INVITATION TO BID
No. 202006

HOPE DRIVE EXTENSION

FOR THE
DEPARTMENT OF PUBLIC SERVICES

Project Manual
Contract Documents
Specifications

May 2020

City of Winchester
Hope Drive Extension
ITB# 202006
Table of Contents

BIDDING DOCUMENTS

- Invitation to Bid
- Instructions to Bidders
- Bid Form
- Contractor Qualification Data Sheet
- Bid Bond
- Non-Collusion Affidavit
- Contract
- Performance Bond
- Labor and Material Payment Bond
- Notice of Intent to Award
- Notice of Award
- Notice to Proceed
- City of Winchester Required General Terms and Conditions
- General Conditions
- Supplement to General Conditions
- Special Terms and Conditions
- Special Provisions - Utilities

TECHNICAL SPECIFICATIONS

- Scope of Work – Sequence of Construction
- Surveying
- As-Built Drawings
- Demolition
- Erosion and Sediment Control
- Rock Excavation
- Disposal of Materials
- Maintenance of Traffic
- Concrete (Curb & Gutter, Sidewalks, Entrances)
- Brick Medians
- Detectable Warning Surfaces
- Earthwork
- Topsoil and Seeding
- Landscaping
- Signal Mast Arms, Poles, Luminaire Arms and Sign Supports
- Emergency Vehicle Preemption Equipment
- Traffic Signal Cabinets
- Traffic Signal Controllers
- Uninterruptible Power Supply
- Video Detection Equipment
- Signal Head Sections
- LED Edge-Lit Internally Illuminated Street Name Signs
- Radio Equipment
- Street Lights

- Storm
- Water Distribution System
- Sanitary Sewer Collection System

DRAWINGS

CSX COORDINATION DOCUMENTS

GEOTECHNICAL REPORT

INVITATION TO BID

Hope Drive Extension

ITB # 202006

The City of Winchester is submitting this Invitation to Bid to establish a contract with qualified Contractors furnishing all labor, equipment, transportation and materials necessary for the following project:

Hope Drive Extension

Work includes the construction of Hope Drive between Valley Avenue and Pleasant Valley Road. Project components include, but are not limited to, the new asphalt roadway, curb and gutter, sidewalks, drainage system improvements, water system improvements, sanitary sewer system improvements, new traffic signal, new streetlights, new tree plantings and site restoration.

A **non-mandatory** pre-bid meeting will be held on **Wednesday, June 17, 2020 at 3:00pm** via Webex Conference. To register for this conference, e-mail Kelly Henshaw at kelly.henshaw@winchesterva.gov no later than close of business on Monday, June 15, 2020. Bidders are highly encouraged to attend this meeting to learn information about the project.

Contract Specifications may be obtained from the below address and all bids shall be received at:

City of Winchester, Virginia
Finance Department
Rouss City Hall, 4th Floor
15 North Cameron Street
Winchester, Virginia 22601
Telephone (540) 667-1815

The contract documents and drawings may be downloaded at no cost from the City's website at:
http://www.winchesterva.gov/purchasing/itbrfp.php

Any questions regarding the contract documents or drawings shall be sent **in writing via e-mail** to:

Kelly Henshaw: kelly.henshaw@winchesterva.gov

Bid prices shall be made on the blank Bid Form provided herein. Bids shall be delivered to the above address on or before **2:00 p.m. (local time) on Wednesday, July 15, 2020,** at which time the bids shall be publicly read aloud.

Bids will be received only from contractors who are registered in the Commonwealth of Virginia. **Bidders shall indicate on the outside of the envelope containing the Bid their current Virginia Contractor's Registration Number. Bids without this information on the outside of the envelope may be non-responsive.**

Each Bid shall be accompanied by complete response to the Contractor Qualification Data Sheet. The

successful bidder shall meet the minimum qualifications specified in the Contractor Qualification Data Sheet. A bid from a bidder that does not meet the minimum qualifications specified in the Contractor Qualification Data Sheet, as determined by the City, shall be non-responsive.

Each Bid shall also be accompanied by a satisfactory Bid Guarantee in the amount of 5% of the bid, in the form of a certified or cashier's check drawn on a bank chartered under the laws of the Commonwealth of Virginia; payable to the Treasurer of the City of Winchester, or a Bid Bond, as a guarantee that the bidder will within fifteen (15) days after the date of the award of the Contract, execute an agreement and file insurance as required by the Contract Documents if his proposal is accepted. If the successful bidder fails to execute and file the agreement and insurance, the amount of the Bid Guarantee shall be forfeited. Bids without a satisfactory Bid Guarantee shall be rejected.

Performance and Payment Bonds will be required of the successful bidder, each in an amount equal to one hundred (100) percent of the amount of the Contract, conditioned upon the faithful performance of the Contract and to the payment in full to all persons furnishing labor, materials, equipment, etc., for and in connection with the work to be performed under the contract.

Bidder desiring to withdraw his bid after the bid opening procedure, shall give notice in writing of his claim of right to withdraw his bid within two (2) business days after the conclusion of the bid opening procedure. Bidder shall submit to the City his original work papers; documents and materials used in preparation of the bid sought to be withdrawn. Bidder withdrawing his bid that does not meet these requirements shall forfeit their bid bond.

The City of Winchester reserves the right to reject any proposal for failure to comply with all requirements of this notice or any of the Contract Documents; however, it may waive any minor defects or informalities at its discretion. The City further reserves the right to reject any and all proposals, cancel the ITB at any time prior to award or to award a contract that in its judgment is in the best interest of the City.

CITY OF WINCHESTER, VIRGINIA

BY: Mike Marzullo, Purchasing Agent

Hope Drive Extension

INSTRUCTIONS TO BIDDERS

1. **OWNER AND ENGINEER:**

The Owner is the City of Winchester Department of Public Services, which shall be represented by the City Engineer or his designee who shall perform the duties of the Engineer. Telephone: Department of Public Services, (540) 667-1815, extension 1481.

2. **COPIES OF CONTRACT DOCUMENTS:**

2.01 Bidding Documents may be examined and downloaded from the City's website at http://www.winchesterva.gov/purchasing/itbrfp at no charge.

City of Winchester, Virginia
Finance Department
Rouss City Hall, 4th Floor
15 North Cameron Street
Winchester, Virginia 22601
Telephone: (540) 667-1815

2.02 Complete set of Bidding 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 Bidding Documents. Owner and Engineer in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining bids on the Work and do not confer a license or grant for any other use.

3. **EXAMINATION OF CONTRACT DOCUMENTS AND SITE:**

3.01 Before submitting a bid, each bidder must examine the Contract Documents thoroughly, visit the site to familiarize himself with local conditions that may in any manner affect cost, progress, or performance of the work, familiarize himself with federal, state, and local laws, ordinances, rules, and regulations that may in any manner affect cost, progress, or performance of the work; and study and carefully correlate bidder's observations with the Contract Documents.

3.02 Before submitting his bid, each bidder will, at his own expense, make such additional investigations and tests as the bidder may deem necessary to determine his bid for performance of the work in accordance with time and other terms and conditions of the

Contract Documents. The Contractor shall be responsible for taking his own borings or making any investigations he requires to establish subsurface conditions in the area of this Contract. The City does not assume any responsibility for the subsurface conditions which may be encountered. On request, Owner will provide each bidder access to the site to conduct such investigations.

3.03 The submission of a bid will constitute an incontrovertible representation by the bidder that he has examined the site and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions of the Work.

3.04 It is understood and agreed by the bidder that the estimate of quantities (if provided) are approximate, and are presented in order to obtain unit prices and approximate amount of the Contract. The Contractor shall make no claim against the City because of any estimate, tests or representations made by any officer or agent of the City, which may prove to be in any respect erroneous.

3.05 Scope of the work is as specified herein. The Owner, however, reserves the right to make adjustments to the scope of the work. Such adjustments shall be accomplished by appropriate Change Orders.

4. **SPECIFICATIONS:**

The technical specifications for the project are provided within this contract document.

5. **INTERPRETATIONS:**

All questions about the discrepancies or ambiguities in the Contract Documents prior to the bid opening shall be submitted in writing via e-mail to the following:

Kelly Henshaw, City Engineer: kelly.henshaw@winchesterva.gov

Replies to questions will be issued by Addenda mailed or delivered to all parties recorded by the Purchasing Agent as having received the Bidding Documents or by posting on a Question and Answer Bulletin Board posted at the following location:

http://www.winchesterva.gov/purchasing/itbrfp

Questions received less than five (5) calendar days prior to the date for opening of bids may not be answered. Only questions answered by formal written Addenda or in writing on the Question and Answer Bulletin Board will be binding.

6. **REQUIRED BOND - BID GUARANTEE:**

6.01 Bid Guarantee shall be made payable to Owner, in an amount of five percent (5%) of the bidder's maximum bid price and in a form of a certified or cashier's check drawn on a bank chartered under the laws of the Commonwealth of Virginia; payable to the Treasurer, City of Winchester, or a Bid Bond issued by a surety having registered resident agents in Virginia.

6.02 The Bid Guarantee of the successful bidder will be retained until such bidder has executed the Agreement and furnished the required Contract Security, whereupon it will be returned. If the successful bidder fails to execute the agreement and furnish the required Contract Security within fifteen (15) calendar days of the Notice of Award, Owner may annul Notice of Award and the Bid Guarantee of the bidder will be forfeited.

7. **REQUIRED BONDS – PAYMENT AND PERFORMANCE:**

Performance and Payment Bonds will be required of the Successful bidder, each in an amount equal to one hundred percent (100%) of the amount of the Contract, conditioned upon the faithful performance of the Contract and to the payment in full to all persons furnishing labor, materials, equipment, etc., for and in connection with the work to be performed under the Contract.

8. **CONTRACT TIME:**

Contractor agrees that all work shall be completed within 545 calendar days following the Notice to Proceed.

Owner and Contractor recognize that the time is of essence in this Contract, and if the work is not completed within the specified times outlined above, plus any extensions allowed, then the Contractor shall pay, as liquidated damages, $1,000.00 for each calendar day that expires after the specified completion date.

9. **PAYMENT PROCEDURE:**

9.01 The basis for payment shall be the actual percentage of work completed, as determined in the field by the Engineer.

9.02 An amount equal to five percent (5%) of each progress payment shall be held from each payment as retainage.

10. **SUBCONTRACTORS:**

10.01 The apparent successful bidder and any other bidder so requested, will within seven (7) days after the day of bid opening submit to Owner a list of all subcontractors and other persons and organizations, including those who are to furnish the principal items of material and equipment, proposed for the work. Such list shall be accompanied by an experience statement with pertinent information as to similar projects and other evidence of qualification for each such subcontractor, person, and organization. If Owner or Engineer, after due investigation has reasonable objection to any proposed subcontractor, other person or organization, either may before giving the Notice of Award request the apparent successful bidder to submit an acceptable substitute without an increase in Bid price. If the apparent successful 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 Bond. Any subcontractor, other person, or organization so listed and to whom Owner or Engineer does not make written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer.

10.02 No Contractor shall be required to employ any subcontractor, other person, or organization against whom he has reasonable objection.

11. **SUBSTITUTE MATERIAL AND EQUIPMENT**

11.01 Whenever it is indicated in the Contract Documents that a substitute or "or equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered until after the Effective Date of the Contract Agreement. The procedure for submittal of any such application by Contractor and consideration by Engineer is set forth in the General Conditions.

12. **PREPARATION OF BID:**

12.01 The Bid Form is included in these Specifications, and may not be altered in any way. Additional copies may be obtained from the City of Winchester.

12.02 Bid Forms must be completed in ink or by typewriter. The Total Base Bid price must be stated in words and numerals; in case of conflict, words will take precedence.

12.03 A. Bids MUST give full firm name and address of bidder. Failure to manually sign bid may disqualify it. Person signing bid will show TITLE or AUTHORITY TO BIND THE FIRM IN A CONTRACT. Firm name and authorized signature must appear on bid in the space provided on the bid form. Those authorized to sign are as follows:

If a sole proprietorship, the owner may sign.
If a general partnership, any general partner may sign.
If a limited partnership, a general partner must sign.
If a limited liability company, a "member" may sign or a "manager" must sign if so specified by the articles or organization.
If a regular corporation, the CEO, President or Vice-President must sign.
Others may be granted authority to sign but the City requires that a corporate document authorizing him/her to sign be submitted with bid.

B. Contractor's license or registration number shall be entered in the space provided on the Bid Form.

C. A bidder or offeror organized or authorized to transact business in the Commonwealth pursuant to Title 13.1 or Title 50 of the Code of Virginia shall include in its bid or proposal the identification number issued to it by the State Corporation Commission (SCC). Any bidder or offeror that is not required to be authorized to transact business in the Commonwealth as a foreign business entity under Title 13.1 or Title 50 of the Code of Virginia or as otherwise required by law shall include in its bid or proposal a statement describing why the bidder or offeror is not required to be so authorized. Any bidder or offeror described herein that fails to provide the required information may not receive an award unless a waiver of this requirement and the administrative policies and procedures established to implement this section is granted by the City Manager. The SCC may be reached at (804) 371-9733 or at http://www.scc.virginia.gov/default.aspx.

12.04 Bidder shall make acknowledgement on the Bid Form of receipt of all Addenda, the numbers of which shall be filled in the Bid Form.

SUBMISSION OF BIDS:

13.01 Bids shall be submitted at the time and place indicated in the Invitation to Bid and shall be included in an opaque sealed envelope, along with the Bid Bond, Non-collusion Affidavit, and other required documents. The sealed envelope shall indicate the Project Title, name and address of the bidder, and State Registration No. of the bidder. If the bid is sent through the mail, or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation **"BID ENCLOSED"** on the face thereof.

13.02 Timely delivery of the Bid shall be the sole responsibility of the Bidder. Bids must be received not later than the time and date stated in the Invitation to Bid. Bids by telephone, facsimile or other forms shall not be accepted.

14. **MODIFICATION AND WITHDRAWAL OF BIDS:**

14.01 Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a bid must be executed) and delivered to the place where bids are to be submitted at any time prior to opening of the bids. The request for withdrawal or modification must be in writing and signed by a person duly authorized to do so.

14.02 No bidder may withdraw his bid within thirty (30) calendar days after the actual date of the bid opening, except as allowed by the Code of the City of Winchester, Virginia, Section 21-43(a), which states "the Bidder shall give notice in writing of his claim of rights to withdraw this bid within two (2) business days after the conclusion of the bid opening procedure". Bidder shall submit to the Owner his original work papers, documents and materials used in preparation of his bid sought to be withdrawn.

OPENING OF BIDS:

14.03 Bids shall be opened publicly, and will be read aloud at the time and location indicated on the Invitation to Bid. An abstract of the amounts of the Bids shall be made available after the opening of bids.

14.04 All bids shall remain open for sixty (60) days after the day of the bid opening, but Owner may, in his sole discretion, release any bid and return the Bid Bond prior to that date.

AWARD OF CONTRACT:

14.05 Owner reserves the right to reject any and all bids, to waive any and all informalities and to negotiate Contract terms with the successful bidder, and the right to disregard all nonconforming, nonresponsive, or conditional bids. Discrepancies between words and figures shall be resolved in favor of words. Discrepancies between indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

14.06 In evaluating bids, Owner will consider the qualifications of the bidders, whether or not the bids comply with the prescribed requirements, and alternates and unit prices if requested in the Bid Form. Owner may consider the qualifications and experience of subcontractors and other persons and organizations proposed for the work.

14.07 Owner may conduct such investigations as he deems necessary to assist in the evaluation of any bid and 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 Contract Documents and to the Owner's satisfaction within the prescribed time.

14.08 Owner reserves the right to reject the bid of any bidder who does not pass any such evaluations to Owner's satisfaction.

14.09 If the Contract is to be awarded, it will be awarded on a Base Bid price basis to the lowest responsive and responsible bidder, and whose evaluation by the Owner indicates that the award will be in the best interest of the Project and the City. Discounts for prompt payment, liquidated damages, and cash incentives will not be part of the award.

15. **NEGOTIATION WITH THE LOWEST BIDDER**:

Unless all bids are cancelled or rejected, the City of Winchester reserves the right granted by § 2.2-4318 of the *Code of Virginia* to negotiate with the lowest responsive, responsible bidder to obtain a contract price within the funds available to the agency whenever such low bid exceeds the agency's available funds. For the purpose of determining when such negotiations may take place, the term "available funds" shall mean those funds which were budgeted by the agency for this contract prior to the issuance of the written Invitation for Bids. Negotiations with the low bidder may include both modifications of the bid price and the Scope of Work/Specifications to be performed. The agency shall initiate such negotiations by written notice to the lowest responsive, responsible bidder that its bid exceeds the available funds and that the agency wishes to negotiate a lower contract price. The times, places, and manner of negotiating shall be agreed to by the agency and the lowest responsive, responsible bidder.

16. **SIGNING OF CONTRACT:**

Owner shall give Notice of Award to the successful bidder accompanied by at least three (3) unsigned counterparts of the Contract and all other Contract Documents. Within fifteen (15) days thereafter, Contractor shall sign and deliver at least three (3) counterparts of the Contract to the Owner with all other Contract Documents attached. Within ten (10) days thereafter, Owner will deliver all fully signed counterparts to Contractor. Engineer will identify those portions of the Contract Documents not fully signed by Owner and Contractor and shall ensure that all parties appropriately execute all required portions of the contract immediately.

*** * * END OF SECTION * * ***

BID FORM
Hope Drive Extension
ITB# 202006

This Bid is submitted to:

City of Winchester, Virginia
Finance Department
Rouss City Hall, 4th Floor
15 North Cameron Street
Winchester, Virginia 22601

In submitting this Bid, bidder acknowledges that the bidder has examined copies of the following Contract Documents:

BIDDING DOCUMENTS

- Invitation to Bid
- Instructions to Bidders
- Bid Form
- Contractor Qualification Data Sheet
- Bid Bond
- Non-Collusion Affidavit
- Contract
- Performance Bond
- Labor and Material Payment Bond
- Notice of Intent to Award
- Notice of Award
- Notice to Proceed
- City of Winchester Required General Terms and Conditions
- General Conditions
- Supplement to General Conditions
- Special Terms and Conditions
- Special Provisions - Utilities

TECHNICAL SPECIFICATIONS

- Scope of Work – Sequence of Construction
- Surveying
- As-Built Drawings
- Demolition
- Erosion and Sediment Control
- Rock Excavation
- Disposal of Materials

- Maintenance of Traffic
- Concrete (Curb & Gutter, Sidewalks, Entrances)
- Brick Medians
- Detectable Warning Surfaces
- Earthwork
- Topsoil and Seeding
- Landscaping
- Signal Mast Arms, Poles, Luminaire Arms and Sign Supports
- Emergency Vehicle Preemption Equipment
- Traffic Signal Cabinets
- Traffic Signal Controllers
- Uninterruptible Power Supply
- Video Detection Equipment
- Signal Head Sections
- LED Edge-Lit Internally Illuminated Street Name Signs
- Radio Equipment
- Street Lights
- Storm
- Water Distribution System
- Sanitary Sewer Collection System

DRAWINGS

CSX COORDINATION DOCUMENTS

GEOTECHNICAL REPORT

ADDENDA:

NUMBER	DESCRIPTION	DATE

Receipt of all of above is hereby acknowledged.

CONTRACTOR: _____

BY (SIGNATURE): _____

NAME AND TITLE: _____

DATE: _____

BID ITEMS/QUANTITIES

(a) The Contractor shall provide all unit prices or lump sum prices for all bid items on the Bid Form herein. **If a unit price or lump sum price is omitted or left blank the bid and bidder shall be non-responsive.** The bid forms designate which prices are for *Install* only work, complete and in place, (i.e. assumes equipment and/ or materials will be supplied by the City). All other bid prices are for Furnish and Install work, complete and in place.

(b) The quantities shown for unit bid items are based upon the best information available at time of preparation of these bid documents, and are established for the purpose of obtaining a bid price. No adjustments to the bid prices based on changes to quantities will be considered. All bid prices will be held throughout the duration of the contract regardless of any increase or decrease in bid quantity.

(c) Emergency work shall be negotiated with a maximum allowable amount of 50% over the bid price by item. This excludes all lump sum bid items.

(d) All other bid items not listed or described in the Contract Documents will be negotiated between the City and the Contractor before the time of need. Once a negotiated price is established, it will be used for the remainder of the contract.

The undersigned Bidder proposes to complete all work in accordance with the Contract Documents for the following unit prices:

City of Winchester
Hope Drive – ITB #201906
BID TABLE

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT COST	TOTAL COST
Mobilization					
1	Mobilization (Maximum of 3% of Total Price)	1	Lump Sum		
Demolition/Removal					
2	Clearing and Grubbing [VDOT Section 301]	12	ACRE		
3	Demolition of Existing Asphalt or Concrete, Includes Disposal	10,000	SY		
Erosion and Sediment Control					
4	Erosion and Sediment Control	1	Lump Sum		
Construction Surveying					
5	Construction Surveying	1	Lump Sum		
Maintenance of Traffic					
6	Maintenance of Traffic	1	Lump Sum		
Earthwork					
7	Regular Excavation	70,000	CY		
8	Borrow Excavation (Select Fill)	40,000	CY		
9	Grading	1	Lump Sum		
10	Rock Excavation	1,000	CY		
Sidewalk/Roadway Improvements					
11	Fence FE-CL [VDOT Section 507]	2,500	LF		
12	Line Brace Unit FE-CL [VDOT Section 507]	218	EA		
13	Corner Brace Unit FE-CL [VDOT Section 507]	33	EA		
14	Brick Median (On 4” Concrete Base)	100	SY		
15	Median Strip MS-2 [VDOT Section 502]	600	LF		

16	Standard Curb CG-2	2,000	LF		
17	Standard Comb. Curb & Gutter CG-6	10,000	LF		
18	CG-12 Detectable Warning Surface	40	SY		
19	R/W Monument RM-2 [VDOT Section 503]	50	EA		
20	Gate FE-CL, L=14' [VDOT Section 507]	2	EA		
21	Asphalt Concrete, Type SM-9.5A [VDOT Section 315]	4,000	TON		
22	Asphalt Concrete, Type IM-19.0A [VDOT Section 315]	1,600	TON		
23	Flexible Pave. Planing [VDOT Section 515]	13,000	SY		
24	Asphalt Concrete, Type BM-25.0A [VDOT Section 315]	3,000	TON		
25	Aggregate Base Course, 21-A (under asphalt roadway and trail only)[Material and installation as per VDOT Section 309]	6,500	TON		
26	Concrete Sidewalk, 4" Thick (Includes aggregate base course)	1,700	SY		
27	Concrete Entrance, CG-9	100	SY		
28	Concrete Manhole Collars	27	EA		
Storm Drainage					
29	12" Storm Sewer Pipe, Class III RCP	50	LF		
30	15" Storm Sewer Pipe, Class III RCP	1,500	LF		
31	18" Storm Sewer Pipe, Class III RCP	560	LF		
32	24" Storm Sewer Pipe, Class III RCP	1,200	LF		
33	30" Storm Sewer Pipe, Class III RCP	400	LF		
34	36" Storm Sewer Pipe, Class III RCP	300	LF		
35	42" Storm Sewer Pipe, Class III RCP	410	LF		
36	54" Storm Sewer Pipe, Class III RCP	675	LF		
37	72" Tunneled Pipe (Class V) [VDOT Section 302]	70	LF		
38	68" x 43" Elliptical Storm Sewer Pipe, Class III RCEP	100	LF		

39	6’ x 4’ Double Box Culvert (Str. 8-7)	75	LF		
40	Storm Structure H3-5, Modify Exist. MH, Adjust Top	1	EA		
41	Storm Structure H3-6, Modify Exist. MH, DI-2E, L=6’	1	EA		
42	Storm Structure H3-2, DI-3B, L=6’	1	EA		
43	Storm Structure H3-3, DI-3B, L=6’	1	EA		
44	Storm Structure H3-4, DI-3B, L=4’	1	EA		
45	Storm Structure H4-1, DI-2B, L=6’	1	EA		
46	Storm Structure H4-8, Modify Exist. MH, Adjust Top	1	EA		
47	Storm Structure H4-9, Modify Exist. MH, Adjust Top	1	EA		
48	Storm Structure H4-2, DI-3C, L=6’	1	EA		
49	Storm Structure H4-3, DI-3C, L=6’	1	EA		
50	Storm Structure H4-4, DI-3B, L=4’	1	EA		
51	Storm Structure H4-17, Modify Exist. MH, DI-2D, L=5’	1	EA		
52	Storm Structure H4-5, DI-3C, L=8’	1	EA		
53	Storm Structure H4-16, Modify Exist. DI, Adjust Top	1	EA		
54	Storm Structure H4-7, Modify Exist. DI, Adjust Top	1	EA		
55	Storm Structure H4-10, Modify Exist. DI, Adjust Top	1	EA		
56	Storm Structure H4-11, Modify Exist. DI, Adjust Top	1	EA		
57	Storm Structure H4-12, DI-3B, L=6’	1	EA		
58	Storm Structure H4-13, Modify Exist. DI, Adjust Top	1	EA		
59	Storm Structure H5-4, Modify Exist. DI, Adjust Top	1	EA		
60	Storm Structure H5-11, Modify Exist. MH, Adjust Top	1	EA		
61	Storm Structure H5-2, MH-1 OR 2	1	EA		
62	Storm Structure H5-12, Modify Exist. DI, Adjust Top	1	EA		

63	Storm Structure H5-1, DI-2B, L=6’	1	EA		
64	Storm Structure H5-14, DI-3B, L=8’	1	EA		
65	Storm Structure H5-5, DI-3B, L=6’	1	EA		
66	Storm Structure H5-10, Modify Exist. DI, Adjust Top	1	EA		
67	Storm Structure H5-3, Modify Exist. MH, Adjust Top	1	EA		
68	Storm Structure H5-15, Modify Exist. MH, Adjust Top	1	EA		
69	Storm Structure H5-9, DI-4BB, L=6’	1	EA		
70	Storm Structure H5-13, Remove Str.	1	EA		
71	Storm Structure H5-16, DI-1	1	EA		
72	Storm Structure H6-5, Mod. DI-1 (Shallow) SD-5, w/ Grate Top	1	EA		
73	Storm Structure H6-3, Mod. DI-1 (Shallow) SD-5, 4 Grates	1	EA		
74	Storm Structure H6-8, DI-2B, L=4’	1	EA		
75	Storm Structure H6-6, DI-2B, L=6’	1	EA		
76	Storm Structure H6-12, MH-1 OR 2	1	EA		
77	Storm Structure H6-7, Mod. Shallow MH Str. w/ DI-2D Top, L=4’	1	EA		
78	Storm Structure H6-10, Mod. DI-1 (Shallow) SD-5, DI-1 Top	1	EA		
79	Storm Structure H6-9, Mod. Shallow MH Str. w/ DI-2F Top, L=8’	1	EA		
80	Storm Structure H6-1, Mod. Shallow MH Str. w/ DI-2F Top, L=10’	1	EA		
81	Storm Structure H6-2, DI-2B, L=4’	1	EA		
82	Storm Structure H6-11, Mod. Shallow MH Str. w/ DI-2E Top, L=6’	1	EA		
83	Storm Structure H6-14, DI-2E, L=6’	1	EA		
84	Storm Structure H6-17, Mod. JB-1	1	EA		
85	Storm Structure H6-13, DI-2B, L=8’	1	EA		
86	Storm Structure H6-19, DI-2E, L=10’	1	EA		
87	Storm Structure H6-20, DI-2B, L=8’	1	EA		

88	Storm Structure H7-3, DI-2E, L=6’	1	EA		
89	Storm Structure H7-11, DI-2C, L=6’	1	EA		
90	Storm Structure H7-10, DI-2B, L=4’	1	EA		
91	Storm Structure H7-9, DI-2B, L=4’	1	EA		
92	Storm Structure H7-5, DI-2C, L=6’	1	EA		
93	Storm Structure H7-17, 15” End Section ES-1 OR 2	1	EA		
94	Storm Structure H7-2, DI-2E, L=10’	1	EA		
95	Storm Structure H7-8, Mod. DI-1 (Shallow) SD-5, w/ Grate Top	1	EA		
96	Storm Structure H7-6, DI-2B, L=6’	1	EA		
97	Storm Structure H7-7, DI-2E, L=6’	1	EA		
98	Storm Structure H7-4, 54” End Wall (EW-2)	1	EA		
99	Storm Structure H7-18, Mod. DI-1 (Shallow) SD-5, DI-1 Top	1	EA		
100	Storm Structure H7-20, Mod. DI-1 (Shallow) SD-5, 3 Grates	1	EA		
101	Storm Structure H7-31, Mod. DI-1 (Shallow) SD-5, DI-1 Top	1	EA		
102	Storm Structure H7-21, DI-3B, L=4’	1	EA		
103	Storm Structure H7-25, DI-3B, L=4’	1	EA		
104	Storm Structure H7-22, DI-3B, L=4’	1	EA		
105	Storm Structure H7-23, DI-3B, L=10’	1	EA		
106	Storm Structure H7-1, 30” End Section ES-1 or 2	1	EA		
107	Storm Structure H7-26, DI-7	1	EA		
108	Storm Structure H8-2, DI-3B, L=6’	1	EA		
109	Storm Structure H8-1, DI-3B, L=4’	1	EA		
110	Storm Structure H8-9, Mod. DI-1 (Shallow) SD-5, 2 Grates	1	EA		
111	Storm Structure H8-8, Mod. DI-1 (Shallow) SD-5, 2 Grates	1	EA		
112	Storm Structure H8-11, Modify Exist. DI, DI-3B, L=8’	1	EA		

113	Storm Structure H8-12, Modify Exist. DI, Adjust Top	1	EA		
114	Storm Structure H8-3, 30” End Section ES-1 OR 2	1	EA		
115	Storm Structure H8-10, DI-3B, L=12’	1	EA		
116	Storm Structure H9-6, DI-2B, L=4’	1	EA		
117	Storm Structure H9-5, Mod. DI-1 (Shallow) SD-5, 4 Grates	1	EA		
118	Storm Structure H9-13, Mod. DI-1 (Shallow) SD-5, w/ Grate Top	1	EA		
119	Storm Structure H9-2, DI-2B, L=4’	1	EA		
120	Storm Structure H9-3, DI-2C, L=6’	1	EA		
121	Storm Structure H9-1, DI-2B, L=6’	1	EA		
122	Storm Structure H9-4, DI-1	1	EA		
123	Storm Structure H9-15, DI-2B, L=8’	1	EA		
124	Storm Structure H9-7, DI-2B, L=8’	1	EA		
125	Storm Structure H9-8, DI-3B, L=8’	1	EA		
126	Storm Structure H9-9, DI-3B, L=8’	1	EA		
127	Storm Structure H9-10, DI-3B, L=4’	1	EA		
128	Storm Structure H9-14, DI-2A, L=4’	1	EA		
129	Storm Structure H9-11, DI-3B, L=10’	1	EA		
130	Storm Structure H9-12, DI-3B, L=8’	1	EA		
131	Storm Structure H10-1, Mod. DI-1 (Shallow) SD-5, 2 Grates	1	EA		
132	Storm Structure H10-2, Modify Exist. DI, Adjust Top	1	EA		
133	Storm Structure H11-1, 15” End Section ES-1 OR 2	1	EA		
134	Storm Structure H11-2, MH-1 OR 2	1	EA		
135	Storm Structure V16-6, 42” End Wall (EW-2)	1	EA		
136	Storm Structure H12-2, Modify Exist. MH, Adjust Top	1	EA		
137	Storm Structure H12-3, 15” End Section ES-1 or 2	1	EA		

138	Storm Structure V16-3, DI-3B, L=6’	1	EA		
139	Storm Structure V16-4, MH-2	1	EA		
140	Storm Structure V16-7, DI-2EE, L=8’	1	EA		
141	Storm Structure H8-7, Double Box Culvert Type I Wings	4	EA		
142	Storm Structure H12-1, Mod. MH-2, Dewatering Well	1	EA		
143	Storm Structure H12-1, 72” End Wall (EW-2)	2	EA		
144	Storm Structure H12-1. Flood Control & Inlet Structure	1	EA		
145	Storm Manhole Frame and Cover	13	EA		
146	Erosion Control Stone Class I, EC-1 [VDOT Section 414]	165	TON		
147	Erosion Control Stone Class II, EC-1 [VDOT Section 414]	30	TON		
148	Dry RipRap, Cl. I [VDOT Section 414]	450	TON		
149	Aquatic Bench Plantings	20	EA		
150	Planting Watering	1	Lump Sum		
Street Lighting and Conduits					
151	Streetlight Foundation	46	EA		
152	Bored Conduit 2”	100	LF		
153	2” PVC Conduit	6,500	LF		
154	Junction Box JB-S1 (Installation Only) (Box Provided by SVEC) [VDOT Section 700]	10	EA		
Traffic Signal					
155	NS Remove Existing Signal Equipment & Signs (Valley Ave./Hope Drive) [VDOT Section 510]	1	LS		
156	Sign Panel [VDOT Section 701]	100	SF		
157	Electric Service SE-5 [VDOT Section 700]	1	EA		
158	Traffic Signal Head Section 12" LED [VDOT Section 703]	29	EA		

159	Relocate Existing Signal Head [VDOT Section 703]	7	EA		
160	Pedestrian Actuation PA-2 [VDOT Section 703]	4	EA		
161	Pedestal Pole PF-2 12' [VDOT Section 700]	3	EA		
162	Concrete Foundation Signal Pole PF-8 [VDOT Section 700]	30	CY		
163	Concrete Foundation CF-1 [VDOT Section 700]	1	EA		
164	Mast Arm Pole Type I	1	EA		
165	Mast Arm Pole Type II	1	EA		
166	Mast Arm 30'	1	EA		
167	Mast Arm 40'	1	EA		
168	Mast Arm 50'	1	EA		
169	Three Video Detection Camera Intersection	2	EA		
170	Video Detection Camera Cable	1,200	LF		
171	Video Detection Camera Y Cable (BNC To 2 Wire)	2	EA		
172	Emitters	2	EA		
173	Emergency Preemption Detector Unit	2	EA		
174	Emergency Preemption Detector Controller Equipment	1	EA		
175	14/2 Conductor Cable [VDOT Section 700]	440	LF		
176	14/4 Conductor Cable [VDOT Section 700]	1,100	LF		
177	14/7 Conductor Cable [VDOT Section 700]	1,900	LF		
178	Hanger Assembly SM-3 One Way (In Line) [VDOT Section 703]	6	EA		
179	Hanger Assembly SM-3 One Way (Cluster) [VDOT Section 703]	3	EA		
180	Hanger Assembly SMB-3, One Way [VDOT Section 703]	4	EA		
181	Remove Existing Pole (Pedestal Pole) [VDOT Section 703]	3	EA		
182	Remove Existing Foundation (Pedestal Foundation) [VDOT Section 703]	3	EA		

183	Remove Existing Signal Head (Ped & Signal) [VDOT Section 703]	9	EA		
184	Remove Existing Manhole/Junction Box [VDOT Section 703]	1	EA		
185	Install Sign [VDOT Section 510]	13	EA		
186	Uninterruptible Power Supply	1	EA		
187	Uninterruptible Power Supply Battery	1	EA		
188	Uninterruptible Power Supply Cabinet	1	EA		
189	LED Edge-Lit Internally Illuminated Street Name sign, One-Sided, One Line	3	EA		
190	Encom 5.8 GHZ Antenna & Radio	1	EA		
191	NS Signalization Test Pit (Ex. Utility Location for Conduits)	35	EA		
192	Pedestrian Signal Head SP-8 [VDOT Section 703]	4	EA		
193	8 Conductor Cable [VDOT Section 700]	50	LF		
194	Junction Box JB-S2 [VDOT Section 700]	3	EA		
195	Junction Box JB-S3 [VDOT Section 700]	1	EA		
196	Electric Service Grounding Electrode (10') [VDOT Section 700]	3	EA		
197	2" PVC Conduit [VDOT Section 700]	175	LF		
198	3" PVC Conduit [VDOT Section 700]	170	LF		
199	Bored 3" Conduit [VDOT Section 700]	365	LF		
200	Trench Excavation ECI-1 [VDOT Section 700]	355	LF		
201	Test Bore [VDOT Section 700]	2	EA		
202	EVP Detector Cable [VDOT Section 703]	705	LF		
203	EVP Detector Cable (For RR Preemption/Interconnect) [VDOT Section 704]	150	LF		
204	Base Mounted Cabinet	1	EA		
205	Traffic Signal Controller (NEMA)	1	EA		
206	NS Modify Existing Controller	1	LS		
207	NS Modify Video Detection Zones	8	EA		

208	Rock Excavation for Traffic Signals	10	CY		
Restoration and Landscaping					
209	Topsoil and Seeding	52,000	SY		
Signs and Pavement Markings		`			
210	NS Reset Existing Sign(s) and Post (With New Anchor Base) [VDOT Section 510]	12	EA		
211	Sign Panel [VDOT Section 701]	90	SF		
212	Steel Sign Supports	13	EA		
213	Sign Anchor Bases	120	LF		
214	Type B, Class 1 Pavement Line Marking, 4" [VDOT Section 704]	15,000	LF		
215	Type B, Class 1 Pavement Line Marking, 6" [VDOT Section 704]	1,000	LF		
216	Type B, Class 1 Pavement Line Marking, 12" [VDOT Section 704]	200	LF		
217	Type B, Class 1 Pavement Line Marking, 24" [VDOT Section 704]	1,000	LF		
218	Pavement Symbol Marking (Thru Arrow, Type B, Class 1 [VDOT Section 704]	2	EA		
219	Pavement Symbol Marking (Single Turn Arrow), Type B, Class 1 [VDOT Section 704]	42	EA		
220	Pavement Symbol Marking (DBL Turn Arrow THRU/LT OR RT), Type B, Class 1 [VDOT Section 704]	1	EA		
221	Pavement Symbol Marking (Triple Turn Arrow), Type B, Class 1 [VDOT Section 704]	2	EA		
222	Pavement Symbol Marking (Railroad Crossing, Type B, Class 1 [VDOT Section 704]	2	EA		
Water and Sanitary Sewer					
223	6” DI Water Main, Class 52	75	LF		
224	8” DI Water Main, Class 52	1,500	LF		
225	10” DI Water Main, Class 52	400	LF		
226	Fire Hydrant Assembly	5	EA		

227	Raise Hydrant to Grade	1	EA		
228	Remove Existing Hydrant	1	EA		
229	New Water Service Line, ¾” copper	20	LF		
230	New Water Service Line, 1” copper	20	LF		
231	New Water Service Line, 2” poly	20	LF		
232	New Water Meter Assembly, ¾”	1	EA		
233	New Water Meter Assembly, 1”	1	EA		
234	New Water Meter Assembly, 2”	1	EA		
235	Water Service Relocation, 1”	3	EA		
236	6” Gate Valve and Box	6	EA		
237	8” Gate Valve and Box	5	EA		
238	10” Gate Valve and Box	9	EA		
239	12” Gate Valve and Box	1	EA		
240	8” PVC Sanitary Sewer Pipe, SDR 26	150	LF		
241	15” PVC Sanitary Sewer Pipe, SDR 26	25	LF		
242	18” PVC Sanitary Sewer Pipe, SDR 26	1,700	LF		
243	Sanitary Sewer Manhole	13	EA		
244	Sewer Manhole Frame and Cover	14	EA		
245	N.S. 4” Concrete Encasement	64	LF		
Miscellaneous					
246	As-Built Drawings	1	Lump Sum		
247	CSX Coordination	1	Lump Sum		
TOTAL FOR ALL – BASE BID					

TOTAL BASE BID: $_____

IN WORDS: _____

CONTRACTOR: _____

BY: (SIGNATURE) _____

NAME AND TITLE: _____

_____

DATE: _____

ADDRESS: _____

_____

_____

TELEPHONE: _____

CURRENT VIRGINIA CONTRACTOR REGISTRATION NUMBER: _____

NOTE: REQUIRED BID GUARANTEE MUST BE ENCLOSED WITH THIS BID PROPOSAL.

