOG

Project: Battlefield Golf Club Water Project
Murray and Whittamore Road
Chesapeake, Virginia

Boring Number: B-8
Contract Number: 08330106.00.03
Sheet: 1 of 1

Contractor: Fishburne Drilling, Inc.
Chesapeake, Virginia
Contractor Foreman: J. Raasio
Schnabel Representative: R. Rountree
Equipment: CME-75
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 6/16/09 **Finished:** 6/16/09

Ground Surface Elevation: 10± (ft) **Total Depth:** 10.0 ft

Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	6/16	1:53 PM	4.0'	---	---
Completion ▼	6/16	2:08 PM	7.8'	---	---
Casing Pulled	6/16	2:10 PM	Dry	---	6.2'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.7	Asphalt; 4" Asphalt and 4" Base Course		8.8					TABB FORMATION
2.0	SILTY SAND, fine to medium grained sand; moist, gray, contains roots	SM	7.5			S-1 14+9+6 REC=18", 100%	MC = 13.7%	
4.0	CLAYEY SAND, fine to medium grained sand; wet, brownish gray ▽	SC	5.5	B2		S-2 7+7+10+10 REC=24", 100%		
6.0	SILTY SAND, fine to medium grained sand; wet, gray	SM	3.5		5	S-3 11+14+11+7 REC=24", 100%	MC = 15.0%	
	SANDY LEAN CLAY; wet, light orangish gray ▼	CL		B1		S-4 6+4+4+3 REC=24", 100%	PP =0.75 tsf	
10.0	Changes to orangish gray, contains silty sand pockets		-0.5		10	S-5 1+2+4+4 REC=24", 100%	PP =0.25 tsf	

Bottom of Boring at 10.0 ft.
Boring backfilled with cuttings upon completion.

Schnabel Engineering

TEST BORING LOG

Project: Battlefield Golf Club Water Project
Murray and Whittamore Road
Chesapeake, Virginia

Boring Number: B-9
Contract Number: 08330106.00.03
Sheet: 1 of 1

Contractor: Fishburne Drilling, Inc.
Chesapeake, Virginia
Contractor Foreman: J. Raasio
Schnabel Representative: R. Rountree
Equipment: CME-75
Method: 2-1/4" I.D. Hollow Stem Auger

Hammer Type: Safety Hammer (140 lb)
Dates Started: 6/16/09 **Finished:** 6/16/09

Ground Surface Elevation: 10± (ft) **Total Depth:** 10.0 ft

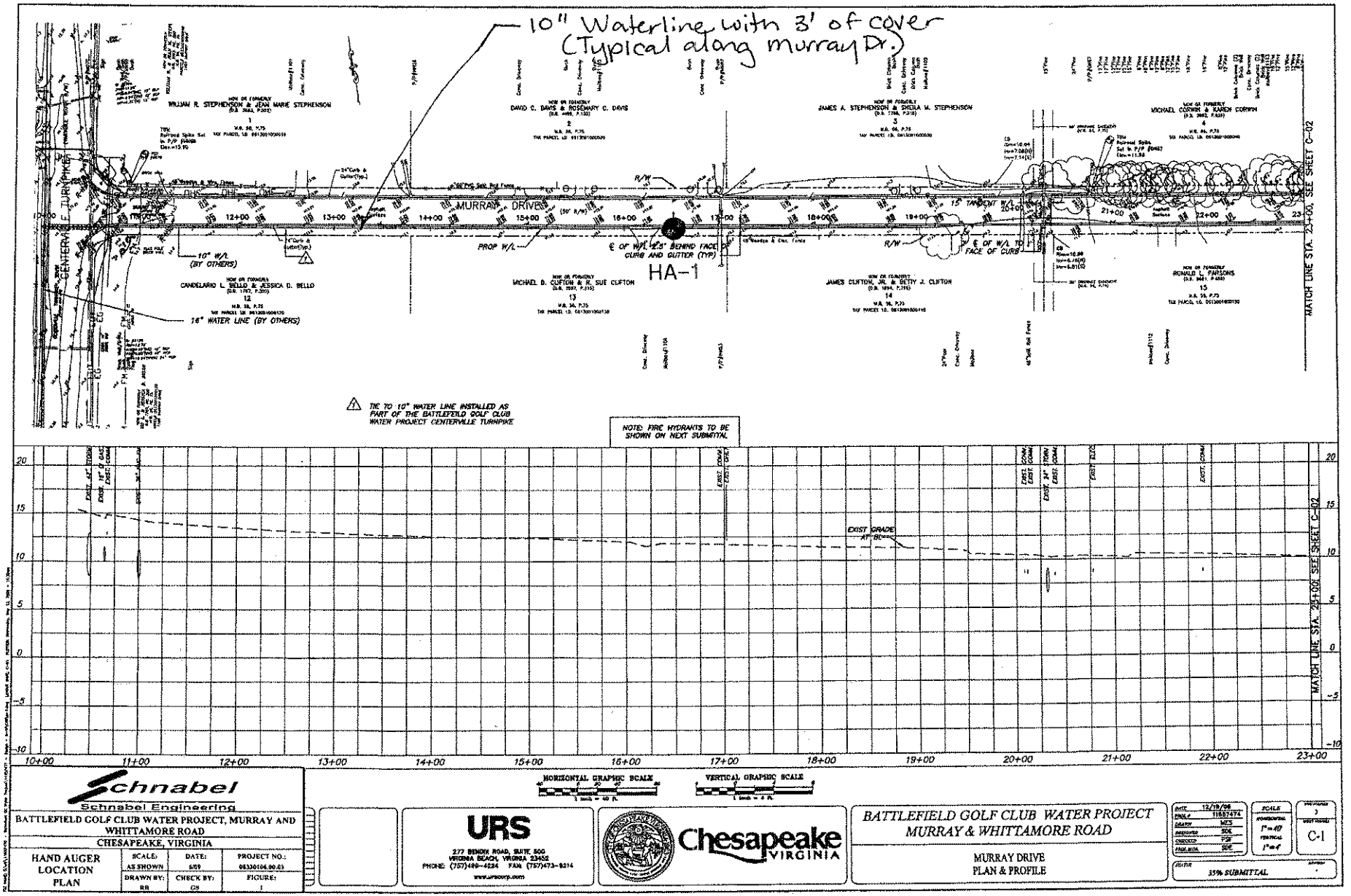
Groundwater Observations

	Date	Time	Depth	Casing	Caved
Encountered ▽	6/16	2:20 PM	2.0'	---	---
Completion ▼	6/16	2:29 PM	6.3'	---	---
Casing Pulled	6/16	2:31 PM	Dry	---	5.2'

DEPTH (ft)	MATERIAL DESCRIPTION	SYMBOL	ELEV (ft)	STRATUM	SAMPLING DEPTH	SAMPLING DATA	TESTS	REMARKS
0.7	Asphalt; 4" Asphalt and 4" Base Course	FILL	9.5	A		S-1 26+23+20 REC=18", 100%		FILL
1.8	FILL, sampled as poorly graded sand with silt, fine to coarse grained sand; moist, orangish brown	SP-SM	8.4	B2				
2.0	POORLY GRADED SAND WITH SILT, fine to medium grained sand; moist, light gray	CL	8.2	B1		S-2 15+14+12+17 REC=24", 100%	PP =0.75 tsf	TABB FORMATION
4.0	SANDY LEAN CLAY; wet, dark gray		6.2			S-3 6+11+10+10 REC=24", 100%		
	SILTY SAND, fine to medium grained sand; wet, light orangish gray ▼	SM		B2	5	S-4 8+5+5+3 REC=24", 100%		Bulk sample collected from 0.7 to 5 feet.
8.0	SANDY SILT; wet, orangish gray	ML	2.2	B1		S-5 2+2+2+2 REC=24", 100%	PP <0.25 tsf	
10.0			0.2		10			

Bottom of Boring at 10.0 ft.
Boring backfilled with cuttings upon completion.

TEST BORING LOG 08330106.00.03.GPJ SCHNABEL DATA TEMPLATE 2008_07_06.GDT 6/30/09



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BATTLEFIELD GOLF CLUB WATER PROJECT, MURRAY AND WHITTAMORE ROAD
CHESAPEAKE, VIRGINIA

HAND AUGER LOCATION PLAN

SCALE:	DATE:	PROJECT NO.:
AS SHOWN	5/09	06330106.00.03
DRAWN BY:	CHECK BY:	FIGURE:
RR	GS	1

HORIZONTAL GRAPHIC SCALE
VERTICAL GRAPHIC SCALE

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BATTLEFIELD GOLF CLUB WATER PROJECT
MURRAY & WHITTAMORE ROAD

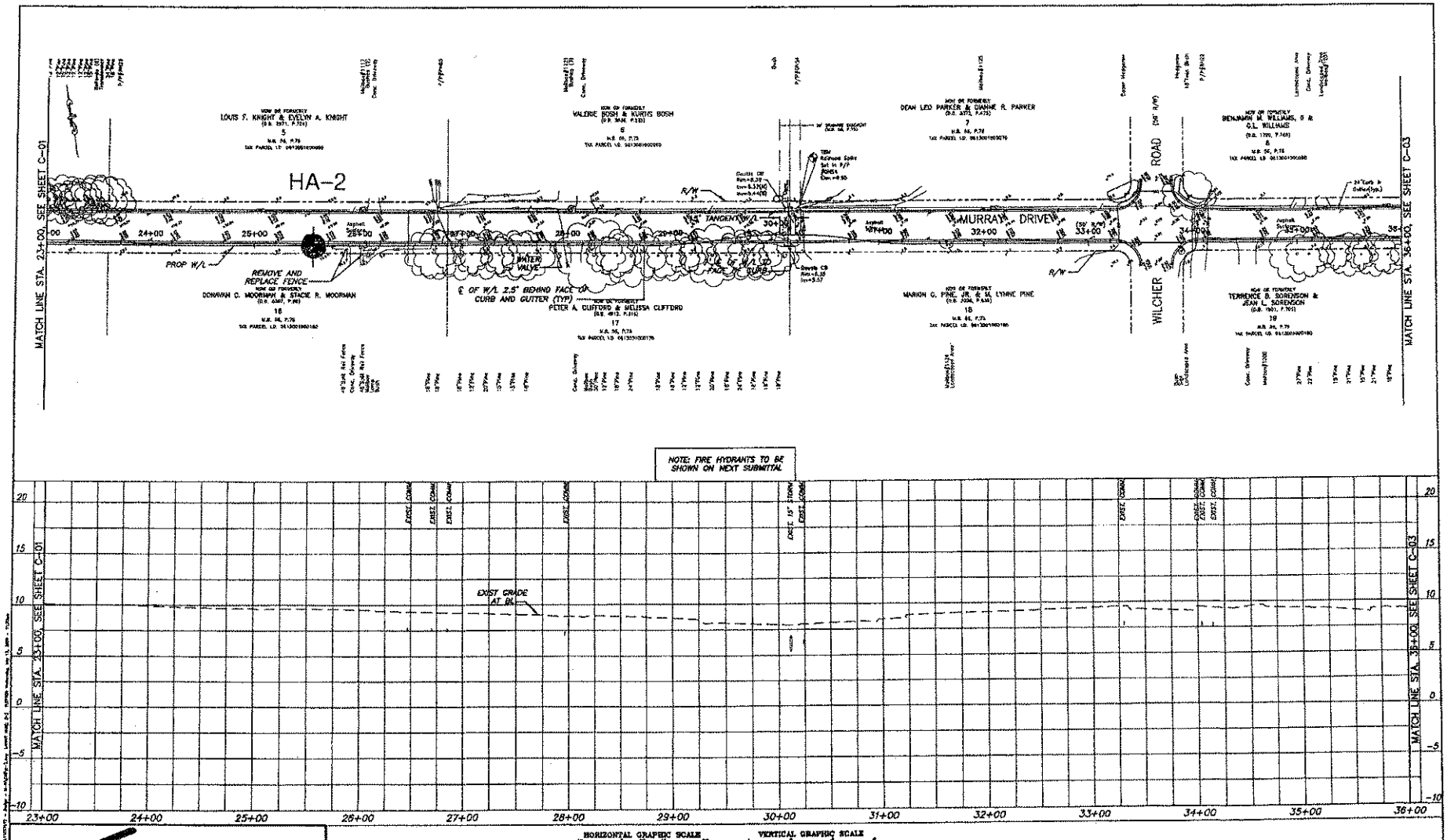
MURRAY DRIVE
PLAN & PROFILE

DATE	12/19/08
ENGR.	118574?4
DRAWN	MES
DESIGNED	SDE
CHECKED	PSF
PROJ. MGR.	SDE

SCALE: HORIZONTAL 1"=40', VERTICAL 1"=4'

SHEET NO. C-1

35% SUBMITTAL



HORIZONTAL GRAPHIC SCALE: 1 inch = 40 ft.

VERTICAL GRAPHIC SCALE: 1 inch = 4 ft.

Schnabel Engineering

BATTLEFIELD GOLF CLUB WATER PROJECT, MURRAY AND WHITTAMORE ROAD
CHESAPEAKE, VIRGINIA

HAND AUGER LOCATION PLAN

SCALE:	DATE:	PROJECT NO.:
AS SHOWN	8/09	58339106.09.03
DRAWN BY:	CHECK BY:	FIGURE:
RR	GS	7

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BATTLEFIELD GOLF CLUB WATER PROJECT
MURRAY & WHITTAMORE ROAD

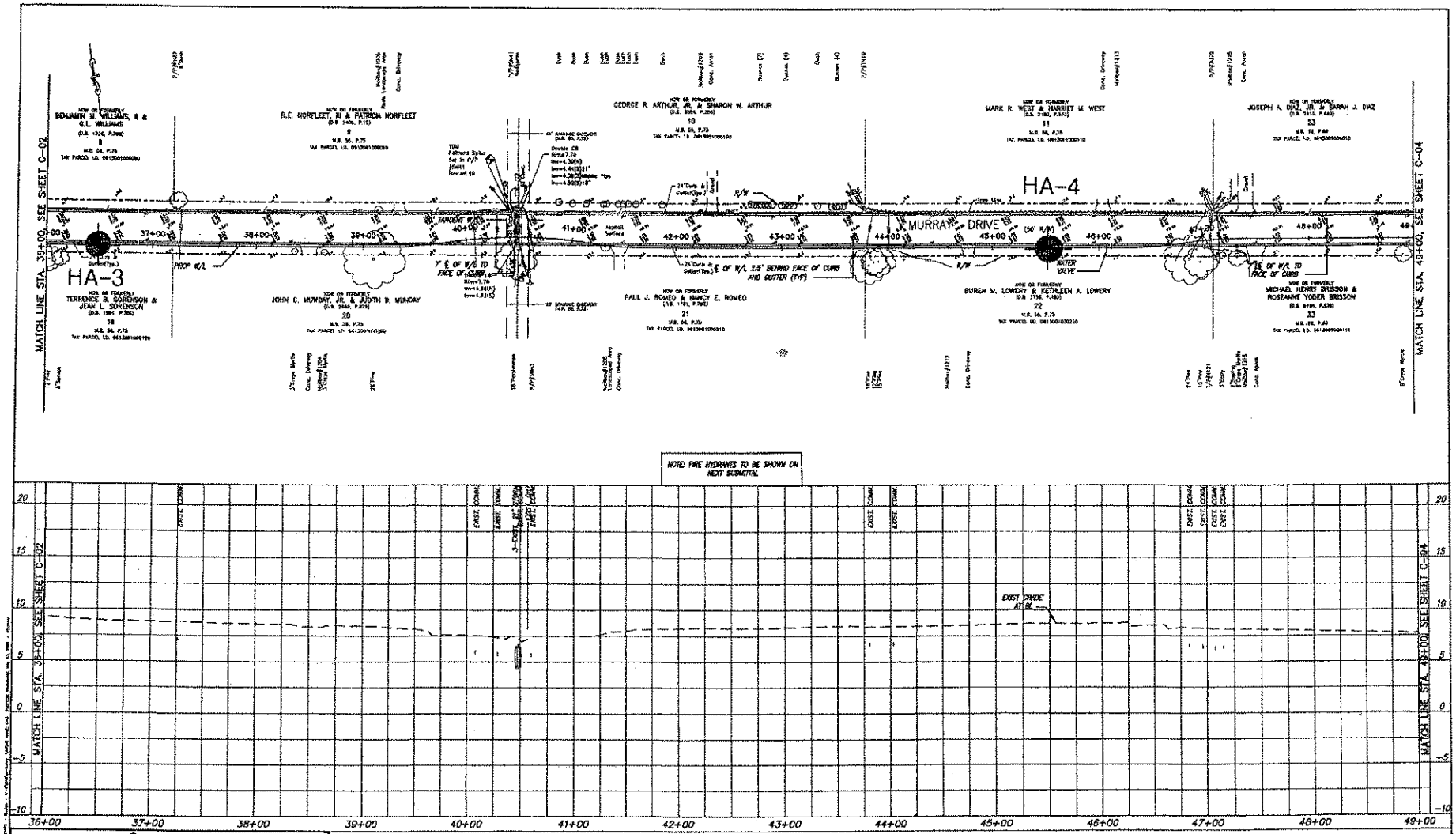
MURRAY DRIVE
PLAN & PROFILE

DATE	12/19/08
FILE #	11867-01
DRAWN	MES
DESIGNED	SDE
CHECKED	PSP
FINAL MOD.	SDE

SCALE: HORIZONTAL 1"=40' VERTICAL 1"=4'

SHEET NO. C-2

STATUS: 35% SUBMITTAL



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BATTLEFIELD GOLF CLUB WATER PROJECT, MURRAY AND WHITTAMORE ROAD
CHESAPEAKE, VIRGINIA

HAND AUGER LOCATION PLAN

SCALE:	DATE:	PROJECT NO.:
AS SHOWN	6/09	06320106.09.03
DRAWN BY:	CHECK BY:	FIGURE:
RR	GS	3

HORIZONTAL GRAPHIC SCALE
VERTICAL GRAPHIC SCALE

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BATTLEFIELD GOLF CLUB WATER PROJECT
MURRAY & WHITTAMORE ROAD

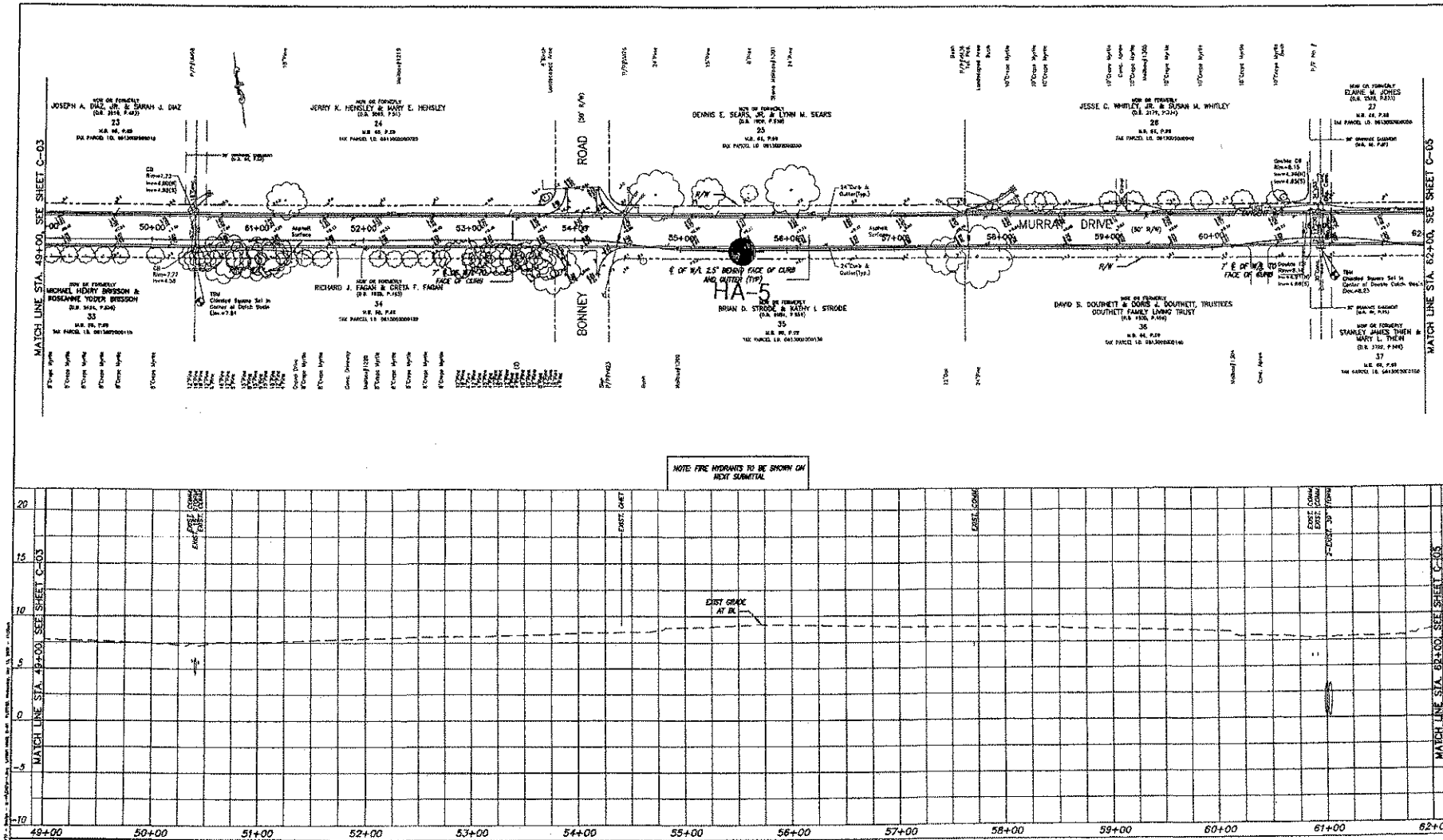
MURRAY DRIVE
PLAN & PROFILE

DATE	12/19/08
JOB #	11837474
DRAWN	MES
DESIGNED	BDE
CHECKED	PSF
PROJ. MGR.	BDE

SCALE: HORIZONTAL 1"=40', VERTICAL 1"=4'

REVISIONS: 1
SHEET NO.: C-3

REVISION: 35% SUBMITTAL



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BATTLEFIELD GOLF CLUB WATER PROJECT, MURRAY AND WHITTAMORE ROAD
CHESAPEAKE, VIRGINIA

HAND AUGER LOCATION PLAN

SCALE:	DATE:	PROJECT NO.:
AS SHOWN	6/09	98330184.00.05
DRAWN BY:	CHECK BY:	FIGURE:
RR	GS	4

HORIZONTAL GRAPHIC SCALE: 1 inch = 40 ft.

VERTICAL GRAPHIC SCALE: 1 inch = 4 ft.

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BATTLEFIELD GOLF CLUB WATER PROJECT
MURRAY & WHITTAMORE ROAD

MURRAY DRIVE
PLAN & PROFILE

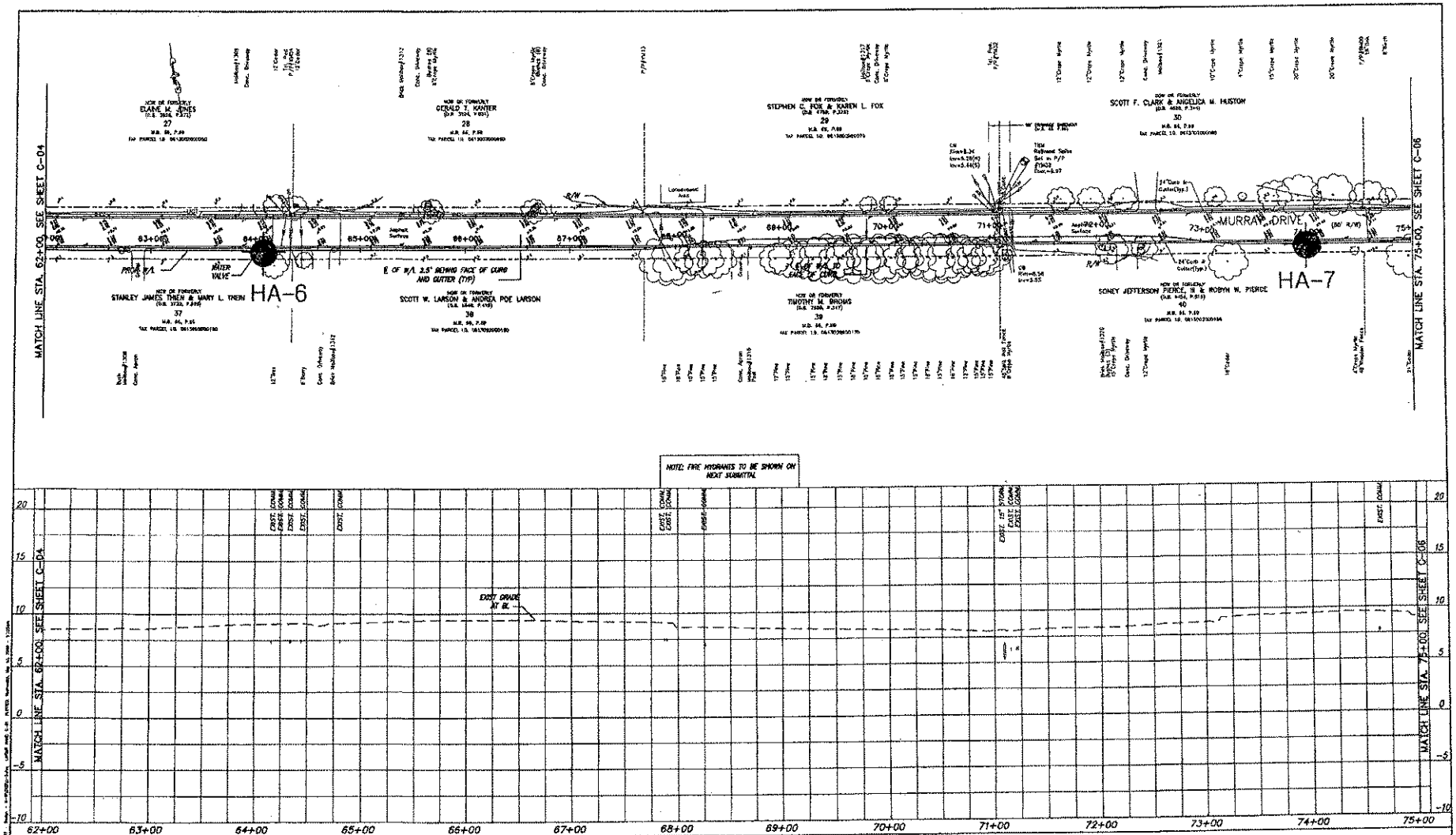
DATE	12/19/08
DESIGN	1186747A
DRAWN	MCS
RECOMMD	SDE
CHECKED	PSP
APPR./MGR.	SDE

SCALE: HORIZONTAL 1"=40', VERTICAL 1"=4'

SHEET 6 OF 11 SHEETS

C-4

STATUS: 35% SUBMITTAL



HORIZONTAL GRAPHIC SCALE

VERTICAL GRAPHIC SCALE

Schnabel Engineering

BATTLEFIELD GOLF CLUB WATER PROJECT, MURRAY AND WHITTAMORE ROAD
CHESAPEAKE, VIRGINIA

HAND AUGER LOCATION PLAN	SCALE: AS SHOWN	DATE: 6/09	PROJECT NO.: 06339106.00.03
	DRAWN BY: RR	CHECK BY: GS	FIGURE: 5

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BATTLEFIELD GOLF CLUB WATER PROJECT
MURRAY & WHITTAMORE ROAD

MURRAY DRIVE
PLAN & PROFILE

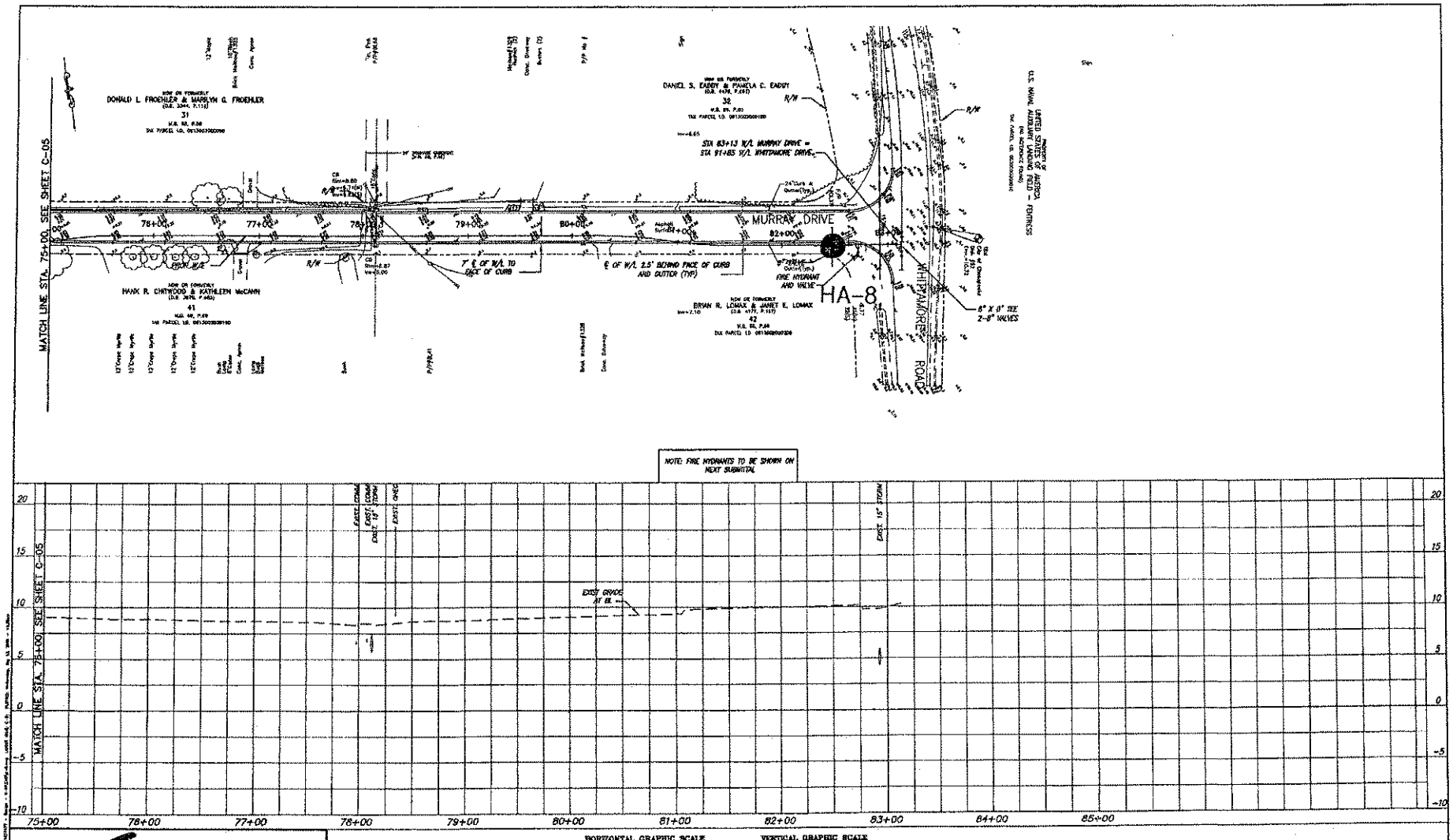
DATE	10/19/09
PROJECT	11857474
DRAWN	MEB
DESIGNED	SDE
CHECKED	PJP
PROJ MGR.	SDE

SCALE: HORIZONTAL 1"=40' VERTICAL 1"=4'

REVISIONS: 1

C-5

STATUS: 35% SUBMITTAL



HORIZONTAL GRAPHIC SCALE

VERTICAL GRAPHIC SCALE

Schnabel Engineering

BATTLEFIELD GOLF CLUB WATER PROJECT, MURRAY AND WHITTAMORE ROAD
CHESAPEAKE, VIRGINIA

HAND AUGER LOCATION PLAN

SCALE:	DATE:	PROJECT NO.:
AS SHOWN	6/09	06336106.00.02
DRAWN BY:	CHECK BY:	FIGURE:
RR	CS	4

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BATTLEFIELD GOLF CLUB WATER PROJECT
MURRAY & WHITTAMORE ROAD

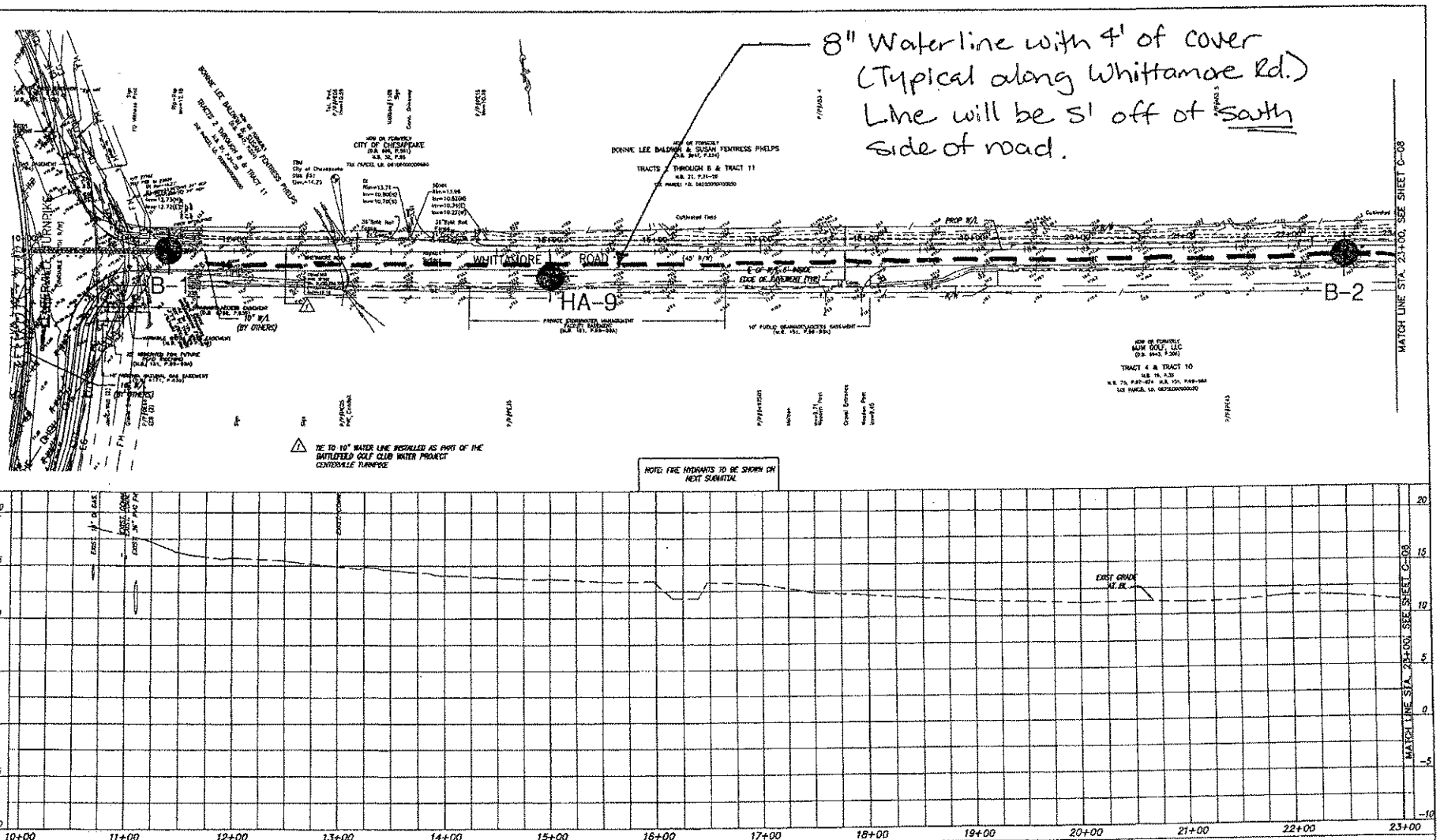
MURRAY DRIVE
PLAN & PROFILE

DATE	12/19/08
JOB #	11657474
DRAWN	MCS
DESIGNED	SDE
CHECKED	PSP
PROJ MGR	SDE

SCALE
HORIZONTAL 1"=40'
VERTICAL 1"=4'

SHEET NO. C-6

STATUS 35% SUBMITTAL



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BATTLEFIELD GOLF CLUB WATER PROJECT, MURRAY AND WHITTAMORE ROAD
CHESAPEAKE, VIRGINIA

BORING AND HAND AUGER LOCATION PLAN

SCALE:	DATE:	PROJECT NO.:
AS SHOWN	6/09	06320106.09.03
DRAWN BY:	CHECK BY:	FIGURE:
RR	CS	7

HORIZONTAL GRAPHIC SCALE: 1 Inch = 40 ft.
VERTICAL GRAPHIC SCALE: 1 Inch = 4 ft.

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BATTLEFIELD GOLF CLUB WATER PROJECT
MURRAY & WHITTAMORE ROAD

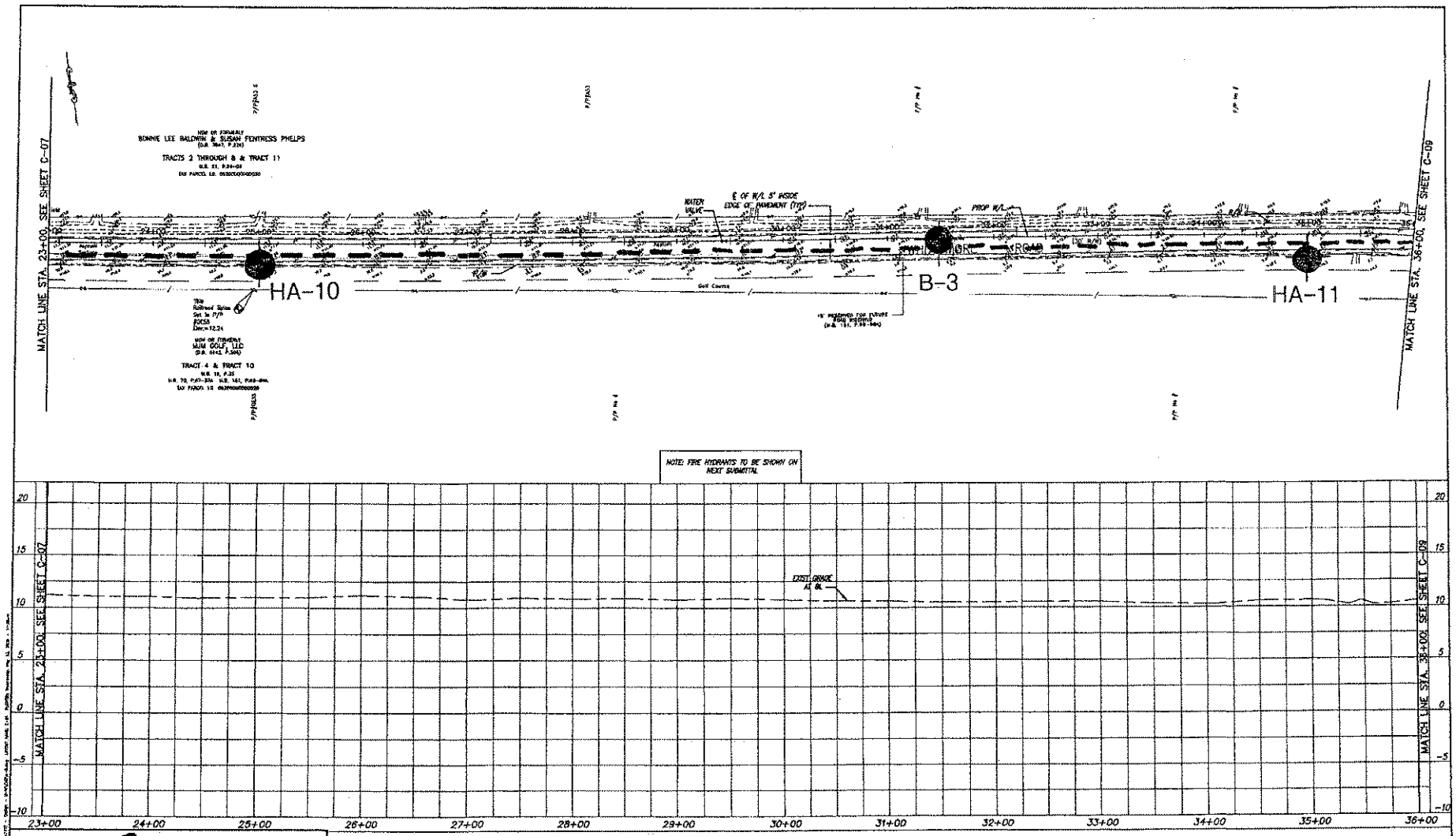
WHITTAMORE ROAD
PLAN & PROFILE

DATE	12/19/08
PROJECT	51957474
DRAWN	MFS
CHECKED	BDK
CHECKED	PJC
FINAL APPR.	BDC

SCALE: HORIZONTAL 1"=40', VERTICAL 1"=4'

SHEET NO. C-7

STATUS: 35% SUBMITTAL



HORIZONTAL GRAPHIC SCALE

1 Inch = 40 Ft.

VERTICAL GRAPHIC SCALE

1 Inch = 4 Ft.

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BATTLEFIELD GOLF CLUB WATER PROJECT, MURRAY AND WHITTAMORE ROAD

CHESAPEAKE, VIRGINIA

BORING AND HAND AUGER LOCATION PLAN	SCALE: AS SHOWN	DATE: 6/09	PROJECT NO.: 66330106.00.65
	DRAWN BY: RR	CHECK BY: GS	FIGURE: 1

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BATTLEFIELD GOLF CLUB WATER PROJECT
MURRAY & WHITTAMORE ROAD

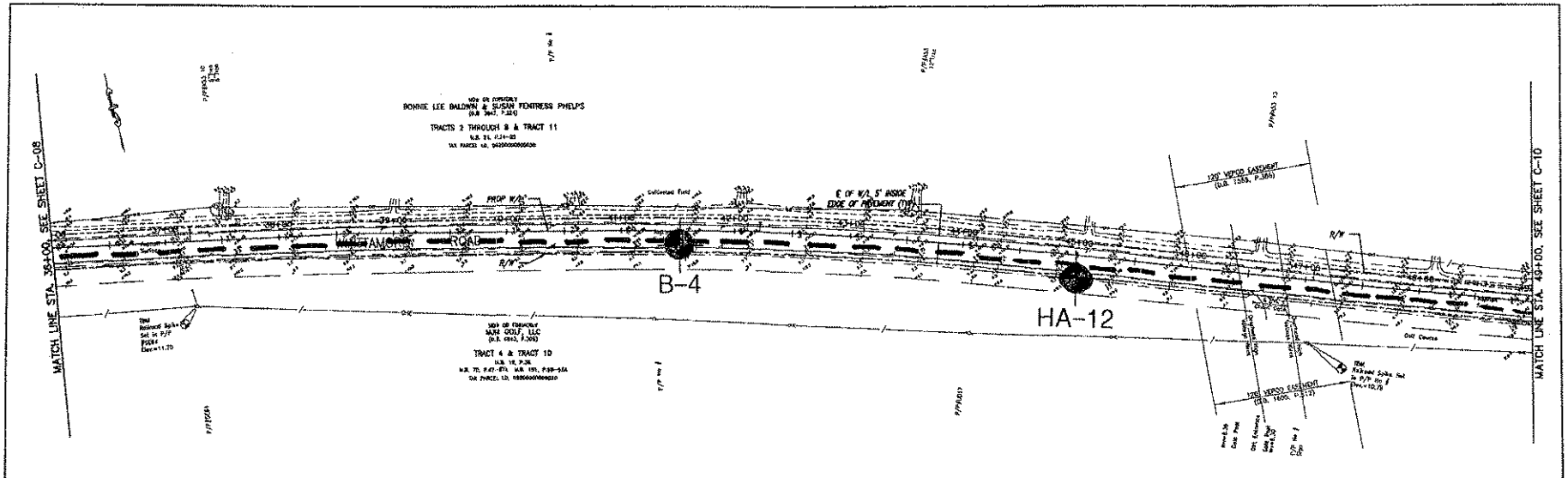
WHITTAMORE ROAD
PLAN & PROFILE

DATE	12/19/08
PROJECT	11457474
DRAWN	MDB
DESIGNED	MDB
CHECKED	PSP
PROJ. MGR.	MDB

SCALE: HORIZONTAL 1" = 40' VERTICAL 1" = 4'