Hope Drive Extension – ITB# 202006

CONTRACTOR QUALIFICATION DATA SHEET

1. General:

In order to be considered for selection, Bidders shall submit the following information as part of your response to this solicitation. Failure to complete and provide this data sheet and the requested information may result in a non-responsive bid.

1.1 Proprietary Information

All source code, executables, user data, materials, meeting minutes, progress reports and documentation shall be submitted to the City and shall belong exclusively to the City, and shall be subject to public inspection in accordance with the Virginia Freedom of Information Act. Trade secrets or proprietary information submitted by a Bidder shall not be subject to public disclosure under the Virginia Freedom of Information Act provided the Bidder invokes the protections of Section 2.2-4342F of the Virginia Public Procurement Act, which provides that:

> "Trade secrets or proprietary information submitted by a Bidder, or subsequently the Contractor, in connection with a procurement transaction, shall not be subject to public disclosure under the Virginia Freedom of Information Act. However, the Bidder or Contractor must invoke the protection of this Section prior to, or upon submission of the data or other materials. The Contractor must identify the data or other materials to be protected and justify in writing the explicit reasons that such protection is necessary. Failure to mark the data or other materials as proprietary or otherwise classified, will result in the data or other materials being released to Bidders or to the public as provided in the Virginia Freedom of Information Act."

The classification of the entire proposal document and total bid price as proprietary or trade secrets is not acceptable.

1.2 Incurred Cost

The Bidder is responsible for all costs of proposal preparation. The City of Winchester is not liable for any costs incurred in response to the ITB.

1.3 Contractor Qualifications:

Proposals should be as thorough and detailed as possible so that City may properly evaluate your capabilities to provide the required services. Bidders shall submit responses for the following items within your Bid response.

1.3.1 General

1.3.1.1 How many years has your organization been in business as a General Contractor?

1.3.1.2 How many years has your organization been in business under its present name?

1.3.1.3 What is your organization's Virginia Contractors Registration Number?

1.3.1.4 List the states and categories of construction in which your organization is legally qualified to do business?

1.3.1.5 *Qualifications:* Provide a description of the organizational structure and history. Identify key personnel to be assigned to this project and their relevant experience in work similar to this project.

1.3.1.6 *Debarment/Suspension List:* Firms shall confirm in writing that they are not currently on any debarment or suspension list of any local, state or federal government. Any firm found to be listed shall be rejected as non-responsive.

1.3.2 Construction-Specific

1.3.2.1 *Quality Management Plan and Timeliness Tracking Plan*

The Contractor shall provide a detailed description of all internal control methods used to insure quality throughout all of the contractor's operations, as well as the system or method that will be employed to track, monitor, and ensure compliance with all time line requirements of this ITB.

1.4.2.2 *Past Project Experience*

The Contractor shall provide a minimum of three (3) references that are similar in nature to the City's proposed construction project. The submitted projects shall have been initiated or completed in the past five (5) years and exceed $1,000,000 of total value. In the response, the Contractor shall provide a one to two paragraph description of the work performed, and the name, address, telephone number, and email address of the owner's representative. For each reference, the response shall also delineate the specific value of the underground utility installations, as defined above, as well as the total value of all the work completed.

The Contractor shall include in this list any contract(s) in the past five (5) years that were terminated and shall provide the reason for termination.

1.4.2.3 *Management of Simultaneous Contracts*

The Contractor shall list all the name of projects, owner's name and address, percent complete and scheduled completion of the major projects in progress on the date of proposal submittal and the estimated contract amount of all executed contracts that will be underway at the same time as the City's proposed construction project. The contractor shall also state how the contract needs of the City will be met with the available company resources considering that these other contracts will be underway simultaneously.

1.4.3 Financial Statements

Please submit your company's audited annual financial statement and/or Dunn & Bradstreet report for the last two (2) years.

1.4.4 Subcontracting Restrictions

The Prime Contractor shall perform or exercise responsibility for this contract with its own work force for at least 50% of the total dollar value of the contract. Identify the sub-Contractor(s) who will do work on this project and the amount of work that each is projected to perform.

1.4.5 Certification

An authorized representative of the company shall sign the Technical Proposal, which shall include the following statement above the name/signature/date line:

I certify that the information provided in the Contractor Qualifications is complete and accurate to the best of my knowledge.

Authorized Signature Title Date

BID BOND

KNOW ALL MEN BY THESE PRESENTS THAT_____

_____
(Here insert the name & address or legal title of the Contractor)

as Principal, hereinafter called the Contractor and _____

_____
(Here insert the legal title of the Surety)

as Surety, hereinafter called the Surety, are held and firmly bound unto the City of Winchester, Virginia, as obligee, hereinafter called the Owner, in the amount of

_____
(Dollars)

($_____) for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a Bid for:

ITB #202006 – Hope Drive Extension

in accordance with Drawing and Specifications prepared by the Public Services Department, City of Winchester, Virginia.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if the Obligee shall accept the Bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with terms of such Bid, and give such bonds as specified in the Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bonds, if the Principal shall pay the Obligee the difference not to exceed the penalty hereof between the amount specified in said Bid and such larger amount for which the

Obligee may in good faith contract with another party to perform the Work covered by said Bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

SIGNED AND SEALED THIS_____DAY OF_____A.D., 2020.

_____
PRINCIPAL

_____
TITLE

_____
WITNESS

_____
SURETY

_____
TITLE

_____
WITNESS

NON-COLLUSION AFFIDAVIT

STATE OF VIRGINIA

Ss: **ITB #202006 – Hope Drive Extension**

CITY OF WINCHESTER, COUNTY of FREDERICK

I, _____ of the City of _____

In the County of _____ and the State of _____

Of full age, being duly sworn according to law or my oath depose and say that:

I am _____ of the firm of _____

_____, of the Company making the Bid for the above named project, and that I executed the said Bid with full authority to do so; that the Company has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free, competitive bid preparation in connection with the above named project; and that all statements contained in said Bid and in this affidavit are true and correct, and made with full knowledge that the City of Winchester relies upon the truth of the statements contained in said Bid and in the statements contained in this affidavit in awarding the Contract for said Project.

I further warrant that no person or selling agency has been employed or retained to solicit or secure such contract upon an agreement or understanding for a commission, percentage, brokerage or contingent fee, except bona fide employees or bona fide established commercial or selling agencies maintained by:

_____
(Name of Contractor)

Subscribed and sworn to _____
(Type or print name of applicant under signature)

before me this _____ day of _____, 20____.

_____
(Notary Public)

of _____

My commission expires: _____, 20____.

Hope Drive Extension
ITB # 202006

CONTRACT

THIS CONTRACT, made and entered into in triplicate originals this _____ day of **_____, 2020**, by and between the **City of Winchester, Virginia**, Party of the First Part, hereinafter referred to as the **"Owner"** and _____, Party of the Second Part, hereinafter referred to as the **"Contractor"**.

WITNESSETH, That the Contractor and the City for the consideration stated herein agree as follows:

ARTICLE I, SCOPE OF WORK - The Contractor shall perform everything required to be performed and shall provide and furnish all of the labor, materials, necessary tools, expendable equipment and all utility and transportation services required to perform and complete in a workmanlike manner all the work required in connection with:

ITB #202006 – Hope Drive Extension

all in strict accordance with the Contract Documents prepared by the Public Services Department, City of Winchester, Virginia. The Contractor shall do everything required by this Contract and other Documents constituting a part thereof.

ARTICLE II, CONTRACT PRICE - The City shall pay to the Contractor for the performance of this Contract, subject to any additions or deductions provided therein, in current funds, the Contract Price computed as follows:

TOTAL CONTRACT PRICE= _____

ARTICLE III. PAYMENTS - Payments are to be made to the Contractor in accordance with and subject to provisions embodied in the Documents made a part of this Contract.

ARTICLE IV. CONTRACT TIME - Work under this Contract shall commence no later than the date to begin work set forth in a written Notice to Proceed from the City or its authorized representative, to the Contractor. The Contractor shall complete all work under this Contract within 545 calendar days following the Notice to Proceed issued for the project.

The Work shall be prosecuted (performed) regularly, diligently and uninterruptedly at such rate of progress as will insure full completion thereof within the time specified. **It is**

expressly understood and agreed by and between the Contractor and the City that the time for the completion of the Work described herein is a reasonable time for the completion of the same.

ARTICLE V. ENGINEER – The project has been designed by the City of Winchester Public Services Department, Engineering Division, 15 N. Cameron Street, Winchester, VA 22601, who is hereinafter called ENGINEER and who is to act as OWNER's representative, assume all duties and responsibilities and have the rights and authority assigned to ENGINEER in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

ARTICLE VI. HOLD HARMLESS CLAUSE - Bids shall provide that during the term of the Contract, including warranty period, for the successful bidder indemnifying, defending, and holding harmless the City, its officers, employees, agent and representatives thereof from all suits, actions, claims of any kind, including attorney's fees, brought on account of any personal injuries, damages, or violation of rights sustained by any person or property in consequence of any neglect in safeguarding contract work, or on account of any act or omission by the Contractor or his employees, or from any claims or amounts arising from violation of any law, bylaw, ordinance, regulation or decree. The Contractor agrees that this clause shall include claims involving infringement of patent or copyrights.

ARTICLE VII. LIQUIDATED DAMAGES AND INCENTIVES - **It is hereby fully understood and agreed that the time is of essence in the performance of this Contract**. Further, the parties understand and agree that the actual damages are uncertain and difficult to determine with exactness and that the amount stated herein is not out of proportion to the probable loss. For each and every calendar day that elapses between the Contract Completion Dates specified in Article IV of this Contract and the date on which the work covered by such Contract is actually completed, including the removal of all plant and obstructions from the site of such work, the Contractor shall pay to the City as liquidated damages and not as a penalty, the sum of ONE THOUSAND DOLLARS PER CALENDAR DAY ($1,000.00). The total amount so payable by the Contractor as liquidated damages either may be deducted from any moneys due or payable to the Contractor by the City or so much thereof as is not so deducted shall be chargeable to and will be payable promptly by such Contractor and his Surety, or either of them, to the City. Such liquidated damages shall be payable to reimburse or compensate, at least in part, the City for (1) the administration of the work covered by such Contract and any other contract or contracts beyond the Contract Completion Date, including the additional expense to the City for supervision, inspection, and superintendence; (2) expenditures resulting from the inability of the City (and the general public) to use the improvement being constructed from and after such Contract Completion Date until the actual date of completion; (3) other miscellaneous obligations and expenditures incurred by the City directly as a result

of the failure to complete the Work covered by such Contract on or before the Contract Completion Date.

ARTICLE VIII. COMPONENT PARTS OF THIS CONTRACT - That this Contract consists of the following component parts which are made a part of this agreement and Contract as fully and absolutely as if they were set out in detail in this Contract:

BIDDING DOCUMENTS

- Invitation to Bid
- Instructions to Bidders
- Bid Form
- Contractor Qualification Data Sheet
- Bid Bond
- Non-Collusion Affidavit
- Contract
- Performance Bond
- Labor and Material Payment Bond
- Notice of Intent to Award
- Notice of Award
- Notice to Proceed
- City of Winchester Required General Terms and Conditions
- General Conditions
- Supplement to General Conditions
- Special Terms and Conditions
- Special Provisions - Utilities

TECHNICAL SPECIFICATIONS

- Scope of Work – Sequence of Construction
- Surveying
- As-Built Drawings
- Demolition
- Erosion and Sediment Control
- Rock Excavation
- Disposal of Materials
- Maintenance of Traffic
- Concrete (Curb & Gutter, Sidewalks, Entrances)
- Brick Medians
- Detectable Warning Surfaces
- Earthwork
- Topsoil and Seeding
- Landscaping
- Signal Mast Arms, Poles, Luminaire Arms and Sign Supports
- Emergency Vehicle Preemption Equipment

- Traffic Signal Cabinets
- Traffic Signal Controllers
- Uninterruptible Power Supply
- Video Detection Equipment
- Signal Head Sections
- LED Edge-Lit Internally Illuminated Street Name Signs
- Radio Equipment
- Street Lights
- Storm
- Water Distribution System
- Sanitary Sewer Collection System

DRAWINGS

CSX COORDINATION DOCUMENTS

GEOTECHNICAL REPORT
ADDENDA:

Above components are complimentary and what is called for by one shall be binding as if called by all.

IN WITNESS WHEREOF, the parties hereto have hereunto set their hands and seals the date first written above.

CONTRACTOR:	CITY OF WINCHESTER, VIRGINIA:
_____	_____ CITY MANAGER
_____ NAME AND TITLE	_____ ATTEST
_____ ATTEST	

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we_____

_____as Principal, hereinafter

called Contractor, and _____

Surety Company, with General Offices in _____

_____, a corporation organized under the laws of the State of _____ and authorized to transact business in the State of Virginia as Surety, hereinafter called Surety, are held and firmly bound onto the City of Winchester, Virginia, hereinafter called Owner, in the penal sum _____
(_____)Dollars, lawful money of the United States, for the payment of which sum, will and truly be made, the Said Contractor and Surety bind themselves, their successors and assigns, jointly and severally, firmly by these presents.

Signed, sealed and delivered this____day of _____, 2020.

WHEREAS, the above named and bounded Contractor has entered into a written contract with the Owner, dated_____, 2020 for:

ITB #202006 – Hope Drive Extension

in accordance with the Drawings and Specifications prepared by the Engineering Department, City of Winchester, Virginia, which Contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if the Contractor shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the Owner.

Whenever Contractor shall be, and declared by Owner to be in default under the Contract, the Owner having performed Owner's obligations thereunder, the Surety may promptly remedy the default, or shall promptly:

1. Complete the Contract in accordance with its terms and conditions, or

2. Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, or, if the Owner elects, upon determination by the Owner and the Surety jointly of the lowest responsible bidder, arrange for a contract between such bidder and Owner, and make available as work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of contract price," as used in this paragraph, shall mean the total amount payable by the Owner to Contractor under the Contract and any amendments thereto, less the amount properly paid by Owner to Contractor.

Any suit under this bond must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators or successors of the Owner.

Signed and sealed this _____day of_____ 2020.

_____	_____
PRINCIPAL	SURETY
_____	_____
TITLE	TITLE
_____	_____
WITNESS	WITNESS

LABOR AND MATERIAL PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, that we _____

_____as Principal, hereinafter

called Contractor, and _____

Surety Company, with General Offices in _____

_____, a corporation organized under the laws of the State of _____ and authorized to transact business in the State of Virginia as Surety, hereinafter called Surety, are held and firmly bound unto the City of Winchester, Virginia, hereinafter called Owner, in the penal sum _____ (_____)Dollars, lawful money of the United States, for the payment of which sum, will and truly be made, the Said Contractor and Surety bind themselves, their successors and assigns, jointly and severally, firmly by these presents.

Signed, sealed and delivered this _____day of_____ 2020.
WHEREAS, the above named and bounded Contractor has entered into a written contract with the Owner, dated_____, 2020 for:

ITB #202006 – Hope Drive Extension

in accordance with the Drawings and Specifications prepared by the Engineering Department, City of Winchester, Virginia, which Contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if the Contractor shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise it shall remain full force and effect, subject, however, to the following conditions:

1. A claimant is defined as one having a direct contract with the Principal or with a Subcontractor of the Principal for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.

2. The above named Principal and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full before

the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgement for such sum or sums as my be justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any costs or expenses of any such suit.

3. No suit or action shall be commenced hereunder by any claimant:

a) Unless claimant, other than the one having a direct Contract with the Principal, shall have given written notice to any two of the following: the Principal, the Owner, or the Surety above named, within (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage paid, in an envelope addressed to the Principal, Owner or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.

b) After the expiration of one (1) year following the date on which Principal ceased work on said Contract, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

c) Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the project, or any part thereof, is situated, or in the United States District Court for the district in which the project, or any part thereof, is situated, and not elsewhere.

4. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanic's liens which may by be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

Signed and sealed this _____day of_____, 2020.

_____
PRINCIPAL

_____
TITLE

_____
WITNESS

_____
SURETY

_____
TITLE

_____
WITNESS

CITY OF WINCHESTER, VIRGINIA

NOTICE OF INTENT TO AWARD

Date:

To:

Thank you for your proposal concerning our Invitation to Bid For:

The City of Winchester intends to award this Invitation to Bid to:

This is not a Notice of Award or a Notice to Proceed.

Sincerely,

Michael Marzullo, CPPB
City of Winchester
Purchasing
Finance Department
15 N. Cameron Street
Winchester, VA 22601
(540) 667-1815 EXT 1477

NOTICE OF AWARD

DATE:

TO:

PROJECT TITLE: **ITB# 202006 – Hope Drive Extension**

Gentlemen:

Your Bid, dated _____, for the above Project has been considered and you are the apparent successful bidder. You are hereby notified that you have been awarded a Contract for:

The Contract Price of your contract is $_____.

Three copies each of the proposed Contract between Owner and Contractor and the Contract Documents accompany this Notice of Award.

You must comply with the following conditions precedent within fifteen days of the date of this Notice of Award, that is by _____.

1. You must deliver to the Owner three (3) fully executed counterparts of the Contract between Owner and Contractor including all the Contract Documents. This includes the sets of Plans and Specifications. Each of the Contract Documents must bear your signature on the Index page of the Plans and on the Specification Table of Contents page.
2. You must deliver with the executed Contract, Payment and Performance Bonds, and required Certificates of Insurance. The Certificate of Insurance must identify the above referenced project as the project for which insurance is being provided. *Additionally, it must indicate the City of Winchester as the Certificate Holder, and name the City of Winchester as an additional insured.*

Failure to comply with these conditions within the time specified will entitle Owner to consider your bid abandoned, to annul this Notice of Award and to declare your Bid Security forfeited.

After you comply with those conditions, and upon approval of the Contract Security by the Owner, the Owner will return to you one fully signed counterpart of the Contract with the Contract Documents.

City of Winchester, Virginia

By: _____
City Manager

NOTICE TO PROCEED

DATE:

TO:

Re: City of Winchester, Department of Public Services

PROJECT TITLE: ITB #202006 – Hope Drive Extension

Gentlemen:

In accordance with the Contract between Owner and Contractor, you are notified that the Time for Completion under the above Contract will commence to run on _____, 2020. By that date, you are to start performing your obligations under the Contract Documents. In accordance with the Contract between Owner and Contractor, the Work shall be substantially completed within 545 calendar days which is _____, 2022.

City of Winchester, Virginia

By: _____
City Manager

CITY OF WINCHESTER

REQUIRED GENERAL TERMS AND CONDITIONS

A. APPLICABLE LAWS AND COURTS
B. ANTI-DISCRIMINATION
C. ETHICS IN PUBLIC CONTRACTING
E. IMMIGRATION REFORM AND CONTROL ACT OF 1986
F. DEBARMENT STATUS
G. ANTITRUST
H. MANDATORY USE OF CITY FORM AND TERMS AND CONDITIONS
I. CLARIFICATION OF TERMS
J. PAYMENT
K. PRECEDENCE OF TERMS
L. QUALIFICATIONS OF BIDDERS OR OFFERORS
M. TESTING AND INSPECTION
N. ASSIGNMENT OF CONTRACT
O. SEVERABILITY
P. CHANGES TO THE CONTRACT
Q. DEFAULT
R. TAXES
S. USE OF BRAND NAMES
T. TRANSPORTATION AND PACKAGING
U. INSURANCE
V. ANNOUNCEMENT OF AWARD
W. DRUG-FREE WORKPLACE
X. NONDISCRIMINATION OF CONTRACTORS
Y. AVAILABILITY OF FUNDS
Z. LICENSES AND PERMITS
AZ. TERMINATION
BZ. HOLD HARMLESS INDEMNIFICATION
CZ. CONFIDENTIALITY OF PERSONALLY IDENTIFIABLE INFORMATION
DZ. BID PRICE CURRENCY

These General Terms and Conditions are required for all sealed and unsealed written or verbal solicitations issued by the City of Winchester for procurements that are subject to the Winchester City Code unless changed, deleted or revised by the City Attorney.

A. **APPLICABLE LAWS AND COURTS:** This solicitation and any resulting contract shall be governed by the laws of the Commonwealth of Virginia. Any dispute arising from the performance or non-performance of this Agreement shall be resolved or otherwise litigated in the Circuit Court for the City of Winchester, Virginia or the Fourth Circuit Federal District Court in Harrisonburg, Virginia. The agency and the contractor are encouraged to resolve any issues in controversy arising from the award of the contract or any contractual dispute following the Winchester City Code, Chapter 21-61. The contractor shall comply with all applicable federal, state and local laws, rules and regulations.

B. **ANTI-DISCRIMINATION:** By submitting their (bids/proposals), (bidders/offerors) certify to the City of Winchester that they will conform to the provisions of the Federal Civil Rights Act of 1964, as amended, as well as the Virginia Fair Employment Contracting Act of 1975, as amended, where applicable, the Virginians With Disabilities Act, the Americans With Disabilities Act and § 2.2-4311 of the *Virginia Public Procurement Act (VPPA).* If the award is made to a faith-based organization, the organization shall not discriminate against any recipient of goods, services, or disbursements made pursuant to the contract on the basis of the recipient's religion, religious belief, refusal to participate in a religious practice, or on the basis of race, age, color, gender or national origin and shall be subject to the same rules as other organizations that contract with public bodies to account for the use of the funds provided; however, if the faith-based organization segregates public funds into separate accounts, only the accounts and programs funded with public funds shall be subject to audit by the public body. (*Code of Virginia*, § 2.2-4343.1E).

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

1. During the performance of this contract, the contractor agrees as follows:

a. The contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the contractor. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

b. The contractor, in all solicitations or advertisements for employees placed by or on behalf of the contractor, will state that such contractor is an equal opportunity employer.

c. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting these requirements.

2. The contractor will include the provisions of 1. above in every subcontract or purchase order over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

C. **ETHICS IN PUBLIC CONTRACTING:** By submitting their (bids/proposals), (bidders/offerors) certify that their (bids/proposals) are made without collusion or fraud and that they have not offered or received any kickbacks or inducements from any other (bidder/offeror), supplier, manufacturer or subcontractor in connection with their (bid/proposal), and that they have not conferred on any public employee having official responsibility for this procurement transaction any payment, loan, subscription, advance, deposit of money, services or anything of more than nominal value, present or promised, unless consideration of substantially equal or greater value was exchanged.

D. **IMMIGRATION REFORM AND CONTROL ACT OF 1986:** By submitting their (bids/proposals), (bidders/offerors) certify that they do not and will not during the performance of this contract employ illegal alien workers or otherwise violate the provisions of the federal Immigration Reform and Control Act of 1986.

E. **DEBARMENT STATUS:** By submitting their (bids/proposals), (bidders/offerors) certify that they are not currently debarred by the Federal Government, Commonwealth of Virginia, or by any City, Town or County from submitting bids or proposals on contracts for the type of goods and/or services covered by this solicitation, nor are they an agent of any person or entity that is currently so debarred.

F. **ANTITRUST:** By entering into a contract, the contractor conveys, sells, assigns, and transfers to the City of Winchester all rights, title and interest in and to all causes of action it may now have or hereafter acquire under the antitrust laws of the United States and the Commonwealth of Virginia, relating to the particular goods or services purchased or acquired by the City of Winchester under said contract.

H. **MANDATORY USE OF CITY FORM AND TERMS AND CONDITIONS:** Failure to submit a bid/proposal on the official City form provided for that purpose may be a cause for rejection of the bid/proposal. Modification of or additions to the General Terms and Conditions of the solicitation may be cause for rejection of the bid/proposal; however, the City of Winchester reserves the right to decide, on a case by case basis, in its sole discretion, whether to reject such a bid/proposal.

I. **CLARIFICATION OF TERMS:** If any prospective (bidder/offeror) has questions about the specifications or other solicitation documents, the prospective (bidder/offeror) should contact the buyer whose name appears on the face of the solicitation no later than five working days before the due date. Any revisions to the solicitation will be made only by addendum issued by the Purchasing Agent, or designee.

J. **PAYMENT:**

1. To Prime Contractor:

a. Invoices for items ordered, delivered and accepted shall be submitted by the contractor directly to the payment address shown on the purchase order/contract. All invoices shall show the state contract number and/or purchase order number; social security number (for individual contractors) or the federal employer identification number (for proprietorships, partnerships, and corporations).

b. Any payment terms requiring payment in less than 30 days will be regarded as requiring payment 30 days after invoice or delivery, whichever occurs last. This shall not affect offers of discounts for payment in less than 30 days, however.

c. All goods or services provided under this contract or purchase order, that are to be paid for with public funds, shall be billed by the contractor at the contract price, regardless of which department is being billed.

d. The following shall be deemed to be the date of payment: the date of postmark in all cases where payment is made by mail.

e. **Unreasonable Charges**. Under certain emergency procurements and for most time and material purchases, final job costs cannot be accurately determined at the time orders are placed. In such cases, contractors should be put on notice that final payment in full is contingent on a determination of reasonableness with respect to all invoiced charges. Charges which appear to be unreasonable will be researched and challenged, and that portion of the invoice held in abeyance until a settlement can be reached. Upon determining that invoiced charges are not reasonable, the City of Winchester shall promptly notify the contractor, in writing, as to those charges which it considers unreasonable and the basis for the determination. A contractor may not institute legal action unless a settlement cannot be reached within thirty (30) days of notification. The provisions of this section do not relieve an agency of its prompt payment obligations with respect to those charges which are not in dispute (*Code of Virginia*, § 2.2-4363).

2. To Subcontractors:

a. A contractor awarded a contract under this solicitation is hereby obligated:

(1) To pay the subcontractor(s) within seven (7) days of the contractor's receipt of payment from the City of Winchester for the proportionate share of the payment received for work performed by the subcontractor(s) under the contract; or

(2) To notify the agency and the subcontractor(s), in writing, of the contractor's intention to withhold payment and the reason.

b. The contractor is obligated to pay the subcontractor(s) interest at the rate of one percent per month (unless otherwise provided under the terms of the contract) on all amounts owed by the contractor that remain unpaid seven (7) days following receipt of payment from the City of Winchester, except for amounts withheld as stated in (2) above. The date of mailing of any payment by U. S. Mail is deemed to be payment to the addressee. These provisions apply to each sub-tier contractor performing under the primary contract. A contractor's obligation to pay an interest charge to a subcontractor may not be construed to be an obligation of the City of Winchester.

K. **PRECEDENCE OF TERMS:** The following General Terms and Conditions APPLICABLE LAWS AND COURTS, ANTI-DISCRIMINATION, ETHICS IN PUBLIC CONTRACTING, IMMIGRATION REFORM AND CONTROL ACT OF 1986, DEBARMENT STATUS, ANTITRUST, MANDATORY USE OF CITY FORM AND TERMS AND CONDITIONS, CLARIFICATION OF TERMS, PAYMENT shall apply in all instances. In the event there is a conflict between any of the other General Terms and Conditions and any Special Terms and Conditions in this solicitation, the Special Terms and Conditions shall apply and take precedence.

The City's procurement, Contractor's response and written negotiation summary shall form part of the Contract. In the case of conflicts, discrepancies, errors or omissions among the City's procurement, the Contractor's response, written negotiation summary and the main body of the Contract, the documents and amendments to them shall take precedence and govern in the following order:

1. Contract
2. Negotiation Summary
3. City's Procurement Document(s)
4. Contractor's Response
5. Other Documents

L. **QUALIFICATIONS OF (BIDDERS/OFFERORS):** The City of Winchester may make such reasonable investigations as deemed proper and necessary to determine the ability of the (bidder/offeror) to perform the services/furnish the goods and the (bidder/offeror) shall furnish to the City of Winchester all such information and data for this purpose as may be requested. The City of Winchester reserves the right to inspect (bidder's/offeror's) physical facilities prior to award to satisfy questions regarding the (bidder's/offeror's) capabilities. The City of Winchester further reserves the right to reject any (bid/proposal) if the evidence submitted by, or investigations of, such (bidder/offeror) fails to satisfy the City of Winchester that such (bidder/offeror) is properly qualified to carry out the obligations of the contract and to provide the services and/or furnish the goods contemplated therein.

M. **TESTING AND INSPECTION:** The City of Winchester reserves the right to conduct any test/inspection it may deem advisable to assure goods and services conform to the specifications.

N. **ASSIGNMENT OF CONTRACT:** A contract shall not be assignable by the contractor in whole or in part without the written consent of the City of Winchester.

O. **SEVERABILITY OF CONTRACT:** In the event that any provision shall be adjudged or decreed to be invalid, such ruling shall not invalidate the entire Agreement but shall pertain only to the provision in question and the remaining provisions shall continue to be valid, binding and in full force and effect.

P. **CHANGES TO THE CONTRACT:**

1. A public contract may include provisions for modification of the contract during performance, but no fixed-price contract may be increased by more than twenty-five percent of the amount of the contract or ten thousand dollars ($10,000), whichever is greater, without the advance written approval of the City Council. In no event may the amount of any contract, without adequate consideration, be increased for any purpose, including, but not limited to, relief of an offeror from the consequences of an error in its bid or offer (Winchester City Code 21-44).

2. Changes can be made to the contract in any of the following ways:

   a. The parties may agree in writing to modify the scope of the contract. An increase or decrease in the price of the contract resulting from such modification shall be agreed to by the parties as a part of their written agreement to modify the scope of the contract.

   b. The City of Winchester may order changes within the general scope of the contract at any time by written notice to the contractor. Changes within the scope of the contract include, but are not limited to, things such as services to be performed, the method of packing or shipment, and the place of delivery or installation. The contractor shall comply with the notice upon receipt. The contractor shall be compensated for any additional costs incurred as the result of such order and shall give the City of Winchester a credit for any savings. Said compensation shall be determined by one of the following methods:

      1. By mutual agreement between the parties in writing; or
      2. By agreeing upon a unit price or using a unit price set forth in the contract, if the work to be done can be expressed in units, and the contractor accounts for the number of units of work performed, subject to the City of Winchester's right to audit the contractor's records and/or to determine the correct number of units independently; or
      3. By ordering the contractor to proceed with the work and keep a record of all costs incurred and savings realized. A markup for overhead and profit may be allowed if provided by the contract. The same markup shall be used for determining a decrease in price as the result of savings realized. The contractor shall present the City of Winchester with all vouchers and records of expenses incurred and savings realized. The City of Winchester shall have the right to audit the records of the contractor as it deems necessary to determine costs or savings. Any claim for an adjustment in price under this provision must be asserted by written notice to the City of Winchester within thirty (30) days from the date of receipt of the written order from the City of Winchester. If the parties fail to agree on an amount of adjustment, the question of an increase or decrease in the contract price or time for performance shall be resolved in accordance with the procedures for resolving disputes provided by the Disputes Clause of this contract or, if there is none, in accordance with the disputes provisions of the City of Winchester Code. Neither the existence of a claim nor a dispute resolution process, litigation or any other provision of this contract shall excuse the contractor from promptly complying with the changes ordered by the City of Winchester or with the performance of the contract generally.

Q. **DEFAULT:** In case of failure to deliver goods or services in accordance with the contract terms and conditions, the City of Winchester, after due oral or written notice, may procure them from other sources and hold the contractor responsible for any resulting additional purchase and administrative costs. This remedy shall be in addition to any other remedies which the City of Winchester may have.

R. **TAXES:** Sales to the City of Winchester are normally exempt from State sales tax. State sales and use tax certificates of exemption, Form ST-12, will be issued upon request.

S. **USE OF BRAND NAMES:** Unless otherwise provided in this solicitation, the name of a certain brand, make or manufacturer does not restrict (bidders/offerors) to the specific brand, make or manufacturer named, but conveys the general style, type, character, and quality of the article desired. Any article which the public body, in its sole discretion, determines to be the equal of that specified, considering quality, workmanship, economy of operation, and suitability for the purpose intended, shall be accepted. The (bidder/offeror) is responsible to clearly and specifically identify the product being offered and to provide sufficient descriptive literature, catalog cuts and technical detail to enable the City of Winchester to determine if the product offered meets the requirements of the solicitation. This is required even if offering the exact brand, make or manufacturer specified. Normally in competitive sealed bidding only the information furnished with the bid will be considered in the evaluation. Failure to furnish adequate data for evaluation purposes may result in declaring a bid nonresponsive. Unless the (bidder/offeror) clearly indicates in its (bid/proposal) that the product offered is an equal product, such (bid/proposal) will be considered to offer the brand name product referenced in the solicitation.

T. **TRANSPORTATION AND PACKAGING:** By submitting their (bids/proposals), all (bidders/offerors) certify and warrant that the price offered for FOB destination includes only the actual freight rate costs at the lowest and best rate and is based upon the actual weight of the goods to be shipped. Except as otherwise specified herein, standard commercial packaging, packing and shipping containers shall be used. All shipping containers shall be legibly marked or labeled on the outside with purchase order number, commodity description, and quantity.

U. INSURANCE: By signing and submitting a bid or proposal under this solicitation, the bidder or offeror certifies that if awarded the contract, it will have the following insurance coverage at the time the contract is awarded. For construction contracts, if any subcontractors are involved, the subcontractor will have workers' compensation insurance in accordance with §§ 2.2-4332 and 65.2-800 et seq. of the *Code of Virginia*. The bidder or offeror further certifies that the contractor and any subcontractors will maintain these insurance coverage during the entire term of the contract and that all insurance coverage will be provided by insurance companies authorized to sell insurance in Virginia by the Virginia State Corporation Commission.

MINIMUM INSURANCE COVERAGES AND LIMITS REQUIRED FOR MOST CONTRACTS:

1. Workers' Compensation - Statutory requirements and benefits. Coverage is compulsory for employers of three or more employees, to include the employer. Contractors who fail to notify the City of Winchester of increases in the number of employees that change their workers' compensation requirements under the *Code of Virginia* during the course of the contract shall be in noncompliance with the contract. The insurer must have an A.M. Best rating of A- or better.

2. Employer's Liability - $100,000.

3. Commercial General Liability - $1,000,000 per occurrence. Commercial General Liability is to include bodily injury and property damage, personal injury and advertising injury, products and completed operations coverage. The City of Winchester must be named as an additional insured and so endorsed on the policy by the insurer. A notation on the certificate of insurance is not sufficient.

4. Automobile Liability - $1,000,000 per occurrence. (Only used if motor vehicle is to be used in the contract.)

NOTE: In addition, various Professional Liability/Errors and Omissions coverages are required when soliciting those services as follows:

Profession/Service	**Limits**
Accounting	$1,000,000 per occurrence, $3,000,000 aggregate
Architecture	$2,000,000 per occurrence, $6,000,000 aggregate
Asbestos Design, Inspection or Abatement Contractors	$1,000,000 per occurrence, $3,000,000 aggregate
Health Care Practitioner (to include Dentists, Licensed Dental Hygienists, Optometrists, Registered or Licensed Practical Nurses, Pharmacists, Physicians, Podiatrists, Chiropractors, Physical Therapists, Physical Therapist Assistants, Clinical Psychologists, Clinical Social Workers, Professional Counselors, Hospitals, or Health Maintenance Organizations.)	$1,925,000 per occurrence, $3,000,000 aggregate

(Limits increase each July 1 through fiscal year 2008, as follows:

July 1, 2008 - $2,000,000. This complies with §8.01-581.15 of the *Code of Virginia*.

Insurance/Risk Management	$1,000,000 per occurrence, $3,000,000 aggregate
Landscape/Architecture	$1,000,000 per occurrence, $1,000,000 aggregate
Legal	$1,000,000 per occurrence, $5,000,000 aggregate
Professional Engineer	$2,000,000 per occurrence, $6,000,000 aggregate
Surveying	$1,000,000 per occurrence, $1,000,000 aggregate

V. **ANNOUNCEMENT OF AWARD:** Upon the award or the announcement of the decision to award a contract over $50,000, as a result of this solicitation, the Purchasing Agent will publicly post such notice on the City of Winchester's web site (www.winchesterva.gov/purchasing) for a minimum of 10 days.

W. **DRUG-FREE WORKPLACE:** During the performance of this contract, the contractor agrees to (i) provide a drug-free workplace for the contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the contractor that the contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

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.

X. **NONDISCRIMINATION OF CONTRACTORS**: A bidder, offeror, or contractor shall not be discriminated against in the solicitation or award of this contract because of race, religion, color, sex, national origin, age, disability, faith-based organizational status, any other basis prohibited by state law relating to discrimination in employment or because the bidder or offeror employs ex-offenders unless the state agency, department or institution has made a written determination that employing ex-offenders on the specific contract is not in its best interest. If the award of this contract is made to a faith-based organization and an individual, who applies for or receives goods, services, or disbursements provided pursuant to this contract objects to the religious character of the faith-based organization from which the individual receives or would receive the goods, services, or disbursements, the public body shall offer the individual, within a reasonable period of time after the date of his objection, access to equivalent goods, services, or disbursements from an alternative provider.

Y. **AVAILABILITY OF FUNDS:** In the event that funds are not appropriated for this Contract for any City fiscal year, following the City's current year, the Contract shall terminate automatically as of the last day for which funds were appropriated without the City providing written notice to the Contractor prior to the date of termination. The City shall not consider termination of the Contract pursuant to this section default. Upon such termination, the City shall be released from any obligation to make future payments and shall not be liable for cancellation or termination charges.

Z. **LICENSES AND PERMITS:** Contractors will be responsible for all licenses and permits, if required. Any person, firm, or corporation responding to the City's procurement which is required to have a current and valid City of Winchester business license and, in fact, does not, will not be considered a "responsive bidder" as such term is defined by the Code of Virginia §2.2-4301, as amended. Any bid received from such an entity may be rejected, at the City's sole option, for that reason alone. In addition, the successful bidder or offeror will be required to produce affirmative evidence, satisfactory to the Purchasing Agent, or designee that it has such a license, or is not required to have such a license, prior to approval and execution of any contract to perform the work herein described.

AZ **TERMINATION:**

a. Termination for Convenience: The City of Winchester may terminate a contract, in whole or in part, whenever the City OF Winchester determines that such termination is in the best interest of the City of Winchester, without showing cause, upon giving ten (10) days written notice to the vendor.
b. Termination for Default: When the vendor has not performed or has unsatisfactorily performed the contract, the City of Winchester may terminate the contract for default. Upon termination for default, payment may be withheld at the discretion of the City of Winchester. The Vendor will be paid for work satisfactorily performed prior to termination.

BZ **HOLD HARMLESS:** Bids/Proposal shall provide that during the term of the contract, including warranty period, for the successful bidder/offeror indemnifying, defending, and holding harmless the City, its officers, employees, agent and representatives thereof from all suits, actions, claims of any kind (including claims for attorney's fees) brought on account of any personal injuries, damages, or violation of rights sustained by any person or property in consequence of any neglect in safeguarding contract work, or on account of any act or omission by the contractor or his employees, or from any claims or amounts arising from violation of any law, bylaw, ordinance, regulation or decree. The vendor agrees that this clause shall include claims involving infringement of patent or copyrights.

CZ**.** **CONFIDENTIALITY OF PERSONALLY IDENTIFIABLE INFORMATION:** The contractor assures that information and data obtained as to personal facts and circumstances related to patients or clients will be collected and held confidential, during and following the term of this agreement, and will not be divulged without the individual's and the agency's written consent and only in accordance with federal law or the Code of Virginia. Contractors who utilize, access, or store personally identifiably information as part of the performance of a contract are required to safeguard this information and immediately notify the agency of any breach or suspected breach in the security of such information. Contractors shall allow the City to both participate in the investigation of incidents and exercise control over decisions regarding external reporting. Contractors and their employees working on this project may be required to sign a confidentiality statement.

DZ**.** **BID PRICE CURRENCY:** Prices are to be stated in US dollars unless otherwise specified in the solicitation.

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the Controlling Law.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly By

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
a practice division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

AMERICAN COUNCIL OF ENGINEERING COMPANIES

AMERICAN SOCIETY OF CIVIL ENGINEERS

This document has been approved and endorsed by

The Associated General Contractors of America

Construction Specifications Institute

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.
00700 - 1

Copyright ©2002

National Society of Professional Engineers
1420 King Street, Alexandria, VA 22314

American Council of Engineering Companies
1015 15th Street, N.W., Washington, DC 20005

American Society of Civil Engineers
1801 Alexander Bell Drive, Reston, VA 20191-4400

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor Nos. C-520 or C-525 (2002 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the EJCDC Construction Documents, General and Instructions (No. C-001) (2002 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (No. C-800) (2002 Edition).

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.
00700 - 2

TABLE OF CONTENTS

Page

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY 6
1.01 *Defined Terms* 6
1.02 *Terminology* 8
ARTICLE 2 - PRELIMINARY MATTERS 9
2.01 *Delivery of Bonds and Evidence of Insurance* 9
2.02 *Copies of Documents* 9
2.03 *Commencement of Contract Times; Notice to Proceed* 10
2.04 *Starting the Work* 10
2.05 *Before Starting Construction* 10
2.06 *Preconstruction Conference* 10
2.07 *Initial Acceptance of Schedules* 10
ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE 10
3.01 *Intent* 10
3.02 *Reference Standards* 11
3.03 *Reporting and Resolving Discrepancies* 11
3.04 *Amending and Supplementing Contract Documents* 11
3.05 *Reuse of Documents* 12
3.06 *Electronic Data* 12
ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS 12
4.01 *Availability of Lands* 12
4.02 *Subsurface and Physical Conditions* 12
4.03 *Differing Subsurface or Physical Conditions* 13
4.04 *Underground Facilities* 14
4.05 *Reference Points* 14
4.06 *Hazardous Environmental Condition at Site* 14
ARTICLE 5 - BONDS AND INSURANCE 16
5.01 *Performance, Payment, and Other Bonds* 16
5.02 *Licensed Sureties and Insurers* 16
5.03 *Certificates of Insurance* 16
5.04 *Contractor's Liability Insurance* 16
5.05 *Owner's Liability Insurance* 17
5.06 *Property Insurance* 17
5.07 *Waiver of Rights* 18
5.08 *Receipt and Application of Insurance Proceeds* 19
5.09 *Acceptance of Bonds and Insurance; Option to Replace* 19
5.10 *Partial Utilization, Acknowledgment of Property Insurer* 19
ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES 19
6.01 *Supervision and Superintendence* 19
6.02 *Labor; Working Hours* 20
6.03 *Services, Materials, and Equipment* 20
6.04 *Progress Schedule* 20
6.05 *Substitutes and "Or-Equals"* 20
6.06 *Concerning Subcontractors, Suppliers, and Others* 22
6.07 *Patent Fees and Royalties* 23
6.08 *Permits* 23
6.09 *Laws and Regulations* 23
6.10 *Taxes* 23

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

6.11 *Use of Site and Other Areas* ... 23
6.12 *Record Documents* ... 24
6.13 *Safety and Protection* ... 24
6.14 *Safety Representative* ... 25
6.15 *Hazard Communication Programs* ... 25
6.16 *Emergencies* ... 25
6.17 *Shop Drawings and Samples* ... 25
6.18 *Continuing the Work* ... 26
6.19 *Contractor's General Warranty and Guarantee* ... 26
6.20 *Indemnification* ... 27
6.21 *Delegation of Professional Design Services* ... 27
ARTICLE 7 - OTHER WORK AT THE SITE ... 28
7.01 *Related Work at Site* ... 28
7.02 *Coordination* ... 28
7.03 *Legal Relationships* ... 28
ARTICLE 8 - OWNER'S RESPONSIBILITIES ... 29
8.01 *Communications to Contractor* ... 29
8.02 *Replacement of Engineer* ... 29
8.03 *Furnish Data* ... 29
8.04 *Pay When Due* ... 29
8.05 *Lands and Easements; Reports and Tests* ... 29
8.06 *Insurance* ... 29
8.07 *Change Orders* ... 29
8.08 *Inspections, Tests, and Approvals* ... 29
8.09 *Limitations on Owner's Responsibilities* ... 29
8.10 *Undisclosed Hazardous Environmental Condition* ... 29
8.11 *Evidence of Financial Arrangements* ... 29
ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION ... 29
9.01 *Owner's Representative* ... 29
9.02 *Visits to Site* ... 29
9.03 *Project Representative* ... 30
9.04 *Authorized Variations in Work* ... 30
9.05 *Rejecting Defective Work* ... 30
9.06 *Shop Drawings, Change Orders and Payments* ... 30
9.07 *Determinations for Unit Price Work* ... 30
9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work* ... 30
9.09 *Limitations on Engineer's Authority and Responsibilities* ... 31
ARTICLE 10 - CHANGES IN THE WORK; CLAIMS ... 31
10.01 *Authorized Changes in the Work* ... 31
10.02 *Unauthorized Changes in the Work* ... 31
10.03 *Execution of Change Orders* ... 31
10.04 *Notification to Surety* ... 32
10.05 *Claims* ... 32
ARTICLE 11 - COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK ... 32
11.01 *Cost of the Work* ... 32
11.02 *Allowances* ... 34
11.03 *Unit Price Work* ... 35
ARTICLE 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES ... 35
12.01 *Change of Contract Price* ... 35
12.02 *Change of Contract Times* ... 36
12.03 *Delays* ... 36
ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK ... 36
13.01 *Notice of Defects* ... 36
13.02 *Access to Work* ... 36
13.03 *Tests and Inspections* ... 37
13.04 *Uncovering Work* ... 37

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

13.05 *Owner May Stop the Work* 37
13.06 *Correction or Removal of Defective Work* 37
13.07 *Correction Period* 38
13.08 *Acceptance of Defective Work* 38
13.09 *Owner May Correct Defective Work* 38
ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION 39
14.01 *Schedule of Values* 39
14.02 *Progress Payments* 39
14.03 *Contractor's Warranty of Title* 41
14.04 *Substantial Completion* 41
14.05 *Partial Utilization* 41
14.06 *Final Inspection* 42
14.07 *Final Payment* 42
14.08 *Final Completion Delayed* 43
14.09 *Waiver of Claims* 43
ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION 43
15.01 *Owner May Suspend Work* 43
15.02 *Owner May Terminate for Cause* 43
15.03 *Owner May Terminate For Convenience* 44
15.04 *Contractor May Stop Work or Terminate* 44
ARTICLE 16 - DISPUTE RESOLUTION 45
16.01 *Methods and Procedures* 45
ARTICLE 17 - MISCELLANEOUS 45
17.01 *Giving Notice* 45
17.02 *Computation of Times* 45
17.03 *Cumulative Remedies* 45
17.04 *Survival of Obligations* 45
17.05 *Controlling Law* 46
17.06 *Headings* 46

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*--Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*--The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

3. *Application for Payment*--The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Asbestos*--Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

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

6. *Bidder*--The individual or entity who submits a Bid directly to Owner.

7. *Bidding Documents*--The Bidding Requirements and the proposed Contract Documents (including all Addenda).

8. *Bidding Requirements*--The Advertisement or Invitation to Bid, Instructions to Bidders, bid security of acceptable form, if any, and the Bid Form with any supplements.

9. *Change Order*--A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim*--A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*--The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*-- Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor's submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

13. *Contract Price*--The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*--The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any, (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.

15. *Contractor*--The individual or entity with whom Owner has entered into the Agreement.

16. *Cost of the Work*--See Paragraph 11.01.A for definition.

17. *Drawings*--That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

18. *Effective Date of the Agreement*--The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

19. *Engineer*--The individual or entity named as such in the Agreement.

20. *Field Order*--A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

21. *General Requirements*--Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

22. *Hazardous Environmental Condition*--The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.

23. *Hazardous Waste*--The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

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

25. *Liens*--Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

26. *Milestone*--A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*--The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.

28. *Notice to Proceed*--A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.

29. *Owner*--The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

30. *PCBs*--Polychlorinated biphenyls.

31. *Petroleum*--Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

32. *Progress Schedule*--A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

33. *Project*--The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

34. *Project Manual*--The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

35. *Radioactive Material*--Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

36. *Related Entity* -- An officer, director, partner, employee, agent, consultant, or subcontractor.

37. *Resident Project Representative*--The authorized representative of Engineer who may be assigned to the Site or any part thereof.

38. *Samples*--Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

39. *Schedule of Submittals*--A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.

40. *Schedule of Values*--A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

41. *Shop Drawings*--All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

42. *Site*--Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

43. *Specifications*--That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.

44. *Subcontractor*--An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

45. *Substantial Completion*--The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

46. *Successful Bidder*--The Bidder submitting a responsive Bid to whom Owner makes an award.

47. *Supplementary Conditions*--That part of the Contract Documents which amends or supplements these General Conditions.

48. *Supplier*--A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or any Subcontractor.

49. *Underground Facilities*--All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

50. *Unit Price Work*--Work to be paid for on the basis of unit prices.

51. *Work*--The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

52. *Work Change Directive*--A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 *Terminology*

A. The following words or terms are not defined but, when used in the Bidding Requirements or Contract Documents, have the following meaning.

B. *Intent of Certain Terms or Adjectives*

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered", "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable,"

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

"proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action or determination will be solely to evaluate, in general, the Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day*

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents, or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents, or

c. has been damaged prior to Engineer's - recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide*

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, "provide" is implied.

F. Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 - PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

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

2.05 *Before Starting Construction*

A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review**:**

1. a preliminary Progress Schedule; indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2. a preliminary Schedule of Submittals; and

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

2.06 *Preconstruction Conference*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.07 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to Owner.

C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

A. Standards, Specifications, Codes, Laws, and Regulations.

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, or Engineer, or any of, their Related Entities, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. Reporting Discrepancies

1. *Contractor's Review of Contract Documents Before Starting Work*: Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

2. *Contractor's Review of Contract Documents During Performance of Work*: If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor knew or reasonably should have known thereof.

B. Resolving Discrepancies

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

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

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

A. 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 either a Change Order or a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. A Field Order;

2. Engineer's approval of a Shop Drawing or Sample; (Subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier or other individual or entity performing or furnishing all of the Work under a direct or indirect contract with Contractor, shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or Engineer's consultants, including electronic media editions; or

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

2. reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaption by Engineer.

B. The prohibition of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

A. Copies of data furnished by Owner or Engineer to Contractor or Contractor to Owner or Engineer that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party..

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Supplementary Conditions identify:

1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Contract Documents; and

2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Contract Documents.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:

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

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

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

1. is of such a nature as to establish that any “technical data” on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer’s Review*: After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer’s findings and conclusions.

C. Possible Price and Times Adjustments

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor’s cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and

b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:

a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

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 Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

c. Contractor failed to give the written notice as required by Paragraph 4.03.A.

3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, Owner and Engineer, and any of their Related Entities shall not be liable to Contractor for any claims, costs, losses, or 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) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

a. reviewing and checking all such information and data,

b. locating all Underground Facilities shown or indicated in the Contract Documents,

c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction, and

d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

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

4.06 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings:* Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the Engineer in the preparation of the Contract Documents.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any.

E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered to Contractor written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.

F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06. G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 - BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.

B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or 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 Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent must be accompanied by a certified copy of the agent's authority to act.

C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

A. Contractor shall deliver to Owner, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

B. Owner shall deliver to Contractor, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

5.04 *Contractor's Liability Insurance*

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

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

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

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

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or

b. by any other person for any other reason;

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

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

B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insured (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

officers, directors, partners, employees, agents, consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include completed operations insurance;

4. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;

5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);

6. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment.

a. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;

2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, (other than caused by flood) and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;

3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

5. allow for partial utilization of the Work by Owner;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

B. Owner shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.

D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insured or additional insured (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order .

B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. The superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or received from the superintendent shall be binding on Contractor.

6.02 *Labor; Working Hours*

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

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

6.03 *Services, Materials, and Equipment*

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

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole,

3) it has a proven record of performance and availability of responsive service; and

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times, and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. Substitute Items

a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. Contractor shall submit sufficient information as provided below to allow Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and an

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented in the General Requirements and as Engineer may decide is appropriate under the circumstances.

d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

1) shall certify that the proposed substitute item will:

a) perform adequately the functions and achieve the results called for by the general design,

b) be similar in substance to that specified, and

c) be suited to the same use as that specified;

2) will state:

a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time;

b) whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and

c) whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

3) will identify:

a) all variations of the proposed substitute item from that specified , and

b) available engineering, sales, maintenance, repair, and replacement services;

4) and shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change,

B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.

D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

E. *Engineer's Cost Reimbursement*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B Whether or not Engineer approves a substitute item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

F. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

6.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued . No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity, nor

2. shall anything in the Contract Documents create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, and Engineer,, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If 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 Owner or Engineer its use is subject to patent rights or copyrights calling for the payment of any license fee or

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

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

6.11 *Use of Site and Other Areas*

A. Limitation on Use of Site and Other Areas

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

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

6.13 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or , or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

D. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

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

6.16 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the acceptable Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. Shop Drawings

a. Submit number of copies specified in the General Requirements.

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:* Contractor shall also submit Samples to Engineer for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals.

a. Submit number of Samples specified in the Specifications.

b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals , any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. Submittal Procedures

1. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:

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

b. the suitability of all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

c. all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto; and

d. shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations, that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawing's or Sample Submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. *Engineer's Review*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

2. Engineer's review and approval 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 review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its Related Entities shall be entitled to rely on representation of Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;

6. any inspection, test, or approval by others; or

7. any correction of defective Work by Owner.

6.20 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage 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 but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

B. In any and all claims against Owner or Engineer or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.

B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 - OTHER WORK AT THE SITE

7.01 *Related Work at Site*

A. Owner may perform other work related to the Project at the Site with Owner's employees, or via other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and

2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.

B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's actions or inactions.

C. Contractor shall be liable to Owner and any other contractor for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's action or inactions.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

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

8.02 *Replacement of Engineer*

A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

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

8.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

A. Owner's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by Engineer in preparing the Contract Documents.

8.06 *Insurance*

A. Owner's responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

8.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility in respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

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

8.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

A. If and to the extent Owner has agreed to furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents, Owner's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents and will not be changed without written consent of Owner and Engineer.

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

such adjustment , a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.

C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.

D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

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

A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question

B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believe that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.

C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees,

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to, the Resident Project Representative, if any, and assistants, if any.

ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

A.Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.B.

10.03 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

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

10.05 *Claims*

A. *Engineer's Decision Required*: All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.

B. *Notice:* Written notice stating the general nature of each Claim, shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of Paragraph

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

C. *Engineer's Action*: Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part,

2. approve the Claim, or

3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.

D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.

F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 - COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.01.B.

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.

4. Costs of special consultants (including but not limited to Engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

5. Supplemental costs including the following:

a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expresses, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A and 11.01.B.

C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances*

1. Contractor agrees that:

a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

b. Contractor's costs for unloading and handling on the Site, labor, installation , overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. Contingency Allowance

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect any other item of Work; and

3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times , or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

C If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

D. Owner, Engineer and the Related Entities of each of them shall not be liable to Contractor for any claims, costs, losses, or 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) sustained by Contractor on or in connection with any other project or anticipated project.

E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

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

13.03 *Tests and Inspections*

A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in said Paragraph 13.04.C; and

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, it must, if requested by Engineer, be uncovered for observation.

F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.

B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

D. If, the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

A. Promptly after receipt of notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or

2. correct such defective Work; or

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

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

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay 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) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

C. All claims, costs, losses, and damages (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) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. Applications for Payments

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

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 also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations on the Site of the executed Work as an experienced and qualified design professional and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and to any other qualifications stated in the recommendation); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

b. that there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or

d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. *Payment Becomes Due*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. *Reduction in Payment*

1. Owner may refuse to make payment of the full amount recommended by Engineer because:

a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;

b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

c. there are other items entitling Owner to a set-off against the amount recommended; or

d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor corrects to Owner's satisfaction the reasons for such action.

3. If it is subsequently determined that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1.

14.03 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.

B. Promptly after Contractor's notification, , Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will within 14 days after submission of the tentative certificate to Owner notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will within said 14 days execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to complete or correct items on the tentative list.

14.05 *Partial Utilization*

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

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor will certify to Owner and Engineer that such part of the Work is substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

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

14.07 *Final Payment*

A. Application for Payment

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.7;

b. consent of the surety, if any, to final payment;

c. a list of all Claims against Owner that Contractor believes are unsettled; and

d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner or Owner's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. *Engineer's Review of Application and Acceptance*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and , will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

(including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;

3. Contractor's disregard of the authority of Engineer; or

4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion),

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds 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) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph Owner shall not be required to obtain the lowest price for the Work performed.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B, and 15.02.C.

15.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. 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) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 - DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions, or

2. agrees with the other party to submit the Claim to another dispute resolution process, or

3. gives written notice to the other party of their intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 - MISCELLANEOUS

17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

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

17.03 *Cumulative Remedies*

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

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

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

17.05 *Controlling Law*

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

17.06 *Headings*

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

EJCDC C-700 Standard General Conditions of the Construction Contract.
Copyright © 2002 National Society of Professional Engineers for EJCDC. All rights reserved.

1. Delete subparagraph 5.06(A), 5.06(A) Sections 1-7, and subparagraph 5.06(B)

2. Delete sentence in subparagraph 5.07(A) beginning with "All such projects shall contain provisions…."

3. Delete subparagraph 5.07(B), 5.06(B) Sections 1-2, and subparagraph 5.06(C)

4. Delete Paragraph 10.05 (Claims) and replace Paragraph 10.05 (Claims) by reference with the Winchester City Code, Section 21-61 (Contractual Disputes), as amended and where the Winchester City Code does not specify in writing the Virginia Public Procurement Act (VPPA) §2.2-4363 shall apply, as amended. Under Winchester City Code 21-61(C), the Purchasing Agent will render such decision within thirty (30) days.

5. Add subparagraph 12.01(D), as follows:
"In accordance with Winchester City Code, Section 21-44, Contract Modification: A public contract may include provisions for modification of the contract during performance, but no fixed-price contract may be increased by more than twenty-five percent of the amount of the contract or ten thousand dollars ($10,000), whichever is greater, without the advance written approval of the City Council. In no event may the amount of any contract, without adequate consideration, be increased for any purpose, including, but not limited to, relief of an offeror from the consequences of an error in its bid or offer."

6. Add the following language to 14.02 (A3), as follows: "See Special Conditions, Section 4.02."

7. Delete paragraph 14.09

8. Add subparagraph 17.01 (B), as follows: "This section, or any other General Condition in conflict with Virginia Code §8.01-222 shall not supercede the Commonwealth of Virginia statutory notice provisions. Virginia Code §8.01-222 shall prevail under all circumstances.

ITB #202006 – Hope Drive Extension

SPECIAL CONDITIONS

1. **SPECIFICATIONS**

Unless otherwise described in the Contract Documents, the following specifications and standards apply to this work:

1. City of Winchester – Public Services Standards Manual
2. 2016 VDOT Road and Bridge Specifications

In the case of overlap or conflict, this order shall be used to determine the governing specification.

2. **INSURANCE REQUIREMENTS – CITY OF WINCHESTER**

2.01 Before any work at the site is started, Contractor shall deliver to Owner, with a Copy to Engineer, an executed Certificate of Insurance. The Certificate shall indicate that the required insurance is in force and state that the policies will not be materially changed or canceled without a thirty (30) day advance notice by registered mail to Owner and Engineer. The representative signing the Certificate shall furnish evidence that he is authorized to so sign as well as his address and the name and address of the agency or agencies through which the insurance was obtained. Contractor shall take out and maintain the following insurance:

2.02 Contractor's Comprehensive General Liability (bodily injury and property damage) shall be provided for the following limits:

A. Combined single limit 5,000,000 dollars each occurrence
B. Combined single limit: 5,000,000 dollars annual aggregate
C. The general liability insurance shall include the following coverage:

1. Comprehensive Form
2. Premises - Operation
3. Explosion and Collapse Hazard
4. Underground Hazards
5. Products/Completed - Operations Hazards
6. Contractual Liability Insurance
7. Broad Form Comprehensive General Liability, Property Damage, including Completed Operations
8. Independent Contractors (Contractor's Protective Liability)
9. Personal Injury (all insuring agreements), Deleting the Employee Exclusion
10. If protection is under an umbrella policy, it shall not exclude any of the above items under the basic policy.

D. City of Winchester shall be named by endorsement as Additional Insured.

2.03 Contractor's Automobile Liability (bodily injury and property damage) shall be provided for the following limits:

A. Combined single limit: 1,000,000 dollars each occurrence

B. The Automobile Liability Insurance shall include the following coverage:

1. Comprehensive Form
2. Owned
3. Hired
4. Non-Owner

2.04 Contractor's Workers Compensation Insurance as required by Federal, State, and Municipal Laws for the protection of all Contractor's employees working on or in connection with the Project, including broad form, all state and voluntary compensation coverage, and employer's liability coverage with the following limits:

A. Bodily injury by accident 1,000,000 Dollars each accident

B. Bodily injury by disease 1,000,000 Dollars policy limit

C. Bodily injury by disease 1,000,000 Dollars for each employee

2.05 All insurers shall be licensed to conduct business in the Commonwealth of Virginia and all insurance companies are required to have an A.M. Best Company financial rating of A- or better.

2.06 Contractor shall require his insurance agent to certify on the insurance certificate that the insurance coverage specified by these specifications is fully in effect, both in scope and amount. If insurance coverage is effected with more than one company, the individual certificates shall identify the items of insurance which the individual companies cover. The insurance certificates shall contain a provision that the coverage afforded under the policies will not be canceled or materially changed unless at least a thirty (30) days prior written notice has been given to the Owner.

2.07 Left Intentionally Blank

2.08 Notification and Handling of an Insurance Claim:

The general contractor on any City construction project shall be responsible for ensuring that all matters concerning the completion of an assigned project, including but not limited to handling of insurance claims by third parties arising as a result of the acts and omissions of the general contractor or his subcontractors, are handled in a professional manner. To this end, the City expects the general contractor to act responsibly with regard to prompt payment of valid insurance claims and upon notice of a claim, the general contractor shall immediately notify the Owner’s project manager, investigate and document the claim, and make a liability determination within ten (10) business days. Pending subrogation between the general contractor

and/or sub-contractor and/or any insurance carrier will not be a cause for delay in payment of a valid claim. Default of this provision may result in retainage payments being withheld and jeopardize the general contractor's future bid opportunities with the City of Winchester.

3. **WORKING HOURS - HOLIDAYS**

Work under the Contract shall not be prosecuted on Sundays, or on legal holidays. Work hours (Monday – Saturday) shall be from 7:00 a.m. until 6:00 p.m. If the Contractor wishes to prosecute any portion of the Work outside of the established work hours or on Sundays or legal holidays, he shall first obtain written permission from the Engineer. Such requests shall be submitted at least 48 hours in advance of the period proposed for such overtime work. For the purpose of this Contract, the legal holidays are identified as:

- Labor Day
- Veteran's Day
- Thanksgiving Day
- Day after Thanksgiving
- Christmas Eve
- Christmas Day
- New Year's Day)
- Martin Luther King Day
- Memorial Day
- Independence Day

4. **PROGRESS PAYMENTS**

4.01 The basis for payments shall be the actual quantity of work completed, as determined in field by the Engineer.

4.02 An amount equal to five percent (5%) of each progress payment shall be held from each payment as retainage.

5. **MISCELLANEOUS OTHER CONDITIONS**

5.01 It shall be the responsibility of the Contractor to locate utilities in the field. Contractor shall give all utility companies that may have subsurface or surface utilities in the area adequate notice at least 48 hours in advance that the Contractor is to perform work in this area.

5.02 The attention of the Contractor is drawn to the fact that the possibility exists of the Contractor encountering various water, chemical, electrical, or other lines. Contractor shall exercise extreme care before and during construction to locate and flag these items so as to avoid damage to existing lines. Should damage occur to an existing line, the Contractor shall repair the line at no cost to the Owner. Temporary support, adequate

protection and maintenance of all underground and surface utility installations and structures, drains, and other obstructions encountered in the progress of the work shall be provided by the Contractor at his own expense.

5.03 Contractor shall be responsible for the temporary removal and re-installation of structures including, but not limited, to piping, conduits, drains, that may interfere with the work. The cost of such work shall be included in the Bid for the project and shall not result in any additional cost to the Owner. It shall be the Contractor's responsibility to contact and obtain permission from various authorities having jurisdiction over such structures, prior to start of the work.

5.04 Local drainage is not to be blocked. Shoulders, ditches, and drainage facilities shall be kept clear at all times and in condition satisfactory to the Engineer.

5.05 Adequate barricades, construction signs, red lanterns and guards as required shall be placed and maintained during the course of the work, and until it is safe for the pedestrian and vehicular traffic to use the area. The rules and regulations of the Local and State and Federal authorities respecting safety provisions shall be observed.

5.06 All acceptance and payment of work is subject to inspection by the City of Winchester.

5.07 The Contractor shall be responsible to establish and maintain communications with the residents and business owners of the area affected by the construction. The purpose of this communication is to notify the residents and business owners of construction activities which affect them, and to coordinate accommodations for them during construction. The Contractor shall also be required to assist businesses and residents as necessary with access into or out of their property during the construction.

5.08 Contractor and all sub-contractors shall obtain a City of Winchester Business License before beginning work.

5.09 Contractor is responsible for correcting any damages caused to private property as a result of construction, at their own expense. Contractor shall be responsible for completing a video recording (DVD) of the entire project area within the City's right-of-way before construction begins and providing a copy of the DVD to the City. This recording must be completed before the mobilization fee is paid to the contractor. This recording will be the basis for help in determining any damages to private property that may occur during construction that the contractor may be responsible for.

5.10 The Contractor shall be solely responsible for adhering to all OSHA requirements at all times during the construction of the project.

5.11 The Contractor shall be solely responsible for protecting the newly poured sidewalks from

vandalism (i.e. children writing names or words in the wet concrete) and shall be required to replace any concrete that is vandalized as directed by the City at the Contractor's expense.

5.12 The Contractor shall be responsible to construct the new facilities and/or modify existing facilities to ensure positive drainage at all locations.

5.13 High-early strength concrete shall be used on all driveway entrances.

5.14 The Contractor shall be solely responsible for ensuring that all new sidewalks and ramps constructed meet all current ADA (American's with Disabilities Act) requirements.

5.15 The Contractor shall adhere to the CSXT requirements sets forth in Appendix A through Appendix D of this bid document package. Phasing of construction and schedule delays due to CSXT construction shall not be the basis of any claim.

*****END SPECIAL CONDITIONS*****

SCOPE OF WORK – SEQUENCE OF CONSTRUCTION

I. Description.

This specification summarizes the scope of work for this project.

II. Scope of Work

In general, the project consists of the construction of the extension of Hope Drive between Valley Avenue and Pleasant Valley Road.

IV. Sequence of Construction

The Contractor shall follow the sequence of construction shown on the construction plans.

The Contractor shall prepare a written project schedule for the construction of the entire project which shall be reviewed and approved by the City before construction begins. This schedule shall delineate the number of work crews and the work each will be completing.

V. Measurement and Payment.

There is no separate payment for this section.

CITY OF WINCHESTER
TECHNICAL SPECIFICATION
SURVEYING

I. Description.

This work shall consist of performing the necessary field surveying and construction staking to complete the work for this project.

II. Procedures

A. The Contractor shall be responsible for any surveying and construction staking necessary to complete the project.
B. The Contractor shall be responsible for field verifying the elevations of all sanitary sewer and storm structures and manholes included within this project.
C. The Contractor shall be responsible for locating the tree monuments located in the existing curb line and re-installing them in the same locations.

III. Measurement and Payment.

"Construction Surveying" will be measured and paid for as a lump sum. Payment will be made under:

Pay Item	Pay Unit
Construction Surveying	Lump Sum

CITY OF WINCHESTER
TECHNICAL SPECIFICATION
AS-BUILT DRAWINGS

May 2020

I. Description.

This work shall consist of preparing and providing as-built drawings for all utility and finish work completed on the project.

II. Procedures

1) As-built drawings shall be prepared in accordance with the latest edition of the City's Public Services Standard Manual, Chapter VIII, As-Built Drawings.
2) The Contractor shall provide to the Owner the following:
   a) One hard-copy set of 24x36 drawings
   b) Digital files of the as-builts, in both AutoCAD (*.dwg or *.dxf) and PDF formats

III. Measurement and Payment.

"As-Built Drawings" will be measured and paid for as a lump sum for the project and shall include all necessary materials and work to develop and submit a complete set of as-built drawings, per the City's standards.

Payment will be made under:

Pay Item	Pay Unit
As-Built Drawings	Lump Sum

CITY OF WINCHESTER
TECHNICAL SPECIFICATION
DEMOLITION AND REMOVAL

May 2020

I. Description.

This work shall consist of demolition/removal and disposal of existing concrete curb & gutter, concrete sidewalk, asphalt roadways, and other items.

II. Procedures

Demolition of concrete curb & gutter, sidewalks and driveway entrances, and asphalt roadways: existing concrete or asphalt shall be saw cut (if necessary), removed, and properly disposed of. When necessary existing pipes and structures shall be removed and properly disposed of.