SHEET NUMBER 10 — SHEET NUMBER C-8

STATUS: 35% SUBMITTAL



NOTE: FIRE HYDRANTS TO BE SHOWN ON NEXT SUBMITTAL

HORIZONTAL GRAPHIC SCALE

VERTICAL GRAPHIC SCALE

Schnabel Engineering

BATTLEFIELD GOLF CLUB WATER PROJECT, MURRAY AND WHITTAMORE ROAD

CHESAPEAKE, VIRGINIA

BORING AND HAND AUGER LOCATION PLAN

SCALE:	DATE:	PROJECT NO.:
AS SHOWN	6/09	06330106.00.03
DRAWN BY:	CHECK BY:	FIGURE:
RR	GS	9

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BATTLEFIELD GOLF CLUB WATER PROJECT
MURRAY & WHITTAMORE ROAD

WHITTAMORE ROAD
PLAN & PROFILE

DATE	12/19/08
PROJECT #	11853474
DRAWN	MCS
DESIGNED	SDE
CHECKED	PSF
FINAL MODEL	SDE

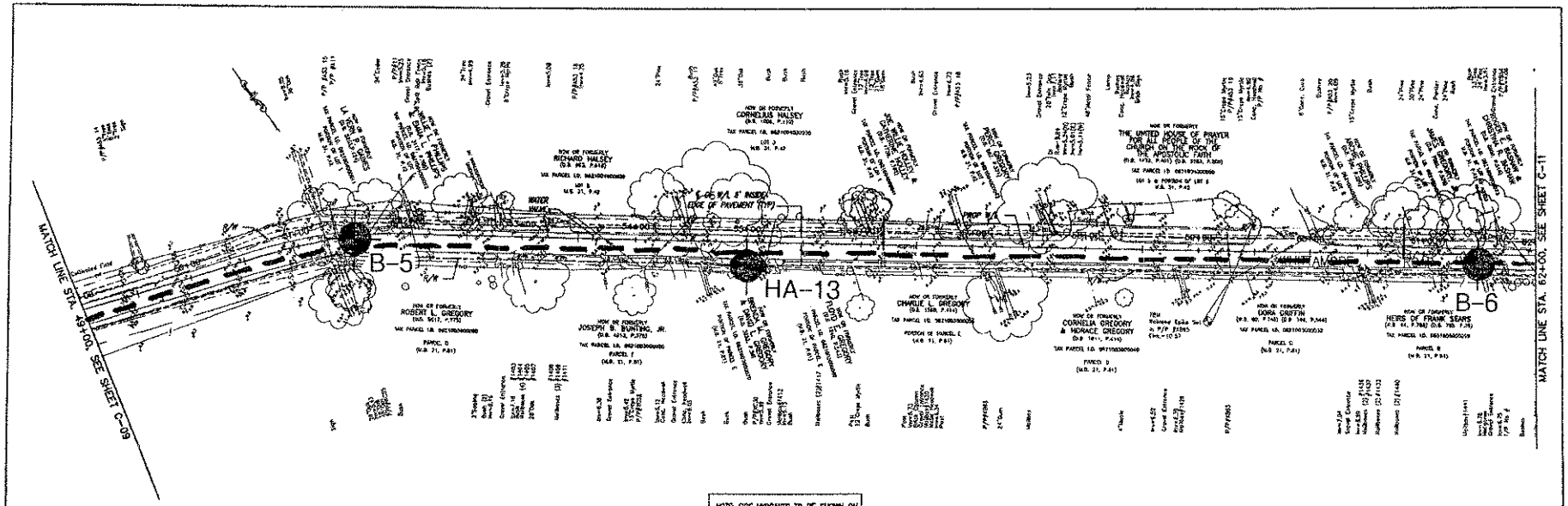
SCALE: HORIZONTAL 1" = 40' VERTICAL 1" = 4'

SHEET NO. 11 OF 11 SHEETS

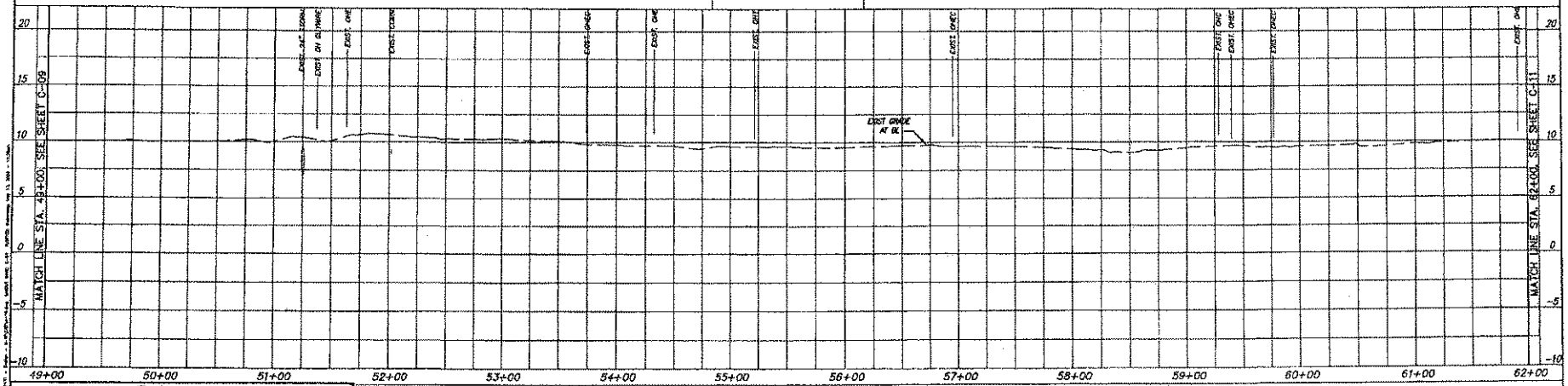
DRAWING NO. C-9

STATUS: 35% SUBMITTAL

REVISION -



NOTE: FIRE HYDRANTS TO BE SHOWN ON NEXT SUBMITTAL



Schnabel Engineering

BATTLEFIELD GOLF CLUB WATER PROJECT, MURRAY AND WHITTAMORE ROAD
CHESAPEAKE, VIRGINIA

BORING AND HAND AUGER LOCATION PLAN

SCALE:	DATE:	PROJECT NO.:
AS SHOWN	6/09	08339196.09.03
DRAWN BY:	CHECK BY:	FIGURE:
RR	GS	10

HORIZONTAL GRAPHIC SCALE: 1 inch = 40 ft.
VERTICAL GRAPHIC SCALE: 1 inch = 4 ft.

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BATTLEFIELD GOLF CLUB WATER PROJECT
MURRAY & WHITTAMORE ROAD

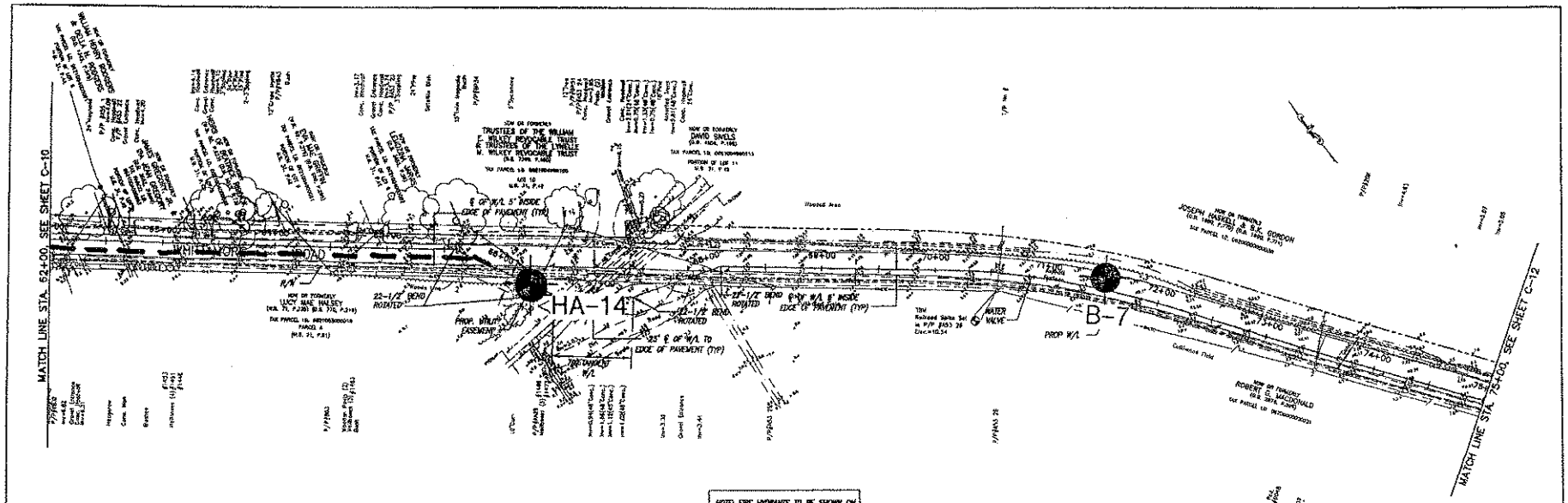
WHITTAMORE ROAD
PLAN & PROFILE

DATE	12/19/08
PROJ. #	11857474
DESIGNED	MCB
DRAWN	SDE
CHECKED	PSP
ENG. MGR.	SDE

SCALE: HORIZONTAL 1"=40', VERTICAL 1"=4'

PROJECT NO. 12
SHEET NUMBER C-10

STATUS: 35% SUBMITTAL



HORIZONTAL GRAPHIC SCALE

VERTICAL GRAPHIC SCALE

Schnabel Engineering

BATTLEFIELD GOLF CLUB WATER PROJECT, MURRAY AND WHITTAMORE ROAD
CHESAPEAKE, VIRGINIA

BORING AND HAND AUGER LOCATION PLAN

SCALE:	DATE:	PROJECT NO.:
AS SHOWN	5/09	60330196.80.03
DRAWN BY:	CHECK BY:	FIGURE:
RR	GS	11

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Chesapeake VIRGINIA

BATTLEFIELD GOLF CLUB WATER PROJECT
MURRAY & WHITTAMORE ROAD

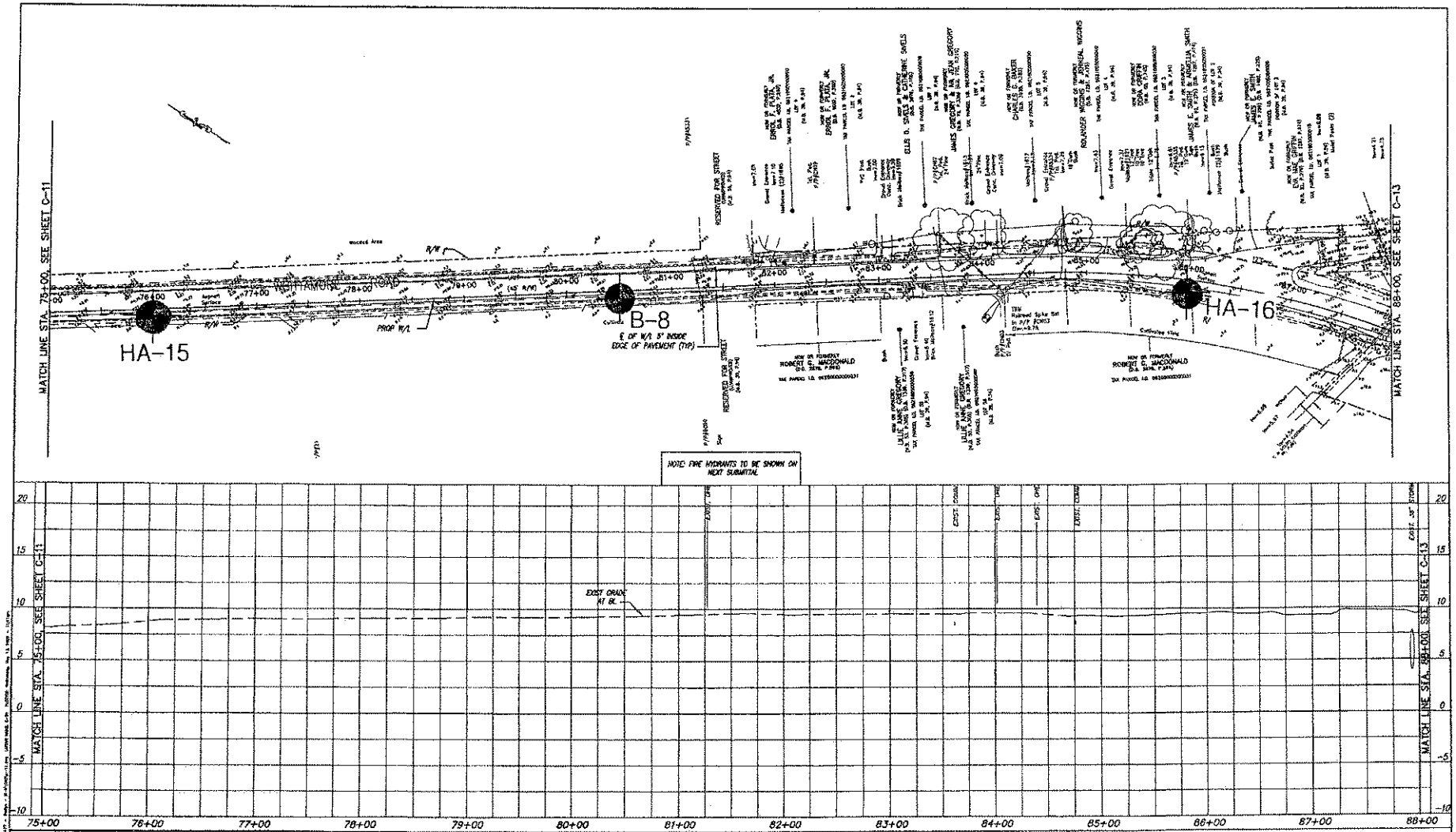
WHITTAMORE ROAD
PLAN & PROFILE

DATE	12/19/08
PROJ. #	11457454
DRAWN	MCS
DESIGNED	SDE
CHECKED	PSF
PROJ. MGR.	SDE

SCALE: HORIZONTAL 1"=40', VERTICAL 1"=4'

DRAWING NUMBER: C-11

STATUS: 35% SUBMITTAL



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BATTLEFIELD GOLF CLUB WATER PROJECT, MURRAY AND WHITTAMORE ROAD
CHESAPEAKE, VIRGINIA

BORING AND HAND AUGER LOCATION PLAN

SCALE:	DATE:	PROJECT NO.:
AS SHOWN	6/09	50338106.00.00
DRAWN BY:	CHECK BY:	FIGURE:
RR	GS	12

HORIZONTAL GRAPHIC SCALE: 40 0 40 80 — 1 inch = 40 ft.

VERTICAL GRAPHIC SCALE: 4 0 4 8 — 1 inch = 4 ft.

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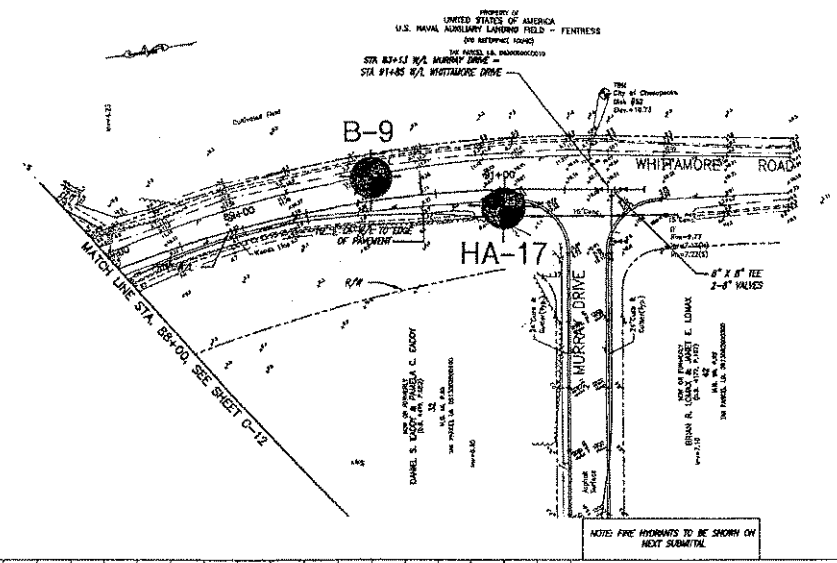
WHITTAMORE ROAD
PLAN & PROFILE

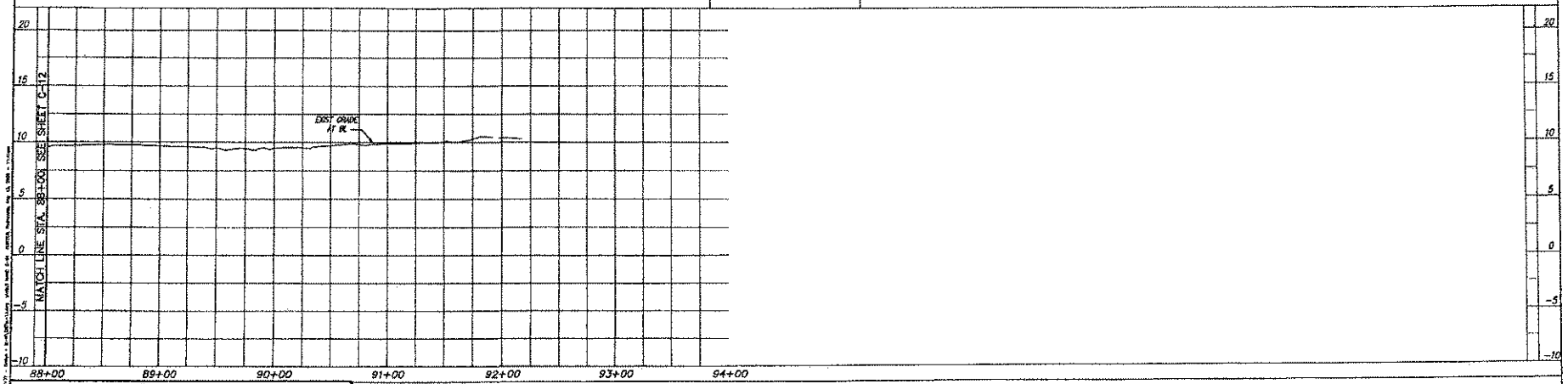
DATE	12/19/08
JOB #	11857474
DRAWN	MES
DESIGNED	PSF
CHECKED	PSF
FILE NAME	MOE

SCALE: HORIZONTAL 1"=40' VERTICAL 1"=4'

SHEET NO. C-12

STATUS: 35% SUBMITTAL





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BATTLEFIELD GOLF CLUB WATER PROJECT, MURRAY AND WHITTAMORE ROAD
CHESAPEAKE, VIRGINIA

BORING AND HAND AUGER LOCATION PLAN

SCALE:	DATE:	PROJECT NO.:
AS SHOWN	5/09	08130106.00.03
DRAWN BY:	CHECK BY:	FIGURE:
RR	CS	13

HORIZONTAL GRAPHIC SCALE

VERTICAL GRAPHIC SCALE

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BATTLEFIELD GOLF CLUB WATER PROJECT
MURRAY & WHITTAMORE ROAD

WITTAMORE ROAD PLAN AND PROFILE

DATE	DECEMBER 23, 2009
PROJ #	11857471
DRAWN	MCS
DESIGNED	SDC
CHECKED	PSF
PROJ MGR.	SDC
STATUS	35% SUBMITTAL

SCALE
HORIZONTAL 1" = 40'
VERTICAL 1" = 4'

DRAWING NO. 35
SHEET NUMBER C-13

APPENDIX B

Soil Laboratory Test Data

Summary of Laboratory Tests (6 Sheets)
Gradation Curve (1 Sheets)

SUMMARY OF SOIL LABORATORY TESTS

HAND AUGER / SAMPLE #	B-3	B-4	B-6	HA-1
DEPTH	2' - 4'	4' - 6'	6' - 8'	1.5' - 2.8'
SAMPLE TYPE	JAR	JAR	JAR	JAR
STRATUM	B1	B2	B1	B2
SAMPLE DESCRIPTION	Dark brown, SILT (ML)	Brown-gray, fine to coarse SILTY SAND (SM), trace gravel	Gray and orange-brown, mottled, SILTY CLAY (CL-ML)	Orange-brown, fine to medium SILTY SAND (SM)
NATURAL MOISTURE CONTENT (%)	24.7	16.9	28.5	17.2
NATURAL WET DENSITY (pcf)				
LIQUID LIMIT	22	NP	24	NP
PLASTIC LIMIT	21	NP	20	NP
PLASTICITY INDEX	1	NP	4	NP
GRADATION DATA				
(% FINER THAN SIEVE)				
3/4"	--	--	--	100.0
NO. 4	--	--	--	100.0
NO. 40	98.8	61.1	98.9	95.7
NO. 200	92.7	22.3	86.4	22.8
MOISTURE DENSITY RELATION DATA (ASTM D 698)				
MAXIMUM DRY DENSITY (pcf)	--	--	--	--
OPTIMUM MOISTURE CONTENT %	--	--	--	--
CBR TEST DATA (VTM-8)				
BEFORE SOAK CBR	--	--	--	--
AFTER SOAK CBR	--	--	--	--
% SWELL	--	--	--	--
COMPACTED SAMPLE DRY DENSITY (pcf)	--	--	--	--
COMPACTED SAMPLE MOISTURE CONTENT %	--	--	--	--
REMARKS				SEE GRADATION SHEET

NOTES: 1. Soil tests in accordance with applicable ASTM, AASHTO and VTM Standards.
2. * corrected per VTM1

SUMMARY OF SOIL LABORATORY TESTS

BORING	HA-2	HA-7	HA-9	HA-12
DEPTH	0.2' - 2.1'	0.9' - 3.4'	1.6' - 2.5'	1.2' - 2.6'
SAMPLE TYPE	JAR	JAR	JAR	JAR
STRATUM	B1	B1	B1	B1
SAMPLE DESCRIPTION	Brown, LEAN CLAY (CL)	Brown-gray, fine to medium sandy SILT (ML)	Dark brown, fine to medium sandy SILTY, CLAY (CL-ML)	Dark brown and orange-brown, mottled, LEAN CLAY WITH SAND (CL)
NATURAL MOISTURE CONTENT (%)	19.0	20.7	21.3	25.0
NATURAL WET DENSITY (pcf)				
LIQUID LIMIT	30	NP	25	32
PLASTIC LIMIT	17	NP	18	19
PLASTICITY INDEX	13	NP	7	13
GRADATION DATA				
(% FINER THAN SIEVE)				
3/4"	--	--	--	--
NO. 4	--	--	--	--
NO. 40	99.3	96.9	93.8	98.7
NO. 200	94.1	68.1	61.2	83.3
MOISTURE DENSITY RELATION DATA (ASTM D 698)				
MAXIMUM DRY DENSITY (pcf)	--	--	--	--
OPTIMUM MOISTURE CONTENT %	--	--	--	--
CBR TEST DATA (VTM-8)				
BEFORE SOAK CBR	--	--	--	--
AFTER SOAK CBR	--	--	--	--
% SWELL	--	--	--	--
COMPACTED SAMPLE DRY DENSITY (pcf)	--	--	--	--
COMPACTED SAMPLE MOISTURE CONTENT %	--	--	--	--
REMARKS				

NOTES: 1. Soil tests in accordance with applicable ASTM, AASHTO and VTM Standards.