III. Measurement and Payment.

"Demolition of Existing Asphalt or Concrete, Includes Disposal" shall be measured and paid for per square yard and shall include saw cutting (if necessary), demolition, removal and disposal. The depth of the materials removed may vary, but must be sufficient to complete the installation of all new items.

Payment will be made under:

Pay Item	Pay Unit
Demolition of Existing Asphalt or Concrete, Includes Disposal	Square Yard

CITY OF WINCHESTER
TECHNICAL SPECIFICATION
EROSION AND SEDIMENT CONTROL

I. Description.

This work shall consist of implementing and maintaining all necessary erosion and sediment control measures to comply with all applicable laws and regulations.

II. Procedures

A. Permit: The Contractor shall prepare the Stormwater Pollution Prevention Plan (SWPPP) for the project and obtain the required VSMP General Permit for Stormwater Discharges from Construction Activities from the City of Winchester before commencing construction. The contractor shall provide the City with proof of coverage under the VSMP prior to starting construction.

B. General: All materials and erosion control measures shall be in accordance with the Virginia Erosion and Sediment Control Handbook (VESCH), and all revisions and addenda. Methods used on site shall include, but shall not be limited to; VESCH, Chapter 3.

C. Performance Requirements: The erosion control measures shall be installed such that the erosion of disturbed ground and the siltation of storm drain pipes and inlets will be prevented.

D. Regulatory Requirements: All phases of the construction work shall comply with or exceed the minimum state requirements for controlling erosion and sedimentation from "land disturbing activities" as outlined in the "Virginia Erosion and Sediment Control Handbook" (VESCH), and all revisions and addenda thereto.

E. All erosion control facilities shall be inspected by the contractor weekly and after each significant rainfall. Inspection shall be performed daily during periods of prolonged precipitation. Any required repairs shall be made immediately. The contractor shall be required to install all measures necessary to be in compliance with the permit at all times during the project, as directed by the County.

III. Measurement and Payment.

"Erosion and Sediment Control" shall be paid for as a lump sum for the project and shall include all necessary materials and erosion control measures to maintain compliance with the SWPPP obtained for this project by the Contractor. Price shall also include the cost necessary to obtain the SWPPP permit from the City.

Payment will be made under:

Pay Item	Pay Unit
Erosion and Sediment Control	Lump Sum

ROCK EXCAVATION

I. Description.

This work shall consist of excavation of solid rock required to complete any work on the project. No blasting shall be allowed.

II. Measurement and Payment.

"Rock Excavation" will be measured and paid for at the contract unit price per cubic yard of rock removed. This price shall include excavation and disposal of material.

Payment will be made under:

Pay Item	Pay Unit
Rock Excavation	Cubic Yard

CITY OF WINCHESTER
TECHNICAL SPECIFICATION
DISPOSAL OF MATERIALS

I. Description.

This work shall consist of properly disposing of all excess and unsuitable materials from the project including, but not limited to: concrete, asphalt, bricks, soil/gravel, rock, existing pipes, existing manholes, signs, posts, etc.

II. Procedures

A. Disposal of all materials shall comply with all applicable federal, state, and local regulations and compliance shall be the sole responsibility of the Contractor.
B. Prior to commencing work, the Contractor shall submit to the City for approval, a written plan detailing how and where all materials shall be disposed of from the project.
C. The Contractor shall provide the City with copies of written agreements from private landowners and/or written approval from landfill operators accepting disposal of the materials from the project.
D. For disposal of materials on private property, the written disposal plan shall include the following:
   1. the location and approximate boundaries of the disposal area;
   2. procedures to minimize erosion and siltation;
   3. provision of environmentally compatible screening;
   4. restoration plan;
   5. cover vegetation;
   6. other use of the disposal site;
   7. the drainage pattern on and away from the area of land affected, including the directional flow of water and a certification with appropriate calculations that verify all receiving channels are in compliance with Minimum Standard 19 of the Virginia Erosion and Sediment Control Regulations;
   8. location of haul roads and stabilized construction entrances if construction equipment will enter a paved roadway;
   9. constructed or natural waterways used for discharge;
   10. a sequence and schedule to achieve the approved plan and;
   11. the total drainage area for temporary sediment traps and basins shall be shown. Sediment traps are required if the runoff from a watershed area of less than three acres flows across a disturbed area. Sediment basins are required if the runoff from a watershed area of three acres or more flows across a disturbed area. The Contractor shall certify that the sediment trap or basin design is in compliance with VDOT Standards and Specifications, all local, state, and federal laws. Once a sediment trap or basin is constructed, the dam and all outfall areas shall be immediately stabilized.
E. Upon completion of the use of private property as an approved disposal area, the Contractor shall furnish the City a release signed by the property owner indicating that the property has been satisfactorily restored.

III. Measurement and Payment.

There shall be no separate payment for this work and the costs associated with this work shall be included in other pay items.

MAINTENANCE OF TRAFFIC

I. Description.

This work shall consist of maintaining and protecting traffic (vehicular and pedestrian) through areas of construction, maintaining public and private entrances, constructing and obliterating detours, and protecting the traveling public (both vehicles and pedestrians) within the limits of the project and over detours.

II. Procedures

Traffic shall be maintained and protected in accordance with the requirements of Section 105.14 of the VDOT Specifications. Work shall be scheduled and performed so as to provide minimum interference with and maximum protection for traffic. The Contractor's personnel, equipment, machinery, tools, and supplies shall be kept outside the clear zone and clear of active traffic lanes except as necessary for prosecuting active work. Stabilized construction entrances shall be used in construction areas where there is a potential for construction vehicles to track material from the construction site onto a paved surface. Material that is spilled or tracked onto the traveled pavement during prosecution of the work shall be promptly removed.

The Contractor shall maintain the traffic control devices, which shall include, but not be limited to, repositioning of displaced devices including traffic barrier service, replacement due to inadequate structural integrity including traffic barrier service, replacement due to loss of reflectivity, repair of defaced sheeting and legend, replacement of broken supports, repositioning of leaning signs so they are plumb and the sign face is perpendicular to the pavement edge, cleaning of dirty devices, and replacement of stolen or vandalized devices. Barricades, barriers, and other safety devices shall be inspected at least daily, and deficiencies shall be immediately corrected. Safety and protective devices furnished by the Contractor will remain the property of the Contractor and shall be removed from the project site upon completion of the work or as directed by the City.

The procedures and devices for the maintenance of traffic shall be the same as in Section 512 of the VDOT Specifications.

The following are specific requirements for this project:

A. The traffic on all existing roadways adjacent to the project area shall be maintained throughout the duration of the project.

The Contractor shall submit a traffic control plan that shall be reviewed and approved by the City before construction commences. **The Contractor shall make immediate changes to the traffic control devices as directed by the City to maintain safety.**

I. Measurement and Payment.

Maintenance of Traffic shall be paid for as a lump sum and shall include barricades, signs, barrel, obliterating existing pavement markings and installing new (including temporary) pavement markings, flaggers, and any other items necessary to maintain traffic as per these specifications.

Pay Item	Pay Unit
Maintenance of Traffic	Lump Sum

I. Description.

This work shall consist of furnishing and installing various concrete components including, but not limited to: curb, gutter, sidewalks and entrances.

II. Materials

a) Subbase Material

1) Subbase materials shall be in conformance with VDOT Section 208, gradation size 21-A.

b) Concrete

1) Concrete shall be Portland Cement air-entrained Class A4 Low Permeability (4,000 psi) with natural sand unless otherwise approved in writing by the Department of Public Services. Additives such as anti-freeze and calcium chloride are prohibited.

c) Joint Filler

1) Joint filler shall be ½" preformed asphalt expansion joint material conforming to ASTM D994 or ASTM D1751.

d) Concrete Sealer

1) Sealer shall be Protectosil CHEM-TRETE 40 VOC by Evonik Industries or approved equal.

e) Rubber

1) Rubber sidewalk shall be KBI Flexi-Pave HD2000. Color shall be "concrete" for sections where the sidewalk is concrete and "brick red" for sections where there is brick sidewalk.

f) Detectable Warning Pavers

1) Truncated dome pavers used in all handicap accessible ramps shall be Hanover Detectable Warning Pavers, 11 ¾" x 11 ¾" x 2", Red 15 color, Tudor finish, or approved equal.

g) Brick

1) Brick sidewalks shall be constructed in the Historic District per standard details SW-2, SW-3 and SW-4. Bricks shall be Pine Hall Brick Pavers, Color – Pathway Full Range, or approved equal.

III. Procedures

a) Sidewalks and Entrances

1) After sidewalks have been removed, the contractor shall pour replacement sidewalks within 48 hours, weather permitting.
2) The contractor shall provide adequate access for abutting owners/tenants and shall keep all natural drainage unobstructed or provide equal courses effectively placed. The Contractor shall maintain access and drainage in such a manner to afford pedestrian access to houses or buildings.

3) Any drain pipe that is under the sidewalk being replaced and is damaged, broken, or clogged, shall be replaced with SDR 35 or greater PVC pipe.
4) Contractor shall provide concrete forms and pour the concrete in conformance with Section 504 of the VDOT specifications. Concrete shall not be poured until the forms have been inspected and approved by the Department of Public Services – Engineering Division.
5) Grades shall be established by the contractor. The subgrade shall be constructed to a minimum of eight inches below the finished grade of the sidewalk. All soft and unsuitable materials shall be removed and replaced with suitable materials. The subgrade shall be compacted by approved methods until a smooth, hard and dense surface is obtained.
6) Aggregate base shall be applied to a minimum of four inches thick on the subgrade, and shall be placed in conformance with Section 309 of the VDOT Specifications.
7) The concrete for all sidewalks shall have a minimum thickness of four inches, except at driveways, where the minimum thickness shall be 7 inches. The stone subgrade shall be moistened prior to the placing of concrete.
8) The depth of the sidewalk shall be as specified and shall not have a deficiency of more than one-quarter inch.
9) All concrete sidewalks shall be constructed so as to drain to the curb on a minimum slope of one-quarter inch per foot or a maximum slope of one-half inch per foot.
10) Expansion joints shall be constructed at intervals of 30 feet, except for closures, but a slab shall not be less than five feet in length. Slabs shall be separated by transverse premolded expansion joint filler for the full width of the slab, extending from the bottom of the slab to within one-quarter inch of its top surface. The slab between the expansion joints shall be divided into blocks 10 feet in length by scoring transversely. When slabs are more than seven feet in width, they shall be scored longitudinally to secure uniform blocks approximately square. Transverse and longitudinal scoring shall extend to at least one-third of the depth of the concrete slab. Scoring may be done with trowels, finishing and edging tools or by other approved means.
11) Where sidewalks are constructed adjacent to permanent structures or other rigid construction on one side and curb on the other, an expansion joint of premolded material extending along both the structure and the curb shall be placed for the full depth of the slab. A premolded expansion joint shall be placed between the sidewalk and adjacent sidewalk or curb at all intersections or crosswalks, both public and private. All premolded expansion joint filler shall be securely fastened to prevent displacement.
12) Where the sidewalk is constructed in conjunction with adjacent curb, the expansion joints in the curb and sidewalk shall coincide. Where such construction is adjacent to existing curb, the expansion joints shall, if practicable, coincide. Prior to placing concrete around any permanent structure, premolded expansion joint material shall be placed around such structure for the full depth of the sidewalk.
13) Where existing or proposed structures, such as light standards, poles, fire hydrants, etc., are within the limits of the sidewalk area, the concrete around such structures shall be scored in a block <u>eight</u> inches wider than the maximum dimension of the structure at the sidewalk elevation. Prior to placing the concrete around such structure, a premolded expansion joint shall be placed around the structure the full depth of the concrete.

14) Finish concrete walks and driveways as specified in Section 404.19 of the VDOT Specifications.
15) Pedestrian traffic shall not be permitted to use the sidewalk for at least three days after the placing of the concrete. Vehicles shall not be permitted on the concrete until it has been in place for at least ten days, unless high early strength concrete is used.
16) Handicap ramps shall be installed in accordance with VDOT CG-12 curb ramp Specifications. Flares of the CG-12 curb ramps will have a standard broom finish.

b) Curb and Gutters

1) The subgrade shall be constructed to the required elevation below the finished surface of the gutter in accordance with dimensions and design as shown on VDOT Standards. Remove all soft and unsuitable material and replace with subbase material, which shall be compacted to 95% density in accordance with AASHTO-T-99 and finished to a smooth surface. Moisten the subbase prior to placing the concrete.
2) Forms shall be constructed of wood or metal conforming to VDOT Section 403.03.
3) Prior to placing concrete, check the line and grade for accuracy and fasten the face forms of the curb to the gutter forms. Spade the concrete and tamp sufficiently to bring the mortar to the surface, after which finish with a magnesium float. Construction shall be in sections of uniform lengths, providing transverse joints at approximately 10-feet intervals and when the time elapsing between placements exceeds 45 minutes. No section shall be less than 6 feet in length. Separate sections by plate steel templates set perpendicular to the grade and center line of the unit specified. The templates shall be 1/8 inch in thickness and shall have a width and depth equal to the unit cross-section. Leave these templates in place until the concrete has set sufficiently to hold its shape.
4) Form expansion joints at intervals of 100 feet or less. When the curb and gutter is constructed adjacent to rigid pavements, the location and width of expansion joints shall coincide with those in the pavement, where practicable. Where stationary structures, such as catch basins and drop inlets, are within the limits of the curb and gutter, place an expansion joint between the structure and the curb and gutter. Place expansion joints at all returns.
5) Screed the face and top of curb and surface of gutter smooth and round the edges to a radius as shown on the VDOT Standards.
6) As soon as the concrete has attained sufficient set, remove the face forms of the curb. The exposed surfaces shall be screeded with a straight edge and finished with a steel trowel. Remove all trowel marks with a brush wet with clear water. Do not use mortar in finishing.
7) The finished surface of curb and gutter shall be true to line and grade with an allowable tolerance as specified in Section 316.05 of the VDOT Specifications.
8) After the concrete has set, fill the spaces on both sides of the gutter or the back side of curb to the required elevation with suitable material and compact to 95% density in layers of not more than 6-inches.
9) The Contractor is responsible for the replacement of any pavement that is damaged and/or removed due to placement of curb and gutter. All patches shall be saw cut and patched according to the latest practices used in asphalt practices used in asphalt patching and as approved by the Department of Public Utilities - Engineering Division.

c) Construction of Forms

1) Construct wood forms of sound material, and of the correct shape and dimensions, constructed tightly and of sufficient strength. Brace and tie the forms together so that the movement of men, equipment, materials or placing and vibrating the concrete will not throw them out of line or position. Forms shall be strong enough to maintain their exact shape under all imposed loads.
2) Use form ties of sufficient strength and in sufficient quantities to prevent spreading of the forms. Place ties at least 1 inch away from the finished surface of the concrete.

e) Preparation for Placing

1) Remove water from excavations before concrete is deposited. Remove hardened concrete, debris, ice and other foreign materials from the interior of the forms and from the inner surfaces of mixing and conveying equipment. Do not place on frozen ground.
2) Prior to the placing of any concrete, notify the Owner so that proper inspection may be made.

f) Delivery

1) Submit a delivery ticket indicating the date, time, ticket and load number, concrete class and design mix, quantity and location of placement. The delivery ticket shall be submitted to the Owner.

g) Placing Concrete

1) Before placing concrete, remove all construction debris, water and ice from the places to be occupied by the concrete. Give particular attention to the removal of dirt and debris from all formed construction joints.
2) Concrete, when deposited, shall have a temperature ranging between a minimum of 50 degrees Fahrenheit (F) and a maximum of 90 degrees F. When the temperature of the surrounding air is below 50 degrees or above 90 degrees F, concreting shall be done in accordance with the recommendations noted in ACI-306 and ACI-305 respectively.
3) Mix concrete in such quantities as required for immediate use and place prior to loss of slump.
4) Spade, work and vibrate concrete as it is being poured, to secure its maximum density, free from voids and completely filling the forms.

h) Removal of Forms

1) After concrete has been placed, all forms, bracing and supports shall remain undisturbed long enough to allow the concrete to reach the strength necessary to support with safety its own weight plus any live load or pressure that might be placed upon it without causing excessive settlement or deflective or any temporary or permanent damage to the structure. Prevent the breaking of edges and corners of concrete in the stripping of forms. Upon removal of formwork, immediately patch any honeycombed areas and other voids to the satisfaction of the Department of Public Utilities – Engineering Division.
2) Thoroughly clean forms before each reuse.

i) Protection of New Work

1) Protect all freshly placed concrete from mechanical injury or action of the elements until such time as the concrete is thoroughly set.

j) Preformed Joints

1) Furnish and install preformed expansion joint material at appropriate locations as described above.
2) Tool the concrete edges at expansion or contraction joints to a 1/8-inch radius.

k) Finishing

1) After screeding and floating, give concrete slabs a light steel toweling to seal the surface and remove any irregularities left by the float. Just before the concrete becomes non-plastic, the surface of the concrete shall be given a fine broom finish perpendicular to the line of traffic and so executed that the corrugations thus produced will be uniform in character and width. The broomed surface shall be free from porous spots, irregularities, depressions, and small pockets rough spots such as may be caused by accidentally disturbing particles of coarse aggregate embedded near the surface.

l) Curing

1) Curing shall be started as soon as it is possible to apply the curing medium without damaging the surface, preferably immediately upon completion of the finishing operation. At no time during the curing period shall the temperature of the concrete be permitted to drop below 40 degrees F.

m) Sealing

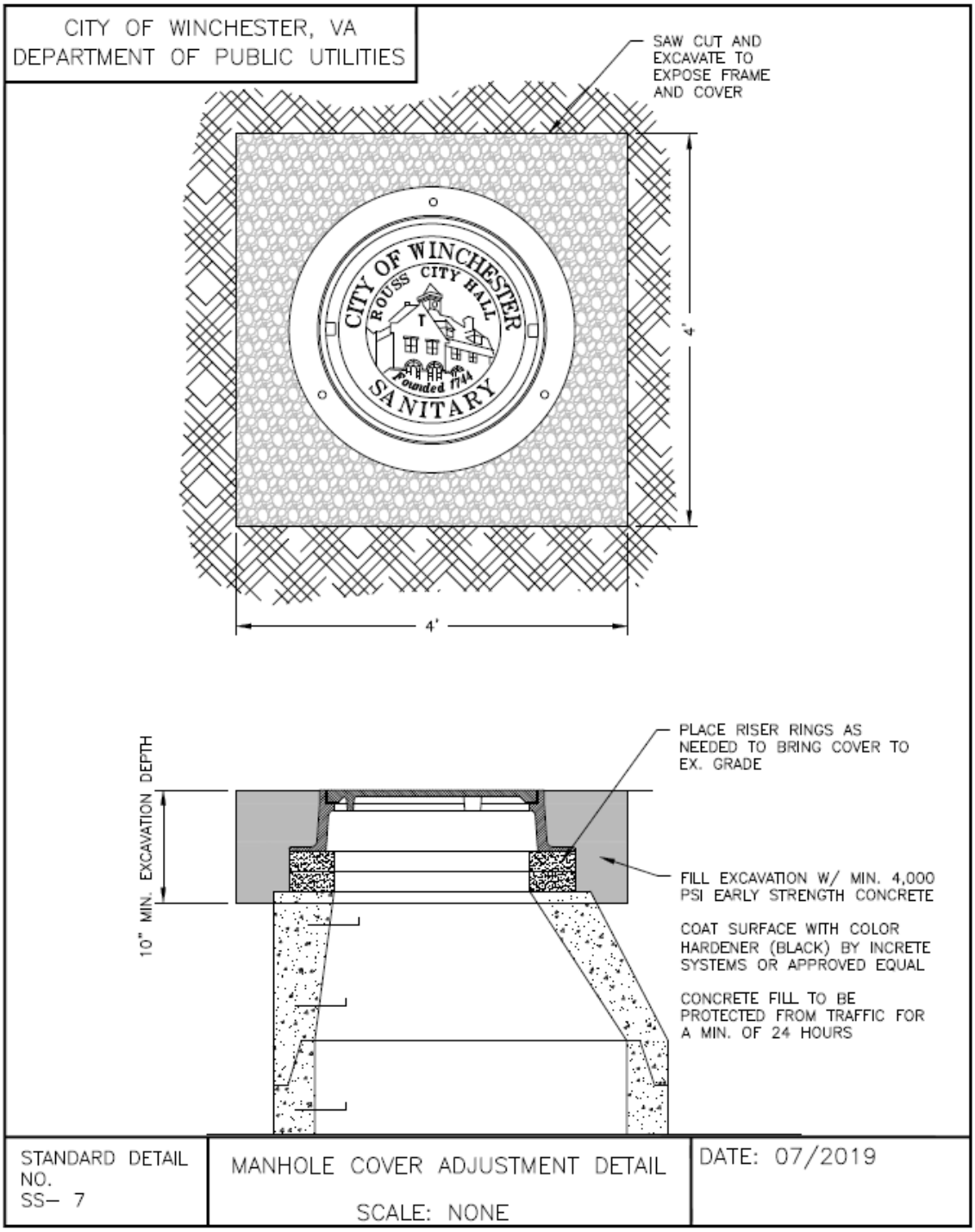
1) Concrete must be allowed to cure for a minimum of 28 days before applying sealer.
2) Contractor shall follow manufacturer's instructions for application and coverage.

n) Defective Concrete

1) Defective concrete is defined as concrete in place which does not conform to strength, shapes, alignment, appearance and/or elevations as required; areas which contain faulty surface areas and/or concrete surfaces not finished in accordance with these specifications.
2) Remove all defective concrete and replace in a manner meeting with the approval of the Department of Public Services.

o) Manhole Collars

1) Contractor shall saw-cut per the following standard detail and excavate a minimum of 10" to expose the manhole frame and cover.
2) Riser rings shall be placed as needed to bring the manhole cover to the grade of the newly paved street.
3) Excavation area shall be filled with concrete, coated with color hardener and protected from traffic for a minimum of 24 hours.


CITY OF WINCHESTER, VA
DEPARTMENT OF PUBLIC UTILITIES
SAW CUT AND EXCAVATE TO EXPOSE FRAME AND COVER
CITY OF WINCHESTER
ROUSS CITY HALL
Founded 1744
SANITARY
4'
4'
10" MIN. EXCAVATION DEPTH
PLACE RISER RINGS AS NEEDED TO BRING COVER TO EX. GRADE
FILL EXCAVATION W/ MIN. 4,000 PSI EARLY STRENGTH CONCRETE
COAT SURFACE WITH COLOR HARDENER (BLACK) BY INCRETE SYSTEMS OR APPROVED EQUAL
CONCRETE FILL TO BE PROTECTED FROM TRAFFIC FOR A MIN. OF 24 HOURS
STANDARD DETAIL NO.
SS– 7
MANHOLE COVER ADJUSTMENT DETAIL
SCALE: NONE
DATE: 07/2019

IV. Measurement and Payment.

"Standard Curb, CG-2" will be measured in linear feet and will be paid for at the contract unit price per linear foot. Measurement shall be along the face of curb. This price shall include all equipment, labor and materials for installing the curb, aggregate base course, excavating, backfilling, compacting, disposing of surplus and unsuitable materials, existing site restoration (including but not limited to asphalt and concrete) and any other item required for a complete installation.

"Combination Curb & Gutter, CG-6" will be measured in linear feet and will be paid for at the contract unit price per linear foot. Measurement shall be along the flow-line of the gutter. This price shall include all equipment, labor and materials for installing the curb & gutter, aggregate base course, excavating, backfilling, compacting, disposing of surplus and unsuitable materials, existing site restoration (including but not limited to asphalt and concrete) and any other item required for a complete installation.

"Concrete Sidewalk, 4" Thick" will be measured in square yards of finished surface, complete-in-place, and will paid for at the contract unit price per square yard. The unit price shall include all equipment, labor and materials for the installation of the sidewalk, excavation and disposal of existing material (soil, grass, or gravel), backfill, aggregate base course, existing site restoration and any other item required for a complete installation.

"Concrete Entrance, CG-9 (7" Thick)" will be measured in square yards of finished surface, complete-in-place, and will paid for at the contract unit price per square yard. The unit price shall include all equipment, labor and materials for the installation of the entrance, excavation and disposal of existing material (soil, grass, or gravel), backfill, aggregate base course, existing site restoration and any other item required for a complete installation.

"Concrete Manhole Collars" will be measured and paid for at the contract unit price for each manhole frame and cover raised and concrete collar installed. The unit price shall include all equipment, labor and materials for raising the existing collar, saw-cutting, excavation of existing manhole frame and cover and asphalt around the frame and cover, leveling rings, concrete, color hardener, protection of work, traffic control, and any other item required for a complete installation.

Payment will be made under:

Pay Item	**Pay Unit**
Standard Curb, CG-2	LF
Combination Curb & Gutter, CG-6	LF
Concrete Sidewalk, 4” Thick	SY
Concrete Entrance, CG-9 (7” Thick)	SY
Concrete Manhole Collars	EA

CITY OF WINCHESTER
TECHNICAL SPECIFICATION
BRICK MEDIANS

May 2020

I. Description.

This work shall consist of furnishing and installing brick medians on concrete bases.

II. Materials.

a) Bricks

1) Bricks shall be Pine Hall Brick Pavers (8" x 4" x 2-1/4"). Color: Pathway Full Range.

III. Procedures

1) Brick medians shall be constructed according to Standard Detail SW-3.

IV. Measurement and Payment.

"Brick Median (On 4" Concrete Base)" will be measured and paid for at the contract unit price per square yard. This price shall include all equipment, labor and materials for installing the bricks, concrete base, weepholes, sand bedding course, sand joints, metal edging (when bricks are not installed adjacent to concrete curb or sidewalk – i.e. tree wells), cutting bricks, backfilling, compacting, disposing of surplus and unsuitable materials, existing site restoration (including but not limited to asphalt and concrete) and any other item required for a complete installation.

Payment will be made under:

Pay Item	Pay Unit
Brick Median (On 4" Concrete Base)	SY

CITY OF WINCHESTER
TECHNICAL SPECIFICATION
DETECTABLE WARNING SURFACES

May 2020

I. Description.

This work shall consist of providing all labor, tools, equipment, and materials required to construct sidewalk detectable warning surfaces at all ADA ramps at crosswalks.

II. Materials.

a) Truncated Dome Pavers

1) Hanover Detectable Warning Pavers, 11 ¾ ” x 11 ¾ ” x 2”, Red 15 color, Tudor finish, or approved equal.

III. Procedures

1) Install pavers at all ADA ramps in accordance with all ADA requirements.
2) Install pavers in a 1-inch latex mortar bed, on top of a 4-inch concrete slab.

IV. Measurement and Payment.

“Detectable Warning Surfaces, CG-12” will be measured and paid for at the contract unit price per square yard of surface installed. This price shall include all equipment, labor and materials for installing the truncated dome pavers: pavers, mortar bed, and concrete base slab.

Payment will be made under:

Pay Item	Pay Unit
Detectable Warning Surfaces, CG-12	SY

CITY OF WINCHESTER
TECHNICAL SPECIFICATION
EARTHWORK

I. Description.

This work shall consist of excavation and removal of any unsuitable soil material, the furnishing and placement of imported select fill material where necessary, and any grading required for the project. The excavation and removal of existing materials and the placement of imported fill shall be minimized as much as possible.

II. Materials and Procedures

1. Imported fill material shall meet the requirements of Select Material Type I (VDOT Specifications Section 207).
2. Imported fill shall be placed and properly compacted as per VDOT Specifications Section 303 and 305.

III. Measurement and Payment.

"Regular Excavation" will be measured in cubic yards of existing unsuitable soil material removed and hauled away and will be paid for at the contract unit price per cubic yard. This price shall include excavation, grading and disposal of material. Any regular excavation shall be approved by the City before completing the work.

"Borrow Excavation (Select Fill)" will be measured in cubic yards of select material imported, placed, grading, and compacted and will be paid for at the contract unit price per cubic yard. Any select fill shall be approved by the City before completing the work.

"Grading" will be measured and paid for as a lump sum for the entire project and will include moving, placing, and compacting existing on site materials as much as possible and the final grading required for the entire project. It will also include the removal and disposal of any excess soil material for the project.

Payment will be made under:

Pay Item	Pay Unit
Regular Excavation	Cubic Yard
Borrow Excavation (Select Fill)	Cubic Yard
Grading	Lump Sum

CITY OF WINCHESTER
SPECIAL PROVISION
TOPSOIL AND SEEDING

I. Description.

This work shall consist of furnishing and placing topsoil and seeding the area with grass.

II. Materials.

a) Topsoil

1) Topsoil shall be VDOT Class B.

b) Seed

Seed will be fescue blend (see below) with less than 1% weed seeds and inert matter. (unless otherwise specified)

- 35% Shenandoah Tall II Fescue
- 25% Falcon IV Tall Fescue
- 10% Falcon III Tall Fescue
- 10% Creeping Red Fescue
- 10% Kentucky Bluegrass
- 10% Perennial Ryegrass

*Seed vendor: Trinity Turf, Inc. 2291 Pulse Hill Lane Harrisonburg, VA 22802, or approved equal.

c) Fertilizer

1) Fertilizer will be at a minimum 15-15-15 sulfur coated slow release.

III. Procedures

a) Contractor shall remove and properly dispose of all the existing loose surface gravel/rocks of the area that shall receive topsoil.
b) A minimum depth of 8-inches of topsoil shall be applied to the entire area.
c) Lime shall be applied to the topsoil (rate of 2 tons/acre).
d) Topsoil shall be prepared as per VDOT Section 603.03(b).
e) Seeding method will be that of hydroseeding. Hydromulch, seed and fertilizer are to be mixed into slurry directly applied to the loosened soil.
f) Clean, dry straw is to cover all seeded areas. All straw is to be heavily tacked using a tackifier and hydroseed slurry so that the straw does not blow away.
g) Contractor shall water the new grass until a full stand of grass reaches a height of 3-inches. Any areas where a full stand of grass does not germinate and grow shall be reseeded at no additional cost to the City.

IV. Measurement and Payment.

"Topsoil and Seeding" will be measured and paid for at the contract unit price per square yard of topsoil placed, prepared, and seeded. This price shall include all equipment, labor and materials for preparing

the area to receive topsoil, placing the topsoil, lime, hydromulch, seed, fertilizer, straw, watering until the grass reaches a height of 3-inches, and re-seeding if necessary.

Payment will be made under:

Pay Item	**Pay Unit**
Topsoil and Seeding	Square Yard

1) Description.

This work shall consist of supplying and planting trees, shrubs, ground covers, and bulbs at various locations in the project area. All planting shall be in accordance with the International Society of Arboriculture (ISA), *New Tree Planting* guide, and the *Specification Guidelines of the Landscape Contractors Association of MD, DC, and VA*, 5th Edition.

2) Materials.

a) Subsoil Material

1) Subsoil to be used in tree planting areas shall comply in all respects to the following requirements: the soil shall have a defined granular or blocky structure and shall be reasonably free from non-soil material, brick and other building materials and wastes, hydrocarbons, plant matter, roots of perennial weeds and any other foreign matter or material or substance that would render the subsoil unsuitable for use.

b) Topsoil Material

1) Topsoil shall be a loam, sandy loam, clay loam, silt loam, sandy clay loam, or loamy sand. Other soils may be used if approved by the city arborist or soil scientist. Regardless, topsoil shall fertile, friable, natural topsoil without admixture of subsoil material, obtained from a well-drained arable site, reasonably free from clay, lumps, coarse sands, stones, plants, roots, sticks, and other foreign materials, with acidity range of between pH 5.5 to 6.0 and be typical of the area.
2) Identify source location of topsoil proposed for use on the project.
3) Provide topsoil free of substances harmful to the plants which will be grown in the soil.
4) Minimum Organic Matter content shall be 5%.
5) Soil Analysis: for each planting soil, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; estimated nitrogen release, nitrate nitrogen, Phosphorus, Potassium, Magnesium, calcium, buffer pH, hydrogen and % base saturation and mineral and plant-nutrient content of the soil.
6) Soil-testing laboratory to provide recommendation for soil amendments to improve soil's ability to support growth of proposed plants.

a) Trees

1) All trees to be single trunk, ball and burlap stock with a minimum caliper of two inches or as noted on the drawings.
2) Trees shall meet the American Standard for Nursery Stock (ANSI Z60.1).
3) All plant material must be approved by Project Landscape Architect on site prior to installation in final planting location.
4) City reserves the right to adjust planting layout prior to installation.

b) Shrubs, Ground Covers, and Bulbs

1) General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by

transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

2) Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.
3) Labeling: Label each plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant as shown on Drawings.

c) Mulch

1) Mulch shall be double shredded hardwood bark and be naturally brown in color without coloring or dyes.

c) Extended Watering Devices

1) All extended watering devices shall be 20 Gallon Treegator® or approved equal.

2) Procedures

a) Excavation

1) To facilitate healthy growth of the trees and provide stable bedding, each location which will receive a new tree shall be excavated to a depth of four feet from the top of the existing surface. The length and width of the excavation shall be to the full extent of each tree planting area as defined by either stone clad walls or poured-in-place concrete curbs.
2) All material excavated from the tree well shall be hauled away and legally disposed of.
3) Any rock or concrete encountered shall be removed by mechanical means.

b) Subsoil Replacement

1) Subsoil meeting the above specifications shall be placed in the tree planting area following excavation.
2) The subsoil shall be settled by careful tamping, in order to support the new tree planting without allowing the tree to settle in place. Water thoroughly after compaction.
3) The top of the subsoil shall coincide with the bottom of the tree root ball to achieve the correct depth when installation is complete.
4) Shrub root balls may be placed into planting soil without subsoil support.

c) Tree Placement

1) Remove all non-degradable materials from the tree and the root ball.
2) Fold down or pull back string, burlap, and/or wire basket from the top 1/3 of the root ball.
3) If the main order root is deeper than 1”-2” in the root ball, remove soil from the top of the root ball until the main order root is 1” deep.
4) Set root ball level 2” above grade; finished grade being 4” below the top of coping on seat-walls, or 2” below top of curb in cast of place concrete curb around tree planting pits.

d) Topsoil Placement

1) Topsoil meeting the above specifications shall be placed around the tree root ball.
2) The topsoil shall be settled by watering and brought to finished grade level.

e) Shrub Placement

1) Shrubs shall be planted in Planting Soil- base of hole shall be tamped to provide a stable and firm base for the root ball but no subsoil is required under shrubs.
2) Fold down or pull back string, burlap, and/or wire basket from the top 1/3 of the root ball.
3) Set root ball level 2" above grade; finished grade being 4" below the top of coping on seat-walls, or 2" below top of curb in cast of place concrete curb around planting pits.
4) Refer to Shrub Planting Detail for further information.

f) Groundcover Placement

1) Groundcover shall be planted in Planting Soil- base of hole shall be tamped to provide a stable and firm base for the root ball but no subsoil is required under groundcover.
2) Firm planting soil around root ball by watering, and bring to finished grade.
3) Refer to Groundcover Planting Detail for further information.

g) Bulb Placement

Bulbs shall be planted in Planting Soil- Refer to Shrub Planting Detail for further information.

h) Mulching

1) Mulch 2" deep shall be placed on topsoil, keeping a 3" circle of bare soil around the trunk of the tree or other planting.

i) Extended Watering Devices and Watering

1) Contractor shall furnish and install two (2), 20-gallon Treegator's on each tree.
2) At the end of the first year maintenance period, contractor shall remove the watering devices and deliver them to City Yards for the City's use in the future.
3) Watering shall occur at intervals directed by the City and may vary depending on weather conditions.
4) The City will allow the contractor to obtain water from the fire hydrant at City Yards to be used for the tree watering on this project at no additional cost.

j) Sidewalks and Adjacent Property

1) Any damage to the existing sidewalks or property adjacent to the tree wells that occurs during the installation of the trees shall be repaired immediately by the Contractor at the Contactor's sole cost.

k) Cleanup

1) The Contractor shall promptly cleanup the sidewalk and street area following the tree planting. The sidewalk area shall be washed down with water at the conclusion of the cleanup.

l) Maintenance

1) Each new plant shall be watered and weeded for a period of one year from the date the last plant is installed. Weeding for each plant shall occur at a minimum interval of at least once per month.

m) Warranty

1) All plants shall be fully warranted for a period thru the spring growing season of 2021. Any plant that does not survive shall be replaced with the same species and planted according to these specifications during the next available planting season, as determined by the City Arborist or Project Landscape Architect.
2) Any plant showing 20% or more of its volume as dead or dying shall be removed and replaced as per the warranty. The City Arborist shall have final determination of the status of a plant at the end of the warranty period.
3) Any tree replaced within two months of the end of the warranty period shall be replaced with a tree of the same species but of a caliper which is consistent with the original caliper plus one year's growth.
4) All replacement plants shall be warranted for one year from the replacement date.
5) Warranty shall not include damage or loss of trees caused by fires, floods, freezing rains, lightning storms, or winds over 75 miles per hour, winter kill caused by extreme cold and severe winter conditions not typical of planting areas; acts of vandalism, traffic accidents, or negligence on the part of the Owner. Any replacement attributed to these causes must be in addition to the contract amount.

n) Rock Excavation

1) Any rock encountered in the tree wells that cannot be removed by hand shall be removed by mechanical means and disposed of properly. No blasting shall be allowed.

3) Measurement and Payment

Payment will be made under:

"Trees" will be measured by each living tree in a healthy growing condition and will be paid for at the contract unit price per each. This price shall include furnishing and delivering trees and incidental planting materials; preparing planting pits including removing and disposing of the existing materials in each tree location to a depth of 4-feet, placing and compacting new subsoil, forming saucers; installing trees; staking, furnishing and installing extended watering devices and watering the trees as necessary the first year, back filling with approved topsoil mixture; pruning; applying mulch; weeding, and maintaining trees in a healthy growing condition until final acceptance.

"Aquatic Bench Plantings" will be measured by each living shrub, plant or bulb in a healthy growing condition and will be paid for at the contract unit price per each. This price shall include furnishing and delivering plants and incidental planting materials; preparing planting pits including removing and disposing of the existing materials in each plant location to a depth to allow proper planting height, installing shrubs, ground covers or bulbs; initial watering, back filling with approved topsoil mixture; pruning; applying mulch; weeding and maintaining shrubs, ground covers or bulbs in a healthy growing condition until final acceptance.

"Watering" will be paid for as a lump sum for watering all the trees through the summer of 2021.

Pay Item	**Pay Unit**
Trees (type and size)	Each
Aquatic Bench Plantings	Lump Sum
Watering	Lump Sum

END OF SECTION

SIGNAL MAST ARMS, POLES, LUMINAIRE ARMS AND SIGN SUPPORTS

I. Descriptions:

This work shall consist of furnishing and/or installing poles for mast arm type traffic signal structures (mast arm poles, with anchor bolts), mast arms, luminaire arms, pedestal poles and sign supports (with anchor base) in conformance with the plans and this provision.

II. Materials:

Unless otherwise specified, mast arm poles shall be a one piece or sectional single member, tubular form and shall be round tapered shaft, having a taper of approximately 0.14" per foot. For decorative mast arm poles, the shaft shall have 16 equally spaced Doric flutes, sharp and clear-cut throughout the entire length of the shaft. The radius of the flutes shall not exceed the thickness of the shaft. Individually rolled flutes or round poles with separate fluted sheathing will not be acceptable. The pole shafts and arms shall have a removable cap fastened by no less than 3 screws.

Poles, mast arms, luminaire arms, pedestal poles, sign supports, anchor bases and appurtenances shall be galvanized as per ASTM A123 and powder coated black after fabrication. All powder coated items shall be prepared in accordance with SSPC-SP7 prior to application of the powder coated system. All threads shall be protected from damage during the blasting process. Powder finish shall be 3-5 mil on all outside surfaces, with Tiger Drylac Durable Series 38 or approved equal. Powder bake according to manufacturer's recommendations, all galvanized parts shall be pre-baked to ensure all gasses are released from the galvanized surface before powder coating after which the top coat shall be applied. All products shall receive a final inspection before packaging. A mil thickness of 3-5 shall be verified and documented.

Mast arm poles, mast arms, pedestal poles, luminaire arms and sign supports shall be designed in accordance with the 1994 AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals* for an 80 mph wind load and shall include and conform to the following:

A removable steel pole cap and mast arm cap. If field adjusting of pole and/or mast arm length is required, the corresponding cap shall fit the pole and/or mast arm after adjustment. The Engineer will notify the Contractor on a per pole and/or mast arm basis whether length adjustment is required.

A steel "J" hook located within 5-inches of the top of the pole for wire suspension. When pole length has been field adjusted, a "J" hook shall be attached after length adjustment.

A grounding lug welded to the inside of the pole, easily accessible from the handhole. Grounding lug shall be designed to secure the grounding electrode conductor and equipment-grounding conductor by inserting the wire under a set screw type of lug.

A. Mast Arm Poles.

Mast arm poles shall conform to A 595 Grade A. Mast arm poles shall include a pole flange plate conforming to A 36 and be of adequate size to accommodate the bolt pattern and edge distance for the bolts. The pole flange plate shall be continuously welded to top, bottom and side gusset plates. Top, bottom and side gusset plates shall be continuously welded to the pole and each other. The pole flange

plate shall be parallel to the axis of the pole. The pole flange plates for poles with two arms shall be positioned 90 degrees to each other. The bolted connection between the pole flange plate and the mast arm flange plate shall be suitable for arm lengths and the corresponding loading shown herein and shall be bolted together using either a through flange bolt assembly or a threaded bolt hole assembly in the pole flange plate. The pole flange plate shall have a 2 ½" diameter wiring hole and the pole shall have a 3" diameter wiring hole centered in the assembly. The wiring holes shall be deburred and rounded or fitted with a rubber grommet. The mast arm connection bolts shall consist of A 325 high strength bolts and have a minimum diameter of 1 ¼". Nuts and washers shall conform to A 194, Grade 2 or 2H and F 436, respectively.

The base plate thickness and number and diameter of the anchor bolts for the mast arm poles shall be suitable for the arm lengths and the corresponding loading shown herein. The thickness of the base plate shall be equal to or greater than the nominal diameter of the anchor bolts. The minimum distance from the center of the anchor bolt to the edge of the base plate shall be two times the nominal diameter of the anchor bolt.

All mast arm poles shall have a minimum of six (6) anchor bolts, each having a minimum diameter of 1 ½". The anchor bolt connection to the foundation shall consist of a double-nut connection (upper nut and bottom leveling nut). All anchor bolts shall be F1554, Grade 55 S1 and be galvanized in conformance with A 153. The portion of the anchor bolt to be galvanized shall extend from the top of the anchor bolt to 4" below the top of the foundation. The upper and lower ends of anchor bolts shall be threaded and furnished with two nuts and washers conforming to A 194, Grade 2H or A 563 Grade DH and F 436, respectively, per anchor bolt. No lock nuts or split washers shall be permitted with the anchor bolts. The distance between the top of the foundation and the bottom of the leveling nut shall be 1" maximum.

Grout shall not be installed between the bottom of the base plate and top of the foundation. A vented rodent barrier shall be installed, see drawing at end of specification for details. Nut covers shall be installed at each anchor bolt location.

Mast arm poles shall be of the following types:

TYPE I shall be manufactured for single mast arms and shall be designed and fabricated (including arm attachment) to support the mast arm lengths and loadings specified herein. Type I mast arm poles will be one of two sub-types:

- Type I-A mast arm poles shall be 19'-6" in height measured from the bottom of the base plate to centerline of the pole flange plate assembly.
- Type I-B mast arm poles shall be 15'-0" in height measured from the bottom of the base plate to centerline of the pole flange plate assembly. These poles shall be used in conjunction with a modified mast arm indicated in Subsection B.

The intended sub-type for each location will be specified on the contract plans.

TYPE II shall be manufactured for dual mast arms and shall be designed and fabricated (including arm attachment) to support two arms - up to 50 feet for one arm and up to 70 feet for the second arm – for the loadings specified herein. Type II mast arm poles will be one of two sub-types:

- Type II-A mast arm poles shall be 19'-6" in height measured from the bottom of the base plate to centerline of the pole flange plate assembly.
- Type II-B mast arm poles shall be 15'-0" in height measured from the bottom of the base plate to centerline of the pole flange plate assembly. These poles shall be used in conjunction with a modified mast arm indicated in Subsection B.

The intended sub-type for each location will be specified on the contract plans.

TYPE III shall be manufactured for single mast arm with luminaire arm. Mast arm poles shall be 26'-6" in height measured from the bottom of the base plate to the bottom of the pole cap and designed and fabricated (including arm attachment) to support both mast arm and luminaire arm of the lengths and loadings specified herein. The centerline of the mast arm connection to the pole shall be located 19'-6" from the bottom of the base plate and the upper connection of the luminaire arm to the pole shall be 26'-0" from the bottom of the base plate.

TYPE IV shall be manufactured for dual mast arms with luminaire arm. Mast arm poles shall be 26'-6" in height measured from the bottom of the base plate to the bottom of the pole cap and designed and fabricated (including arm attachment) to support two mast arms of any length up to 50 feet for one arm and up to 70 feet for the second arm and a luminaire arm of the length and loadings specified herein. The centerline of the mast arm connection to the pole shall be located 19'-6" from the bottom of the base plate and the upper connection of the luminaire arm to the pole shall be 26'-0" from the bottom of the base plate.

TYPE V shall be decorative mast arms. Decorative mast arm poles shall be Union Metal Corporation Columbian Family Series, or approved equal. Mast arm poles shall be 17'-0" in height measured from the bottom of the base plate to the top of the pole and designed and fabricated (including arm attachment) to support both mast arm of the lengths and loadings specified herein. The centerline of the mast arm connection to the pole shall be located 15'-0" from the bottom of the base. The pole top shall be designed to accept a decorative top casting or a top tenon for a pole top luminaire (to be provided by Allegheny Power). These poles shall be used in conjunction with a decorative mast arm indicated in Subsection B.

TYPE VI shall be decorative dual mast arms. Decorative dual mast arm poles shall be Union Metal Corporation Columbian Family Series, or approved equal. Mast arm poles shall be 17'-0" in height measured from the bottom of the base plate to the top of the pole and designed and fabricated (including arm attachment) to support two mast arms of any length up to 50 feet for one arm and up to 70 feet for the second arm. The centerline of the mast arm connection to the pole shall be located 15'- 0" from the bottom of the base. The pole top shall be designed to accept a decorative top casting or a top tenon for a pole top luminaire (to be provided by Allegheny Power). These poles shall be used in conjunction with a decorative mast arm indicated in Subsection B.

In addition to the loads indicated in Subsection B below, poles shall be designed to support a CCTV video and associated mounting bracket attached to the side of the pole 1'-0" from the top. The pole shall be designed for installation of CCTV equipment within the full pole circumference. Loading of the CCTV equipment and bracket shall be 15 lbs. dead load and 1 sq. ft. wind load area (includes drag coefficient).

A. Mast Arms.

Mast arms shall conform to A 595 Grade A. Mast arms shall have a mast arm flange plate conforming to A 36 and shall be of the same width and height as the pole flange plate with holes to accommodate the bolted connection described herein. The mast arm flange plate shall have a 2 ½" diameter wiring hole centered in the assembly. The wiring hole shall be deburred and rounded or fitted with a rubber grommet. The amount of arm rise (or rake angle) shall not be less than required to prevent the end of the arm from deflecting below the horizontal plane after all equipment and signs are attached nor greater than required to prevent the mounting height of signal heads from exceeding 19 feet as measured from the highest point of the pavement surface to the lowest point of the signal head assembly including backplate (if specified). Modified mast arms and decorative mast arms shall have an initial rake angle and radius (monocurve) to provide an arm rise to the tangent section to meet the requirements above for deflection of signal equipment. The modified mast arms shall only be used with pole Types I-B and II-B as listed in Subsection A. The decorative mast arms shall only be used with pole Types V and VI listed in Subsection A, and shall be interchangeable with 16-flute mast arm pole shafts.

All telescopic field joints in the mast arms shall have a minimum length of 18". The telescopic field joint shall contain a minimum 5/8" diameter galvanized threaded stud with two (2) lock nuts and flat washers installed in a shop drilled ¾" diameter hole in the outboard tube and a field drilled ¾" diameter hole in the inboard tube to assure snug fit. The galvanized threaded stud shall be cut to length in the shop. The minimum size of all extension sections shall be seven (7) gauge steel.

Mast arms shall be one of seven different lengths: 30, 40, 50, 60, 65, 70 and 75 feet and shall be designed to accommodate the dead load and wind load specified below for rigid mounted signal heads and signs.

30 and 40 Foot Mast Arm Lengths

Loading concentrated 1'-0" from the end of mast arm shall be a signal with backplate having a dead load of 100 lbs. and a front area of 13 sf. Three (3) additional signal loads, applied at 8'-0" (maximum) increments from the first load to the pole attachment, shall be signals with backplates having a dead load of 60 lbs. and a front area of 8 sf. The side, bottom and ice area shall be based on a standard 12" signal head section with backplate. The wind drag coefficient, Cd, shall be 1.2.

Two (2) sign loads shall be applied as follows: The Type A sign load shall be applied 4'-0" from the end of the mast arm and shall consist of a sign having a dead load of 20 lbs. and a front area of 8 sf. The ice area for the Type A sign shall be based on the front area. The length to width ratio of the Type A sign shall be 1.25 for determining the wind drag coefficient, Cd. The Type B sign load shall be applied at midpoint between the pole attachment and the closest signal load and shall consist of a sign having a dead load of 100 lbs. and a front area of 25 sf. The side, bottom and ice area of the Type B sign shall be based on a depth as indicated in the specification for LED Internally Illuminated Signs. The length to width ratio of the Type B sign shall be 5.33 for determining the wind drag coefficient, Cd.

50, 60 and 65 Foot Mast Arm Lengths

Loading shall be the same as for the 30 and 40 foot mast arm lengths except one (1) additional 8'-0" (maximum) increment loading of 60 lbs. and a front area of 8 sf for a signal with backplate shall be applied. The wind drag coefficient, Cd, shall be 1.2.

70 and 75 Foot Mast Arm Lengths

Loading shall be the same as for the 30 and 40 foot mast arm lengths except two (2) additional 8'-0" (maximum) increment loads of 60 lbs. and a front area of 8 sf for a signal with backplate shall be applied. The wind drag coefficient, Cd, shall be 1.2.

30, 40, 50, 60, 65, 70 and 75 Foot Mast Arm Lengths

Two (2) additional concentrated loads shall be applied to the midpoint of all mast arm lengths. The first additional load shall consist of a video camera and associated mounting bracket having a dead load of 22 lbs. and a 1 sq. ft. area (includes drag coefficient). The second additional load shall consist of an emergency vehicle preemption detection unit with confirmation light and associated mounting bracket having a dead load of 15 lbs. and a 1 sq. ft. area (includes drag coefficient). The dead load and exposed wind area for these two additional loads shall be cumulative.

An appropriate horizontal offset from the centroid of the mast arm to the application of the signal and sign loads shall be considered in the design of the mast arm.

B. Luminaire Arms.

Luminaire arms shall conform to A 53 Grade B and be designed for clamp on installation on the Type III, Type IV, Type VII, and Type VIII poles. Luminaire arm design shall be in accordance with the AASHTO design requirements indicated herein. Clamps shall be provided with stainless steel or galvanized hardware with a minimum of four bolts per clamp for securing the clamps to the pole. Use of U-bolts is acceptable for attaching the luminaire arm to the pole. Clamps attaching the luminaire arm to the pole shall be designed to fit the section of pole above the mast arm without using spacers or shims for a uniform rigid installation. A 2" diameter hole shall be shop drilled in the arm clamp. A 1 3/8" diameter hole shall be field drilled in the pole. The wiring hole shall be deburred and rounded or fitted with a rubber grommet.

Luminaire arm shall be a truss type design with a nominal rise of 4'-0" measured from the centerline of the upper mounting assembly of the luminaire arm to the attachment of the luminaire to the luminaire arm. Luminaire arms for either Type III or Type IV poles shall have an arm length of 15'-0".

Luminaire arms shall be designed to accommodate a video camera with a dead load of 22 lbs. and 1 sf wind load area (drag coefficient included) concentrated 1 ft. from the end of arm. An additional load applied on the end of the arm, shall be a luminaire having a dead load of 75 lbs. and 1 sq. ft. wind load area (drag coefficient included).

C. Pedestal Poles

Pedestal poles shall conform to the requirements of Section 700 and shall be either straight tubular or decorative, as specified on the plans. Decorative pedestals shall be Union Metal 16-flute with Columbian base or approved equal.

D. Sign Supports/Anchor Bases

Sign supports shall conform to A570, Grade 50.

Square Tubular Steel Sign Supports and Square Tubular Steel Anchor bases shall be formed from 12 gauge steel. All sides of the tubes shall have 7/16 inch perforated knock-outs, at one inch centers along the entire length.

The Tubular Steel Sign Supports shall be two inch square tubes. Maximum 9 SF for single sign support or 18 SF for two sign supports of sign areas with a clearance of 7 feet, 0 inches or less from ground to bottom of sign can be installed.

Square Tubular Steel Anchor Bases shall be comprised of two telescoping tubes. The first shall be 2 ¼ inch square, 3 feet long, formed from 12 gauge steel and shall snugly fit over the sign support. The second section shall be 2 ½ inch square, 18 inch long, formed from 12 gauge steel, and shall snugly fit over the 2 ¼ inch section.

III. WORKING DRAWINGS:

The Contractor shall submit working drawings, catalog cuts of the equipment to be installed on the mast arm and mast arm pole and design calculations in conformance with Section 105 and 700.03 of the Specifications. Working drawings and design computations shall be certified by a Professional Engineer, holding a valid license to practice engineering in the Commonwealth of Virginia and have experience in the design of traffic signal structures. A total of seven (7) copies of each shall be submitted with the manufacturer's name and address clearly noted.

The working drawings shall clearly depict all pertinent information for the poles, mast arms, luminaire arms, and appurtenances of the traffic signal structure. In addition, the orientation of the anchor bolt layout with respect to the orientation of the mast arm shall be clearly shown.

IV. PROCEDURES:

Mast arm poles shall not be erected on concrete foundations until the concrete has obtained a compressive strength of at least 3,000 pounds per square inch. The concrete and reinforcing steel for the traffic signal structure foundations shall conform to Section 217 and Section 223, respectively.

A 3/8" thick anchor plate shall be installed at the bottom of the anchor bolts to maintain alignment of the anchor bolt system. The bolt circle diameter for the anchor bolt holes in the anchor plate shall be the same as the bolt circle diameter for the pole base plate. The size of the anchor bolt holes to be

drilled in the anchor plate shall be 1/16" larger than the nominal diameter of the anchor bolt. A hole equal to the size of the pole diameter measured at the base shall be cut into the center of the anchor plate. The anchor plate shall consist of a ring plate with the ring width equal to the diameter of the F436 washer of the anchor bolt size used plus 1/8".

Anchor bolts shall be installed with misalignments of less than 1:40 from vertical. After installation, firm contact shall exist between the anchor bolt nuts, washers and base plate on any anchor bolt installed in a misaligned position.

Upon installation of the leveling nuts to the specified height, the pole shall be installed and all nuts shall be tightened to a snug condition. Snug is defined as the full force of an ordinary person using an ordinary spud wrench. The nuts shall then be turned an additional 30-degrees (+ 15-degrees, -0- degrees).

The tightening criteria for high strength bolts installed in through flange bolt holes of the mast arm flange plate to pole flange plate connection shall be as follows: Bolts shall be installed in all holes of the flange connection and brought up to a snug tight condition. Snug tightening is defined as the tightness that exists when the plies are in firm contact while all loads of the arm are being released. Adequate tightness may be obtained by a few impacts of an impact wrench or full effort of a person using an ordinary spud wrench. Following this snug tightening operation, all bolts in the connection shall be tightened by half (1/2) turn (± 30-degrees).

All welding shall be performed in conformance with AWS D1.5. Weld type and size shall be designed using the 1994 AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.*

Unless otherwise specified on the plans, Mast arm poles shall be installed in accordance with these provisions and Section 700 of the Specifications.

For decorative mast arm poles and mast arms the following additional requirements apply:

Decorative mast arm poles shall include a decorative base assembly Union Metal Corporation Model Number 230, or approved equal, and shall conform to the requirements of AA-319-OF Aluminum. It shall be a two piece clamshell design with two removable doors at 180 degrees. The base shall be 40 inches in height and 25 inches in diameter at the bottom. The base halves shall be split equally and fitted to provide a hairline seam when assembled. The base halves shall be secured by stainless steel hardware with internal lugs. The base opening shall match the decorative 16-flute mast arm pole shaft. The foundation must be level to accept the base assembly.

Each mast arm pole shall be provided with a decorative pole top for mast arm poles where a pole top luminaire is not provided. This spiked shaped pole decorative pole top shall be mechanically attached to the top of the shaft to provide access for wiring signals secured by a provided J-hook wire support. Material shall conform to the requirements of AA-319.OF Aluminum.

An optional outlet frame shall be integrally welded into the pole shaft to accommodate an included 20A-125V duplex receptacle. The receptacle frame and cover shall be weatherproof to NEMA 3R standards and painted to match mast arm pole.

Manufacturer shall certify to the City that the accepted decorative mast arm pole, mast arm, and decorative shroud is or will become a stock item, readily available with replacement parts for a minimum ten year period.

An identification tag conforming to the requirements of Section 700.04(e) of the Specifications shall be permanently attached to each mast arm pole.

The Square Tubular Steel Anchor Base assembly shall be constructed by placing the 18 inch base section over the 3 foot base section so that they are flush at the top and the holes are aligned. The entire until shall be driven into the ground so that one or two rows of holes in the Square Perforated Tubular Steel Base are exposed (maximum 4 inch exposure allowed). The base shall be driven so that it remains plumb and to provide the final sign assembly with the correct orientation.

Finished length of the Tubular Steel Sign Supports shall be determined by adding the total height of the signs to 8 feet, 2 inches. The sign support shall be cut to the correct length, and cold spray galvanizing and black paint matching the powder coating shall be applied to the cut end. The signs shall be bolted to the top of the sign supports, using tamper proof bolts or drive rivets. The Square Tubular Steel Sign Supports shall be lowered 8 inches into the base, and the sign support secured to the base using two corner bolts designed for this purpose.

I. MEASUREMENT AND PAYMENT:

Mast arm poles of the types specified will be measured in units of each for the type specified and will be paid for in units of each. This price bid shall include pole, anchor bolts, anchor plate(s), field adjustment of pole lengths, base plate, pole flange plate(s), grounding lugs, hand holes and covers, terminal strips when required, pole caps, bolt covers, decorative base assemblies (where required), vented rodent barrier, fittings, rubber grommets, J-hook, identification tag, coating system, all hardware, and design and corresponding working drawings.

Mast arms will be measured in units of each for the length specified and will be paid for at the contract unit price per each. Mast arms shall include arms, field adjustment of arm lengths, arm flange plates, arm caps, fittings, field drilling of wire outlet holes and rubber grommets, coating system, all hardware, and design and corresponding working drawings.

Install City-Supplied mast arm pole will be measured in units of each for all types and will be paid for in units of each. This price shall include picking up the pole, luminaire arm (if applicable), and anchor bolts at the City Yards, located at 301 East Cork Street, transporting same to the project site, installing same at the locations designated on the plans, and field adjustment of pole lengths.

Install City-Supplied mast arm will be measured in units of each for all types and lengths and will be paid for in units of each. This price shall include picking up the mast arm and supplied hardware at the City Yards, located at 301 East Cork Street, transporting same to the project site, installing same at the locations designated on the plans, and field adjustment of arm lengths.

Luminaire arms will be measured and paid for in accordance with Section 700.05 of the Specifications. Luminaire arms shall also include field drilling of wire outlet holes and rubber grommets, coating system, all hardware, and design and corresponding working drawings.

Pedestal poles will be measured and paid for in accordance with Section 700.05 of the Specifications. Pedestal poles shall also include field drilling of wire outlet holes and rubber grommets, coating system, all hardware, and design and corresponding working drawings.

Square Perforated Tubular Steel Sign Supports will be measured and paid for at the contract unit price per each. The payment will be full compensation for the sign support, corner bolts, and painting as required, and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

Square Tubular Steel Anchor Bases will be measured and paid for at the contract unit price per LF. The payment will be full compensation for both tubes comprising the base section, all excavation, anchor bases, and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

Payment for mast arm poles and mast arms will be made under:

Pay Item	Pay Unit
Mast Arm Pole Type I – for up to 40 foot mast arm	Each
Mast Arm Pole Type I – for up to 65 foot mast arm	Each
Mast Arm Pole Type I – for up to 75 foot mast arm	Each
Mast Arm Pole Type II – for up to dual 40 foot mast arm	Each
Mast Arm Pole Type II – for up to one 50 and one 70 foot mast arm	Each
Mast Arm Pole Type III – for up to 40 foot mast arm	Each
Mast Arm Pole Type III – for up to 65 foot mast arm	Each
Mast Arm Pole Type III – for up to 75 foot mast arm	Each
Mast Arm Pole Type IV – for up to dual 40 foot mast arm	Each
Mast Arm Pole Type IV – for up to one 50 and one 70 foot mast arm	Each
Mast Arm Pole Type V – for up to 40 foot mast arm	Each
Mast Arm Pole Type V – for up to 65 foot mast arm	Each
Mast Arm Pole Type V – for up to 75 foot mast arm	Each
Mast Arm Pole Type VI – for up to dual 40 foot mast arm	Each
Mast Arm Pole Type VI – for up to one 50 and one 70 foot mast arm	Each
Mast Arm – 30 Feet	Each
Mast Arm – 40 Feet	Each
Mast Arm – 50 Feet	Each
Mast Arm – 60 Feet	Each
Mast Arm – 65 Feet	Each
Mast Arm – 70 Feet	Each
Mast Arm – 75 Feet	Each
Decorative Mast Arm – 30 Feet	Each
Decorative Mast Arm – 40 Feet	Each
Decorative Mast Arm – 50 Feet	Each
Decorative Mast Arm – 60 Feet	Each
Decorative Mast Arm – 65 Feet	Each

Decorative Mast Arm – 70 Feet	Each
Decorative Mast Arm – 75 Feet	Each
Steel Sign Supports	Each
Sign Anchor Bases	Each

EMERGENCY VEHICLE PREEMPTION EQUIPMENT

I. Description.

This work shall consist of furnishing and installing emitters and all other emergency preemption equipment in accordance with these specifications and as shown on the plans or as directed by the Engineer.

II. Equipment.

a) Emergency preemption equipment shall be optically activated providing all features and functions as the existing equipment within the City of Winchester's emergency preemption system and shall fully interface with that existing equipment. Existing equipment consists of 3M Opticom Priority Control System:

   1) Model 721 Detector (Dual-Input, Single-Output) Unit
   2) Model 575 Confirmation Light Kit
   3) Model 138 Detector Cable
   4) Model 752/754 Phase Selectors
   5) Model 757 Auxiliary Harness
   6) Model 760 Card Racks
   7) Model 792H Emitters
   8) Model 793S Emitter Switches

b) Conductor cables between the optical detectors and the phase selector(s)/system chassis shall be in accordance with the manufacturer's recommendations. Transient protection for the cables shall be in accordance with Section 703.02(d) 3b of the Specifications.

c) Mounting System - mounting assemblies for the detectors and emitters shall be fabricated from corrosion resistant materials or shall be galvanized. The detector unit and confirmation light kit must rigidly mount directly to the signal mast arm or to a light mast arm with no moving parts. Unit bracket must be able to be leveled to accommodate mast arms that are slightly off level. Bracket hardware must mount to Pelco Astro-Brac AS-3009 or approved equal.

III. Procedures.

Locations of optical detectors shown on plans and sketches provided by the City are approximate; actual locations shall be as required for proper signal reception and to avoid interference with other overhead-mounted equipment. Installation of all emergency preemption equipment shall be in accordance with the manufacturer's recommendations. Emergency preemption detector cables shall be permanently identified in accordance with Section 703.03(g) of the Specifications, except tags shall indicate preempt detector and the direction of approach. The Contractor shall provide five sets of the manufacturer's installation, operational and maintenance manuals for each piece of equipment to the Engineer.

IV. Testing.

Initial testing of the emergency preemption system shall be accomplished in the presence of the Engineer and/or designated representative. The Contractor shall contact the Engineer 48 hours in advance to arrange system testing. The City will provide an operator and vehicle equipped with an emitter for the test to determine if equipment is operating properly in regards to placing the intersection in preemption. A second test will be accomplished by the City during the thirty day intersection demonstration period to verify the logging capabilities of the equipment. Equipment failing either test shall be replaced at the Contractor's expense.

V. Measurement and Payment.

Emitters will be measured in units of each and will be paid for at the contract unit price per each. This price shall include Model 729H Emitters and Model 793S Emitter Switches, mounting bracket attachments, emitter cable, and manufacturer's installation, operational and maintenance manuals. Model 790-CS configuration software shall be included for the City's use for programming emergency vehicles installed with emitters. Work will include preparing catalog cuts of all supplied materials and all incidentals as required. The payment shall be full compensation for all materials, labor, equipment and all other incidentals necessary to furnish and install emitters. The City will make payment for the following item only upon receipt and acceptance by the City.

Emergency Preemption Detector Unit will be measured in units of each and will be paid for at the contract unit price per each. This price shall include Model 721 Detectors, Model 575 Confirmation Light Kit, mounting bracket attachments, and manufacturer's installation, operational and maintenance manuals. Work will include preparing catalog cuts of all supplied materials and all incidentals as required. The payment shall be full compensation for all materials, labor, equipment and all other incidentals necessary to complete this work. The City will make payment for the following item only upon completion of the installation and commissioning of the emergency preemption detection system and acceptance by the City.

Emergency Preemption Detector Controller Equipment will be measured in units of each and will be paid for at the contract unit price per each. This price shall include Model 753/754 Phase Selectors, Model 757 Auxiliary Harness, Model 760 Card Rack, mounting bracket attachments, and manufacturer's installation, operational and maintenance manuals. Work will include preparing catalog cuts of all supplied materials and all incidentals as required. The payment will be full compensation for all materials, labor, equipment and all other incidentals necessary to complete this work. The City will make payment for the following item only upon completion of the installation and commissioning of the emergency preemption detection system and acceptance by the City.

Emergency Preemption Detector Cable will be measured in units of linear feet and will be paid for at the contract unit price per linear foot. This price shall include Model 138 Detector Cable, and manufacturer's installation, operational and maintenance manuals. Work will include preparing catalog cuts of all supplied materials and all incidentals as required. The payment shall be full compensation for all materials, labor, equipment and all other incidentals necessary to complete this work. The City will make payment for the following item only upon completion of the installation and commissioning of the emergency preemption detection system and acceptance by the City.

Payment will be made under:

Pay Item	**Pay Unit**
Emitters	Each
Emergency Preemption Detector Unit	Each
Emergency Preemption Detector Controller Equipment	Each

CITY OF WINCHESTER
TECHNICAL SPECIFICATION
TRAFFIC SIGNAL CABINETS

I. Description.

This work shall consist of furnishing and installing NEMA TS-2 traffic signal cabinets in accordance with these specifications and as shown on the plans or as directed by the Engineer. All equipment shall meet the specifications of NEMA TS2-2003.

II. Equipment.

a) Compatible with Existing City Equipment

Traffic signal cabinets in the City have been procured from RGA Inc. (804-794-1592). The City prefers to maintain consistency between existing equipment and equipment procured under this contract. However, any cabinet that meets these specifications will be allowed, subject to catalog cut review and approval by the City. Existing equipment consists of a Siemens/Eagle TS-2 cabinet with NEMA TS 2 Type 1 controllers

b) Cabinet Enclosure

1) Base Mounted Cabinets shall be 44” Wide, by 77” Tall, by 27.5” overall depth.

2) Pole Mounted Cabinets shall be 30” Wide, by 51” Tall, by 18” overall depth

3) Completely fabricated from .125"-thick type 5052-H32. Vinyl-coated, mill-finished aluminum utilizing intermittently welded construction, subsequently weatherproofed with silicone sealant.

4) Internal attaching components include four (4) adjustable "C" mounting channels (2 per side), and two (2) slotted rails on rear wall for attaching equipment panels.

5) The door opening is single-flanged on the sides and bottom, and double-flanged on top to prevent water drops when the door is open. The opening also includes a mount for two door-operated switches.

6) Thermoconvection air ventilation system utilized with provisions for mounting fan for forced-air cooling. Exhaust outlet openings are provided under the roof over-hang.

7) All internal and external hardware utilizes non-corrosive material.

8) Adjustable 3/8"-diameter stainless steel door stop can be latched in various positions.

9) Three (3) shelves included.

10) Interior walls powder-coated white.

c) Cabinet Door

1) Provided with three-point locking mechanism.

2) ¾"-diameter stainless steel inward turning handle with provisions for padlocking.

3) Main Door lock - industrial standard pin tumbler lock with #2 key.

4) Louvered inlet with filter to prevent dirt from entering with air flow.

5) Closed-cell neoprene door seal gasket used.

6) Heavy gauge aluminum continuous hinge utilizing a non-removable 3/16"-diameter stainless steel hinge pin for door support, carriage bolted in place, for ease of door removal.

7) A 2"-deep, fabricated switch compartment is included with a standard "police" lock and a 14-gauge stainless steel continuous hinge with a 3/32"-diameter hinge pin riveted in place. Compartment is mounted flush to the

d) Base Mounted Cabinet Foundation

The maximum width and depth shall be such that the cabinet will fit entirely on the standard CF- 1 foundation. The cabinet bolt pattern shall be rectangular, with dimensions of 40 5/8 inches in width and 18 1/2 inches in depth. Anchor bolts shall be 3/4 inch in diameter and at least 16 inches in length with a 5-inch L bend.

e) Equipment Documentation

1) Complete instructions and schematics for field connections

2) Complete manuals for all associated equipment

f) Cabinet Assembly

1) Malfunction Management Unit: MMU2-16(IP) EDI Smart Monitor

2) 8 Flash Transfer Relays

3) TF5016 terminal facility

4) Base Mounted Cabinets shall have a 16 Load Switch Terminal Facility with 16 Load Switches. Pole Mounted Cabinets shall have a 12 Load Switch Terminal Facility with 12 Load Switches

5) Base Mounted Cabinets shall have 2 Flashers, Pole Mounted Cabinets shall have 1 Flasher

6) 4 Resistors, Type RE mounted on the left wall inside the cabinet

7) Communications terminal block assembly

1) 3 EDI BIU-700 Bus Interface Units

2) Detector Rack, Type 1

3) 1 SHA-1250 plug-in AC Surge Suppressor

4) Surge Suppressor for pedestrian pushbuttons

5) 1 CPS102 Cabinet Power Supply

6) 1 Solid State Bus Relay

7) EPAC31008 "D" Panel

8) Power Panel with necessary breakers, contactors, bus bars and outlets

9) Cabinet lighting is to be LED strip lighting around door opening with door open switch

10) Technician Switch mounted inside the cabinet with Auto/Flash Switch, Stop Time Switch, Control Equipment Power On/Off Switch, Controller On/Off, Stop Time and Pedestrian Detector Input Switches

11) Police Switch mounted outside the cabinet with Auto/Flash Switch, Manual Advance/ Police Push Button and Signals On/Off Switches.

12) The cabinet shall be provided with two (2) thermostatically controller (adjustable between 80 – 150 degrees Fahrenheit) ventilation fans in the top of the cabinet plenum. The fan shall be a ball bearing type fan and shall be capable of drawing a minimum of 100 cubit feet of air per minute. The fan screen shall use 1/8" size mesh screen or higher.

13) Radio frequency interference filter rated at 50 amps

14) Transient protection devices

15) 12 outlet power strip to be mounted on shelf face

g) Powder Coating

Pole Mounted Cabinets shall be galvanized as per ASTM A123 and powder coated after fabrication. The Contractor will be notified in advance (including the color of finish coat) and cabinets shall be prepared in accordance with SSPC-SP7. All threads shall be protected from damage during the blasting process. Powder finish shall be 3-5 mil on all surfaces, inside and out, with Tiger Drylac Durable Series 38 or approved equal. Powder bake according to manufacturer's recommendations, all galvanized parts shall be pre-baked to ensure all gasses are

released from the galvanized surface before powder coating after which the top coat shall be applied. All products shall receive a final inspection before packaging. A mil thickness of 3-5 shall be verified and documented.

I. Measurement and Payment.

Base Mounted Cabinet will be measured in units of each and will be paid for at the contract unit price per each. This price shall include the controller cabinet, back panels, power panels, detector panels, auxiliary panels, police panels, thermostatically controlled fan units in the cabinet with a vent, flashers, local flasher switches, radio frequency interference filters, signal switches, main switches, police hand controls, conflict monitors, flasher relay assemblies, power relays, signal control assemblies, lamp receptacles and ground fault convenience receptacles, circuit diagrams, flexible cables, grounding systems, transient protection devices, and fittings.