SUMMARY OF SOIL LABORATORY TESTS

BORING	HA-14			
DEPTH	0.9' - 3.5'			
SAMPLE TYPE	JAR			
STRATUM	B1			
SAMPLE DESCRIPTION	Brown-gray, SILTY, CLAY WITH SAND (CL-ML)			
NATURAL MOISTURE CONTENT (%)	19.6			
NATURAL WET DENSITY (pcf)				
LIQUID LIMIT PLASTIC LIMIT PLASTICITY INDEX	24 19 5			
GRADATION DATA				
(% FINER THAN SIEVE)				
3/4"	--			
NO. 4	--			
NO. 40	98.3			
NO. 200	74.6			
MOISTURE DENSITY RELATION DATA (ASTM D 698)				
MAXIMUM DRY DENSITY (pcf)	--			
OPTIMUM MOISTURE CONTENT %	--			
CBR TEST DATA (VTM-8)				
BEFORE SOAK CBR	--			
AFTER SOAK CBR	--			
% SWELL	--			
COMPACTED SAMPLE DRY DENSITY (pcf)	--			
COMPACTED SAMPLE MOISTURE CONTENT %	--			
REMARKS				

NOTES: 1. Soil tests in accordance with applicable ASTM, AASHTO and VTM Standards.

Summary Of Laboratory Tests

Project Number: 08330106.00.03

Boring No.	Sample Depth ft / Elevation ft	Sample Type	Description of Soil Specimen	pH	Oxidation Reduction Potential (mV)	Resistivity (ohm-cm)	Sulfides
HA-01	1.0 - 4.0 / El 11 to 8	Jar	SILTY SAND, gray-brown (VISUAL)	7.1	56	7700	0
HA-02	1.0 - 4.0 / El 8.5 to 5.5	Jar	SILTY SAND, brown (VISUAL)	6.1	109	11000	0
HA-03	1.0 - 4.0 / El 8 to 5	Jar	SANDY SILT, gray (VISUAL)	6.6	139	3400	0
HA-04	1.0 - 4.0 / El 8 to 5	Jar	SANDY ELASTIC SILT, gray-brown (VISUAL)	7.1	154	4800	0
HA-05	1.0 - 4.0 / El 8.5 to 5.5	Jar	SANDY SILT, gray (VISUAL)	5.9	327	6300	0
HA-06	1.0 - 4.0 / El 8 to 5	Jar	SANDY SILT, gray (VISUAL)	5.9	351	6400	0
HA-07	1.0 - 4.0 / El 8.5 to 5.5	Jar	SILTY SAND, gray (VISUAL)	5.8	320	8600	0

Notes:
1. Soil tests in general accordance with ASTM standards.
2. Soil classifications are in general accordance with ASTM D2487(as applicable), based on testing indicated and visual classification.
3. Key to abbreviations: NP=Non-Plastic; -- indicates no test performed

Schnabel Engineering

Project: Battlefield Golf Club Water Project

DYNAMIC LAB SUMMARY LAB TEST RESULTS HA-1-HA-17.GPJ SCHNABEL DATA TEMPLATE 2008_04_22.GDT 6/30/09

Summary Of Laboratory Tests

Project Number: 08330106.00.03

Boring No.	Sample Depth ft / Elevation ft	Sample Type	Description of Soil Specimen	pH	Oxidation Reduction Potential (mV)	Resistivity (ohm-cm)	Sulfides
HA-08	1.0 - 4.0 / El 9 to 6	Jar	SANDY ELASTIC SILT, gray (VISUAL)	5.7	315	7200	0
HA-09	2.0 - 5.0 / El 11.5 to 8.5	Jar	SANDY SILT, dark brown (VISUAL)	6.8	128	3900	0
HA-10	2.0 - 5.0 / El 9 to 6	Jar	SILTY SAND, dark gray (VISUAL)	7.1	94	4100	0
HA-11	2.0 - 5.0 / El 8.5 to 5.5	Jar	SANDY SILT, dark gray (VISUAL)	6.6	133	5400	0
HA-12	2.0 - 5.0 / El 8.2 to 5.2	Jar	SANDY LEAN CLAY, brown, dark gray (VISUAL)	6.7	166	6000	0
HA-13	2.0 - 5.0 / El 7.5 to 4.5	Jar	SANDY ELASTIC SILT, gray (VISUAL)	7.1	261	4800	0
HA-14	2.0 - 5.0 / El 6 to 3	Jar	SANDY ELASTIC SILT, gray (VISUAL)	6.6	203	3700	0

Notes:
1. Soil tests in general accordance with ASTM standards.
2. Soil classifications are in general accordance with ASTM D2487(as applicable), based on testing indicated and visual classification.
3. Key to abbreviations: NP=Non-Plastic; -- indicates no test performed

Schnabel Engineering

Project: Battlefield Golf Club Water Project

DYNAMIC LAB SUMMARY LAB TEST RESULTS HA-1-HA-17.GPJ SCHNABEL DATA TEMPLATE 2006 04 22.GDT 6/30/09

Summary Of Laboratory Tests

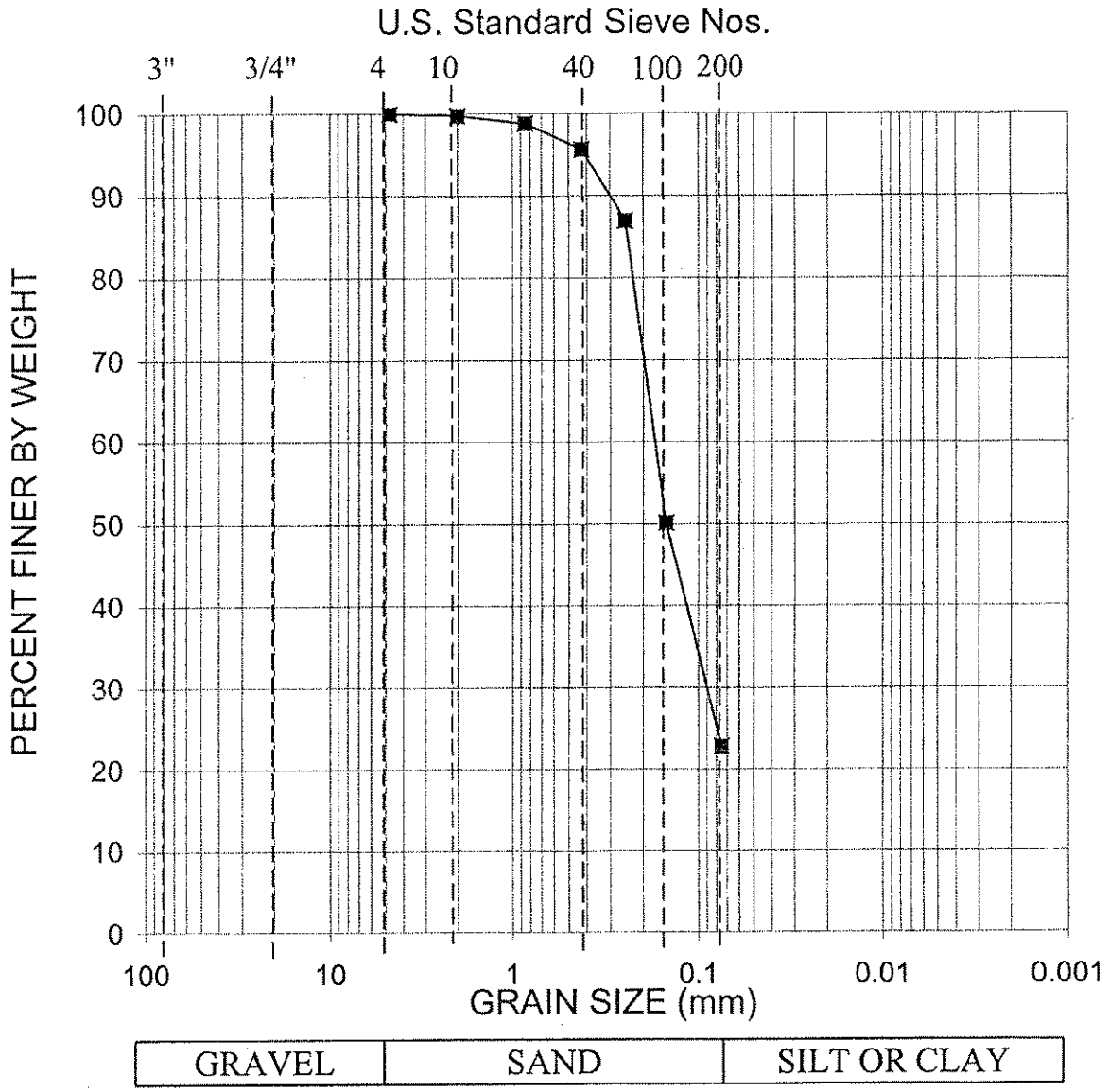
Project Number: 08330106.00.03

Boring No.	Sample Depth ft / Elevation ft	Sample Type	Description of Soil Specimen	pH	Oxidation Reduction Potential (mV)	Resistivity (ohm-cm)	Sulfides
HA-15	2.0 - 5.0 / El 7 to 4	Jar	ELASTIC SILT, gray (VISUAL)	7.3	112	4700	0
HA-16	2.0 - 5.0 / El 7.5 to 4.5	Jar	SILTY SAND, brown (VISUAL)	5.8	194	7000	0
HA-17	2.0 - 5.0 / El 8.2 to 5.2	Jar	SILTY SAND, gray-brown (VISUAL)	5.9	94	12000	0

Notes:
1. Soil tests in general accordance with ASTM standards.
2. Soil classifications are in general accordance with ASTM D2487(as applicable), based on testing indicated and visual classification.
3. Key to abbreviations: NP=Non-Plastic; -- indicates no test performed

Schnabel Engineering

Project: Battlefield Golf Club Water Project



Key	Sample	Depth(ft.)	Sample Description	Class.	LL	PI
▩	HA-1	1.5' - 2.8'	Orange-brown, fine to medium SILTY SAND	SM	NP	NP

Schnabel Engineering

GRADATION CURVES

Project: BATTLEFIELD GOLF CLUB WATER PROJECT, CENTERVILLE TURNPIKE, CHESAPEAKE, VA

Contract No. 08330106.00.03

Schnabel Engineering, LLC

300 Ed Wright Lane, Suite I
Newport News, VA 23606

Phone (757) 947-1220
Fax (757) 947-1225
www.schnabel-eng.com

July 8, 2009

Mr. Robert Sciacchitano, P.E.
URS Corporation
277 Bendix Road, Suite 500
Virginia Beach, Virginia 23452

Subject: 08330106.00.03 Report Addendum No. 1, Geotechnical Engineering Services, Battlefield Golf Club Water Project, Murray and Whittamore Roads, Chesapeake, Virginia

Dear Robert:

Schnabel Engineering, LLC is pleased to submit a copy of this Report Addendum No. 1 providing results of soil laboratory testing completed following our geotechnical engineering reports issued prior to this date.

SOIL LABORATORY TESTING

Bulk samples were collected from approximately 0.7 to 5 ft below the ground surface from Borings B-2, B-7 and B-9 for laboratory testing. The bulk soil samples were tested for natural moisture content, Atterberg Limits, and gradation Standard Proctor and California Bearing Ratio (CBR). The summary of soil laboratory test results is included in the attachment.

Based on the bulk samples testing, these soils are considered suitable for use as pipe trench backfill. However, the natural moisture content values for the bulk samples tested were generally higher than the optimum moisture content values for compaction of these soils. Therefore, some scarifying and drying of these soils may be necessary during backfilling to achieve adequate compaction.

We have endeavored to complete the services identified herein in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality and under similar conditions as this project. No other representation, express or implied, is included or intended, and no warranty or guarantee is included or intended in this report addendum or other instrument of service.

We appreciate the opportunity to be of continued service on this project. If you have any questions, please do not hesitate to contact us.

Very truly yours,
SCHNABEL ENGINEERING, LLC

Russell W. Rountree

Russell W. Rountree
Senior Staff Scientist

Gilbert T. Seese, P.E.
Principal

COMMONWEALTH OF VIRGINIA
GILBERT T. SEESE, JR.
Lic. No. 012625
PROFESSIONAL ENGINEER

RWR:GTS:dah

Attachment: Soil Laboratory Test Data

c: URS Corporation
Stephen Edwards (e-mail only)

ATTACHMENT 1

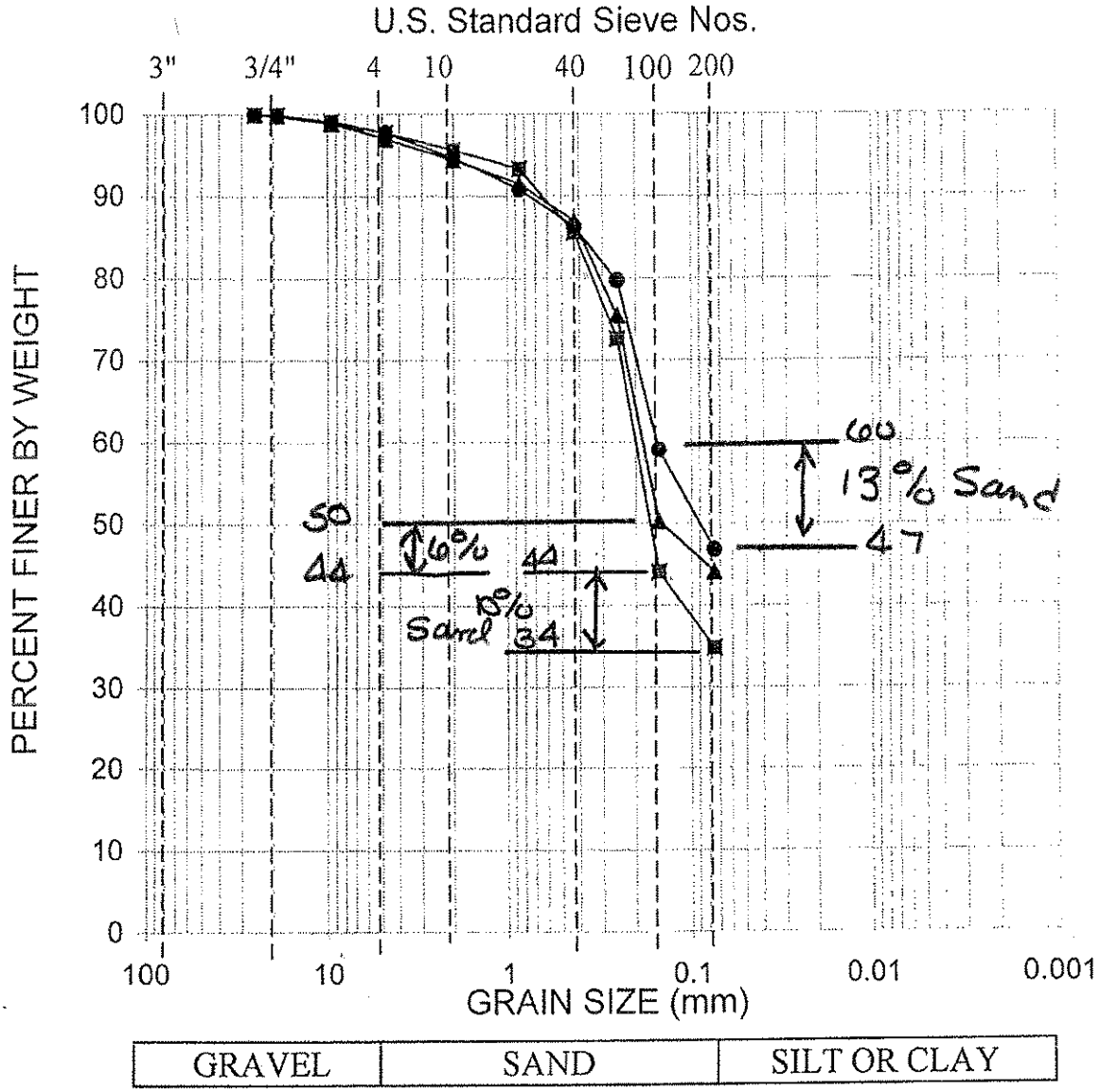
Soil Laboratory Test Data

Summary of Laboratory Tests (1 Sheet)
Gradation Curve (1 Sheet)
Moisture-Density Relationships (3 sheets)

SUMMARY OF SOIL LABORATORY TESTS

HAND AUGER / SAMPLE #	B-2	B-7	B-9	
DEPTH	1' - 5'	1' - 5'	1' - 5'	
SAMPLE TYPE	BULK	BULK	BULK	
STRATUM	A1 / B1 / B2	B2 / B1	A / B2 / B1	
SAMPLE DESCRIPTION	Brown, fine to coarse SILTY, CLAYEY SAND (SC-SM), trace gravel, contains crushed stone and asphalt	Brown, fine to coarse CLAYEY SAND (SC), contains crushed stone	Brown, fine to coarse CLAYEY SAND (SC), contains crushed stone and asphalt	
NATURAL MOISTURE CONTENT (%)	18.4	12.0	11.4	
NATURAL WET DENSITY (pcf)				
LIQUID LIMIT	20	23	21	
PLASTIC LIMIT	14	15	13	
PLASTICITY INDEX	6	8	8	
GRADATION DATA				
(% FINER THAN SIEVE)				
3/4"	99.9	99.8	99.9	
NO. 4	97.7	97.7	97.0	
NO. 40	85.6	86.3	87.0	
NO. 200	34.8	46.8	44.1	
MOISTURE DENSITY RELATION DATA (ASTM D 698)				
MAXIMUM DRY DENSITY (pcf)	119.8	124.8	121.4	
OPTIMUM MOISTURE CONTENT %	11.3	9.6	10.6	
CBR TEST DATA (VTM-8)				
BEFORE SOAK CBR	--	--	--	
AFTER SOAK CBR	20.8	21.3	25.4	
% SWELL	0.00	0.04	0.04	
COMPACTED SAMPLE DRY DENSITY (pcf)	119.4	124.4	121.0	
COMPACTED SAMPLE MOISTURE CONTENT %	10.4	8.9	9.7	
REMARKS	SEE GRADATION AND MOISTURE-DENSITY SHEET	SEE GRADATION AND MOISTURE-DENSITY SHEET	SEE GRADATION AND MOISTURE-DENSITY SHEET	

NOTES: 1. Soil tests in accordance with applicable ASTM, AASHTO and VTM Standards.