Pole Mounted Cabinet will be measured in units of each and will be paid for at the contract unit price per each. This price shall include the controller cabinet, back panels, power panels, detector panels, auxiliary panels, police panels, thermostatically controlled fan units in the cabinet with a vent, flashers, local flasher switches, radio frequency interference filters, signal switches, main switches, police hand controls, conflict monitors, flasher relay assemblies, power relays, signal control assemblies, lamp receptacles and ground fault convenience receptacles, circuit diagrams, flexible cables, grounding systems, transient protection devices, and fittings.

Powder Coated Pole Mounted Cabinet will be measured in units of each and will be paid for at the contract unit price per each. This price shall include all of the features of the Pole Mounted Cabinet item noted above, and powder coating.

Payment will be made under:

Pay Item	**Pay Unit**
Base Mounted Cabinet	Each
Pole Mounted Cabinet	Each
Powder Coated Pole Mounted Cabinet	Each

CITY OF WINCHESTER
TECHNICAL SPECIFICATION
TRAFFIC SIGNAL CONTROLLERS

I. Description.

This work shall consist of furnishing and installing NEMA TS-2, Type 1 traffic signal controllers in accordance with these specifications and as shown on the plans or as directed by the Engineer.

II. Equipment.

a) Compatible with Existing City Equipment

Traffic signal controllers shall include all features and functions as existing controllers in the City of Winchester's Pleasant Valley Road closed loop system and shall completely interface with the system masters and the office computers closed loop system software. When the controllers are being installed in an isolated location, or in a system utilizing spread- spectrum radio interconnect, the controllers shall contain an additional RS232C communication port. When the controllers are being installed in a system situation utilizing hardwire interconnect, the controllers shall be capable of supporting full communications with the master controller. Existing equipment consists of Eagle Signal Model EPAC M-52 controllers, Model MARC 360 master controllers and closed loop software.

b) Signal Timing

The City will furnish controller timings including up to 5 coordination plans and preemption timings to the Contractor for implementation. The Contractor shall be present for one AM, one PM, and one either Saturday or Midday peak period once the intersection is operational to view traffic conditions and fine tune timings to provide for the orderly flow of traffic.

c) Traffic Signal Controllers

Traffic signal controllers shall be Eagle Signal Model EPAC M-52, TS-2, Type 1 controllers. The controllers shall be fully compatible for spread-spectrum radio communications for operation within a closed-loop system, and shall include all radio communications modules and firmware.

d) Isolated Intersection Traffic Signal Controller

Traffic signal controllers shall be Eagle Signal Model EPAC M-52, TS-2, Type 1 controllers. The controller shall have all necessary hardware (dual port serial option) and firmware for GPS time interface.

e) Master Controller

Master controllers shall be Eagle Signal Model MARC 360 master controllers. They shall be a stand-alone unit. The latest version of the Eagle closed-loop software for download/upload via laptop computer shall be provided with each Master Controller.

f) GPS Time Reference Receiver

The GPS Time Reference Receiver shall be readily compatible with an Eagle M-52 signal Controller. This equipment shall include a GPS Antenna, 16-foot Cat 5 cable, cable connectors, and controller interface adapters for a complete and operational installation. Installation of the GPS Antenna shall be on top of the cabinet, unless otherwise directed by the Engineer. This item shall be furnished as a turn-key system.

g) Vendor

Contact RGA Inc.
1550 Standing Ridge Drive, Suite 100
Powhatan, VA 23139
Phone: (804) 794-1592
Fax: (804) 379-1016

III. Measurement and Payment.

Traffic Signal Controller will be measured in units of each and will be paid for at the contract unit price per each. This price shall include timing implementation and the traffic signal controller. The payment shall be full compensation for all materials, labor, equipment and all other incidentals necessary to complete this work.

Isolated Intersection Traffic Signal Controller will be measured in units of each and will be paid for at the contract unit price per each. This price shall include timing implementation, the traffic signal controller, GPS Time Reference Receiver, GPS antenna, cables, and cable connectors. The payment shall be full compensation for all materials, labor, equipment and all other incidentals necessary to complete this work.

Master Controller will be measured in units of each and will be paid for at the contract unit price per each. This price shall include timing implementation, the traffic signal controller, and the closed-loop software. The payment shall be full compensation for all materials, labor, equipment and all other incidentals necessary to complete this work.

Payment will be made under:

Pay Item	**Pay Unit**
Traffic Signal Controller	Each
Isolated Intersection Traffic Signal Controller	Each
Master Controller	Each

I. Description.

This work shall consist of furnishing and installing Uninterruptible Power Supply (UPS) for traffic signal control equipment and other communication devices in accordance with this special provision, the National Electrical Code, and as shown on the plans or as directed by the Engineer. UPS system shall be line interactive topology and operational at all times to provide power conditioning and battery backup for clean and regulated power to all loads at all times against sags and surges. The UPS shall protect devices against lightning, spikes, transients, line noise and power failure. The UPS shall be compatible with NEMA TS-1, TS-2, 170 and 2070 traffic signal control equipment.

II. Materials.

a) **Paint** shall conform to the requirements of Section 231 of the VDOT Specifications and shall be applied in accordance with Section 411 of the VDOT Specifications except on nonferrous materials where it shall be applied in accordance with the manufacturer's recommendations.

b) **Steel** for fabricated items shall conform to the requirements of Section 226 of the VDOT Specifications and shall be fabricated, welded and inspected in accordance with Section 407 of the VDOT Specifications.

c) **Aluminum** for fabricated items shall conform to the requirements of Section 229 of the VDOT Specifications and shall be fabricated, welded and inspected in accordance with the requirements of Section 407 of the VDOT Specifications.

d) **Electrical items** shall conform to Sections 238 and 700 of the VDOT Specifications.

e) **Concrete** shall be Class A3 conforming to the requirements of Section 217 of the VDOT Specifications.

f) **Reinforcing Steel** shall conform to the requirements of Section 223 of the Specifications.

g) **Electrical Grounding** shall be in accordance with Sections 238 and 700 of the VDOT Specifications.

III. Equipment.

a) **General:** The UPS system including the batteries shall be installed in a separate cabinet attached to the traffic signal controller cabinet, unless the plans or the Engineer requires the UPS to be installed in the traffic signal cabinet, or a separate cabinet. UPS shall be the manufacturer's standard production model. UPS shall, as a minimum, be comprised of a solid state electronic converter and inverter for output, battery bank, automatic bypass- transfer circuit, integral maintenance bypass switch and all necessary hardware and connecting wires, cabinet and cabinet foundation. The UPS system shall include Digital Signal Processing for direct digital control of all UPS control and monitoring functions. UPS shall be fully power factor corrected while operating in battery backup mode. The UPS,

including the batteries and necessary hardware, shall be easily installed or replaced without the use of special tools.

The UPS shall be designed to operate continuously at rated capacity as an on-line automatic system in the following modes:

NORMAL – The inverter continuously regulates AC power to the critical load. The converter converts utility AC power to regulated DC power, which then serves as the inverter input and, simultaneously, as a float charge input to the storage battery(s).

EMERGENCY – In the event of a utility AC power failure, the inverter shall derive its input from the system battery(s), thus providing uninterrupted power to the critical load. This transition shall be accomplished without any switching or coupling, and with no interruption of power to the critical load from either failure or restoration of utility AC power.

RECHARGE – Subsequent to restoration of utility AC power, the converter shall automatically reactivate and provide DC power to the inverter, simultaneously recharging the battery system. This shall occur automatically and without interruption to the critical load.

BYPASS – In the event that the UPS must be taken off-line due to an overload condition or UPS failure, the critical load shall be transferred to the bypass source without interruption of power to the critical load. A paralleling wrap-around contactor shall be used to maintain the bypass source. This bypass switch shall only be utilized for automatic emergency transfers. Retransfer from bypass to inverter shall be performed automatically in overload conditions. Retransfer shall be inhibited if satisfactory synchronization of the inverter and bypass is not accomplished. The use of the bypass switch shall not be required during the manual or automatic retransfer process.

MAINTENANCE BYPASS – The UPS system shall be equipped with an external maintenance bypass switch (MBS) to allow safe and reliable maintenance of the UPS system. The bypass shall be of the break-before-make, zero-energy type to ensure maximum load reliability and personnel safety.

Operating temperature range for the entire UPS system, including liquid crystal displays, shall be -40 degrees C to +70 degrees C, 5 to 95 percent relative humidity, non-condensing.

The UPS shall use a temperature-compensated, variable charging rate based on battery charge status battery charging system. The charging system shall compensate over a range of 2.5 – 4.0 mV/ °C per cell. The temperature sensor shall come with sufficient connecting wire to monitor the battery temperature. Batteries shall not be recharged when battery temperature exceeds 50 degrees C plus or minus 3 degrees C. An integral system to prevent battery from destructive discharge and/or overcharge shall be provided.

The UPS shall have lightning surge protection compliant with IEEE/ANSI C.62.41.

The UPS shall provide a minimum of six (6) programmable alarm contact outputs. As a minimum, the following conditions/alarms shall be communicated to the traffic signal controller:

ON BATTERY – When the UPS switches from AC line voltage to battery power.

LOW BATTERY – When the batteries approach 40 percent of their remaining useful capacity.

TIMER – When the UPS has been operating on battery power for a user programmable period of time.

The UPS shall include displays to indicate current battery charge status and conditions, and a battery capacity indicator with readings from 0 to 100 percent. Front panel display(s) shall be provided that indicates the number of times the UPS has been activated and the total number of hours the unit has operated since last being reset. Both the displays shall have a reset function. UPS shall have a DB-9 connector mounted on the front panel for RS232 interface. The system shall come complete with the manufacturer's software installed and connecting cable. An additional copy of the UPS software on optical disc shall be provided to the Engineer at no additional cost.

b) **Operational**: UPS shall be sized with a minimum load of 1000 watts and sized to provide a minimum of 8 hours of full run-time operation for an intersection comprised of a traffic signal controller cabinet, LED traffic signal indications and LED pedestrian signal indications. The UPS shall be wired in so that the Police Panel Signal power disconnect switch will operate properly (disconnect power to the signals) even when the signal system is operating on battery power.

The maximum transfer time between the disruption of normal utility line voltage and providing a stabilized inverter line voltage from batteries shall be 60 milliseconds. A 60millisecond maximum allowable transfer time shall apply when switching from inverter line voltage to utility line voltage.

UPS shall bypass utility line power whenever the utility line voltage is outside of 95 VAC to 135 VAC (□ 2 VAC). While operating on battery power the output voltage from the system shall be between 110 VAC and 125 VAC, inclusive; pure sine wave output, □ 3 percent THD, 60 Hz □ 3Hz.

In situations where the utility line voltage drops below 80 VAC or is absent, the UPS shall transfer from utility line power mode to battery backup mode. Once the utility line voltage has been restored to 105 VAC □ 2 VAC for more than 30 seconds the UPS shall transfer from battery backup mode back to utility line mode.

In situations where the utility line voltage exceeds 185 VAC, the UPS shall transfer from utility line power mode to battery backup mode. Once the utility line voltage has been

restored at below 125 VAC ± 2 VAC for more than 30 seconds the UPS shall transfer from battery backup mode back to utility line mode.

In situations where the line voltage is within the range of 80 VAC – 185 VAC, commonly called "Brown-out Conditions", the UPS shall regulate the output voltage to the critical load to 120 VAC plus or minus 10% variance. This voltage regulation shall be accomplished without the use of UPS batteries, so that a low battery condition or no battery condition shall not cause a loss of voltage regulation. This also insures that all battery energy shall be retained for use during power outages or extreme line power variances.

The UPS shall be equipped to prevent a malfunction feedback to the cabinet or from feedback to the utility service. In the event of converter/inverter/charger failure, battery failure or complete battery discharge, the power transfer relay shall revert to the NC (de- energized) state, when the utility line power is connected to the cabinet.

The UPS shall be equipped with an input contact that can be defined as Emergency Power Off. This input shall cause the UPS to immediately turn off regardless of power source in use. This is a safety feature that shall, as an example, protect the unit from engaging battery backup if the line power is removed by an accident, such as striking and dislodging the traffic control cabinet that could create an hazardous condition if power is not interrupted.

Battery charging by the UPS shall be a temperature compensated multi-stage process providing for the most efficient re-charge based on battery temperature and discharge state, providing a high charge when the battery is near-fully discharged and tapering off as the battery charge state reaches 80 percent or more fully charged.

c) Battery System: Battery system shall be shelf-mount, rack-mount, or swing-tray mount, or a combination thereof. Shelves, racks, trays and vertical mounting channels shall be heavy duty and have sufficient strength to hold the batteries without deforming, bending or breaking. Batteries shall be easily replaced and commercially available as "off the shelf" items. Batteries shall be 12 VDC, deep cycle, sealed prismatic lead-calcium based AGM/VRLA (Absorbed Glass Mat/Valve Regulated Lead Acid). Batter housing shall be a light-weight, non-metal, non-corrosive material. Batteries shall be certified by the manufacturer to operate over a temperature range of – 25 degrees C to + 74 degrees C. Batteries shall indicate maximum recharge data and recharging cycles. Battery recharge time from protective low cutoff to 80 percent or more of full charge capacity shall not exceed 12 hours. Batteries shall be provided with appropriate interconnect wiring and corrosion resistant mounting trays and or brackets.

Batteries shall be stored below the level of all traffic signal control electronic equipment or in the lowest space within the cabinet. Batteries shall not be stored in direct contact with concrete. In the event there is insufficient space within the traffic signal controller cabinet; a separate cabinet shall be utilized to house the UPS and UPS batteries.

The number and amp-hour rating for the batteries shall be determined by the manufacturer of the system to provide the required voltage/wattage while on battery power for the time period referenced (8-hours) but shall not be rated at less than 80Ahr at 12V DC.

d) Battery Harness: Battery interconnect wiring shall be via a two-part modular harness.

Part I shall be equipped with red (+) and black (-) 12 inch cabling that can be permanently connected to the positive and negative posts of each battery. Each red and black pair shall be terminated into an Anderson-type power connector or equivalent.

Part II shall be equipped with the mating Anderson-type power connector for the batteries and a single, insulated power pole style connection to the inverter/charger unit. Harnesses shall be fully insulated and constructed to allow batteries to be quickly and easily connected in any order to ensure proper polarity and circuit configuration.

Power connectors may be either one piece or two-piece. If a two-piece connector is used, a locking pin shall be used to prevent the connection from separating.

The lateral length of the harness between battery connectors shall be a minimum of 12 inches.

All battery interconnect harness wiring shall be UL Style 1015 CSA TEW or Welding Style Cable or equivalent, and shall be of the proper gauge with respect to design current and have a sufficient strand count for flexibility and ease of handling.

All battery terminals shall be covered and insulated with molded boots to prevent accidental shorting.

e) Wiring

Wiring for the UPS within the traffic signal controller cabinet and within the UPS cabinet (when required) shall be sized in accordance with the NEC and shall conform to the requirements of Sections 238 and 700 of the VDOT Specifications. Wiring panels and terminal blocks shall be neatly finished and clearly and permanently marked. Conductors shall be neatly arranged and bundled in groups with cable ties. The bundled conductors shall not obstruct access to other circuits and terminals in the cabinet. A listing, indicating terminal numbers with a description of their use, shall be attached to the cabinet door and overlaid with a clear, plastic covering. Edges of the plastic overlay shall be sealed with a clear waterproofing compound. Unless cable is passing through the cabinet uninterrupted, incoming and outgoing conductors shall have each wire connected to terminal post positions.

f) Documentation

The Contractor shall provide five blue and white prints of the control circuit diagram. The blue and white prints shall be produced from the original diagram and shall be clear and

legible. The Contractor shall install two copies of the circuit diagram inside the traffic signal controller cabinet or in the UPS cabinet in the readily accessible water resistant enclosure and shall furnish three additional copies to the Engineer. The Contractor shall provide three sets of the following: equipment list, operation and maintenance manuals, board level schematic diagram and wiring diagrams of the UPS and battery data sheets. One copy of these materials shall be stored in the water resistant enclosure within the traffic signal controller cabinet and two sets provided to the Engineer.

g) Cabinet

When a separate cabinet is required, the cabinet shall house the batteries, wiring, and related equipment; and, the UPS, which includes converter/inverter/charger unit, power transfer relay, power management unit, manually operated bypass switch and other control panels and wiring harnesses. The cabinet shall be either a stand-alone design suitable for pad mounting or a side-mount design suitable for direct attachment to the existing traffic control cabinet. If of the stand-alone design, the cabinet shall be located as close as possible to the traffic signal controller cabinet.

Cabinet for UPS shall be weatherproof and constructed of welded sheet aluminum, 0.125-inch minimum. Cabinet mounting attachments shall be durable, corrosion resistant, compatible with the aluminum of the cabinet or isolated from it and of heavy-duty construction. Cabinets shall be at least 48 inches in height, 20 inches in width, and 14 inches in depth. The maximum width and depth shall be such that the cabinet will fit entirely on the proposed foundation. If the cabinet is of the stand-alone design, the cabinet bolt pattern shall be approved by the Engineer and the anchor bolts shall be 3/4-inch in diameter and at least 12 inches in length with a 3 inch “L” bend. If the cabinet is of the side-mount design, it shall be attached to the traffic control cabinet in at least two (2) points and be provided with an internal cabinet to cabinet wiring path.

1. **Doors:** Cabinet doors shall provide full access to the cabinet interior and shall have gaskets to ensure weatherproofing. The door shall be equipped with the Agency’s standard tumbler lock. Two keys for each cabinet shall be provided to the Engineer. Hinges shall be stainless steel and continuous. Doors shall have a doorstop arrangement that will allow it to be firmly positioned at 90 and 135 degrees, ▯ 10 degrees. The locking system for cabinets shall be a three-point draw roller system. Rollers shall be fabricated from nylon with a diameter of at least 8/10 inch. The door opening shall be double flanged on all four sides.

   The door shall have a screened and louvered vent design to prevent rain entry, with a standard size furnace vent filter. The filter tray shall be sized to house and secure the filter in place. The screen shall be constructed from at least 0.031-inch aluminum with 1/8-inch diameter openings positioned on 3/16 inch staggered centers. The screen shall be placed on the inlet side of the filter and held in place by the filter or silicone adhesive.

2. **Interior:** The interior of cabinet shall be of sufficient size to provide adequate ventilation of the equipment housed therein. Cabinet shall contain at least two adjustable shelves or equivalent supports, with enough space to hold batteries, wiring and related equipment. Vertical mounting channels for the shelves shall allow for adjustable shelf placement ranging from 5 inches from the bottom to 5 inches from the top of the cabinet. Shelves and vertical mounting channels shall be heavy duty and have sufficient strength to hold the batteries without deforming, bending or breaking. Wiring panels and terminal blocks shall be neatly finished and clearly and permanently marked. Conductors shall be neatly arranged and bundled in groups with cable ties. The bundled conductors shall not obstruct access to other circuits and terminals in the cabinet.

   A water resistant enclosure to store documentation shall be securely attached to the UPS cabinet with studs welded to the cabinet and nuts. The enclosure shall have non-corrosive metal grommets for use with the studs.

   A listing, indicating terminal numbers with a description of their use, shall be attached to the UPS cabinet door and overlaid with a clear, plastic covering. Edges of the plastic overlay shall be sealed with a clear waterproofing compound. Unless cable is passing through the cabinet uninterrupted, incoming and outgoing conductors shall have each wire connected to terminal post positions.

   A screened air exhaust opening under the top overhang shall be provided. One thermostatically controlled vent fan with a screened guard in the top section of the cabinet each with a capacity of exhausting at least 100 CFM shall be provided. The thermostat shall be adjustable from 80 degrees F to 130 degrees F. Degree markings shall be indicated on the thermostat in 10-degree increments. The fan shall be AC operated from the same line output of the Manual Bypass Switch that supplies power to the Traffic Signal Control Cabinet. A two position terminal block shall be provided on the fan panel. Proper over current protection shall be provided for the fan circuit.

   A LED lamp receptacle, LED lamp (ordering code #F20T12/D), and an ON/OFF door switch shall be located in the cabinet so that it provides unobstructed illumination of the interior of the cabinet. A momentary switch operated by the door shall be connected inline for operation of the lamp. The LED lamp and switches shall be AC operated from the same line output of the Manual Bypass Switch that supplies power to the Traffic Signal Control Cabinet. Proper over current protection shall be provided for the fluorescent lamp circuit.

   Wiring for the lamp, fans and other auxiliary equipment shall be connected via terminal blocks.

   If the stand-alone cabinet design is used, wiring from the UPS to the traffic signal controller cabinet shall be accomplished via a conduit passing through the UPS foundation, underground to a spare conduit in the traffic signal controller cabinet.

If the side-mount cabinet design is used, wiring from the UPS to the traffic signal controller cabinet shall be accomplished via an adequately sized and edge-protected opening in the side of the cabinet attached to the traffic control cabinet such that all wiring power and alarm wiring may be passed into the UPS cabinet.

3. **Cabinet Foundation:** If used, the cabinet foundation shall be installed in accordance with Agency Standards.

h) Interface to traffic control cabinet (power and status/alarm)

1. Power: The AC power interface shall be either a fully integrated design with the traffic control power panel meeting the following minimum requirements or shall be an independent panel design meeting the following minimum requirements.

1. **Integrated Design:** The Integrated Design shall be primarily used for new cabinets in which the traffic control cabinet power panel shall be wired such that the incoming utility electric service is controlled by a properly rated circuit breaker and that the controller equipment is protected from electrical noise and voltage surge that may be injected from utility line or signal display sources connected to the cabinet. Such protection and rejection shall be equal to that required by the Agency's standard specification for traffic control cabinets. The wiring to the Manual Bypass Switch shall be integrated into the power panel such that all wires are accessible within the power panel on identified terminal stripes that will allow for the maintenance of the equipment using only standard hand tools. It shall be possible to remove all power, including battery backup, from the traffic control cabinet at the power panel by the use of co-located circuit breakers.
2. **Independent Panel Design:** The Independent Panel Design shall be used for existing cabinets being retrofitted with UPS systems. This panel shall be mounted in close proximity to the existing power panel and shall provide the following: easy relocation of incoming utility service wiring to the new panel power in terminal strip, a properly rated circuit breaker to control utility power state, a surge suppressor to protect the UPS, the wiring to the Manual Bypass Switch shall be integrated into this panel for incoming AC Power such that all wires are accessible within this panel on identified terminal stripes that will allow for the maintenance of the equipment using only standard hand tools. The output AC power from the Manual Bypass Switch shall be terminated on the original incoming utility power service terminals. The panel shall be covered with plexi-glass or other approved material to minimize the risk of electrical hazards.

2. **Status/Alarms:** The Status/Alarms outputs of the UPS shall be interfaced into the traffic controller through appropriately defined status inputs to report the conditions required above. Logic Common from the traffic controller shall be provided to the common side of the status/alarm terminations and the status/alarm output shall be returned to the controller. No other interface shall be required.

IV. Procedures

When installing UPS at an existing traffic signal controller cabinet location, the Contractor shall notify the Agency Traffic Engineer a minimum of five days prior to beginning work. The traffic signal shall not be disconnected from utility power unless a representative of the Agency Traffic Engineer is present and then only during the time of day and day of week designated by the Agency Traffic Engineer.

Upon completion of the installation, the Contractor shall notify the Agency Traffic Engineer to arrange demonstration of the UPS. The Contractor shall demonstrate that the UPS is completely operational and shall demonstrate the various features available.

V. Warranty

The UPS, in its entirety, shall be warranted for three years from the date of installation against defective material, batteries and workmanship.

VI. Measurement and Payment

Uninterruptible Power Supply will be measured in units of each and will be paid for at the contract unit price per each. This price shall include furnishing and installing converter/inverter/charger, power management unit, transfer switches, bypass switches, switches, two-part modular battery harnesses, temperature sensor, sensor cable, software, DB-9 connecting cable, conductor cables, flexible conductor cables, flexible cables, terminal blocks, power panels, surge protection devices, over current protection devices (fuses/circuit breakers), circuit diagrams, manuals, transient protection devices and warranty. The price shall also include complete integration with the traffic signal control equipment and testing in the presence of the Engineer.

Uninterruptible Power Supply Battery will be paid for in units of each and will be paid for at the contract unit price per each. This price shall include furnishing and installing batteries.

Uninterruptible Power Supply Cabinet will be measured in units of each and will be paid for at the contract unit price per each. This price shall include furnishing and installing cabinet, thermostatically controlled fans in the cabinet with a vent, thermostat, switches, air filter, fluorescent lamp receptacle, fluorescent lamp, conductor cables, flexible cables, over current protection devices (fuses/circuit breakers), terminal blocks, power panels, surge protection devices, circuit diagrams, grounding systems, conduits and fittings.

Payment will be made under:

Pay Item	**Pay Unit**
Uninterruptible Power Supply	Each
Uninterruptible Power Supply Battery	Each
Uninterruptible Power Supply Cabinet	Each

I. Description.

This work shall consist of furnishing and installing video detection equipment in accordance with this special provision and as shown on the plans or as directed by the Engineer. Video detection equipment shall detect by processing video images and providing detection input for NEMA TS-1 and NEMA TS-2 traffic signal controllers.

II. Equipment

a) Video Image Processor (VIP)

1) The VIP shall be modular by design and housed in either a self-contained stand-alone unit or fit directly into NEMA TS1 & TS2 type racks as well as Type 170/179 input files. The VIP shall be interchangeable between a shelf or rack mount installation without replacing or modifying existing VIP units.

2) The system shall control from 1 to 6 VIP boards allowing for 1 to 12 image sensors

3) The system shall be designed to operate reliably in the adverse environment of roadside cabinets and shall meet or exceed all NEMA TS1 and TS2, as well as Type 170/179 environmental specifications.

4) Ambient operating temperature shall be from –35 to +75 degrees Centigrade at 0 to 95% relative humidity non-condensing.

5) The system shall be powered by 12-40 VDC and draw less than 2 amperes.

6) The system shall utilize cabinet 24 VDC for rack mount installations or external 24 VDC for stand-alone shelf installations.

7) Surge ratings shall be set forth in the NEMA TS1 and TS2 specifications.

8) Serial communications shall be through an RS232 serial port. This port can be used for communications to a modem or laptop to upload/download detector configurations, count data and software upgrades. RS485 on the rear edge connector shall facilitate communications to other VIP boards.

9) Each VIP board shall have 4 opto-isolated open collector outputs. Twenty (20) additional outputs shall be available via the expansion port. The VIP shall have 20 presence detection zones and 4 data detection zones per camera. Data zones shall collect and store vehicle counts, volume, speed, gap time, headway, occupancy, and classification. Data shall be time-stamped (6713 intervals) and stored onboard (non- volatile memory) in intervals from 1-60 minutes.

10) Data alarms are generated for: queue, inverse direction, speed drop, no video, and errors.

11) Must be able to provide single or double loop emulation.

12) Presence hold time must have parameters that range from 10 to 600 seconds.

13) Each VIP board shall allow for 20 digital inputs via the I/O Expansion port.

14) Each VIP board shall have error detection. An output contact will open if the video signal is bad or the VIP board is not functioning properly. A user defined quality level will automatically put the VIP into a recall state in cases of severe degraded visibility (i.e., fog, blizzard, etc.). Normal detection resumes when visibility improves above the user defined quality level.

15) Operator selectable recall shall be available via the VIP front panel. Holding the recall switch on for 5 seconds shall activate this function.

16) A video select button on the VIP front panel will switch between camera images of the VIP.

17) The VIP board shall have 2 video inputs (RS-170 NTSC or CCIR composite video) and two video outputs (one on the front panel and one on the edge connector). The video inputs shall be though the VIP board's edge connector.

18) The VIP board shall have a reset button on the front panel to reset video detectors to "learn" the roadway image. During "relearn", selectable recall can be enabled or disabled for immediate operation. Learning time of video detectors shall be less than 5 minutes.

19) External surge suppression, independent of the VIP board shall separate the VIP from the image sensor.

20) The VIP board shall have separate light emitting diodes (LEDs) that indicate:

    i) POWER: Red to verify power supply.

    ii) I/O COMM: Red to indicate communications to expansion boards.

    iii) VIDEO 1 & 2: Red to verify the presence of video input 75 Ohm.

    iv) TX & RX: Red to indicate communications via the serial port.

    v) OUT1- OUT4: Green if the corresponding detection group is active.

21) The VIP board shall also have 2 separate buttons for VIDEO SELECT:

    i) RECALL: Manually places call on detectors.

    ii) RESET: Manually reset detectors to "learn" new background.

22) The video detection system shall be capable of being programmed locally with a handheld keypad. Keypad and monitor must be separate units. A PC mouse will not be allowed. The monitor is to have a 9 inch, black and white screen.

23) The VIP board shall have a video out female RCA style connector, DB9 female Service port and DB9 I/O Expansion port.

24) The VIP Expansion board shall have 8 dip switches that define inputs and outputs used (range: 1-12 or 13-24). The VIP Expansion board shall also have separate LEDs that indicate:

    i) POWER: Red to verify power supply.

    ii) COMM: Red to indicate communications to VIP board.

    iii) I/O1- I/O4: Green if the corresponding detection group is active.

25) Event Log Database: The VIP module shall have an onboard database capable of time stamping and storing 500 events. The Event Log Database can be viewed or downloaded to a selected spread sheet. Erasure of the Event Log Database shall not alter programmed configurations. As a minimum, the VIP shall log and time stamp the following events:

    i) Firmware upgrade

    ii) Loss of video signal.

    iii) Resumption of video signal.

    iv) Configuration change.

    v) Bad video quality.

    vi) Loss of power to VIP module.

    vii) Resumption of power to VIP module.

    viii) Speed alarm.

    ix) Inverse direction.

    x) Recall activated.

26) Each VIP board shall be capable of processing two (2) separate video signals (two (2) separate cameras) per VIP board. The video signal shall be analyzed in real time (30 times per second).

27) The system shall be expandable up to 12 cameras that may be connected to different

VIP units and programmed independently.

28) The system shall be capable of displaying detectors on the video image with associated outputs. Outputs/Inputs status will be indicated on the screen. Parameters will also include the ability to view raw video without any verbiage and/or detectors for surveillance purposes.

29) Each VIP board will detect within the view of the connected camera the presence of vehicles in user defined zones. Detectors available shall be presence, count, queue, delay, extension, or pulse mode of either arrival or departure of vehicles. Delay and extension shall be defined between 0.1 – 99.9 seconds and pulse mode between 0 – 200msin 33ms increments if NTSC is used. Each VIP board shall also detect and collect traffic data of passing vehicles in user-defined zones within the view of the connected camera.

30) Collected traffic data by direction shall include:

    i) Volume (absolute numbers) per length class and per lane.

    ii) Average speed (km/h or mph) per length class and per lane.

    iii) Average gap time (1/10 sec) per length class and per lane.

    iv) Average headway (m or feet) per lane.

    v) Occupancy (%) per lane

    vi) Concentration (vehicles/km or mile) per lane.

    vii) Average length (m or feet) per lane.

    viii) Confidence level (0-10) per lane.

31) The VIP board shall be programmed without the use of a supervisor computer. A standard CCTV monitor and handheld keypad plugged into the VIP serial port will facilitate detector programming. The handheld keypad shall include the following keys and respective functionalities:

Keys	**Functionality**
Enter Key	● To enter a menu, a submenu or an item within a submenu. ● To select a value for a parameter and exit the topic.
Escape Key	● To exit the menu or submenu. ● To exit the main menu and save the settings in the current

Keys	**Functionality**
	configuration.
Arrow Keys	● To scroll through a menu. ● To scroll through the values of a parameter. ● To select a submenu. ● To make a presence zone direction sensitive.
F1 Next Key	● To proceed to the next detection zone.
F2 Prev Key	● To move to the previous detection zone.
F3 Add Key	● To add a detection zone.
F4 Del Key	● To delete a detection zone.
Dir Key	● To make a data zone direction sensitive.
Help Key	● To display help text for an item.
Output Number Key	● To assign an output number to a detection zone.
Operate Key*	● To put the board in operation mode.
Edit Key	● To change settings while starting from default values for all parameters.
Modify Key*	● To change settings while starting from the last saved settings for all parameters.

* The functionality of this key is only for the video system communications modules

32) The VIP board shall store up to 8 detector configurations (4 per video input). It shall be possible to switch between detector configurations manually, automatically by time of day or remote input.

33) Via the serial port, detector configurations can be uploaded to a laptop and stored on disk.

34) Detectors may be linked to 24 outputs and 20 inputs using Boolean Logic features: AND, OR, NOT. It will be possible to generate conditional outputs based upon inputs from a controller.

It shall be possible to make a detector directional sensitive. Options will include an omni-directional detector or a detector that only senses movement: from right to left,

left to right, up to down or down to up as you look at the monitor.

35) All detectors and parameters can be changed without interrupting detection. For example: when one detector is modified, all existing detectors continue to operate, including the one that is being modified. When the new position is confirmed, the new detector will enter a learning phase. Once the new detector is in function, it will take over the job of the old one. In this way, the detector is always fully operational with no interruption on any detector, even during modification. Learning phases for new detectors shall not exceed 10 seconds.

36) Four data detection zones per camera on a two camera VIP board may be used for collection of vehicle count, speed, classification, occupancy, density, headway, and gap time. These detectors will detect and store traffic data at user-defined intervals of 1, 2, 3, 5, 6, 10, 15, 30 & 60 minutes. It shall be possible for each VIP board to store up to 6713 intervals of data in non-volatile memory.

37) Six detectors per camera may be used as queue detectors. Using on screen calibration, queue detectors will detect queue delays and display the queue length in feet or meters. A queue may also generate an output alarm from the VIP board.

38) Associated software shall be used with a PC to download count data and export to a spreadsheet. The software shall also be used to upload/download detector configurations, traffic data, technical events and update software versions of the VIP board.

39) All software upgrades to associated software and VIP board software shall be provided at no cost to the City for the expected life of the VIP board.

40) The VIP board shall have an internal clock with daylight saving time system, which can be enabled or disabled.

41) The VIP board shall provide overlaid tool tips for each individual menu- and submenu-items.

42) The VIP board shall have an optional password implementation. Different user-levels shall be available each having different rights.

43) All equipment must be capable of having a minimum of 10 users that can be defined for each user-level.

44) The VIP board shall be able to delay or extend a detector zone output in combination with an input from the controller.

45) The VIP board shall detect wrong-way drivers and shall provide an alarm/event via communication board and/or output.

1) The VIP board shall provide an alarm and/or output when the user selected queue detection threshold of occupancy is exceeded for more than a user selected time threshold.

2) The VIP board shall distinguish five classes of detected vehicles based upon user selectable vehicle length thresholds.

3) The VIP shall be able to emulate loop emulation with user selectable loop dimensions.

4) The VIP shall have a Detection Hold Time function. The timing parameters shall be 10 – 600 seconds.

5) The VIP board shall provide advanced settings to optimize detection to avoid cross-lane traffic occlusion. Directional detectors shall be able to be programmed for Low, Medium or High depending on the severity of the occlusion.

6) The VIP shall be programmable for Wrong Way Suppression Delay. The timing parameters shall be 1 – 30 seconds.

7) The VIP board shall utilize advanced shadow rejection algorithms. It shall be possible to place detection zones over lane markings without affecting the shadow rejection accuracy from adjacent vehicle (moving) shadows.

8) The VIP board shall utilize an advanced Tree Shadow Suppression algorithm to suppress false detection of moving shadows (non-vehicular, i.e. trees) within a detection zone. It shall be possible to enable or disable this feature.

9) The VIP board shall provide integrated image quality diagnostics eliminating the need for users to manually place quality detection zones on the image. Advanced diagnostic information shall display both the quality of the video images (Qim) as well as the quality of detection (Qdet). The Qim and Qdet together will be averaged to provide an overall quality (Q). Each quality diagnostic (Qim, Qdet & Q) will be based on a 1 (poor quality) to 10 (excellent quality) scale.