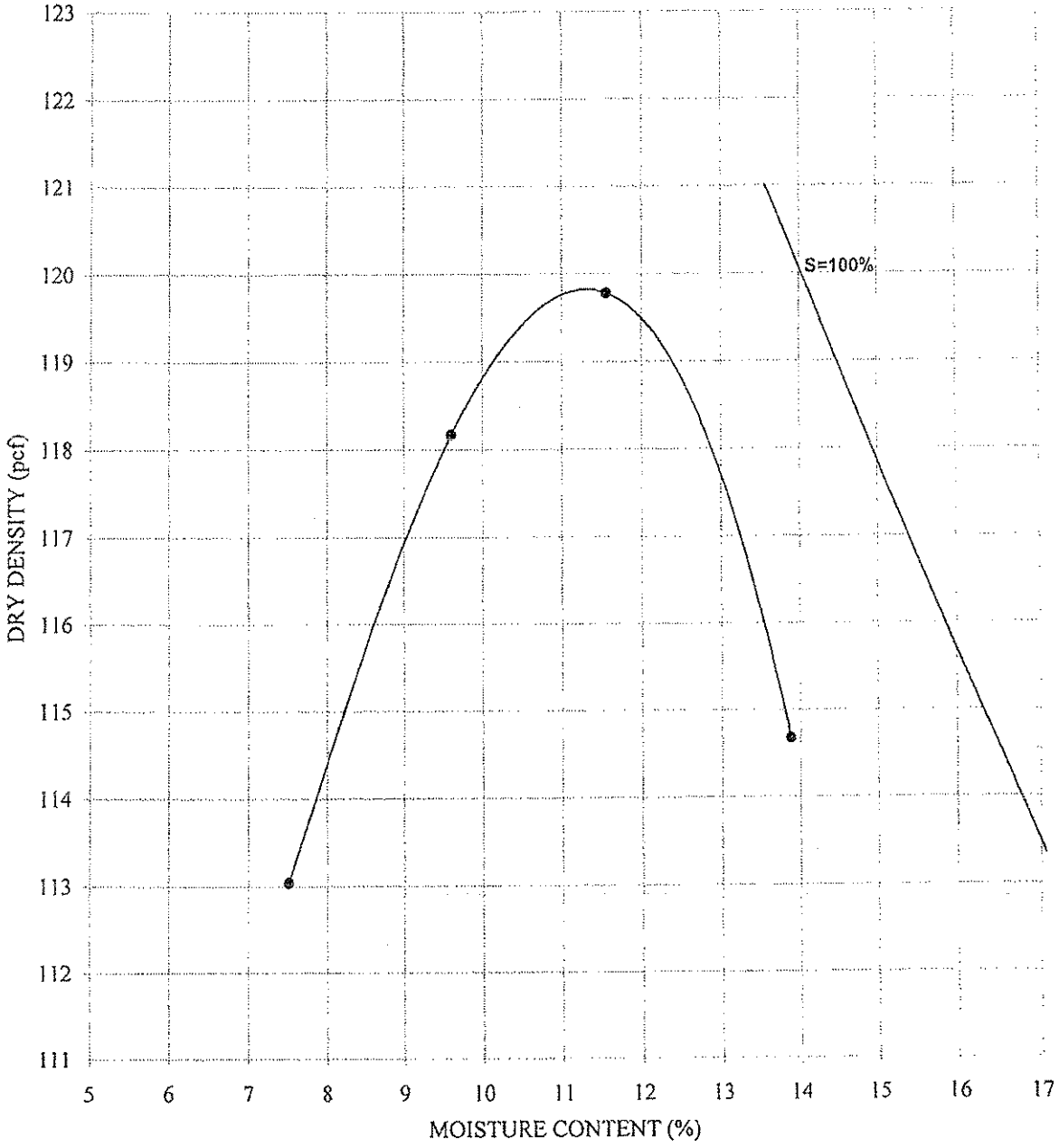
Key	Sample	Depth(ft.)	Sample Description	Class.	LL	PI
■	B-2	1'-5'	Brown, fine to coarse SILTY, CLAYEY SAND, trace gravel, contains crushed stone and asphalt	SC-SM	20	6
○	B-7	1'-5'	Brown, fine to coarse CLAYEY SAND, contains crushed stone	SC	23	8
▲	B-9	1'-5'	Brown, fine to coarse CLAYEY SAND, contains crushed stone and asphalt	SC	21	8

Schnabel Engineering

GRADATION CURVES

Project: BATTLEFIELD GOLF CLUB WATER PROJECT, MURRAY AND WHITTAMORE ROAD, CHESAPEAKE, VA

Contract No. 08330106.03



Sample Description: Brown, fine to coarse SILTY, CLAYEY SAND, trace gravel, contains crushed stone and asphalt			
Classification:	SC-SM		
Sample Number:	B-2		
Sample Depth (Ft.):	1'-5'		
Sample Source: ON-SITE		Assumed Specific Gravity:	2.63
		Liquid Limit (LL):	20
		Plasticity Index (PI):	6
% Passing #4 Sieve:	97.7	Max. Dry Density (pcf):	119.8
% Passing #200 Sieve:	34.8	Opt. Moist. Content (%):	11.3

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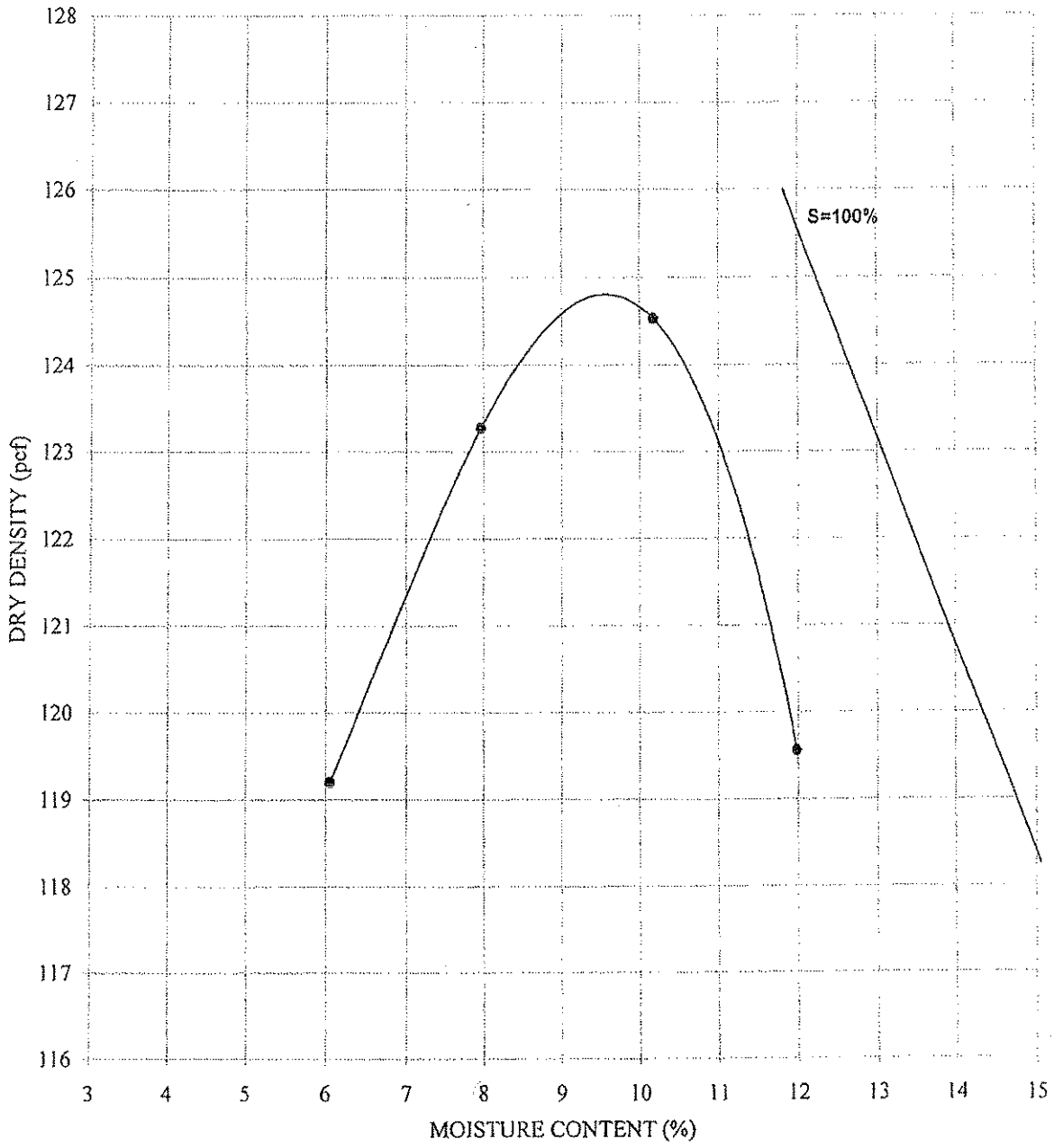
MOISTURE-DENSITY RELATION

Specification: VTM-1

Project: BATTLEFIELD GOLF CLUB WATER PROJECT, MURRAY AND WHITTAMORE ROAD, CHESAPEAKE, VA

Project No.: 08330106.03



Sample Description: Brown, fine to coarse CLAYEY SAND, contains crushed stone			
Classification:	SC		
Sample Number:	B-7		
Sample Depth (Ft.):	1'-5'		
Sample Source: ON-SITE		Assumed Specific Gravity:	2.65
		Liquid Limit (LL):	23
		Plasticity Index (PI):	8
% Passing #4 Sieve:	97.7	Max. Dry Density (pcf):	124.8
% Passing #200 Sieve:	46.8	Opt. Moist. Content (%):	9.6

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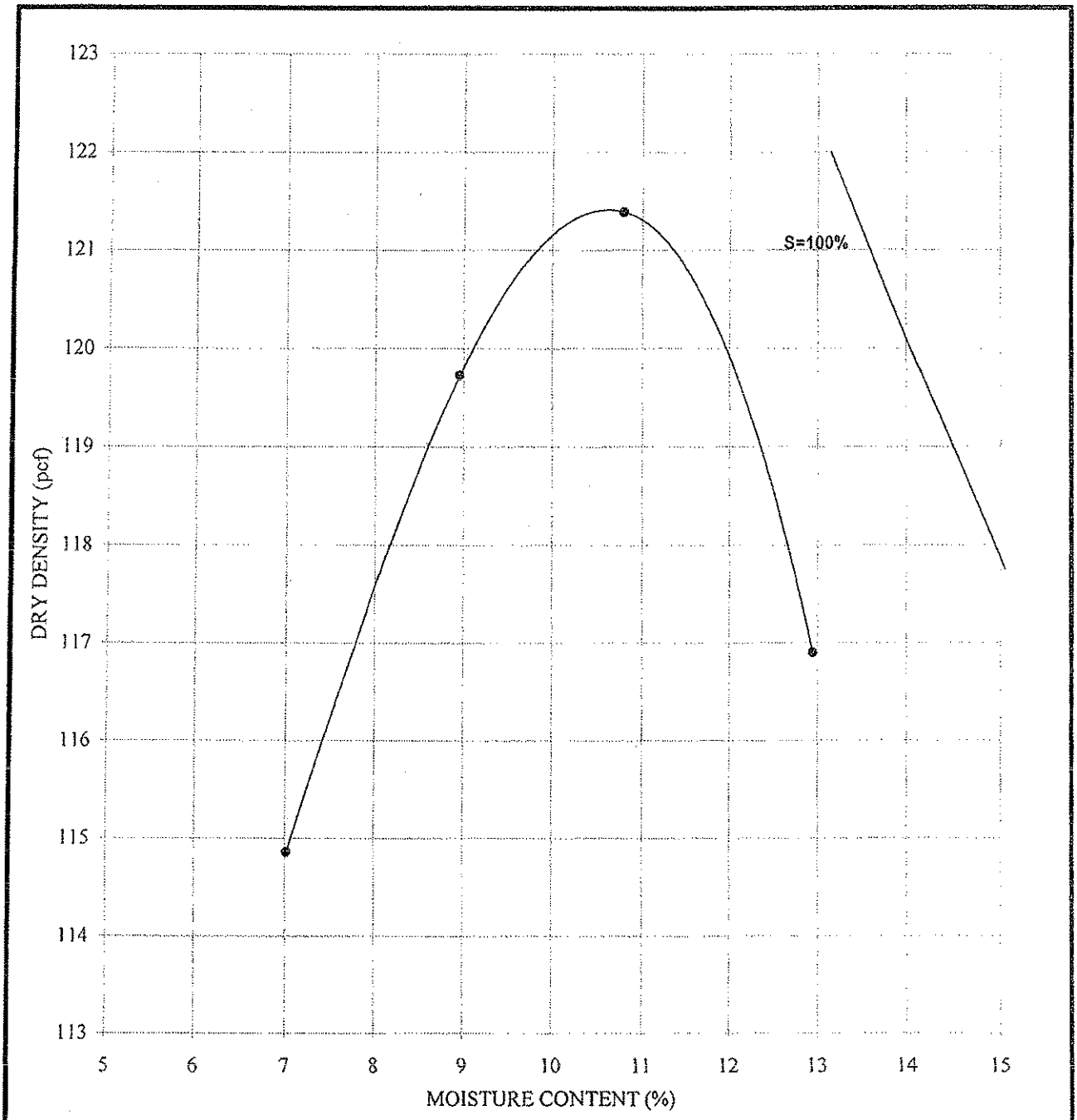
MOISTURE-DENSITY RELATION

Specification: VTM-1

Project: BATTLEFIELD GOLF CLUB WATER PROJECT, MURRAY AND WHITTAMORE ROAD, CHESAPEAKE, VA

Project No.: 08330106.03



Sample Description: Brown, fine to coarse CLAYEY SAND, contains crushed stone and asphalt			Schnabel Engineering
Classification: SC			MOISTURE-DENSITY RELATION
Sample Number: B-9			
Sample Depth (FL): 1'-5'			Specification: VTM-1
Sample Source: ON-SITE	Assumed Specific Gravity:	2.63	Project: BATTLEFIELD GOLF CLUB WATER PROJECT, MURRAY AND WHITTAMORE ROAD, CHESAPEAKE, VA
	Liquid Limit (LL):	21	
	Plasticity Index (PI):	8	
% Passing #4 Sieve: 97.0	Max. Dry Density (pcf):	121.4	
% Passing #200 Sieve: 44.1	Opt. Moist. Content (%):	10.6	Project No.: 08330106.03

Appendix B

CORROSION CONTROL ENGINEERING STUDY

Battlefield Golf Club Water Project
Murray and Whittamore Rd.
Chesapeake, Virginia

Prepared for:

URS Corporation
277 Bendix Road, Suite 500
Virginia Beach, VA 23452

October 2009

Prepared by:

System Protection Services, Inc.
500 Westwood Office Park
Fredericksburg, Virginia 22401

William M. Rivers
N.A.C.E. Certified
Corrosion Specialist

TABLE OF CONTENTS

INTRODUCTION

System Protection Services, Inc. (SPS) acting as a sub-consultant for URS Corporation., was requested to perform a corrosion evaluation and condition assessments associated with approximately 15,000 linear feet of proposed pipeline for the Battlefield Golf Club Water Main, Murray Whittamore section, project in Chesapeake, Virginia.

This study was performed to assess environmental conditions that can affect corrosion related problems associated with the soil conditions within the alignment location of the proposed water main.

The compilation of data associated with the following report provides a profile of the corrosivity conditions associated with the pipeline alignment and the potential effect these conditions are having on the state of corrosion of the pipeline.

BACKGROUND

Corrosion conditions vary according to specific pipeline alignments. There are numerous factors that can influence the corrosion rate of metals. Pipelines corrode for many reasons. Dissimilar metal conditions, dissimilar surface conditions of the metals, varying stress conditions on the metal, dissimilar electrolytes, zones of differential oxygen concentration, and varying soil composition may all contribute to the natural galvanic process. Stray currents from outside sources can also accelerate the normal galvanic process and cause considerable damage in a relatively short period of time.

The process of corrosion can be defined as the destruction of a metal or a degradation of its properties due to the electro-chemical reaction with its environment. Corrosion occurs at the anodic (anode) region of the galvanic cell. The galvanic cell is the primary cause for corrosion on buried structures. The galvanic cell consists of four (4) components, all of which must be present for the cell to exist: 1) anode, 2) cathode, 3) electrolyte (typically soil and water), and 4) an electrical path (typically the metal of the pipeline itself). The electro-chemical action causes current to flow, taking molecules of the metal from the anodic area and putting them into a solution that travels to the cathodic area of the corrosion cell. The corrosion damage to a metallic pipeline occurs at the anodic region of this corrosion cell as a result of the current discharging into the soil to flow through the soil to the cathodic region.

FIELD TESTING

The ability of an electrolyte to conduct current is governed by resistivity, which is expressed in ohm-centimeters. In general, the lower the soil resistivity is, the more corrosive the environment is. More specifically, resistivities below 5,000 ohm-centimeters are considered to be corrosive to ductile iron and steel pipelines. Soil resistivity levels above 10,000 ohm-centimeters are considered mildly corrosive and the effects of the soil resistivity on the corrosion process decreases as the soil resistivity increases. In addition to soil resistivity levels, corrosion cells can develop in areas where soil resistivities vary along the pipeline alignment due to voltage potential variations created by the pipeline passing through dissimilar soil conditions. Variations in these soil conditions and the resistivities associated with them can generate galvanic potential differentials (galvanic cells) along the structure that promote corrosion in areas of lower soil resistivities.

Following is a guideline explanation of soil resistivity ranges and how they are generally categorized in their contributions to the corrosion process:

Soil Resistivity Range (ohm-cm)	Corrosivity Rating
0-1,000	Extremely Corrosive
1,001-3,000	Very Corrosive
3,001-5,000	Corrosive
5,001-10,000	Moderately Corrosive
Over 10,000	Mildly Corrosive

In-Situ Soil Resistivity Measurements

As part of this study, soil resistivities were measured at approximately 100-foot intervals along the proposed pipeline alignment where access was available. The industry standard Wenner Four Pin method was used to evaluate in-situ soil resistivity conditions. This procedure involves driving four pins into the earth in a straight line, equally spaced, with the pin spacing equal to the depth of the average soil resistivity desired to be calculated. The calculated resistivity is an average of all the soil contained in the hemisphere from the ground surface to a depth equal to the spacing at the midpoint of the pins. Essentially, setting the pins to 7.5 foot spacing will result in an average resistivity measurement of the soil within the semi-hemispherical area from 0 to 7.5 feet. The area of soil tested is approximately 22.08 square feet. The soil resistivity is calculated by measuring the voltage drop between the pair of pins with a known current flowing between the two outside pins. The hemispheric depths measured at the tested locations were 2.5 feet, 5 feet, 7.5 feet and 10 feet. These measurements provide information related to soil characteristics that affect the flow of the

corrosion current. It is especially useful to determine how the soil resistivity changes with depth. The resistance of the electrolyte is the primary factor that affects the ability for current flow associated with the galvanic corrosion process.

In-Situ pH Measurements

Electrolytes can be classified as acid, neutral, or alkaline. As a guideline, soil pH levels of 4.0 and below are considered acidic and can significantly contribute to the corrosion process by allowing corrosion cells to remain active. Generally, as the pH levels increase above 4.0, the pH level becomes less of a contributor to the corrosion process.

The pH levels were measured along the proposed alignment at approximately one foot below the surface at the locations where in-situ soil resistivity measurements were taken. The industry standard for performing these tests is to measure the voltage potential between a portable saturated copper-copper sulfate reference electrode and an antimony reference electrode. This voltage potential is than converted to equivalent pH values. The pH data was then analyzed to determine the potential effects to the corrosion process from the pH of the soil along the proposed force main alignment.

The following chart is a general guideline as to the effects of pH levels found in soils and how they can contribute to the overall corrosion process:

PH	Corrosivity
0-2	Very Corrosive
2-4	Corrosive
Over 4	Negligible

Discussion

In-situ Soil Resistivity Measurements

Regional in-situ soil resistivity measurements were taken at 93 locations along the alignment where reasonably accessible. Roadway crossings, dense forestation, dangerous traffic patterns, high water, and less than amicable property owners are several reasons that data cannot be collected at precise 100 foot increments. The results of this field-testing can be seen on the graphed profile Charts 1-11 found in Appendix A and the tabulated data shown as Table 1 found in Appendix A.

The results of the in-situ soil resistivity survey indicate that at an estimated pipe depth of 7.5 feet the average soil resistivity is 7,022.03 ohm-cm (moderately corrosive). The corrosivity of the soil along the pipeline alignment can be categorized as 4.3% Extremely Corrosive (0-1,000 ohm-cm), 15% Very Corrosive (1,001-3,000 ohm-cm), 21.5% Corrosive (3,001-5,000 ohm-cm), 43% Moderately Corrosive (5,001-10,000 ohm-cm), and 20.4% Mildly Corrosive (over 10,000 ohm-cm). The alignment would be considered Moderately Corrosive.

In-situ Regional pH Measurements

Regional in-situ soil pH measurements were also taken at 93 locations along the proposed pipeline alignment at the test locations where the in-situ soil resistivity measurements were performed. The results of this field-testing can be seen on the graphed profile Chart 12 found in Appendix A, and the tabulated data shown as Table 1 found in Appendix A.

The results of the testing performed as part of this survey indicate the average pH of the alignment is 4.9 and that 91.4% of the corrosion effects of the pH levels measured along the proposed pipeline alignment would be considered negligible. It should be emphasized that these measurements were taken at the surface in the right of way for the pipeline alignment. Typically, the soil at the surface of an alignment is exposed to decaying vegetation and other possible surface contaminants that can result in low pH levels.

Soil Sample Testing

Soil samples were taken at 17 locations along the alignment. The results of the soil sample testing are another tool used to gain a better understanding of the corrosivity of the proposed pipeline alignment.

The soil sample testing is performed on a single sample. The data recorded is indicative of the soil conditions of a precise location. In contrast, the in-situ soil resistivity testing results in an average soil resistivity of the entire hemispherical area associated with the projected depth of the test. As mentioned on page 4, the in-situ testing is the result of the average soil resistivity of a ~22.08 square foot area. The results of the in-situ testing and the results of the sample testing are not always equal. However, the overall views of the alignment are, typically, proportionally consistent.

The average soil resistivity of the samples is 6,294.12 ohm-cm. This is in the moderately corrosive range which is consistent with the in-situ findings. The average pH of the soil samples was 6.47.

In addition to the corrosivity issues related to soil resistivities and pH levels previously addressed, soils that consistently indicate the presence of sulfides can contribute to the aggressiveness of the corrosion process. As seen in Appendix C of the Geo-tech report, the test results along for the presence of sulfides along the alignment was zero (0, negligible).

It is important to re-state that any observed inconsistencies between the in-situ measurements and the sample measurements are due to the nature of the two types of testing. During the in-situ testing, the water table and overall saturation of the soil tested as well as the depth of the test being performed result in a seasonally varying average. The sample testing takes a sample from a precise location at a determined depth. The sample is then completely saturated, presenting a "worst-case" level of saturation, and then tested. The results of soil sample testing are typically, although not always, lower than the in-situ results. The two types of testing by themselves are not a determining factor in the analysis of the alignment. Together, though, these tools provide an overall understanding of the alignment in varying conditions.

Stray DC and AC Current Results

There were no indications of any stray DC or AC current issues.

CONCLUSION/ SUMMARY

The environmental conditions found along the alignment associated with the proposed ductile iron water main indicate the system would benefit from supplemental cathodic protection considerations. The in-situ soil resistivity testing indicates that 47.3% of the soil tested at a depth of 7.5 feet is at or below 5,000 ohm-cm. Typically, pipelines being installed in similarly low-resistivity environments are installed with varying degrees of corrosion control in order to meet the expected operating life.

The conductivity of current, especially the DC current associated with the galvanic corrosion cell, is governed proportionally to the resistivity of the environment (the electrolyte of the galvanic cell). Sections of the pipeline that will be installed in the lower resistance portions of the alignment should be given corrosion control consideration.

RECOMMENDATIONS

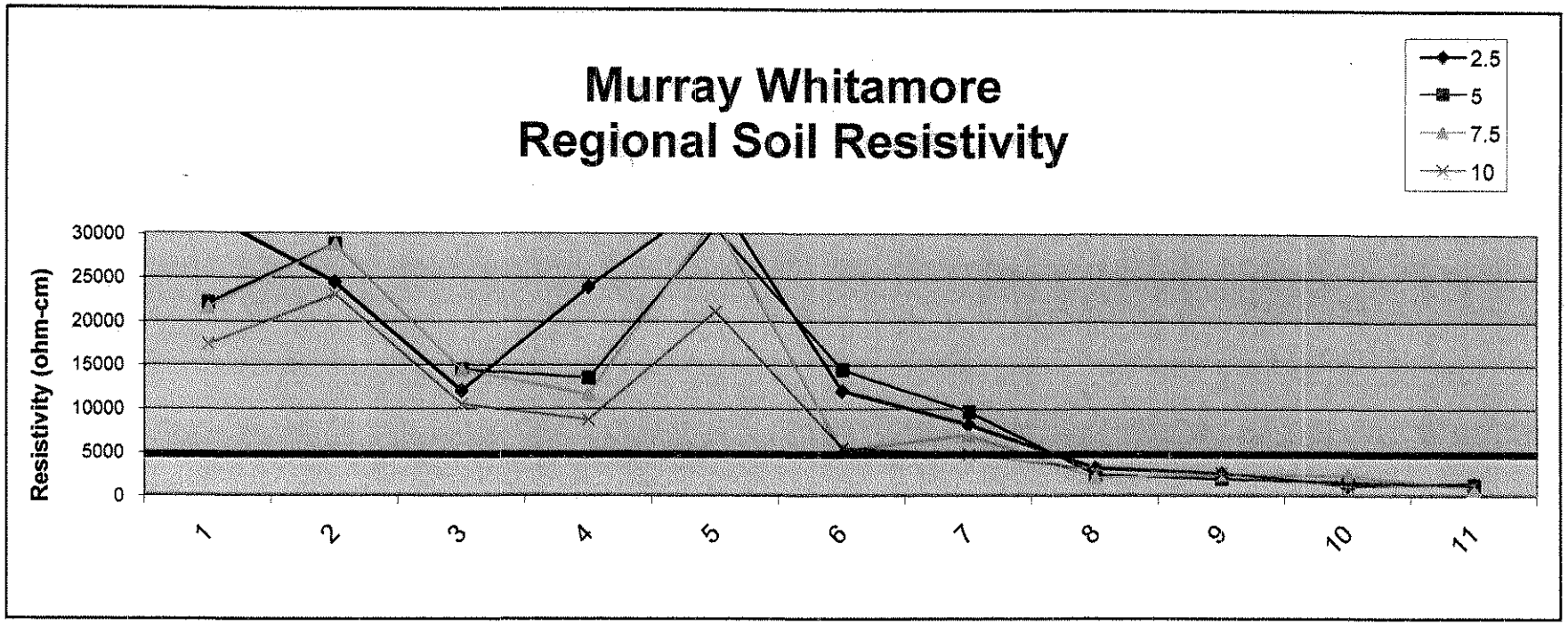
The corrosion control design is to provide the entire length of the proposed metallic pipeline with a double wrap of polyethylene encasement and to field coat all mechanical fittings installed as part of the pipeline construction. Applying the polyethylene encasement to the ductile iron pipeline in addition to field-coating the mechanical joints will minimize the metallic structure's direct contact with the electrolytic portion of the galvanic corrosion cell. This portion of the corrosion cell must be present for galvanic corrosion cells to occur.

Supplemental corrosion control is to be provided through the installation of PVC piping in the areas of the alignment where it was indicated that soil conditions are aggressive and conducive to accelerated corrosion. The implementation of PVC, a non-metallic piping material, eliminates the possibility of galvanic corrosion (see page 3) thus eliminating the risk of corrosion in the designated areas where PVC is utilized. The proposed locations of the PVC piping can be found on the design drawings accompanying this report.

The details of these corrosion control enhancements are clarified as part of the written corrosion control specifications and corrosion control design overviews included as part of the overall pipeline design submittal.

System Protection Services, Inc.
113 11th St.
Colonial Beach, VA 22443

Chart 1- Murray Whitamore



5,000 Ohm-cm

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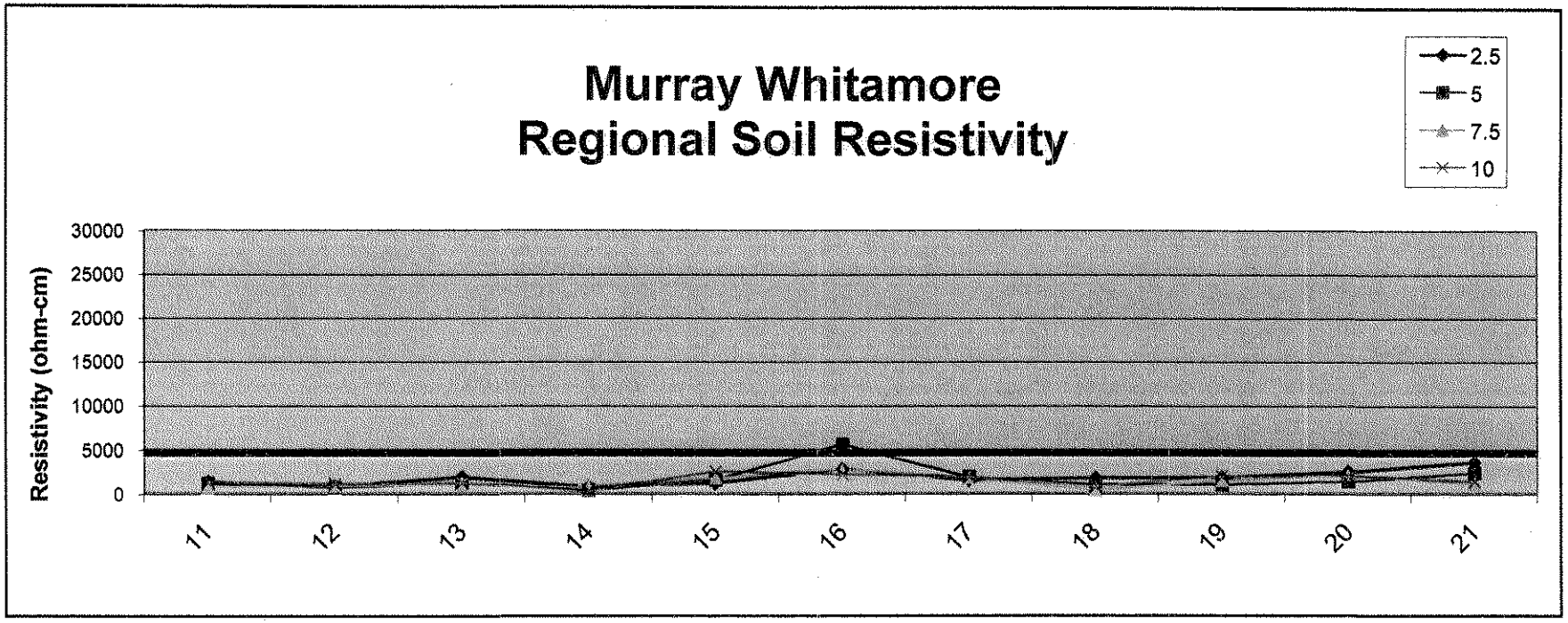
Chart 2- Murray Whitamore



5,000 Ohm-cm

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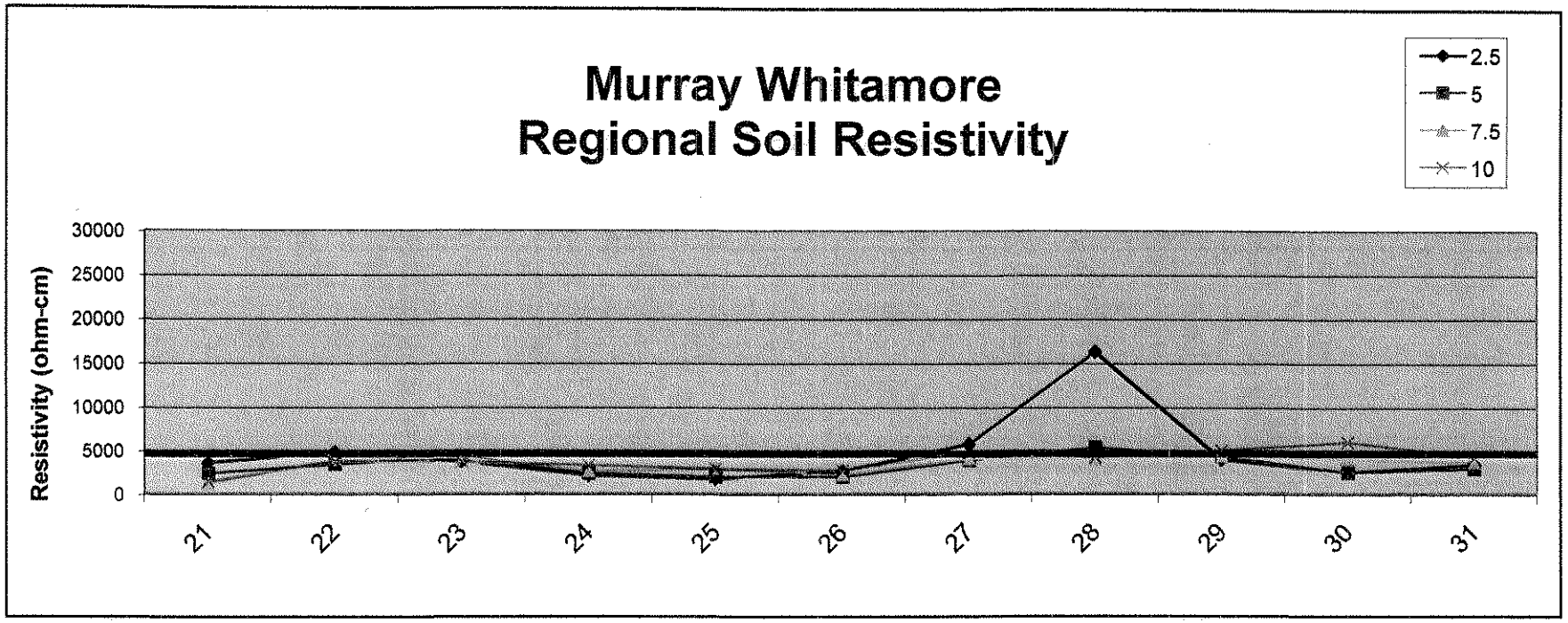
Chart 3- Murray Whitamore



5,000 Ohm-cm

System Protection Services, Inc.
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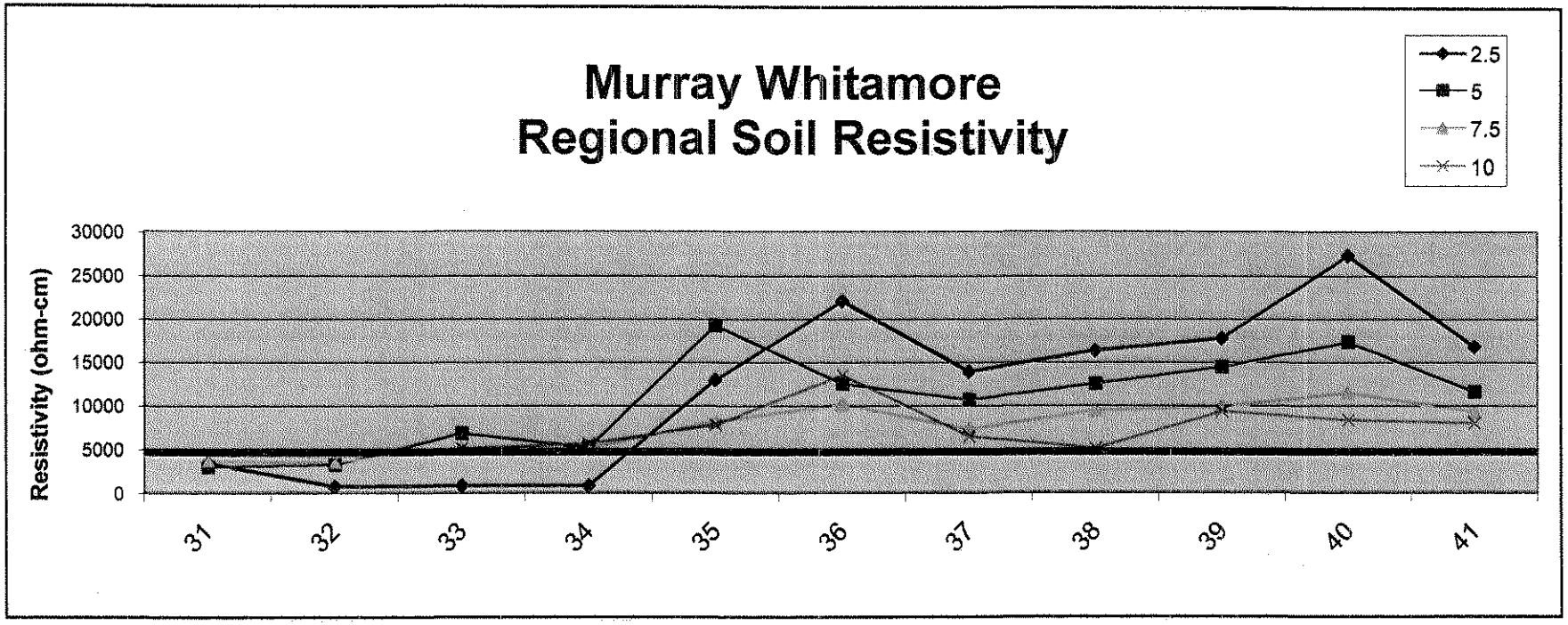
Colonial Beach, VA 22443

Chart 4- Murray Whitamore



5,000 Ohm-cm

System Protection Services, Inc.
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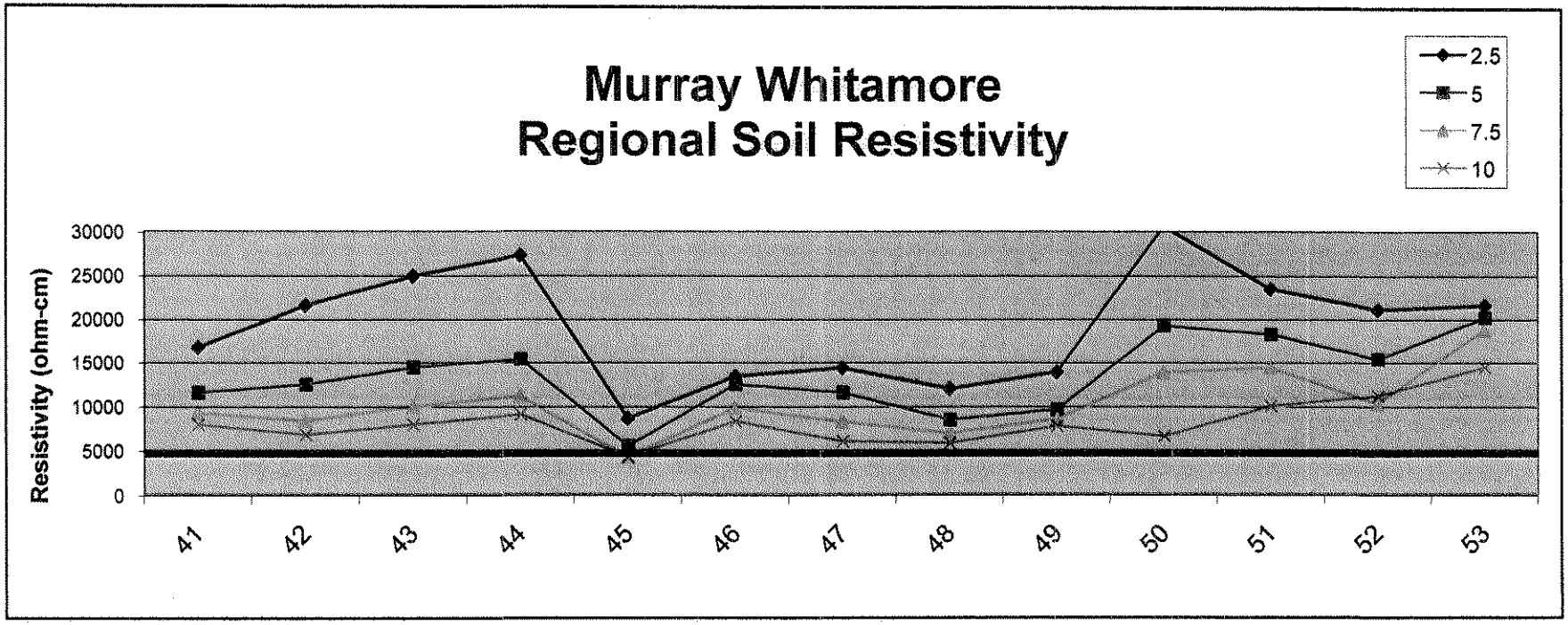
Colonial Beach, VA 22443

Chart 5- Murray Whitamore



5,000 Ohm-cm

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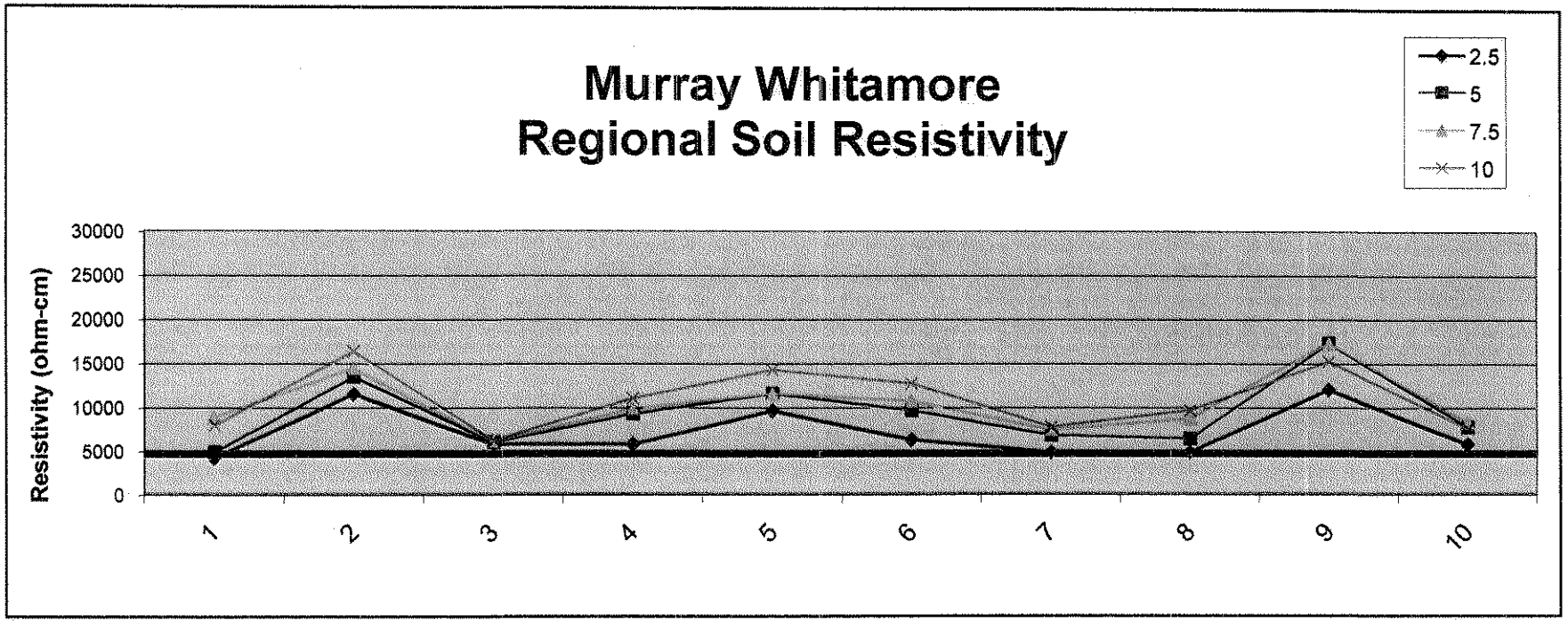
Chart 6- Murray Whitamore



5,000 Ohm-cm

System Protection Services, Inc.
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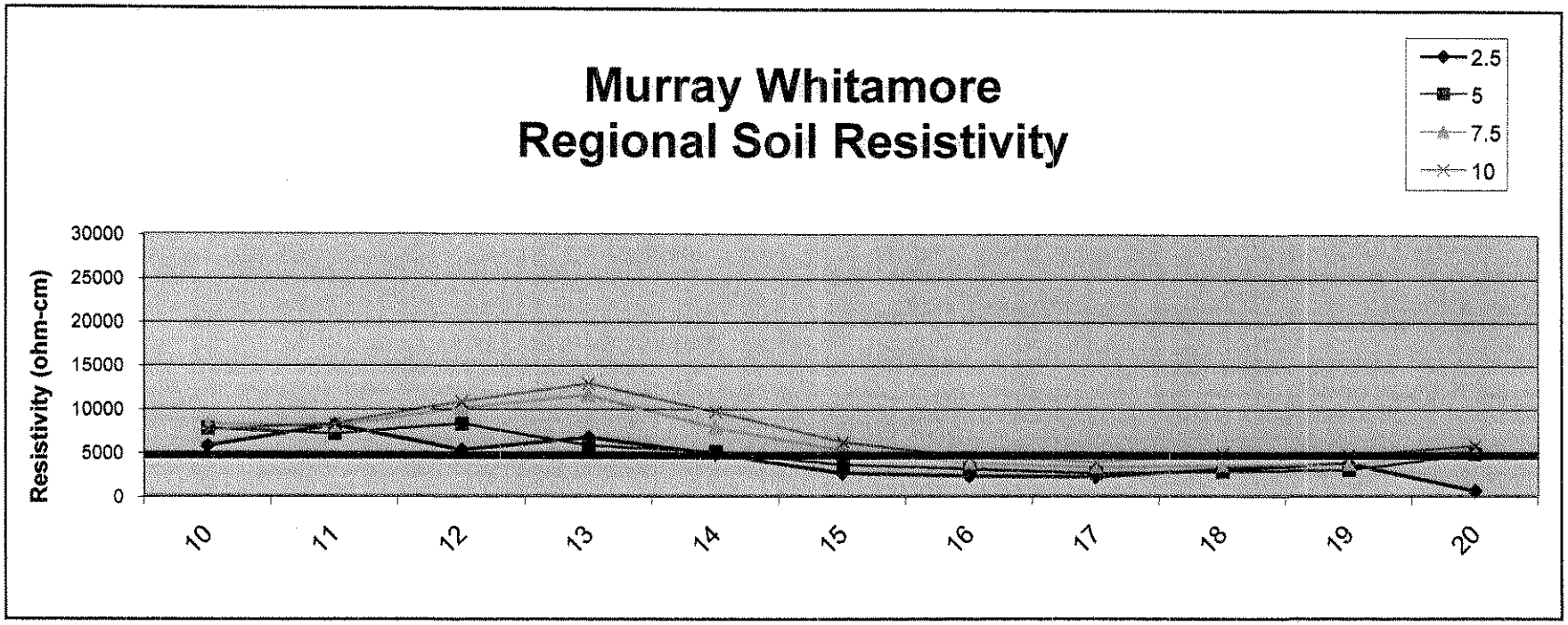
Chart 7- Murray Whitamore