10) The VIP board shall provide the capability to enter a “recall” state if the quality threshold falls inside a user-defined range. The range shall be defined by the Quality Level (1-10) and a timeout range of 1 to 99 minutes. For example, if the quality drops to level 5 for 2 minutes, the VIP shall enter a “recall” mode. Once the quality rises above level 5 for 2 minutes, the VIP resumes normal operation. The VIP shall also provide a contact closure output during this condition.

b) Video System Communications Module

1) The Communication board shall be modular by design and housed in either a self-contained stand-alone unit or fit directly into NEMA TS1 & TS2 type racks as well as Type 170/2070 input files.

2) The Communication board shall control from 1 to 6 VIP boards allowing for 1 to 12 image sensors.

3) The system shall be designed to operate reliably in the adverse environment of roadside cabinets and shall meet or exceed all NEMA TS1 and TS2, as well as Type 170/2070 environmental specifications.

4) Ambient operating temperature shall be from –34 to +74 degrees Centigrade at 0 to 95% relative humidity non-condensing.

5) The system shall be powered by 12-40 VDC and draw less than 2 amperes.

6) Serial and Ethernet (TCP/IP) communications shall be through respectively an RS232 serial port (F DB9 connector) and Ethernet port (RJ-45 connection). These ports can be used for communications to a laptop or modem to upload/download detector configurations, traffic data, technical events, send software upgrades and do remote setup of detectors. RS485 on the rear edge connector shall facilitate communications to VIP boards.

7) Surge ratings shall be set forth in the NEMA TS1 and TS2 specifications.

8) The Communication board shall have separate light emitting diodes (LEDs) that indicate:

   i) POWER: Red LED to verify power supply.

   ii) LAN: Red LED to indicate data activity over Ethernet communication.

   iii) VIDEO OUT: Female RCA style connector.

   iv) RESET: Manual reset to re-initialize communications.

   v) SERVICE: DB9 female Service port for setup of communication board and also used for serial/dial-up communication.

9) The Video System Communication board shall control from 1 to 6 VIP boards allowing for 1 to 12 image sensors.

10) The Video System Communication board shall provide a serial or Ethernet interface and communication to provide traffic data and allow remote configuration from the Traffic Operations Center.

11) The LAN port shall meet IEEE 802.3 with a RJ-45 connector and meet the following specification: Data rates for Ethernet via LAN port: 10Mbit/s, TCP/IP based protocol.

12) The serial communications port shall meet EIA-232-E and meet the following specifications:

i) Dial-up data rates for RS232 via Serial port: maximum 57600 bps

ii) Direct data rates for RS232 via Serial port: maximum 115200 bps

iii) Mode of operation: asynchronous, serial, 8 bit word, 1 stop bit, duplex or half-duplex

iv) Parity: none

v) Handshake: RTS - CTS, DCD

vi) Configuration: DTE

13) The communication shall support all functions of the video detection system.

14) All data transmissions shall be protected by CRC (cyclic redundancy checking) or an equivalent error detection method.

15) The communication board shall be programmed without the use of a supervisor computer. A standard CCTV monitor and keypad plugged into the communication serial port will facilitate board programming.

16) The communication shall support streaming video over Ethernet and serial communication.

17) Streaming video frame rate:

i) Over Ethernet: 10 frames/second

ii) Over serial communication: guarantee of 1 frame every 2 seconds.

18) Password protected remote setup (configuration upload/download, setup of detectors and detector parameters, setup of communication board parameters, firmware updates for Communication and VIP module) and monitoring of every connected VIP module shall be possible.

19) Dialup shall be possible through PSTN modems.

20) The Communication board shall log data and events provided by the VIP module(s) and transmit data and events to the HOST computer.

21) RS485 communication to every VIP module shall be established via the Edge connector.

22) The Communication board shall able to store on board pre-post video sequences of alarm triggered upon traffic user defined events. When connected to a HOST computer, the JPEG video sequences shall automatically be downloaded to the HOST computer.

23) The Communication board shall be able to accept PAL or NTSC video format.

24) A (via Ethernet) connection with a standard Internet browser shall be possible to communicate with the Communication board for remote set-up, monitoring and real-time data of the VIP modules.

25) Password protection shall be provided on the Communication board for remote operations.

c) Thermal Camera

1) Specifications

i) Array Format (NTSC) – 320 x 240

ii) Detector Type – Long-Life, Uncooled VOx Mircrobolometer

iii) Effective Resolution – 76,800

iv) Pixel Pitch – 25 µm : 48º x 37º (FC-348t ; 9mm)

v) Field of View - 34º x 26º (FC-334t; 13mm): 24º x 18º (FC-324t; 19mm)

vi) Spectral Range – 7.5 µm to 13.5µm

vii) Focus Range – Athermalized, focus-free

2) Outputs

i) Composite Video NTSC or PAL

ii) External Analytics Compatible

3) General

i) Weight Dimensions (L, W, H) – 4.2lbs (w/ sun shield); 10.8” x 5.4” x 4.4” (w/ sun shield)

ii) Input Voltage – 90-240 VAC single phase; 50-60 z

iii) Power Consumption – 1.7 W nominal at 110 VAC; 18 W peak w/ heaters

iv) Mounting Provisions – Two ¼-20 threaded holes, 1” spacing along centerline front to back

4) Environmental

   i) IP Rating – IP66

   ii) Operating Temperature Range - -50ºC to 75ºC (continuous operation); -40ºC to 75ºC (cold start)

   i) Storage Temperature Range - -55ºC to 85ºC

   ii) Range Humidity – 0-95% relative

d) Image Sensor-Housing

1) The environmental housing shall be an aluminum enclosure designed for outdoor CCD camera installations.

2) Temperature range -40 to +50 degrees C

3) Housing mounting Three 1/4-20 tapped holes

4) Camera mounting Removable cradle assembly

5) Cable entry Three liquid-tight fittings that will accept cable diameters of:

   i) One fitting -2 to 7 mm

   ii) Two fittings - 3 to 10 mm

6) Finish: Off-white semi-gloss polyurethane

7) Construction: Extruded aluminum housing, Aluminum rear-end cap, Aluminum front cap with glass face plate, and Aluminum cradle. A sunshield shall be included

8) Window: 3 mm thick glass that includes a Thermostatically controlled window Heater/defogger strip

9) Rated input voltage: 115 VAC 60 Hertz

10) Voltage range: 108 VAC to 132 VAC

11) Output voltage: 24 VAC 60 Hertz

12) Nominal power: 30 Watts

13) Enclosure protection: Waterproof and dust-tight in a NEMA-4, IP65, enclosure Type 3

e) Surge Protection

1) A video surge suppressor(s) shall be available for installation inside the traffic signal controller cabinet. The suppressor shall provide coaxial cable connection points to an EDCO CX06-BNCY or approved equal transient suppresser for each image sensor.

2) Peak Surge Current (8 x 20 us) 20KA

3) Technology Hybrid, Solid State

4) Attenuation 0.1db @ 10Mhz

5) Response Time <1 nanosecond

6) Protection Line to Ground

7) Shield to Ground (isolated shield modules)

8) Clamp Voltage 6 volts

9) Connectors BNC

10) Impedance 75 Ohms

11) Temperature -40 to +85 degrees C

12) Humidity 0-95% non-condensing

13) Dimensions 4.5” x 1.5” x 1.25”

14) UL Listed UL 497B

f) Image Sensor-Mounting Brackets

1) Mast arm installations shall be mounted at a sufficient height to prevent occlusion from cross traffic between the stop bar and the mast arm on which the camera is installed. A 74” maximum length of internally reinforced, aluminum tube shall be attached to the mast arm bracket for camera mounting above the mast arm. Camera shall be mounted to the top of the tube with the camera manufacturers recommended bracket. Camera bracket shall provide adjustments for both vertical and horizontal positioning for the camera. Camera attachments shall be designed to securely fasten the camera to prevent the extension tube from falling into the path of vehicles and/or becoming loose. Mounting bracket must fasten to the Mast arm using a 64” or 82” aircraft cable. Miscellaneous hardware shall be stainless steel or galvanized steel. The cameras and associated pole/arm attachment unit shall be designed to withstand a wind load of 90 MPH with a 30-second gust factor.

2) Luminaire arm installations shall be installed on the luminaire arm, with the camera/video manufacturers recommended brackets. Camera luminaire brackets shall provide adjustments for both vertical and horizontal positioning of the camera. Camera attachments shall be designed to securely fasten the camera to the luminaire arm. Mounting bracket shall be made of aluminum. Miscellaneous hardware shall be stainless steel or galvanized steel. The cameras and associated pole/arm attachment unit shall be designed to withstand a wind load of 90 MPH with a 30-second gust factor.

g) Image Sensor-Cable (Coaxial & Power)

1) Coaxial & Power cable (Siamese) shall be installed in conduits or overhead as indicated in the plans. Coaxial cable shall be suitable for exterior use and in direct sunlight. Power cable will have a minimum of five (5) conductors.

2) A junction box on the camera bracket arm shall provide access to video and power cable terminations. No soldering shall be required in the field. Coaxial cable will terminate with a “barrel” style BNC connector and power shall be terminated via a small terminal strip or via “wire nuts.”

3) Coaxial cable will be terminated in the surge suppressor before being connected to the VIP boards.

4) Power cable will be terminated into a fuse panel provided by the manufacturer and connected to 120 VAC in the controller cabinet.

5) Description of cable: Composite, 6 Conductors 2 elements: 18awg 5 conductors 7/26 bare copper, .016” polyethylene, 20awg 1 conductor, solid bare copper, 056” foam polyethylene jacket black, overall .030” PVC jacket black.

h) Video Monitor

A monochrome monitor for viewing the video output from the video processor unit shall be provided in the controller cabinet irregardless of the programming method utilized by the equipment. Monitor shall have a minimum diagonal measurement of 9". Monitor resolution shall exceed the required camera resolution. Monitor shall be provided with connector and cable for connection to the video processor unit. Monitor shall be provided with front panel mounted controls for contrast, brightness, vertical hold, horizontal hold and power on/off. Monitor shall be provided with 125 VAC power cord. Monitor shall fit on the shelf within the control cabinet without interference to control equipment.

III. Installation & Training

a) The product supplier of the video detection system shall supervise the installation and the testing of the video equipment. A factory certified representative from the manufacturer shall be on-site during installation. The factory representative shall install, make fully operational, and test the system as indicated on the intersection drawings and this

specification.

b) Two days training shall be provided to personnel of the contracting agency in the operation, setup, and maintenance of the video detection system. Instruction and materials shall be produced for a maximum of 10 persons and shall be conducted at a location selected by the contracting agency. The contracting agency shall be responsible for travel, room and board expenses for its own personnel.

IV. Warranty

a) The video detection system shall be warranted against manufacturing defects in materials and workmanship for a period of two years from date of installation. The video detection supplier shall provide all documentation necessary to maintain and operate the VIP system.

b) Life expectancy of the video cameras and VIP boards shall be a minimum of five (5) years.

V. Measurement and Payment

4-Video Detection Camera Intersection will be measured in units of each for the type specified and will be paid for at the contract unit price per each. This price shall include:

- Two 2-position VIP Cards
- Four Camera Assembly Packages
- Four Camera Mounting Assemblies, Mast Arm, Side of Pole, or Luminaire Arm as per the plans
- One Camera Interface Panel, 4-Camera, NEMA
- One 10-Pos Rack wired for ViewCom/E Expansion
- One Power Supply for 10-Pos Rack
- Ten BNC connectors
- One Programming Keypad
- One 9" Monitor
- One CT Zoom Lens Controller
- Software
- Transient protection
- Hardware
- Warranty
- Technical Support

3- Video Detection Camera Intersection will be measured in units of each for the type specified and will be paid for at the contract unit price per each. This price shall include:

- Two 2-position VIP Cards
- Three Camera Assembly Packages
- Three Camera Mounting Assemblies, Mast Arm, Side of Pole, or Luminaire Arm as per the plans
- One Camera Interface Panel, 3-Camera, NEMA
- One 10-Pos Rack wired for ViewCom/E Expansion
- One Power Supply for 10-Pos Rack
- Eight BNC connectors
- One Programming Keypad
- One 9" Monitor

- Software
- Transient protection
- Hardware
- Warranty
- Technical Support

2-Video Detection Camera Intersection will be measured in units of each for the type specified and will be paid for at the contract unit price per each. This price shall include:

- One 2-position VIP Cards
- Two Camera Assembly Packages
- Two Camera Mounting Assemblies, Mast Arm, Side of Pole, or Luminaire Arm as per the plans
- One Camera Interface Panel, 2-Camera, NEMA
- One 10-Pos Rack wired for ViewCom/E Expansion
- One Power Supply for 10-Pos Rack Six BNC connectors
- One Programming Keypad
- One 9" Monitor
- Software
- Transient protection
- Hardware
- Warranty
- Technical Support

Video Detection Camera Cable will be measured in units of linear feet and paid for at the contract unit price per linear foot. This price shall include the Siamese (coaxial and power) cable.

Video Detection Camera Y Cable will be measured in units of each for the type specified and will be paid for at the contract unit price per each. This price shall include Y Cables (BNC to 2 wire) for installation into existing racks.

Payment will be made under:

Pay Item	**Pay Unit**
Four Video Detection Camera Intersection	Each
Three Video Detection Camera Intersection	Each
Two Video Detection Camera Intersection	Each
Video Detection Camera Cable	Linear Feet
Video Detection Camera Y Cable (BNC to 2 wire)	Each

I. Description.

This work shall consist of furnishing and installing traffic signal head sections in accordance with these specifications and as shown on the plans or as directed by the Engineer. It is the City's intent that the signal head sections match those being used elsewhere in the City.

II. Detail Requirements. Traffic Signal Head Sections.

a) All pedestrian signal head sections shall be 16" x 18" LED Dual Pedestrian Countdown signals. All LED traffic signal head sections shall be 12 Inch Balls, and/or 12 Inch Arrows

b) Approved Products - The following manufacturer's products are approved for use in the City of Winchester:

i) Manufacturer:

General Electric
Company 3135 Easton
Turnpike
Fairfield, CT 06828
Toll Free: 1-800-417-0575
www.gelighting.com

ii) Model numbers:

PS7-CFF1-VLA 16" x 18" Overlay Countdown GTX City LED Countdown Pedestrian Signal

DR6-RTFB-VLA TINTED RED 12" BALL GTX City LED Signal Module DR6-YZFB-VLA TINTED YELLOW 12" BALL GTX City LED Signal Module DR6-GTFB-VLA TINTED GREEN 12" BALL GTX City LED Signal Module

DR6-RTAAN-VLA RED 12" GTX City Arrow Signal Module
DR6-YTAAN-VLA YELLOW 12" GTX City Arrow Signal Module
DR6-GTAAN-VLA GREEN 12" GTX City Arrow Signal Module

iii) Distributed and delivered through:

Traffic Systems &
Technology 10110
Battleview Parkway
Manassas, VA 20109
(703) 530-9655

c) The Contractor may provide alternate products for consideration by the Engineer. The alternate system shall meet the specifications listed above and as shown on the plans or as directed by the Engineer. The approval of alternate traffic signal head sections is at the sole discretion of the Engineer.

LED EDGE-LIT INTERNALLY ILLUMINATED STREET NAME SIGNS

I. Description.

This work shall consist of furnishing and installing LED Edge-Lit Internally Illuminated Street Name Signs in accordance with these specifications and as shown on the plans or as directed by the Engineer. It is the City's intent that the signs match those being used elsewhere in the City.

II. Equipment.

a) Mechanical Specifications

1) The outer dimensions of the sign assembly shall be standard nominal heights of 18 inches for one line signs, and 30 inches for two line signs, with standard nominal widths of 48, 60, 72, 84, or 96 inches.

2) The maximum thickness of the sign shall be 1.60 inches.

3) The maximum weight shall not exceed:

i) 72 pounds for a 96 inch wide by 18 inch high, single sided, one line sign

ii) 90 pounds for a 96 inch wide by 30 inch high, single sided, two line sign

4) The long edges of the sign shall be made from a single section of 6000 series aluminum extrusion. The ends caps shall be made from a single section of aluminum and shall be affixed to the frame with stainless steel screws. The power supply shall be mounted internally in one of the end caps. The non-electrical end cap shall be removable to enable replacing panels and components.

5) The sign shall have a front panel that is UV, weather, abrasion and impact resistant. The front panel shall be replaceable so that the City has the option of supplying its own sheeting and electrocut film for the sign faces.

6) White diamond grade material should be used for the letters with green electrocut film.

b) Mounting System

1) Rigid Mount – the sign must rigidly mount directly to the signal mast arm or to a sign mast arm with no moving parts. Sign bracket must be able to be leveled to accommodate mast arms that are slightly off level. Sign bracket hardware must mount to Pelco Astro-Brac AS-3009 or approved equal.

2) Under Hang Mount – the Sign must be supplied with under hang mounting brackets on two positions on the top of the sign that allows the sign to swing freely. The mounting bracket shall have a bolt hole pattern to accept Pelco SE-5015, SE-5146, or approved equal.

c) Environmental Specifications

1) The sign and power supply shall be able to withstand and operate at temperature extremes of -22 deg F to +140 deg F.

2) Signs shall be tested and certified for the following environmental conditions:

   i) Exclusion of Water Test

   ii) Strain Relief Test

   iii) Temperature Test

   iv) Dielectric Voltage-Withstand Test.

3) A representative sample of the product shall be tested in accordance with the Standards for Electric Signs (UL 48). Documentation required upon request.

d) Structural Specifications

1) The sign shall meet the following structural specifications:

   i) Wind Loading – 150 mph with 1.14 gust factor and ice loading as per AASHTO LTS-4 2001

   ii) Fatigue – Galloping, Natural Wind Gusts, Truck-Induced Gusts per AASHTO LTS-4 2001

   iii) Shock – ANSI C136.31, 10 G inertial applied perpendicular and vertically to sign face

   iv) Vibration – Oscillations of 12 in. amplitude at 1 Hz over 20 years, including fatigue considerations per FHWA recommendations for signage

e) Luminance

1) The entire surface of the sign panel must be evenly illuminated with a minimum average brightness reading at the letters of 400 lux and a variation of no more than 15% for any reading from the average (minimum of 50 readings). Each background reading measured must not vary by more than 10% (minimum of 50 readings) from the average of the background brightness readings. The light transmission factor of the sign panel must provide a letter to background ratio of a minimum of 4:1.

f) Light Source

1) The light source for the sign shall be LEDs (light emitting diodes). LEDs shall be mounted along both the top and bottom edges of the sign. The LEDs shall evenly illuminate a light panel that is the same dimensions of the sign face. The LEDs shall have a minimum rated lumen maintenance of 70% at 50,000 hours. A maximum of four LEDs per square foot shall be used.

g) Energy Requirements

1) The average power consumption of the sign shall not exceed:

   i) 48 Watts for a 96 inch wide by 18 inch high, single sided, one line sign

ii) 54 Watts for a 96 inch wide by 30 inch high, single sided, two line sign

2) The sign shall be an Energy Star Qualified Product.

h) Quality Requirements

1) Sign must be guaranteed for a minimum of three years.

2) Manufacturer must be ISO 9001:2000 certified.

3) The Sign shall be listed and approved to UL 48 Standards by a Nationally Recognized Testing Laboratory. The outside of the sign shall be marked with a certification mark for Electric Signs UL 48.

i) Approved Products - The following manufacturer's product is approved for use in the City of Winchester:

Temple, Inc.
Decatur, Alabama

Distributed and delivered through:

i) RGA, Inc.
1550 Standing Ridge Drive
Powhatan, VA 23139
(804) 794-1592

2) The Contractor may provide an alternate product for consideration by the Engineer. The alternate system shall meet the specifications listed above and as shown on the plans or as directed by the Engineer. The approval of an alternate LED Edge-Lit Internally Illuminated Street Name Sign is at the sole discretion of the Engineer.

III. Measurement and Payment.

LED Edge-Lit Internally Illuminated Street Name Signs will be measured in units of each for any length sign and will be paid for at the contract unit price per each. This price shall include enclosure cabinets, message panel, lens, lamps, internal electrical wiring and components, louvers, mounting attachments, grounding systems, and fittings. The electrical feed to the junction box from the power source will be paid for under the pertinent contract items. Work will include development of shop drawings and all incidentals as required. The payment shall be full compensation for all materials, labor, equipment and all other incidentals necessary to complete this work. The City will make payment for the following item only upon completion of the installation and commissioning of the sign and acceptance by the Engineer.

Payment will be made under:

Pay Item	**Pay Unit**
LED Edge-Lit Internally Illuminated Street Name Signs – Single Sided, One Line	Each

WIRELESS BROADBAND RADIO EQUIPMENT

I. Description

This work shall consist of furnishing and installing spread - spectrum radio equipment in accordance with this special provision and as shown on the plans or as directed by the Engineer. Spread-spectrum radio equipment shall be used for bi-directional data communications between master and local intersection controllers.

II. Materials

a) **Electrical Items** shall conform to the requirements of Section 238 of the Specifications.
b) **Galvanizing** shall conform to the requirements of Section 233 of the Specifications.
c) **Steel** for fabricated items shall conform to the requirements of Section 226 of the
d) Specifications.
e) **Aluminum** for fabricated items shall conform to the requirements of Section 229 of the
f) Specifications.

III. EQUIPMENT

a) Compatible with Existing City Equipment

Wireless broadband radios shall include all features and functions as existing radios in the City of Winchester's Pleasant Valley Road closed loop system and shall completely interface with the system and current computer control program. Existing equipment consists of Encom Model COMMPAK BB5858 Ethernet radios. Current computer control program is Encom Stratos Plus Version 2.1.39.0

b) Power and Communication Cable Power and communication cable shall be category 5E conforming to the following:

- Number of Conductor Pairs: 4
- Size: 24 AWG
- Stranding: Solid
- Conductor Material: Solid Annealed Bare Copper
- Shield Material: Al Foiled Shield
- Designed for direct exposure to all weather conditions

c) **Antenna Cable:** Antenna cable shall be flexible type coaxial cable conforming to the following:

- Impedance 50 ohms
- Type LMR 400 (Times Microwave) or approved equal
- Feedline loss of the antenna cables shall be no more than 3dB per fifty feet
- Frequency range 902-928 MHz
- Black polyethylene or equal outer jacket
- Minimum bending radius of 1 inch
- Designed for direct exposure to all weather conditions

d) **Antenna Interface Cable:** Antenna cable connecting surge suppressor to radio shall be `"Superflexible" type coaxial conforming to the following:
- Impedance 50 ohms
- RG-58
- Frequency range 902-928 MHz
- Minimum bending radius of 1inch
- Black polyethylene or equal outer jacket
- Maximum length to be 6 feet

e) **Lightning Protection:** Lightning protection device shall conform to the following:
- Frequency Range 1.5 - 1000 MHz, D.C. blocked
- VSWR 1.5:1 Maximum
- Power Capacity 200 Watts @ 900 MHz
- Insertion loss of less than 0.1 dB @ 900 MHz
- Surge 50kA, 8 x 20 microseconds waveform, 500 joules
- Connectors "N" type female

f) Vendor Contact

RGA Inc.
1550 Standing Ridge Drive, Suite 100
Powhatan, VA 23139
Phone: (804) 794-1592
Fax: (804) 379-1016

IV. Procedures

a. **Transceivers:** The Contractor shall perform a wireless site survey, prior to installing Wireless broadband radios transceivers, connecting cables and other incidentals needed in existing or new traffic control cabinets as indicated by the plans or as directed by the Engineer. Tests shall be performed by the Contractor to determine transceiver system requirements, including signal strength, data transfer capabilities, spectral analyses and repeater locations (if any), and the results shall be submitted to the Engineer for approval prior to the installation of the master, remote and repeater radio transceivers. Only single radio repeaters are to be used for repeater functionality. The Contractor shall install a duplex receptacle (120VAC, 20A) in each cabinet for AC power to the spread-spectrum transceivers. Receptacles shall be wired to the existing 20 amp circuit breaker in accordance with the National Electrical Code. A spare transceiver fuse (F1) shall be included with each transceiver. Spare fuse shall be placed in a resealable envelope, labeled "spare transceiver fuse" and placed in the waterproof enclosure in the control cabinet.

b. **Antennas:** The Contractor shall install antennas, antenna masts, antenna cables and connectors at each master, repeater and remote radio transceiver location. The Contractor shall review all sites prior to installation and check clearance of all antennas to be installed with overhead power lines. Any location where the antenna will be closer than 10 feet to

the primary power line neutrals, the Contractor shall advise the Engineer. At no time shall any antenna be installed that would cause any conflict with distance regulations required by the power company.

Antenna masts shall be mounted on existing steel signal poles closest to the traffic signal controller cabinets. Masts shall be 1½ inch diameter minimum rigid galvanized metal conduit and shall be attached with the same type of band mount brackets required in Standard drawing SM-3 of the *Road and Bridge Standards.* Brackets shall be attached to the top of the pole with the antenna mast positioned horizontally away from the pole to prevent interference with the pole cap and any other attachments. The Contractor shall determine the required number of brackets to properly support the antenna and mast and submit to the Engineer for approval. Bracket hardware shall be galvanized steel or stainless steel. Location and length of the masts shall be determined prior to installation and submitted to the Engineer for approval.

Antennas shall be attached to the antenna mast with antenna manufacturers approved mounting brackets. Remote antennas shall be installed to the antenna masts and oriented such that the antennas point directly towards each respective master/repeater location. Antenna cable shall be attached to the antenna mast with stainless steel self locking straps at the first point of contact between cable and mast and the last point of contact prior to entering pole and on 18 inch centers between those points. The Contractor shall connect all antenna connections and seal all exposed antenna connections with 2 inch wide butyl rubber tape and cover with three overlapping layers of ¾ inch black UV electrical tape for a waterproof seal. Both layers of tape shall extend 2 inches beyond both ends of connector.

Antenna cables shall be continuous from the antennas to the lightning protection at each location. Antenna lead-in cable shall be run from the lightning protection unit to the transceivers at each location. The length of antenna lead-in cable shall not exceed a maximum of six feet and shall be designed for minimal loss. Antenna cables shall be routed from the traffic signal poles to the controller cabinets through existing spare conduits in pole and cabinet foundations. The Contractor shall connect the existing spare conduit from the pole to the cabinet with the same size conduit at each location prior to installing the antenna cable. Conduit from the pole to the cabinet shall not exceed the antenna cable manufacturers bending radius or exceed the number of bends. In the event there are not spare conduits in either the pole or cabinet foundation or the bending radius and/or the number of conduit bends exceeds the cable manufacturers recommendation, the Contractor shall advise the Engineer and submit a recommended alternate installation for the Engineers approval. Installation of additional conduit in the pole and/or cabinet foundation will be accomplished and paid for in accordance with Section 109.05 of the Specifications. Any cable damaged during installation shall be replaced prior to final acceptance of the project.

When antenna cable lengths are longer than 60 feet the Contractor shall advise the Engineer of such and provide the radio transceiver manufacturer's recommendation for antenna cable for approval prior to installing. Installation of this cable will be accomplished

and paid for in accordance with Section 109.05 of the Specifications. Antenna connectors shall be installed in accordance with the manufacturer's instructions for the particular type of connector used. The Contractor shall be responsible for any special tools required for installing the connectors to assure maximum mechanical and electrical reliability.

The Contractor shall be responsible for drilling any hole in the existing or new traffic signal pole for routing cables from the antenna into the pole. Holes in mast arm poles shall be drilled approximately 2 inches from the top of the pole to the top of the hole on the side opposite the mast arm. On mast arm poles where both remote and repeater antennas will be installed, the second hole shall be drilled 90° to the other hole at the same distance from the top of the pole. If slots for the antenna cable do not exist in the strain poles, holes shall be drilled the same as required for mast arm poles except the first hole shall be drilled on the side opposite the span wire. Holes shall be fitted with a protective neoprene grommet and shall be no larger than required to provide a snug fit for the antenna cable. The Contractor shall install silicone sealant between the grommet and the antenna cable to provide a weatherproof seal. Contractor shall install lightning protection device in traffic signal controller cabinets at each master, remote and repeater radio transceiver location. Lightning protection device shall be installed between the antenna cable and the antenna lead-in cable. Location of lightning protection shall be determined during installation by the Contractor and submitted to the Engineer for approval. Lightning protection shall not interfere with cabinet wiring or traffic control equipment. Lightning protection shall be electrically bonded with a # 6 bare copper conductor to the cabinet ground buss. All connections shall be electrically and mechanically sound.

c. **Equipment Testing:** Contractor shall conduct a VSWR test at each radio transceiver location with a fully configured antenna system. The VSWR shall not exceed 1.5:1 at 900 MHz. The Contractor shall verify all spread-spectrum radio transceiver tests and signal measurements by a factory-authorized technician. Documentation of the measurements shall be submitted to the Engineer prior to final acceptance of the spread-spectrum radio equipment. Testing of the spread - spectrum traffic signal system

V. WORKING DRAWINGS

The Contractor shall submit catalog cuts of the equipment to be installed in conformance with Section 105 and 700.03 of the Specifications.

VI. MEASUREMENT AND PAYMENT

Wireless Broadband Radio Transceivers will be measured in units of each and will be paid for at the contract unit price per each. This price shall include transceivers, power supplies, modem splitters, antenna lead-in cable, lightning protection, grounding equipment, duplex receptacles with wiring, spare transceiver fuse (F1), testing and connecting cables.

Antenna Cable will be measured in linear feet and will be paid for at the contract unit price per linear foot. This price shall include antenna cable, stainless steel straps, tape, neoprene grommets, silicone sealant and connectors.

Antenna will be measured in units of each and will be paid for at the contract unit price per each. This price shall include the antenna mast, mounting assemblies, and all tools, incidentals and labor necessary to complete the work.

Payment will be made under:

Pay Item	**Pay Unit**
Spread-Spectrum Radio Transceivers	Each
Antenna Cable	Linear Feet
Antenna	Each

CITY OF WINCHESTER
TECHNICAL SPECIFICATION
STREET LIGHTS

I. Description.

This work shall consist of furnishing and installing concrete foundations that will be used by Shenandoah Valley Electric to install new streetlights and installing new underground electric conduits.

II. Materials.

a) Concrete
1) Applicable VDOT Specifications

b) Reinforcing Steel
1) Applicable VDOT Specifications

c) Anchor Bolts
1) Shall be supplied by City (from Shenandoah Valley Electric)

d) PVC Conduit
1) PVC conduit shall be Schedule 80.

III. Procedures

1) Foundations shall be 24-inches in diameter and 60-inches deep.
2) Anchor bolts and anchor bolt pattern shall be supplied by the City (via Shenandoah Valley Electric).
3) 2-inch conduit shall be placed within the foundation as shown on the detail before pouring the concrete.
4) A #6 solid copper wire shall be placed within the foundation as shown on the detail before pouring the concrete. This copper wire shall be connected to a 5/8-inch ground rod, 8-feet long, that shall be supplied and installed by the Contractor adjacent to the foundation.
5) A ¼' nylon pull string shall be installed in the conduits.
6) Minimum burial depth shall be 2-feet.
7) Sweep ells shall be used for all bends in the conduit. Short elbows shall not be used.

IV. Measurement and Payment.

"Streetlight Foundation will be measured and paid for at the contract unit price per each foundation installed. This price shall include all equipment, labor and materials for installing the foundation, concrete, reinforcing steel, copper wire, ground rod and clamp, excavation, removal and disposal of existing asphalt or concrete, bedding and backfill, compaction, existing site restoration (including but not limited to asphalt and concrete), removal and disposal of excess material, sheeting and shoring.

"Conduit (size)" will be measured and paid for at the contract unit price per linear foot of conduit installed. This price shall include all equipment, labor and materials for installing the conduit under the sidewalk before the new sidewalk is installed or in the median, fittings, pull string, excavation, bedding and backfill, compaction, existing site restoration, removal and disposal of excess material, sheeting and shoring.

Payment will be made under:

Pay Item	**Pay Unit**
Streetlight Foundation	Each
Conduit, Size & Type	LF

CITY OF WINCHESTER
TECHNICAL SPECIFICATION
STORM SEWERS

I. Description.

This work shall consist of furnishing and installing or replacing various storm drainage system infrastructure components including, but not limited to: pipe, inlets (precast or cast-in-place), and manholes.

II. Materials.

a) Pipe

1) Unless otherwise noted, all drainage pipes within the roadway shall be Class III reinforced concrete pipe.

b) Inlets

1) Inlets shall be standard VDOT inlets, unless otherwise noted.
2) Inlets within the street shall be capable of sustaining an H-20 loading.
3) Covers on DI-3 inlets (including modified VDOT) shall have the City of Winchester logo.

c) Manholes/Structures

1) Manholes shall be capable of sustaining an H-20 loading.
2) Manholes can be standard VDOT manholes or a special/modified design.
3) Manholes/Structures that are not standard VDOT designed shall be designed by a Virginia Professional Engineer. Contractor shall submit the sealed design drawings for all special/modified manholes to the City for review and approval.
4) Precast manholes are preferred, but manholes can be cast-in-place as approved by City.
5) All manhole covers shall have the City of Winchester logo.

III. Procedures

a) General

1) The Contractor shall be responsible to construct the project so positive drainage is achieved in all locations within the project area.

b) Backfill/Bedding

1) The storm pipe shall be bedded by hand, or approved mechanical method, from 6 inches below the pipe to a minimum of 12-inches above the pipe with crushed stone classified as VDOT No. 57. Bedding material shall be deposited in the trench for its full width of each side of the pipe.
2) All inlets and manholes shall be installed on 6-inches of compacted granular bedding material (VDOT Class 21-A or VDOT No. 57).

c) Depth and Grades

1) Depth and grade shall be as shown on the drawings.

IV. Measurement and Payment.

"Storm Drain Pipe (Size and Type)" will be measured in linear feet and will be paid for at the contract unit price per linear foot. Measurement shall be along the centerline of the pipe. This price shall include furnishing and installing: the pipe, all fittings, excavation, removal and disposal of existing asphalt or concrete, bedding and backfill, compaction, removal and disposal of excess material, sheeting, shoring, and restoring existing surfaces.

"Storm Structure (#)" will be measured and paid for at the contract unit price for each. This price shall include furnishing and installing: the inlet (pre-cast or cast in place) or structure, excavation, removal and disposal of existing asphalt or concrete, bedding and backfill, compaction, removal and disposal of excess material, sheeting and shoring. Where curb or curb and gutter extend along the drop inlet, the contract unit price for drop inlets shall include that part of the curb or gutter within the limits of the structure. Price shall also include providing a sealed design drawing from a Virginia Professional Engineer for any special or VDOT modified inlet/structure. If the structure is an existing structure, the price shall include any and all modifications required to the existing structure.

"Adjust Manhole/Structure Top" will be measured and paid for as a lump sum. This price shall include removal of frames, covers and gratings and the walls shall be reconstructed as required. Cleaned frames shall be reset at the required elevation. Upon completion of the adjustment, each structure shall be cleaned of silt, debris and foreign matter and shall be kept clear of such accumulation until final acceptance.

"Storm Sewer Manhole Frame & Cover" will be measured and paid for each. This price shall include furnishing and installing: the manhole frame & cover, excavation, removal and disposal of existing asphalt or concrete, bedding and backfill, compaction, removal and disposal of excess material, sheeting and shoring.

Payment will be made under:

Pay Item	**Pay Unit**
Storm Sewer Pipe (Type and Size)	LF
Storm Structure (Type)	Each
Adjust. Manhole/Structure Top	Each
Storm Sewer Manhole Frame and Cover	Each

I. Description.

This work shall consist of furnishing and installing various potable water distribution system infrastructure components including, but not limited to: water mains, water services and meters, fire hydrants, valves, and fittings.

II. Materials.

A. Water Mains

1) Ductile iron pipe shall be used for water lines 4 inches and larger in diameter. The ductile iron pipe shall conform to the requirement of AWWA Standard C151. Pipe shall be Class 52 minimum with cement-mortar lining and a bituminous seal coating conforming to the requirements of AWWA C205.
2) Ductile iron pipe shall be zinc coated, conforming to AWWA C150 and C151 with the following minimum properties:
   i) Coating system shall conform to ISO 8179
   ii) Coated with a layer of arc-sprayed zinc – 200 g of zing shall be applied per m^2 of pipe surface area.
   iii) Asphaltic top-coat shall be applied. The mean dry thickness shall be greater than or equal to 3 mils. The local allowable thickness is 2 mils.
3) Ductile iron pipe shall be encased in polyethylene in accordance with AWWA C105. Bag shall be V-Bio polywrap flat tube linear low-density polyethylene film (minimum 8 mil) or approved equal.