5,000 Ohm-cm

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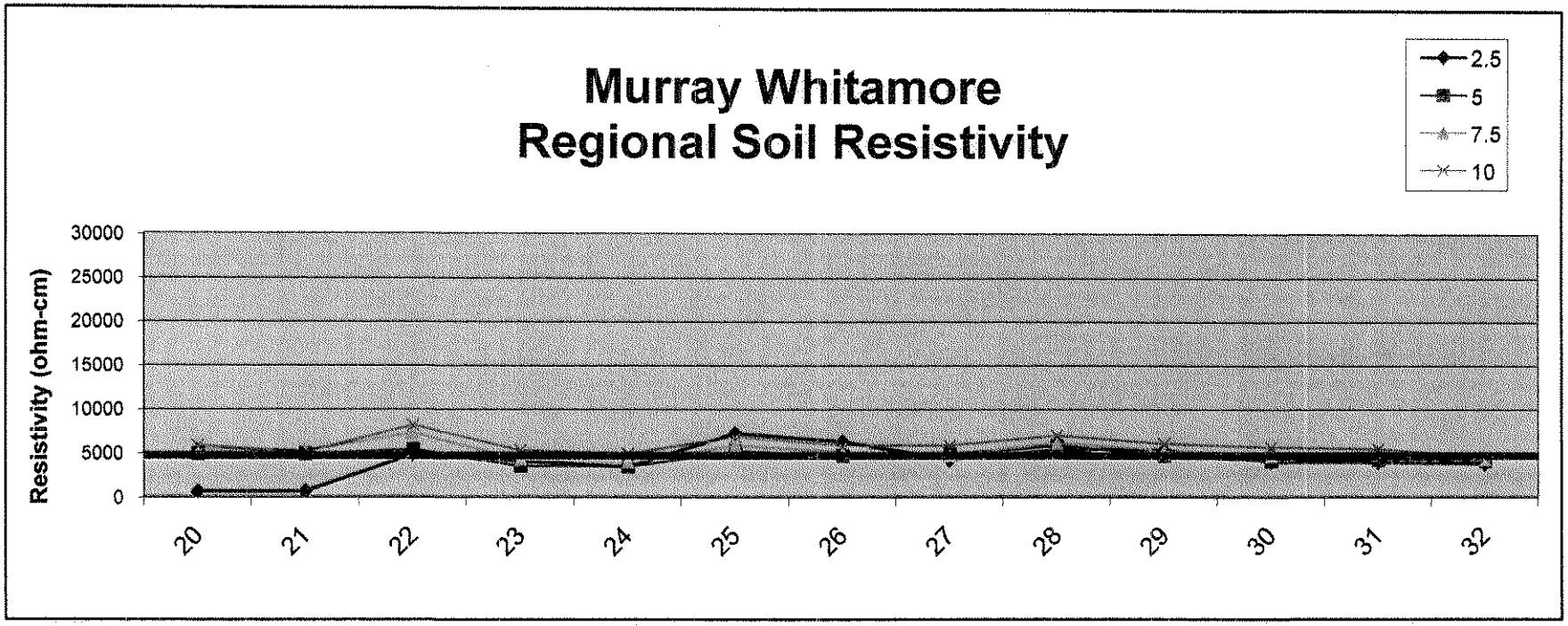
Chart 8- Murray Whitamore



5,000 Ohm-cm

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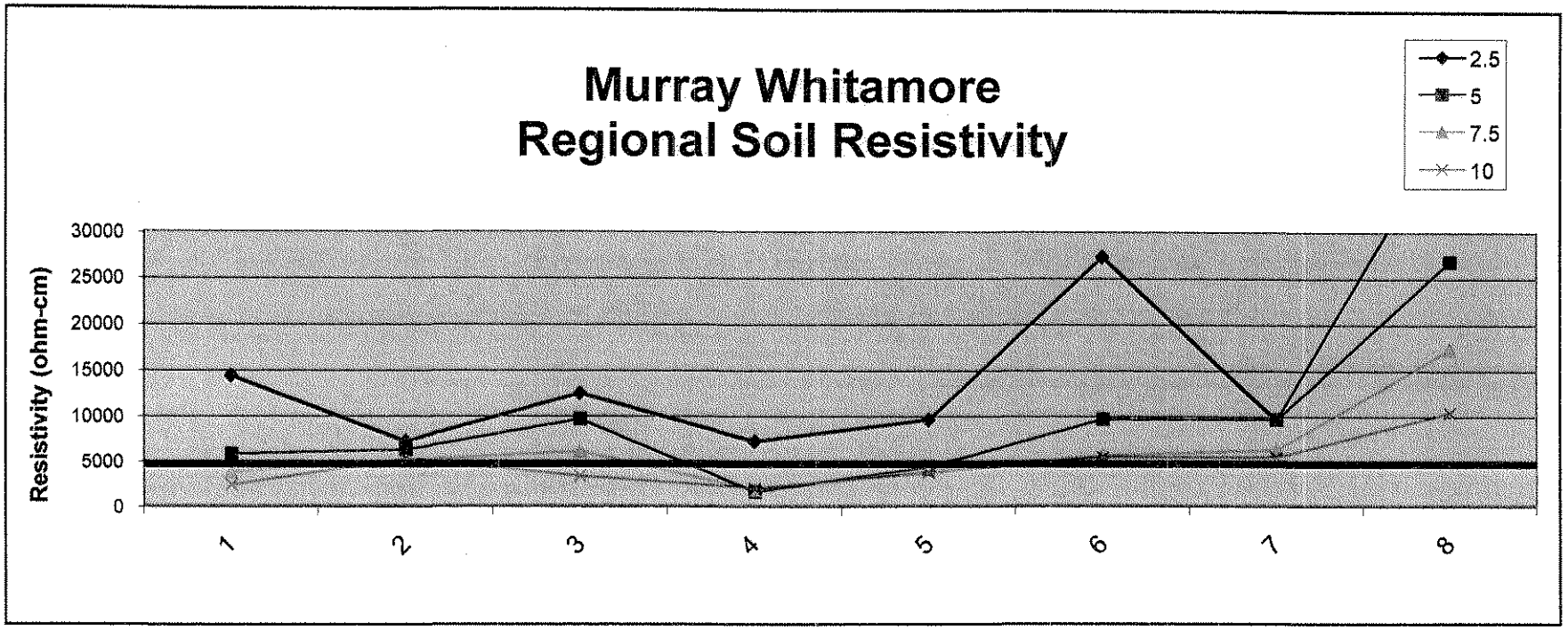
Chart 9- Murray Whitamore



5,000 Ohm-cm

System Protection Services, Inc.
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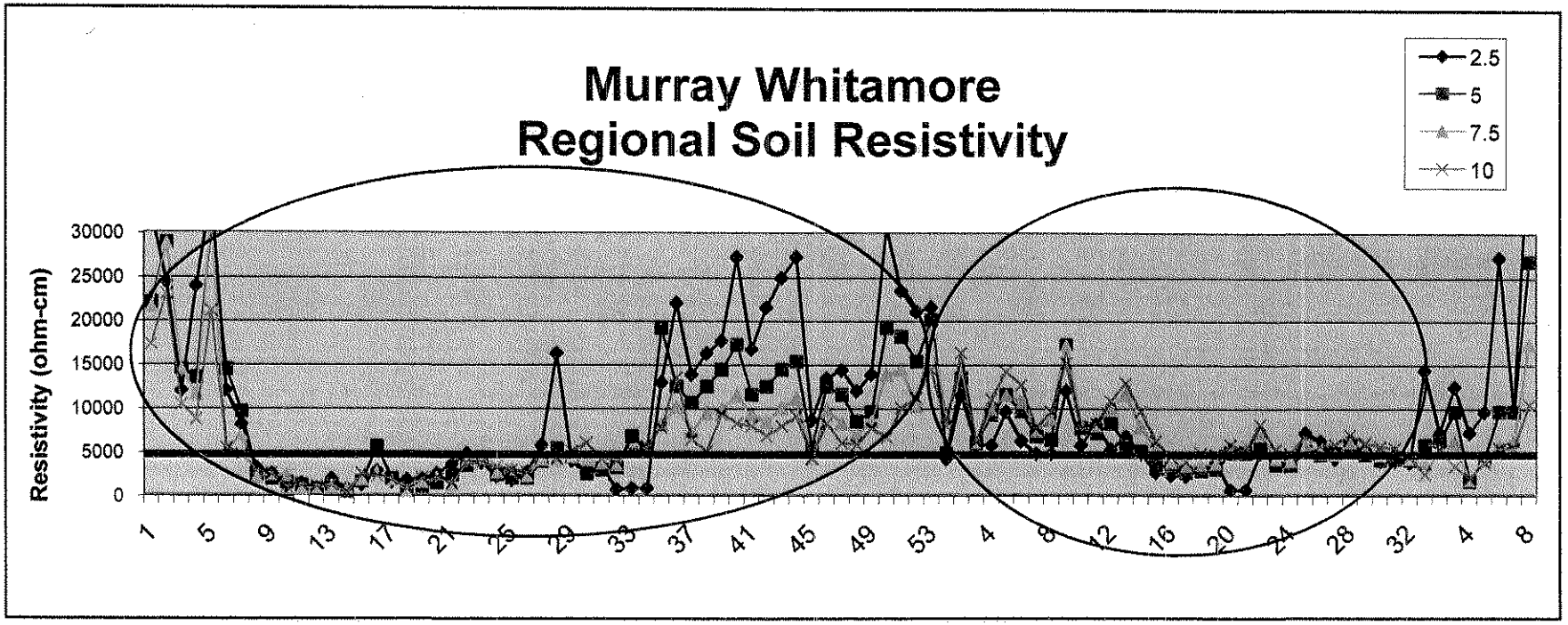
Chart 10- Murray Whitamore



5,000 Ohm-cm

System Protection Services, Inc.
113 11th St.
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Chart 11- Murray Whitamore

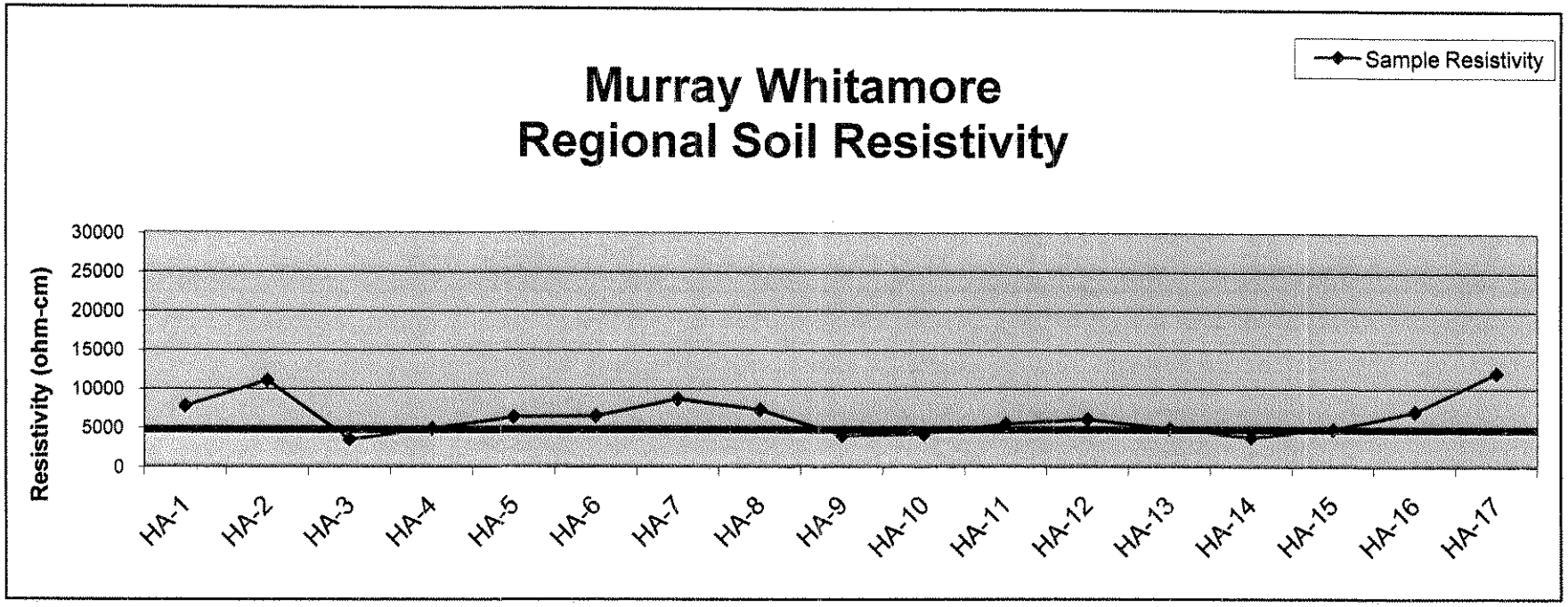

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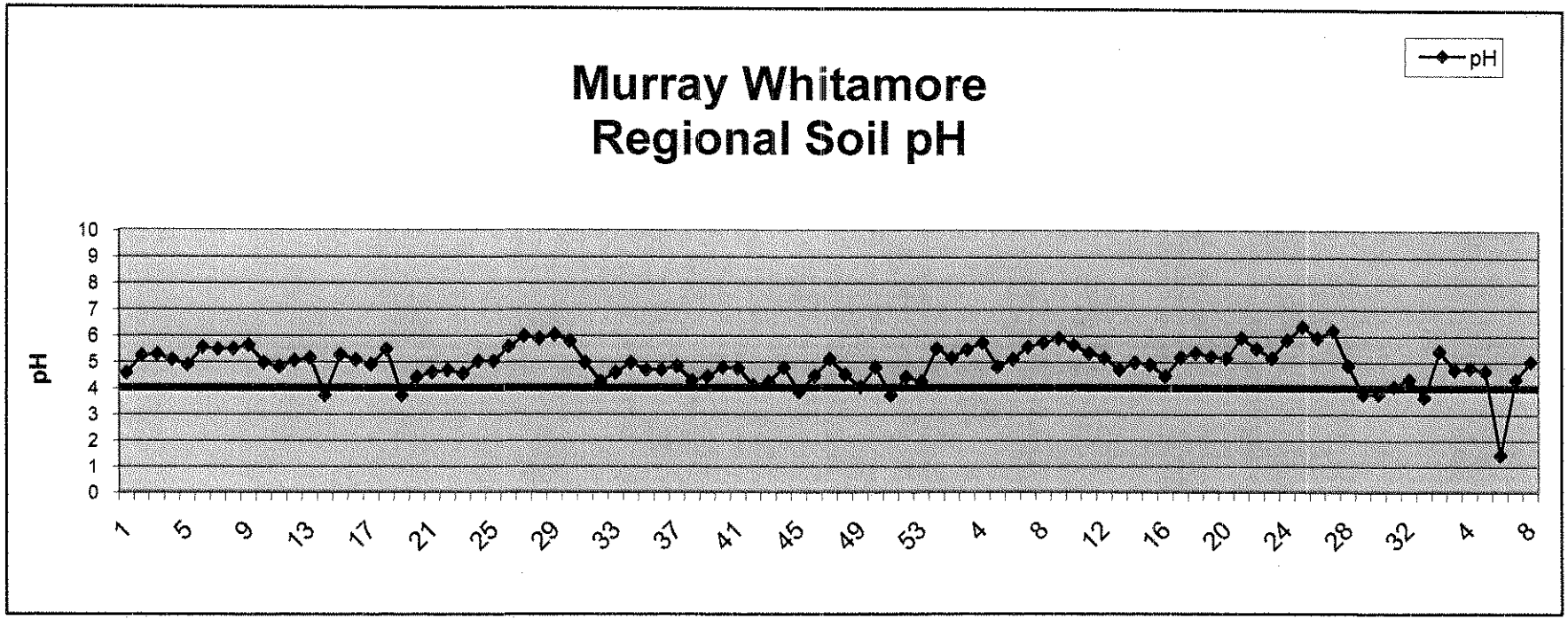
Chart 12- Murray Whitamore



pH 4

Table 1

Murray Whitemore
Tabulated Data

	2.5	5	7.5	10	pH
1	32076.25	22022.50	21543.75	17235.00	4.56
2	24416.25	28725.00	28725.00	22980.00	5.22
3	11968.75	14362.50	14362.50	10341.00	5.28
4	23937.50	13405.00	11490.00	8617.50	5.07
5	34470.00	30640.00	31597.50	21065.00	4.87
6	11968.75	14362.50	5026.88	5362.00	5.54
7	8138.75	9575.00	6894.00	4596.00	5.46
8	3111.88	2298.00	2010.75	2872.50	5.48
9	2489.50	1819.25	2298.00	2489.50	5.61
10	1053.25	1436.25	2154.38	938.35	4.95
11	1292.63	1053.25	746.85	1244.75	4.80
12	813.88	651.10	789.94	1034.10	5.04
13	1867.13	1149.00	1034.10	1187.30	5.13
14	718.13	325.55	775.58	191.50	3.72
15	1196.88	1532.00	1723.50	2489.50	5.26
16	2776.75	5553.50	2728.88	2106.50	5.06
17	1532.00	1819.25	1723.50	1857.55	4.89
18	1771.38	957.50	387.79	785.15	5.46
19	1819.25	957.50	1436.25	1915.00	3.72
20	2489.50	1340.50	2154.38	1915.00	4.41
21	3590.63	2298.00	1134.64	1378.80	4.59
22	4787.50	3351.25	3877.88	3638.50	4.67
23	3782.13	4308.75	4165.13	3638.50	4.54
24	2154.38	2298.00	2585.25	3255.50	5.00
25	1723.50	1915.00	2872.50	2872.50	5.00
26	2633.13	1915.00	2154.38	2681.00	5.56
27	5745.00	3830.00	4021.50	4787.50	5.96
28	16277.50	5266.25	4021.50	4213.00	5.87
29	3973.63	4308.75	4308.75	4979.00	6.02
30	2489.50	2393.75	4021.50	5936.50	5.78
31	3351.25	2872.50	3590.63	4213.00	4.96
32	670.25	3159.75	3447.00	4021.50	4.24
33	766.00	6702.50	5026.88	4979.00	4.58
34	766.00	5074.75	5026.88	5553.50	4.95
35	12926.25	19150.00	8043.00	7660.00	4.69
36	22022.50	12447.50	10053.75	13405.00	4.69
37	13883.75	10532.50	7181.25	6319.50	4.83
38	16277.50	12447.50	9335.63	4979.00	4.28
39	17713.75	14362.50	9766.50	9192.00	4.43
40	27288.75	17235.00	11346.38	8234.50	4.78
41	16756.25	11490.00	9192.00	7851.50	4.74
42	21543.75	12447.50	8330.25	6702.50	4.09
43	24895.00	14362.50	9910.13	7851.50	4.22
44	27288.75	15320.00	11059.13	9000.50	4.76
45	8617.50	5457.75	4165.13	4213.00	3.84
46	13405.00	12447.50	9766.50	8234.50	4.45
47	14362.50	11490.00	8186.63	5936.50	5.09
48	11968.75	8426.00	6894.00	5745.00	4.50
49	13883.75	9575.00	8473.88	7660.00	4.04
50	30640.00	19150.00	13788.00	6511.00	4.78
51	23458.75	18192.50	14362.50	9958.00	3.72

Table 1

Murray Whitamore
Tabulated Data

52	21065.00	15320.00	10197.38	11107.00	4.41
53	21543.75	20107.50	18671.25	14362.50	4.24
1	4165.13	4787.50	8761.13	7851.50	5.50
2	11490.00	13405.00	14362.50	16277.50	5.13
3	5745.00	5936.50	6032.25	6128.00	5.46
4	5745.00	9192.00	9766.50	10915.50	5.72
5	9575.00	11490.00	11490.00	14171.00	4.80
6	6223.75	9575.00	10628.25	12639.00	5.09
7	4787.50	6702.50	7324.88	7660.00	5.56
8	4787.50	6319.50	8617.50	9575.00	5.72
9	11968.75	17235.00	17235.00	15128.50	5.89
10	5745.00	7660.00	8186.63	7468.50	5.63
11	8138.75	7085.50	7899.38	8234.50	5.32
12	5266.25	8234.50	10053.75	10724.00	5.15
13	6702.50	5745.00	11490.00	12830.50	4.70
14	4787.50	4979.00	7755.75	9575.00	4.96
15	2633.13	3542.75	5170.50	6128.00	4.89
16	2298.00	3064.00	3734.25	4404.50	4.45
17	2202.25	2585.25	3303.38	3830.00	5.17
18	3064.00	2776.75	3447.00	4787.50	5.33
19	3734.25	2968.25	3590.63	4596.00	5.19
20	574.50	4787.50	5314.13	5745.00	5.13
21	622.38	4787.50	5170.50	4979.00	5.91
22	4787.50	5266.25	7181.25	8043.00	5.50
23	4069.38	3447.00	4165.13	5170.50	5.15
24	3351.25	3351.25	3877.88	4787.50	5.83
25	7181.25	5074.75	5745.00	6702.50	6.33
26	6223.75	4596.00	5026.88	5745.00	5.91
27	4165.13	4787.50	4596.00	5745.00	6.18
28	5266.25	5745.00	6032.25	6894.00	4.85
29	5266.25	4596.00	5170.50	5936.50	3.78
30	3925.75	4021.50	4596.00	5553.50	3.78
31	3925.75	4117.25	5026.88	5362.00	4.06
32	3734.25	4021.50	4165.13	4404.50	4.33
1	14362.50	5745.00	3734.25	2298.00	3.65
2	7181.25	6223.75	5026.88	5170.50	5.41
3	12447.50	9575.00	6032.25	3255.50	4.70
4	7181.25	1532.00	1723.50	1915.00	4.76
5	9575.00	4308.75	4021.50	3638.50	4.65
6	27288.75	9575.00	5601.38	5362.00	1.43
7	9575.00	9575.00	6175.88	5362.00	4.33
8	41651.25	26810.00	17235.00	10341.00	5.00

	Sample Resistivity
HA-1	7700.00
HA-2	11000.00
HA-3	3400.00
HA-4	4800.00
HA-5	6300.00

Table 1

Murray Whitamore
Tabulated Data

HA-6	6400.00
HA-7	8600.00
HA-8	7200.00
HA-9	3900.00
HA-10	4100.00
HA-11	5400.00
HA-12	6000.00
HA-13	4800.00
HA-14	3700.00
HA-15	4700.00
HA-16	7000.00
HA-17	12000.00

	2.5	2.5	5	5	7.5	7.5	10	10
1	67	32076.25	23	22022.5	15	21543.75	9	17235
2	51	24416.25	30	28725	20	28725	12	22980
3	25	11968.75	15	14362.5	10	14362.5	5.4	10341
4	50	23937.5	14	13405	8	11490	4.5	8617.5
5	72	34470	32	30640	22	31597.5	11	21065
6	25	11968.75	15	14362.5	3.5	5026.875	2.8	5362
7	17	8138.75	10	9575	4.8	6894	2.4	4596
8	6.5	3111.875	2.4	2298	1.4	2010.75	1.5	2872.5
9	5.2	2489.5	1.9	1819.25	1.6	2298	1.3	2489.5
10	2.2	1053.25	1.5	1436.25	1.5	2154.375	0.49	938.35
11	2.7	1292.625	1.1	1053.25	0.52	746.85	0.65	1244.75
12	1.7	813.875	0.68	651.1	0.55	789.9375	0.54	1034.1
13	3.9	1867.125	1.2	1149	0.72	1034.1	0.62	1187.3
14	1.5	718.125	0.34	325.55	0.54	775.575	0.1	191.5
15	2.5	1196.875	1.6	1532	1.2	1723.5	1.3	2489.5
16	5.8	2776.75	5.8	5553.5	1.9	2728.875	1.1	2106.5
17	3.2	1532	1.9	1819.25	1.2	1723.5	0.97	1857.55
18	3.7	1771.375	1	957.5	0.27	387.7875	0.41	785.15
19	3.8	1819.25	1	957.5	1	1436.25	1	1915
20	5.2	2489.5	1.4	1340.5	1.5	2154.375	1	1915
21	7.5	3590.625	2.4	2298	0.79	1134.638	0.72	1378.8
22	10	4787.5	3.5	3351.25	2.7	3877.875	1.9	3638.5
23	7.9	3782.125	4.5	4308.75	2.9	4165.125	1.9	3638.5
24	4.5	2154.375	2.4	2298	1.8	2585.25	1.7	3255.5
25	3.6	1723.5	2	1915	2	2872.5	1.5	2872.5
26	5.5	2633.125	2	1915	1.5	2154.375	1.4	2681
27	12	5745	4	3830	2.8	4021.5	2.5	4787.5
28	34	16277.5	5.5	5266.25	2.8	4021.5	2.2	4213
29	8.3	3973.625	4.5	4308.75	3	4308.75	2.6	4979
30	5.2	2489.5	2.5	2393.75	2.8	4021.5	3.1	5936.5
31	7	3351.25	3	2872.5	2.5	3590.625	2.2	4213
32	1.4	670.25	3.3	3159.75	2.4	3447	2.1	4021.5
33	1.6	766	7	6702.5	3.5	5026.875	2.6	4979
34	1.6	766	5.3	5074.75	3.5	5026.875	2.9	5553.5
35	27	12926.25	20	19150	5.6	8043	4	7660
36	46	22022.5	13	12447.5	7	10053.75	7	13405
37	29	13883.75	11	10532.5	5	7181.25	3.3	6319.5
38	34	16277.5	13	12447.5	6.5	9335.625	2.6	4979
39	37	17713.75	15	14362.5	6.8	9766.5	4.8	9192
40	57	27288.75	18	17235	7.9	11346.38	4.3	8234.5
41	35	16756.25	12	11490	6.4	9192	4.1	7851.5
42	45	21543.75	13	12447.5	5.8	8330.25	3.5	6702.5
43	52	24895	15	14362.5	6.9	9910.125	4.1	7851.5
44	57	27288.75	16	15320	7.7	11059.13	4.7	9000.5
45	18	8617.5	5.7	5457.75	2.9	4165.125	2.2	4213
46	28	13405	13	12447.5	6.8	9766.5	4.3	8234.5
47	30	14362.5	12	11490	5.7	8186.625	3.1	5936.5
48	25	11968.75	8.8	8426	4.8	6894	3	5745
49	29	13883.75	10	9575	5.9	8473.875	4	7660
50	64	30640	20	19150	9.6	13788	3.4	6511
51	49	23458.75	19	18192.5	10	14362.5	5.2	9958

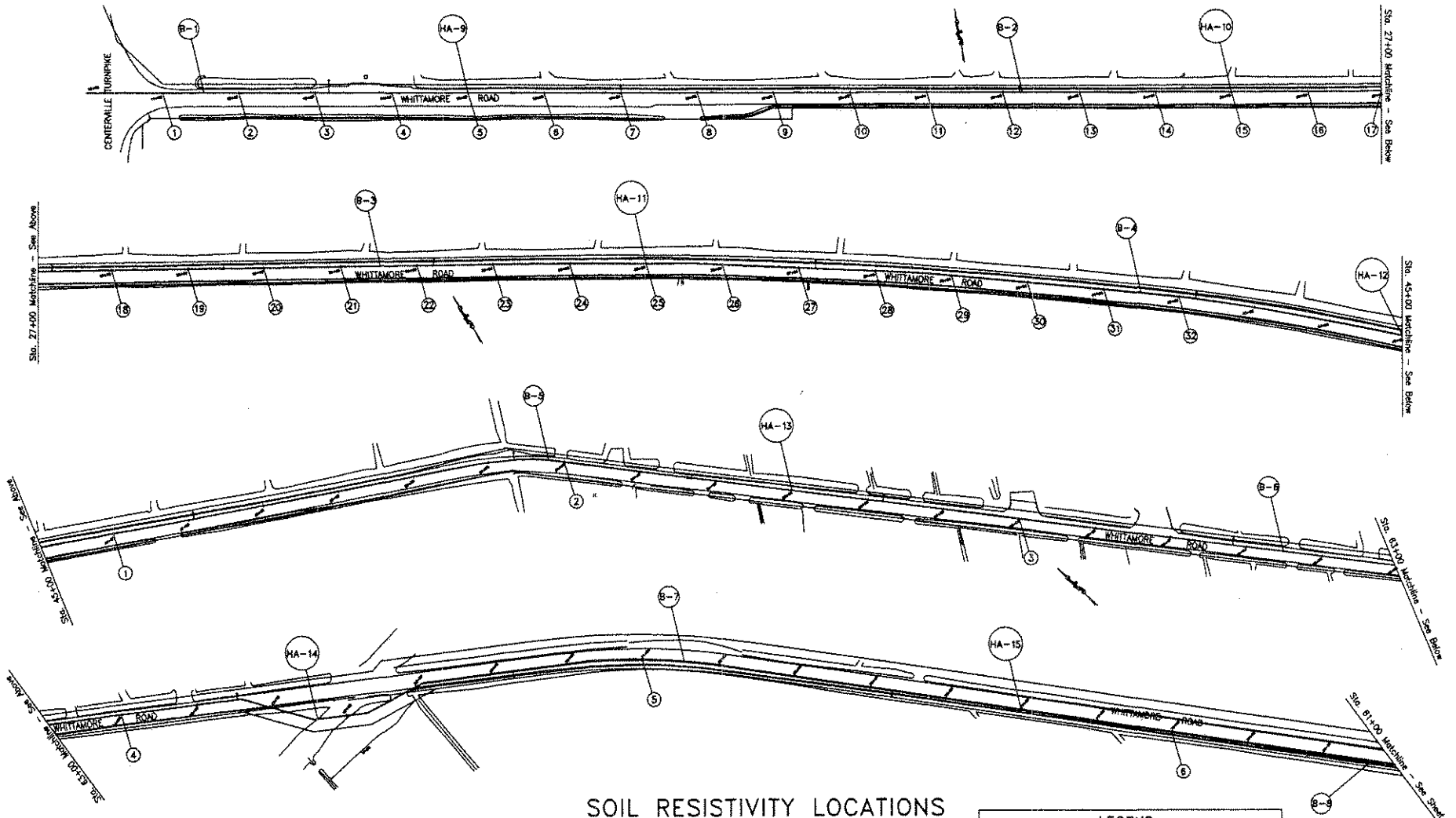
52	44	21065	16	15320	7.1	10197.38	5.8	11107
53	45	21543.75	21	20107.5	13	18671.25	7.5	14362.5
1	8.7	4165.125	5	4787.5	6.1	8761.125	4.1	7851.5
2	24	11490	14	13405	10	14362.5	8.5	16277.5
3	12	5745	6.2	5936.5	4.2	6032.25	3.2	6128
4	12	5745	9.6	9192	6.8	9766.5	5.7	10915.5
5	20	9575	12	11490	8	11490	7.4	14171
6	13	6223.75	10	9575	7.4	10628.25	6.6	12639
7	10	4787.5	7	6702.5	5.1	7324.875	4	7660
8	10	4787.5	6.6	6319.5	6	8617.5	5	9575
9	25	11968.75	18	17235	12	17235	7.9	15128.5
10	12	5745	8	7660	5.7	8186.625	3.9	7468.5
11	17	8138.75	7.4	7085.5	5.5	7899.375	4.3	8234.5
12	11	5266.25	8.6	8234.5	7	10053.75	5.6	10724
13	14	6702.5	6	5745	8	11490	6.7	12830.5
14	10	4787.5	5.2	4979	5.4	7755.75	5	9575
15	5.5	2633.125	3.7	3542.75	3.6	5170.5	3.2	6128
16	4.8	2298	3.2	3064	2.6	3734.25	2.3	4404.5
17	4.6	2202.25	2.7	2585.25	2.3	3303.375	2	3830
18	6.4	3064	2.9	2776.75	2.4	3447	2.5	4787.5
19	7.8	3734.25	3.1	2968.25	2.5	3590.625	2.4	4596
20	1.2	574.5	5	4787.5	3.7	5314.125	3	5745
21	1.3	622.375	5	4787.5	3.6	5170.5	2.6	4979
22	10	4787.5	5.5	5266.25	5	7181.25	4.2	8043
23	8.5	4069.375	3.6	3447	2.9	4165.125	2.7	5170.5
24	7	3351.25	3.5	3351.25	2.7	3877.875	2.5	4787.5
25	15	7181.25	5.3	5074.75	4	5745	3.5	6702.5
26	13	6223.75	4.8	4596	3.5	5026.875	3	5745
27	8.7	4165.125	5	4787.5	3.2	4596	3	5745
28	11	5266.25	6	5745	4.2	6032.25	3.6	6894
29	11	5266.25	4.8	4596	3.6	5170.5	3.1	5936.5
30	8.2	3925.75	4.2	4021.5	3.2	4596	2.9	5553.5
31	8.2	3925.75	4.3	4117.25	3.5	5026.875	2.8	5362
32	7.8	3734.25	4.2	4021.5	2.9	4165.125	2.3	4404.5
after golf course								
1	30	14362.5	6	5745	2.6	3734.25	1.2	2298
2	15	7181.25	6.5	6223.75	3.5	5026.875	2.7	5170.5
3	26	12447.5	10	9575	4.2	6032.25	1.7	3255.5
4	15	7181.25	1.6	1532	1.2	1723.5	1	1915
5	20	9575	4.5	4308.75	2.8	4021.5	1.9	3638.5
6	57	27288.75	10	9575	3.9	5601.375	2.8	5362
7	20	9575	10	9575	4.3	6175.875	2.8	5362
8	87	41651.25	28	26810	12	17235	5.4	10341
						7022.027		

	Sample Resistivity
HA-1	7700
HA-2	11000
HA-3	3400
HA-4	4800
HA-5	6300

HA-6	6400
HA-7	8600
HA-8	7200
HA-9	3900
HA-10	4100
HA-11	5400
HA-12	6000
HA-13	4800
HA-14	3700
HA-15	4700
HA-16	7000
HA-17	12000

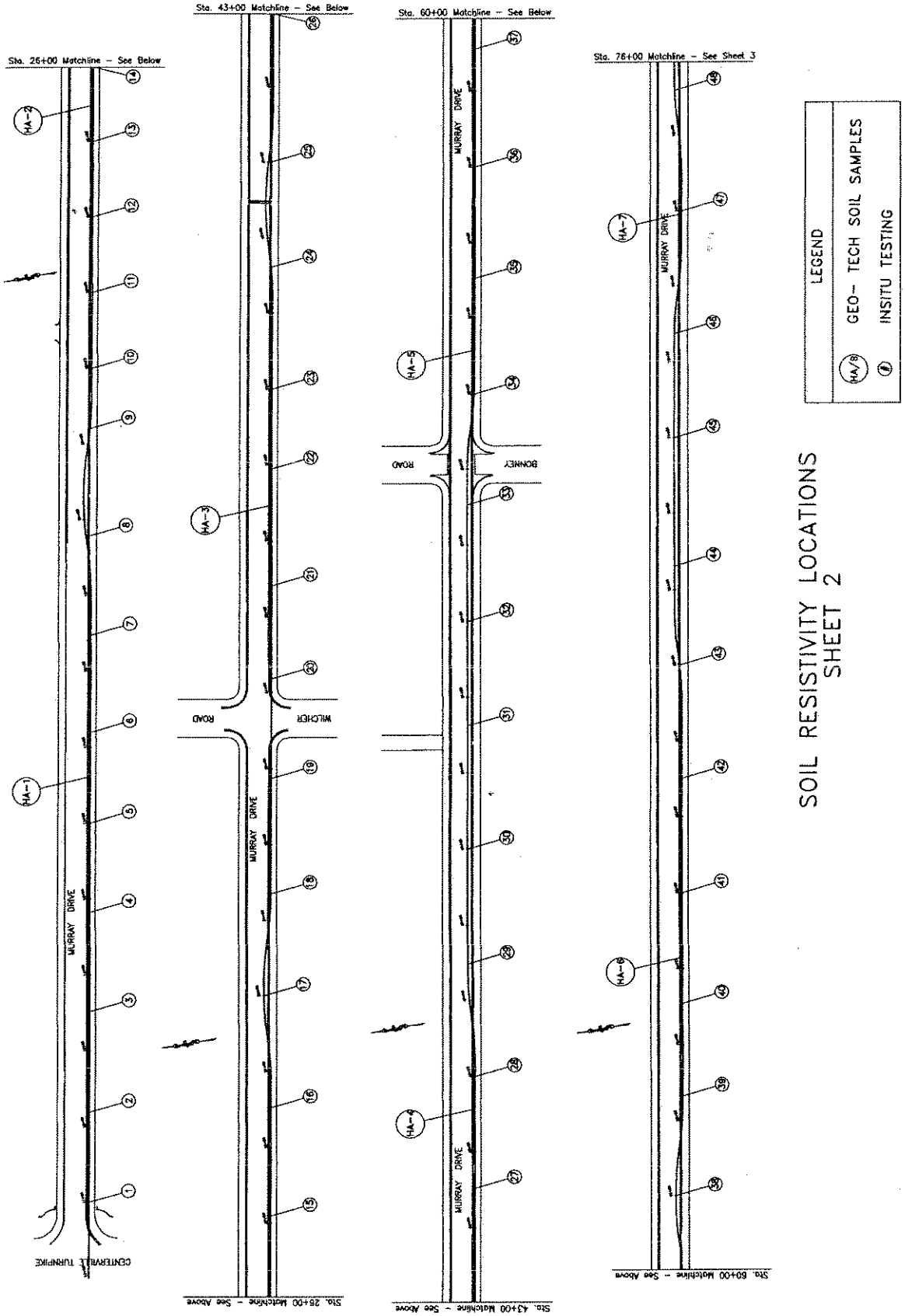
pH	pH			
349	4.56	Murray Whitamore		
385	5.22		387.7875	
388	5.28		746.85	
377	5.07		775.575	
366	4.87		789.9375	0.043011
402	5.54		1034.1	
398	5.46		1134.638	
399	5.48		1436.25	
406	5.61		1723.5	
370	4.95		1723.5	
362	4.80		1723.5	
375	5.04		2010.75	
380	5.13		2154.375	
304	3.72		2154.375	
387	5.26		2154.375	
376	5.06		2298	
367	4.89		2585.25	
398	5.46		2728.875	
304	3.72		2872.5	0.150538
341	4.41		3303.375	
351	4.59		3447	
355	4.67		3447	
348	4.54		3590.625	
373	5.00		3590.625	0.913978
373	5.00		3734.25	
403	5.56		3734.25	
425	5.96		3877.875	
420	5.87		3877.875	
428	6.02		4021.5	
415	5.78		4021.5	
371	4.96		4021.5	
332	4.24		4021.5	
350	4.58		4165.125	
370	4.95		4165.125	
356	4.69		4165.125	
356	4.69		4165.125	
364	4.83		4308.75	
334	4.28		4596	
342	4.43		4596	0.215054
361	4.78		5026.875	
359	4.74		5026.875	
324	4.09		5026.875	
331	4.22		5026.875	
360	4.76		5026.875	
310	3.84		5026.875	
343	4.45		5170.5	
378	5.09		5170.5	
346	4.50		5170.5	
321	4.04		5314.125	
361	4.78		5601.375	
304	3.72		5745	

341	4.41		6032.25	
332	4.24		6032.25	
			6032.25	
400	5.50	Whittamore and Centerville	6175.875	
380	5.13	Golf Course	6894	
398	5.46		6894	
412	5.72		7181.25	
362	4.80		7181.25	
378	5.09		7324.875	
403	5.56		7755.75	
412	5.72		7899.375	
421	5.89		8043	
407	5.63		8186.625	
390	5.32		8186.625	
381	5.15		8330.25	
357	4.70		8473.875	
371	4.96		8617.5	
367	4.89		8761.125	
343	4.45		9192	
382	5.17		9335.625	
391	5.33		9766.5	
383	5.19		9766.5	
380	5.13		9766.5	
422	5.91		9910.125	0.430108
400	5.50		10053.75	
381	5.15		10053.75	
418	5.83		10197.38	
445	6.33		10628.25	
422	5.91		11059.13	
437	6.18		11346.38	
365	4.85		11490	
307	3.78		11490	
307	3.78		11490	
322	4.06		13788	
337	4.33		14362.5	
			14362.5	
300	3.65		14362.5	
395	5.41		17235	
357	4.70		17235	
360	4.76		18671.25	
354	4.65		21543.75	
180	1.43		28725	
337	4.33		31597.5	0.204301
373	5.00			
	4.90			

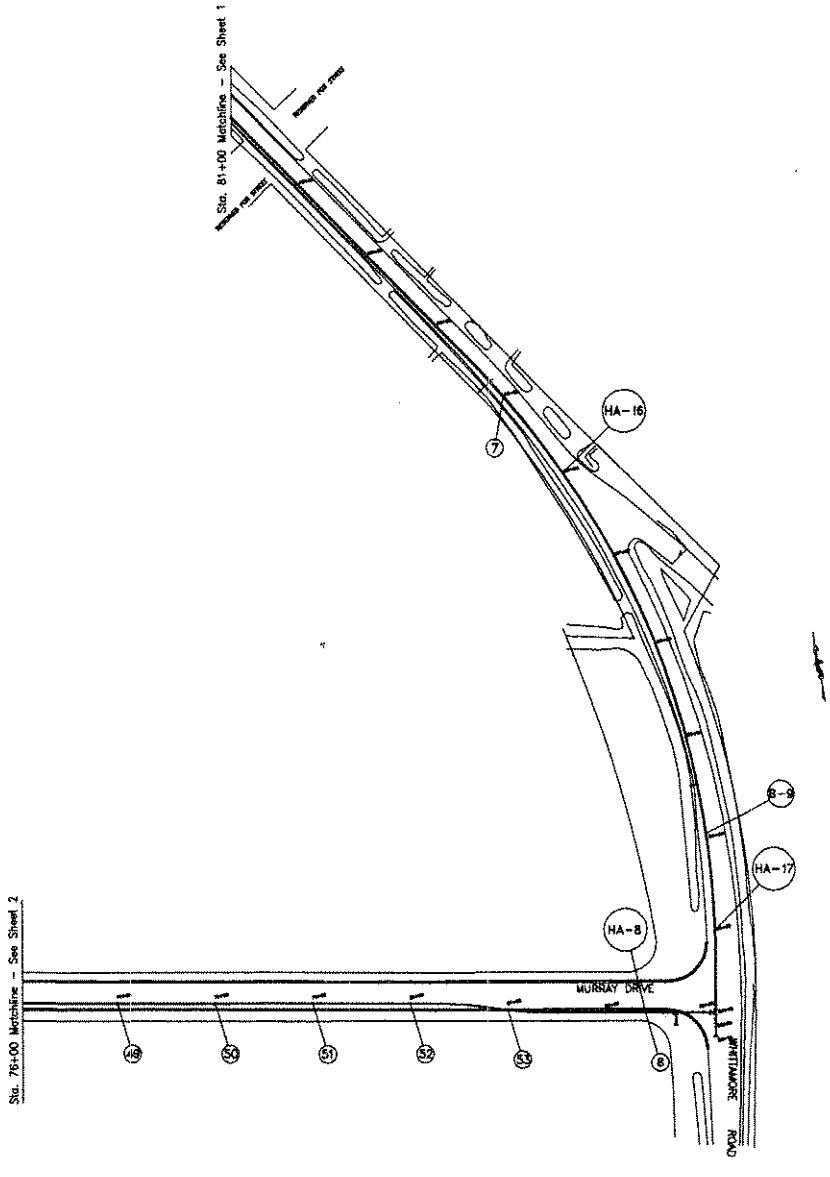


SOIL RESISTIVITY LOCATIONS
SHEET 1

LEGEND	
HA/B	GEO- TECH SOIL SAMPLES
	INSITU TESTING



SOIL RESISTIVITY LOCATIONS
SHEET 2



SOIL RESISTIVITY LOCATIONS
SHEET 3

LEGEND	
HA/B	GEO– TECH SOIL SAMPLES
#	INSITU TESTING