B. Pipe Fittings

1) All pipe fittings shall be ductile iron conforming to AWWA C-110, C-111, C-153. Fittings shall be cement-mortar lined and with a bituminous seal coat and epoxy coating.
2) Fittings shall be short body standard with mechanical joints for buried installation and flanged for interior and exterior exposed installations.
3) All fittings shall have a pressure rating of 350 psi or greater.
4) Mechanical joint restraint for ductile iron fittings shall be incorporated in the design of the retainer gland. The gland shall include a restraining mechanism which, when activated, imparts multiple wedging action against the pipe which increases its resistance as pressure increases.
5) Glands shall be designed to allow flexibility of pipe joints after installation and backfill. Glands shall be manufactured of ductile iron, conforming to ASTM A536-80. Glands shall have U.L. listing through 24-inch in size and Factory Mutual approval through 12-inch.
6) Retainer glands shall be used on each side of fittings where the water main changes direction. Additional sets of retainer glands are required at pipe lengths above and below fittings as required.
7) Retainer glands shall be Megalug Series 1100, Uni-Flange Series 1400, or approved equal.
8) Thrust restraint on slip joint ductile iron pipe shall be American Ductile Iron Flex-Ring Joint Pipe or approved equal.
9) All accessories shall be blue fluoropolymer coated.

C. Direct Bury Gate Valves

1) Gate valves 12 inches and smaller shall be of the tight-closing resilient seated gate valves, which meet or exceed the requirements for AWWA C-515.
2) All resilient seat valves are to be ductile iron body, internally reinforced molded natural rubber mounted, wedged disc, non-rising stem, tapered seat type.
3) Valves shall have a clear, unobstructed water way when fully opened and shall be at least as large as the pipe inside diameter for which it is intended.
4) Valves shall open counterclockwise and seating shall use compression closure.
5) Valve end connections shall be mechanical joint.
6) Top operating nut shall be 2-inch square operating nut.
7) The operating stem shall be a minimum diameter of 7/8-inch with a triple O-ring seal. The configuration of the O-rings shall be two above and one below the thrust collar.
8) Valves must have a 250 psi working pressure and 400 psi test pressure.
9) Valves installed with more than 5 feet of cover shall have extension rods added to bring the operating nuts to within 3 feet of the surface.
10) Manufacturer shall be Mueller Company (Model 2360), American Flow Control (Series 2500 Resilient Wedge Valve), Kennedy (Model #7571 D.B.) or approved equal.

D. Valve Box Assemblies

1) Valve boxes are to be installed on all valves within the water network. These boxes shall be two piece and screw type for adjustment to finish grade.
2) All valve boxes shall be installed upon the valve with the use of a Valve Box Adaptor II as manufactured by Adaptor, Inc. or approved equal. The adaptor shall be manufactured to fit the specified size and brand of both valve and valve box with which it is installed. The adaptor shall be made of a resilient rubber material. The adaptor shall be installed in lieu of hardwood blocking and shall be installed incidental to the valve and box installation.
3) Valve box shall be furnished with a 5-1/4-inch lid made of cast iron and marked "Water".
4) When valve may be subjected to traffic, the top of the valve box shall be flush with the final surface. An 18" x 18" concrete pad (6" thick) is required around valve boxes installed outside of pavement area.

E. Tapping Sleeves and Valves ("Wet Taps")

1) Tapping sleeves shall be ductile iron construction meeting ASTM Grade 65-45-12. Side flange seals shall be of the O-ring type. Sleeves shall be coated with asphaltic varnish in compliance with NSF-61.
2) Stainless steel tapping sleeves may be used on pipe sizes 6 inch through 30 inch and shall be Ford Style FAST or FTSS, or approved equal.
3) Tapping sleeves shall be American Flow Control Series 2800, or approved equal.
4) Valves shall be American Flow Control Series 2500 resilient wedge valve or approved equal.
5) Tapping valves shall be resilient seat type with bodies and bonnets made of ductile iron for 250 psi working pressure. Cutters used shall be at least 1/4-inch smaller than the valve size.

F. Fire Hydrants

1) Hydrants shall be dry barrel conforming to AWWA C502, and have a traffic breakaway flange and stem coupling.
2) Design of the hydrant shall be of the compression type main valve and O-ring seal between the operating nut and bonnet.
3) Traffic breakaway flange shall be installed 4 inches from the final grade.
4) Hydrant shall have a 6-inch inlet and a 4-1/2 inch valve opening. Outlets shall be one 4-1/2 inch streamer nozzle and two 2-1/2 inch hose nozzles. Outlet nozzles shall be field replaceable utilizing straight threads or quarter turn seal by an O-ring. Each nozzle cap shall be equipped with chain and gasket.
5) Hydrant shall open right (clockwise) utilizing a pentagon shaped nut 1-1/2 inch in size.
6) Install "out-of-service" signs on new fire hydrants until all testing is complete and the hydrants become active.
7) Fire hydrants to be used as air release shall:

    a) Provide positive slope upward from hydrant tee to fire hydrant base.
    b) Mechanical joint ductile iron pipe and fittings with retainer glands at each fitting required.

8) Hydrants shall be American Darling, Model MK-73-2, as manufactured by American Flow Control, Kennedy Valve Guardian K81D, or approved equal. Upper barrel, lower barrel and base must be ductile iron painted yellow. Base bolts and nuts must be stainless steel.
9) Hydrant shall have a solid base surrounding the barrel no less than 24 inches by 24 inches by 6 inches deep. The solid base shall include high density concrete. Tamped soil is not considered a solid base.

G. Water Services

1) 3/4-inch Water Service

a) Water services to be installed in accordance with the City of Winchester Standard Details.
b) Corporation stops shall conform to AWWA C800, minimum pressure rating of 250 psi, 3/4-inch ball style, as manufactured by Ford, Model FB1000 or approved equal. Connection at corporation stop shall be flared or compression.
c) Service line shall be 3/4-inch ID type "K" copper tubing and shall be one continuous piece from corporation stop to meter setting.
d) Meter setting shall consist of a meter yoke, inlet angle valve, and outlet double check valve. The meter setting shall have two independent vertical cartridge check valves and be in conformance with ASSE 1024. Meter setting shall include:
    - iron yoke bar (Ford model Y502)
    - iron yoke expansion connector (Ford Y502)
    - yoke angle dual check valve (Ford HHCA94-323TV)
    - yoke angle ball valve (Ford BA94-223W)

e) Meter box shall be 18 inches in diameter and 30 inches tall, high density polyethylene (HDPE), with an 18-inch diameter frame and 11-1/2 inch diameter hinged lid. Meter box shall have a 10,000 lb minimum crush rating and shall have a minimum wall thickness of ½ inch. Frame and lid shall be made of cast iron and shall be recessed to accommodate the Neptune Radio Read antennae. Frame and lid shall be A.Y McDonald model number 74M32ARG. Traffic rated lids are required in areas subject to traffic; frame and lids shall be A.Y. McDonald meter box cover 74H32ARG.

2) 1-inch and Dual ¾-inch Water Service

a) Water services to be installed in accordance with the City of Winchester Standard Details.
b) Corporation stops shall be 1-inch and shall conform to AWWA C800, as manufactured by Ford, Model FB1000 or approved equal.
c) Service line shall be 1-inch ID type "K" copper tubing and shall be one continuous piece from corporation stop to meter setting.
d) Meter box shall be 20-inch by 24-inch tapered “bullet box” and 30 inches tall, high density polyethylene (HDPE). The interior of the box shall be white for light reflection. Frame and lid shall be made of cast iron and shall be recessed to accommodate the Neptune Radio Read antennae. Frame and lid with centering prongs shall be A.Y. McDonald model number 74MRARG. Traffic rated lids are required in areas subject to traffic and shall be Ford meter box cover X32H.
e) 1-inch meter setting shall consist of a meter yoke, inlet angle valve, and outlet double check valve. The meter setting shall have two independent vertical cartridge check valves and be in conformance with ASSE 1024. Meter settings shall include:
   - Iron yoke bar (Ford model Y504)
   - Iron yoke expansion connection (Ford Y504)
   - Yoke angle dual check valve (For HHCA94-444TV)
   - Yoke angle ball valve (Ford BA94-334W)
f) Dual ¾-inch meter settings shall consist of two single meter settings connected by a U-branch (Ford U48-427.5).

1) 1-1/2 inch and 2-inch Water Services

a) Water services to be installed in accordance with the City of Winchester Standard Details.
b) Corporation stops shall be 2 inches in size and shall conform to AWWA C800, as manufactured by Ford, or approved equal.
c) Service line shall be 2-inch ID SDR 9 polyethylene line and shall be one continuous piece from corporation stop to curb stop. Tracer wire shall be wrapped around the polyethylene service line and shall be connected on each end to the corporation stop and the curb stop.
d) Meter shall be set in a custom meter setting consisting of flanged angle valve on the inlet and outlet. Include bypass with ball valve and locking cap.

e) Meter box shall be 4'-0" long x 4'-0" wide x 4'-0" deep as shown in Standard Detail WD-4.
f) Access door shall be H-20 rated as manufactured by Bilco Door Company, Type PCM-2, or Halliday Products Model H1R3030. Dimensions shall be 2'-6" x 2'-6".
g) Backflow device shall meet applicable plumbing codes and City of Winchester Ordinance. Device must be installed outside of meter box.

III. Procedures

A. Bedding and Backfill

1) Outside of Traffic Area (see Detail WS-1)

1) The water main pipe, fittings and appurtenances shall be bedded by hand, or approved mechanical method, from 6 inches below the pipe to 12 inches above the pipe with crushed stone classified as VDOT No. 57. Bedding material shall be deposited in the trench for its full width of each side of the pipe, fitting or appurtenance.
2) From 12 inches above the pipe to the final grade, excavated trench material containing stones no greater than 3 inches in diameter may be used as backfill material, unless otherwise specified.

2) Within Traffic Area (See Detail WS-2)

a) The water main pipe, fittings and appurtenances shall be bedded by hand, or approved mechanical method, from 6 inches below the pipe to 12 inches above the pipe with crushed stone classified as VDOT No. 57. Bedding material shall be deposited in the trench for its full width of each side of the pipe, fitting or appurtenance.
b) When pipe is constructed within the road, street, driveway or parking lot, granular backfill (VDOT Class 21A) is required for the full depth of backfill. Backfill shall be placed in 6-inch layers and compacted by tamping.
c) Granular backfill (VDOT Class 21A) is required for the full depth of backfill where the trench is outside of the pavement but the nearest trench wall is within 5 feet of the edge of pavement.
d) Pipe trenches shall be restored within 24 hours. When necessary, trenches may be restored temporarily with cold patch asphalt. When weather permits, temporary trenches must be restored permanently within 7 days.

B. Thrust Restraint

1) Both megalug mechanical joint restraints and/or megalug slip joint restraint harness <u>and</u> concrete thrust blocks are required in all locations for thrust restraint including:
   a) Bends (Inlet and Outlet)
   b) Tee – All Branches

c) Offsets – Inlet and Outlet
d) Caps
e) Plugs
f) Dead Ends
g) Hydrant run-outs shall be restrained as dead ends

C. Depth

1) All lines shall be laid with a minimum cover of 36 inches from the top of pipe to finished ground surface grade. Water main cover shall not exceed 11 feet with City approval.

D. Separation of water mains and sewers (both sanitary and storm)

1) Parallel installation. Under normal conditions water mains shall be laid at least 10 feet horizontally from a sewer or sewer manhole. The distance shall be measured edge to edge.
2) Parallel installation. Under unusual conditions when local conditions prevent a horizontal separation of 10 feet, the water main may be laid closer to a sewer or sewer manhole provided that:

   a) The bottom of the water main shall be at least 18 inches above the top (crown) of the sewer.
   b) Where this vertical separation cannot be obtained, the sewer shall be constructed of Class 52, ductile iron water pipe, pressure tested in place without leakage prior to backfilling.
   c) The sewer manhole shall be of watertight construction and tested in place.

3) Crossing. Under normal conditions, water lines crossing sewers shall be laid to provide a separation of at least 18 inches between the bottom of the water line and the top of the sewer whenever possible.
4) Crossing. Under unusual conditions when local conditions prevent a vertical separation of 18 inches, the following construction shall be used:

   a) Sewers passing over or under water mains shall be constructed of Class 52, ductile iron sewer pipe according to the standards for ductile iron gravity mains.
   b) Water mains passing under sewers shall be protected by providing:

      (1) A vertical separation of at least 18 inches between the bottom of the sewer and the top of the water main.
      (2) Adequate structural support for the sewers to prevent excessive deflection of the joints and the settling on and breaking of the water main. Support may be provided by a concrete cradle sized appropriately for the sizes of the mains and the surrounding soil conditions.
      (3) The length of the water main pipe section shall be centered at the point of crossing so that the joints shall be equidistant and as far as possible from the sewer.

5) No water main shall pass through or come in contact with any part of a sewer manhole.

E. Connections to Existing System

1) All connections to the existing system shall be made by a "wet tap" with a tapping sleeve/valve, as directed by the City.

F. Pressure and Leakage Test

1) General - Distribution Mains

   a) Testing shall be in accordance with the Virginia Department of Health and AWWA C600.
   b) Test pressure shall not exceed pipe or thrust-restraint design pressures.
   c) Test pressure shall not vary for the duration of the test.
   d) Test pressure shall not exceed the rated pressure of the valves when the pressure boundary of the test section includes closed, resilient-seated gate valves or butterfly valves.
   e) When hydrants are in the test section, the test shall be made against open hydrant valves.

2) Test Procedure - Distribution Mains

   a) After the pipe has been laid all pipe shall be subjected to a hydrostatic pressure of not less than 150 psi or 1.25 times the working pressure at the highest point along the test section.
   b) Each section of pipe to be tested shall be slowly filled with water.
   c) Expel all air from pipeline.
   d) Apply 100 percent of required test pressure at beginning of test. It is good practice to allow the system to stabilize at the test pressure before conducting the leakage test.
   e) Maintain test pressure for a minimum of 2 hours.
   f) There shall be zero leakage during the test period.
   g) If the leakage is greater or the pressure cannot be maintained, the contractor shall locate and make approved repairs as necessary until the leakage is within the specified tolerance.
   h) All visible leaks are to be repaired, regardless of the amount of leakage.

3) Test Procedure - Fire Lines

   a) Test procedure is the same as described above, except that the test pressure shall be 200 psi, duration of test is 1 hour. There shall be zero leakage during the 1-hour test period.

G. Disinfection

1) Disinfection shall be performed after the pressure testing has passed and approved by the City of Winchester.
2) All water mains shall be disinfected and bacteriological testing completed immediately prior to being placed in operation.
3) The basic disinfection procedure consists of:

   A. Preventing contamination materials from entering the water main during storage, construction or repair.
   B. Removing, by flushing or other means, those materials that may have entered the water main.
   C. Chlorinating any residual contamination that may remain, and flushing the chlorinated water from the main. A newly installed main shall be disinfected in accordance with AWWA C651, and the Virginia Department of Health regulations.
   D. Protecting the existing distribution system from backflow due to hydrostatic pressure test and disinfection procedures.
   E. Determining the bacteriological quality by laboratory test after disinfection.
   F. Final connection of the approved new main to the active distribution system.

4) Chlorination shall be by the tablet method, unless otherwise approved in writing by the City of Winchester. This method may be used only if the pipe and appurtenances are kept clean and dry during construction. Alternate disinfection procedures may be required at the option of the City of Winchester if the circumstances are such that the pipe and appurtenances are not kept clean and dry.

   During construction, 5-g calcium hypochlorite tablets shall be placed in each section of pipe. Also, one such tablet shall be placed in each hydrant, hydrant branch and other appurtenances. Table 1 shows the number of tablets required for commonly used sizes of pipe.

Table 1. Number of 5-g calcium hypochlorite tablets required for dose of 25 mg/l

Length of Pipe Section, ft					
Pipe Diameter (inches)	</= 13	18	20	30	40
	Number of 5-g calcium hypochlorite tablets				
4	1	1	1	1	1
6	1	1	1	2	2
8	1	2	2	3	4
10	2	3	3	4	5

12	3	4	4	6	7
16	4	6	7	10	13

Filling and contact. When installation has been completed, the main shall be filled with water at a rate such that water within the main will flow at a velocity no greater than 1 ft/s. Precautions shall be taken to ensure that air pockets are eliminated. This water shall remain in the pipe for at least 24 hours.

Final flushing: After the required retention period, the chlorinated water shall be flushed from the main using potable water. However, the chlorinated water shall not be flushed out until the residual is less than 1 mg/L. A reducing agent shall be applied as required to achieve this residual.

After final flushing and before the main is placed in service, two consecutive sets of acceptable samples, taken at least 24 hours apart, shall be collected from the main. At least one set of samples shall be collected from every 1,000 feet of the new main, plus one set from the end of the line and at least one set from each branch. Samples shall be collected in the presence of an inspector for the Department of Public Utilities in bottles provided by the City. Samples shall be tested for bacteriologic quality by the City of Winchester, and shall show the absence of coliform organisms. If contamination is indicated, then the disinfection/testing procedure must be repeated.

H. New Service Line Installations

1) Contractor shall coordinate and schedule with each individual customer any disruption in service necessary to place the new water service lines in operation.

I. Valve Insertions

1) As directed by the City, valves shall be inserted into existing water mains, as necessary, to minimize disruptions to existing customers during the project.

J. Bypass System

1) Contractor shall provide and operate a water service bypass system as shown on the contract drawings. Contractor shall be permitted to provide an alternate bypass plan for the City's consideration; any deviation from the City-provided plan shall be reviewed and approved by the City prior to bypass system installation.

IV. Measurement and Payment.

"Water Main Installation" will be measured in linear feet and will be paid for at the contract unit price per linear foot. Measurement shall be along the centerline of the pipe and fittings. This price shall include furnishing and installing: the pipe, all fittings, poly-wrap, mechanical restraints and concrete thrust blocks, excavation, removal and disposal of existing pipe, asphalt or concrete, bedding and backfill, base asphalt

in the trench, compaction, removal and disposal of excess material, sheeting and shoring, concrete encasement, testing, disinfecting, dewatering, and any other work necessary to provide a complete and working water system. The price shall also include establishing and maintaining a water main bypass system during installation and the removal and disposal of the existing water main.

"Gate Valve and Box" will be measured and paid for each valve installed in the water main and fire hydrant services. This price shall include furnishing and installing: all components shown on standard detail WD-8, including the valve, mechanical restraints and concrete thrust blocks, extension stem, valve box, concrete pad around the valve box (in unpaved areas), excavation, removal and disposal of existing asphalt or concrete, bedding and backfill, base asphalt in the trench, compaction, removal and disposal of excess material, sheeting and shoring.

"Wet Tap" will be measured and paid for each tapping sleeve and valve installed to connect to an existing water main. This price shall include furnishing and installing: the tapping sleeve and valve, mechanical restraints and concrete thrust blocks, valve box and extension stem, concrete pad around the valve box (in unpaved areas), excavation, removal and disposal of existing asphalt or concrete, bedding and backfill, base asphalt in the trench, compaction, removal and disposal of excess material, sheeting and shoring.

"Water Service Line" will be measured and paid per linear foot of service line installed. This price shall include furnishing and installing the service saddle and tapping the water main, corporation stop, quarter bend coupling, copper or PE service line, excavation, removal and disposal of existing asphalt or concrete, bedding and backfill, base asphalt in the trench, compaction, removal and disposal of excess material, sheeting and shoring. **The existing water meter will be placed in the new meter assembly by the Contractor at the time of placing the new service line in operation.** Price shall also include existing site restoration, including asphalt repairs within the roadway, topsoil, seeding, etc.

"Water Meter Assembly" will be measured and paid for each meter assembly installed. This price shall include furnishing and installing: all components shown on standard details WD-1, WD-2, WD-3 or WD-4, including the meter setting, meter box/vault and lid/hatch, valves, backflow devices, excavation, removal and disposal of existing asphalt or concrete, bedding and backfill, base asphalt in the trench, compaction, removal and disposal of excess material, sheeting and shoring. **The existing water meter will be placed in the new meter assembly by the Contractor at the time of placing the new service line in operation.** Price shall also include existing site restoration, including asphalt repairs within the roadway, topsoil, seeding, etc.

"Fire Hydrant Assembly" will be measured and paid for each fire hydrant installed. This price shall include furnishing and installing: all components shown on standard detail WD-7, including the fire hydrant, fittings, mechanical thrust restraint and concrete thrust blocks, tie road, concrete base, drainage fill, disinfection and testing, excavation, removal and disposal of existing asphalt or concrete, bedding and backfill, compaction, removal and disposal of excess materials, sheeting and shoring. The lateral piping required will be paid under "Ductile Iron Water Main" and the gate valve/box will be paid for under "Gate Valve and Box."

Payment will be made under:

Pay Item	**Pay Unit**
Water Main Installation, Size & Type	LF
Gate Valve and Box, Size	EA
Wet Tap, Size	EA
Water Service Line, Size & Type	LF
Water Meter Assembly, Size	EA
Fire Hydrant Assembly	EA

I. Description.

This work shall consist of furnishing and installing various sanitary sewer collection system infrastructure components including, but not limited to: sanitary sewer mains, manholes, laterals and cleanouts.

II. Materials.

a) Gravity Sanitary Sewer Mains

1) Sanitary sewers shall be polyvinylchloride (PVC) SDR 26 heavy wall sewer pipe and shall meet or exceed ASTM D-3034. Joints shall be gasketed, bell and spigot type with the bell made integral with the pipe.
2) Each length of pipe shall be marked with the manufacturer's name, trade name, nominal size, class, hydrostatic test pressure, manufacturer's standard symbol to signify it was tested, and date manufactured.

b) Pipe Fittings

1) PVC fittings used in a gravity collection system shall be of the same SDR rating as the collection pipe being used.
2) Fittings are permitted only on service laterals and drop manholes in gravity collection system.

c) Manholes

1) Manholes shall be precast reinforced concrete capable of sustaining an H-20 loading and meeting standards put forth under ASTM C-478.
2) Manholes shall have a minimum inside diameter of 48 inches with a minimum wall thickness of five inches.
3) The base section shall be monolithic to a point 12 inches above the crown of the incoming pipe with a minimum base thickness of 8 inches. The base shall have a diameter 12 inches larger than the barrel of the manhole.
4) Pipe holes in new manholes shall be properly located and cast in place with appropriate boot (Hamilton-Kent Tylex Cast-in-Boot or approved equal). After assembly, pipe to be grouted in place using non-shrinking grout inside the manhole.
5) Services into existing manholes may be cored and shall be sealed using Kor-N-Seal or Lock-Joint with two stainless steel bands by Dukor Co., Milford, NH, to hold the pipe in position.
6) Cone sections shall be eccentric narrowing from 48 inches to 24 inches inside diameter.
7) Flat top sections shall be used in place of a cone section for manholes less than 5 feet deep. The 24-inch access hole shall be offset to allow easy access to steps and shall be reinforced to support H-20 loading.
8) The exterior of the manhole shall be covered with fibrous bitumastic coating.
9) Manhole steps conforming to the applicable provisions of ASTM Specifications C 478 such as aluminum 14967 as manufactured by Alcoa or plastic steps manufactured by MA Industries or equal, shall be factory built into precast sections. Step spacing and alignment to be maintained uniform and vertical throughout the depth of the manhole.
10) Each manhole section shall have not more than two holes for the purpose of handling and laying. These holes shall be sealed with cement mortar.

1) Joints of the manhole sections shall be of the tongue and groove type; sections shall be joined using 0-ring rubber gaskets.
2) All joints, holes, etc., shall be sealed with cement mortar.
3) Drop connections shall be used in the following cases:
    1) For pipes with diameters between 8” and 12”, an inside drop connection shall be used when the distance between the invert in and invert out is greater than 3’-1”. If the distance between the invert in and invert out is less than 3’ – 1”, the incoming line shall be lowered such that the invert in is no greater than 2’ above the invert out.
    2) For pipe with diameters 15” and greater, an outside drop connection shall be used when the distance between the invert in and invert out is greater than 6’-0”. If the distance between the invert in and invert out is less than 6’-0”, the incoming line shall be lowered such that the invert in is no greater than 2’ above the invert out.

d) Manhole Frame & Cover

1) Manhole frames and covers shall conform to ASTM A-48. The words "sanitary sewer" and the City Logo shall be cast into the cover and shall be plainly visible, per standard detail SS-6.
2) Manhole frames and covers shall be as manufactured by Neenah Foundry, Item No. 1643T05, or approved equal.

e) Lateral Piping

1) PVC pipe used for installation of lateral services shall be 4-inch unless otherwise specified and have a minimum wall thickness of SDR 26. All fittings shall be gasketed.
2) D.W.V. fittings shall comply with ASTM D-2665, and be socket by socket. Gasketed adapter shall meet ASTM D-3139 with gaskets meeting ASTM F-477.
3) 4-inch main line and lateral cleanout wyes shall be gasket by gasket by gasket on stand pipe lead.
4) Cleanouts for 4-inch laterals shall be 4-inch cast iron gasketed cleanouts with a recessed brass screw plug, Panella model PA4SV-CSK.
5) Lateral connections to an existing sewer shall be made with a boot-n-saddle with stainless steel straps and appropriate rubber fitting or by cut-in wye, using an 8x6 inch PVC tee wye, then reduced to 4” PVC.
6) Cleanouts subject to traffic or in the sidewalk area shall have a cleanout frame and cover. Cleanout frames and covers shall be Capitol Foundry model B-1140 or approved equal.

III. Procedures

a) Bedding and Backfill

1) The sanitary sewer pipe, fittings and appurtenances shall be bedded by hand, or approved mechanical method, from 6 inches below the pipe to a minimum of 12-inches above the pipe with crushed stone classified as VDOT No. 57. Bedding material shall be deposited in the trench for its full width of each side of the pipe, fitting or appurtenance.

2) Granular backfill (VDOT Class 21A) is required for the final 18-inches of backfill. Backfill shall be placed in 6-inch layers and compacted by tamping.

b) Depth

1) All sanitary sewer mains shall be laid with a minimum cover of 36 inches from the top of pipe to finished ground surface grade.

c) Separation of water mains and sewers (both sanitary and storm)

1) Parallel installation. Under normal conditions water mains shall be laid at least 10 feet horizontally from a sewer or sewer manhole. The distance shall be measured edge to edge.
2) Parallel installation. Under unusual conditions when local conditions prevent a horizontal separation of 10 feet, the water main may be laid closer to a sewer or sewer manhole provided that:

   a) The bottom of the water main shall be at least 18 inches above the top (crown) of the sewer.
   b) Where this vertical separation cannot be obtained, the sewer shall be constructed of Class 52, ductile iron water pipe, pressure tested in place without leakage prior to backfilling.
   c) The sewer manhole shall be of watertight construction and tested in place.

3) Crossing. Under normal conditions, water lines crossing sewers shall be laid to provide a separation of at least 18 inches between the bottom of the water line and the top of the sewer whenever possible.
4) Crossing. Under unusual conditions when local conditions prevent a vertical separation of 18 inches, the following construction shall be used:

   a) Sewers passing over or under water mains shall be constructed of Class 52, ductile iron water pipe with Sewper Coat Lining (Griffin).
   b) Water mains passing under sewers shall be protected by providing:

      (1) A vertical separation of at least 18 inches between the bottom of the sewer and the top of the water main.
      (2) Adequate structural support for the sewers to prevent excessive deflection of the joints and the settling on and breaking of the water main.
      (3) The length of the water main pipe section shall be centered at the point of crossing so that the joints shall be equidistant and as far as possible from the sewer.

5) No water main shall pass through or come in contact with any part of a sewer manhole.

e) Connections to Existing System

1) All connections to existing sanitary mains shall be made with a saddle type connection with a stainless steel strap, ductile iron saddle and rubber boot, as directed by the City.

1) All connections to new sanitary mains shall be made by using a manufactured PVC tee-wye, same class as the pipe, as directed by the City.

f) Inspections and Testing

1) General

a) All costs of cleaning, inspection and testing are to be borne by the Contractor and/or Developer.
b) Cleaning, televising and testing shall be performed a minimum of 30 days after the completion of backfill and compaction, and shall be witnessed by the City. The Contractor or Developer shall contact the City at the start of the waiting period.
c) Any portion of the sanitary sewer system failing to meet the inspection or testing requirements of the City of Winchester shall be corrected to the satisfaction of the City. The costs for such corrections shall be borne by the Contractor and/or Developer.
d) All repair methods, other than replacement of the defective areas with new materials, shall be subjected to prior approval of the City. Grouted, collared, clamped, or otherwise patched sewer pipe shall not be acceptable.
e) All unacceptable conditions found during television inspection must be corrected and re-televised.

2) Test Procedure – Gravity Sewer Mains

a) The completed sanitary sewer shall be high-pressure water jet cleaned and subjected to a low pressure air test. In accordance with the following procedures:

1) All service laterals, cleanouts, stubs and fittings within the sewer test section shall be properly capped or plugged during construction to prevent air loss that could cause an erroneous air test result.
2) Plugs shall be supplied and installed by the Contractor in the line to be tested at each manhole. Each plug shall be securely placed.
3) Low pressure air shall be slowly introduced into the sealed line until a constant internal pressure of 4.0 psi is maintained.
4) After a constant pressure of 4.0 psi is reached, the air supply shall be throttled back to maintain that internal pressure for at least two minutes.
5) After the stabilization period, the air hose from the control panel to the air supply shall be shut off or disconnected, and the test shall begin.
6) For a section of the line to pass, there shall be zero leakage for a five-minute interval after the supply has been shut off.

b) The entire length of all flexible sewers shall be tested for deflection using a “go-no-go” mandrell (95% of the pipe’s internal diameter).
c) Sewer line sections shall be visually inspected by means of a closed circuit television. The inspection shall be done one manhole section at a time and recorded on a VHS cassette. Sewers are to be flow tested before television inspection to ensure no

ponding occurs.

1) The television camera used for the inspection shall be one specifically designed and constructed for such inspection. The image shall be clear enough to enable the City representative and others viewing the monitor to easily evaluate the interior condition of the pipe. The inspection shall be recorded on a VHS videocassette and the City shall retain a copy of the tape.
2) The visual inspection may be provided by an approved TV inspection firm or by the City. If the Developer should request this service from the City, He/she shall be charged per lineal foot inspected at the current rate.

3) Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. The camera shall have a footage-recording device and the footage shall be displayed on the monitor.

4) Unacceptable conditions that adversely affect the ability of the system to function as designed or to be properly maintained may include, but are not limited to the following:

   a) Protruding taps.
   b) Root intrusion.
   c) Cracked or faulty pipe.
   d) Improper pipe repair.
   e) Misaligned or deformed pipe.
   f) Debris in line.
   g) Infiltration/exfiltration.
   h) Bellies or sags with a depth greater than or equal to 10% (or a maximum of 1-1/2 inches) of pipe diameter and/or a length greater than 25 feet.

3) Test Procedure - Manholes

   a) Precast concrete manholes shall be tested in accordance with ASTM C 1244-93, standard test method for concrete sewer manholes by the negative air pressure test (vacuum method).
   b) Manholes shall be tested after installation with all connections in place.
   c) Procedure for testing shall be as follows:

      1) Temporarily plug all pipes entering the manhole at least eight inches into the sewer pipe. The plug must be inflated at a location past the manhole/pipe gasket, and braced to prevent the plugs or pipes from being drawn into the manhole.
      2) The test head shall be placed inside the frame at the top of the manhole and inflated, in accordance with the manufacturer's recommendations.
      3) A vacuum of ten inches of mercury (10" Hg) shall be drawn on the manhole. Shut the valve on the vacuum line to the manhole and shut off the pump or disconnect the vacuum line from the pump.

4) The pressure gauge shall be liquid filled, having a 3.5 inch diameter face with a reading from zero to 30 inches of mercury.
5) The manhole is considered to pass the vacuum test if the time for the vacuum reading to drop from 10" to 9" Hg is one minute or more.
6) If the manhole fails the test, necessary repairs shall be made. The vacuum test shall be repeated until the manhole passes the test.
7) All temporary plugs and braces shall be removed after each test.

d) Manholes shall show no signs of ponding water in the inverts.

g) New Service Line Installations

1) Contractor shall coordinate and schedule with each individual customer any disruption in service necessary to place the new sanitary laterals in operation.

h) Inactive Sewer Laterals

1) All sewer laterals found to be inactive when excavated shall be sealed with concrete and backfilled. Concrete cap may be placed at the point of excavation as the lateral does not need to be terminated at the main.

IV. Measurement and Payment.

"Sanitary Sewer Manhole" will be measured and paid for each manhole installed. This price shall include furnishing and installing: the manhole, excavation, removal and disposal of existing asphalt or concrete, bedding and backfill, compaction, removal and disposal of excess material, sheeting and shoring.

"Sanitary Sewer Manhole Frame & Cover" will be measured and paid for each. This price shall include furnishing and installing: the manhole frame & cover, excavation, removal and disposal of existing asphalt or concrete, bedding and backfill, compaction, removal and disposal of excess material, sheeting and shoring. Price shall also include existing site restoration, including asphalt repairs within the roadway, topsoil, seeding, etc.

"Sanitary Sewer Main (Type and Size)" will be measured in linear feet and will be paid for at the contract unit price per linear foot. Measurement shall be along the centerline of the pipe. This price shall include furnishing and installing: the pipe (SDR 26 PVC), excavation, removal and disposal of existing asphalt or concrete, bedding and backfill, compaction, removal and disposal of excess material, sheeting and shoring, testing, connection of service laterals and any other work necessary to provide a complete and working sanitary sewer system.

Payment will be made under:

Pay Item	**Pay Unit**
Sanitary Sewer Manhole	Each
Sanitary Sewer Manhole Frame & Cover	Each
Sanitary Sewer Main (Type and Size)	Linear Foot

Insurance Requirements for Public Projects

I. Insurance Policies:

Agency and Contractor, if and to the extent that either is performing work on or about CSXT's property, shall procure and maintain the following insurance policies:

1. Commercial General Liability (CGL) coverage at their sole cost and expense with limits of not less than $5,000,000 in combined single limits for bodily injury and/or property damage per occurrence, and such policies shall name CSXT as an additional insured.

2. Statutory Worker's Compensation and Employers Liability Insurance with limits of not less than $1,000,000, which insurance must contain a waiver of subrogation against CSXT and its affiliates [if permitted by state law].

3. Commercial Automobile Liability insurance with limits of not less than $1,000,000 combined single limit for bodily injury and/or property damage per occurrence, and such policies shall name CSXT as an additional insured.

4. Railroad Protective Liability (RPL) insurance with limits of not less than $5,000,000 combined single limit for bodily injury and/or property damage per occurrence and an aggregate annual limit of $10,000,000, which insurance shall satisfy the following additional requirements:

   a. The Railroad Protective Liability Insurance Policy must be on the ISO/RIMA Form of Railroad Protective Insurance - Insurance Services Office (ISO) Form CG 00 35.

   b. CSX Transportation must be the named insured on the Railroad Protective Liability Insurance Policy. The named insured's address should be listed as:

      CSX Transportation, Inc.
      500 Water Street, C-907
      Jacksonville, FL 32202

   c. The name and address of the Contractor and of the Project Sponsor/Involved Governmental Agency must be shown on the Declarations page.

   d. A description of operations and location must appear on the Declarations page and must match the Project description.

   e. Terrorism Risk Insurance Act (TRIA) coverage must be included.

   f. Authorized endorsements must include:

      (i). Pollution Exclusion Amendment - CG 28 31, unless using form CG 00 35 version 96 and later

   g. Authorized endorsements may include:

      (i). Broad Form Nuclear Exclusion - IL 00 21

      (ii). Notice of Non-renewal or cancellation

      (iii). Required State Cancellation Endorsement

      (iv). Quick Reference or Index - CL/IL 240

h. Authorized endorsements may not include:

(i). A Pollution Exclusion Endorsement except CG 28 31

(ii). An Endorsement that excludes TRIA coverage

(iii). An Endorsement that limits or excludes Professional Liability coverage

(iv). A Non-Cumulation of Liability or Pyramiding of Limits Endorsement

(v). A Known Injury Endorsement

(vi). A Sole Agent Endorsement

(vii). A Punitive or Exemplary Damages Exclusion

(viii). A "Common Policy Conditions" Endorsement

(ix). Policies that contain any type of deductible

(x). Any endorsement that is not named in Section 4 (f) or (g) above that CSXT deems unacceptable

5. All insurance companies must be A. M. Best rated A- and Class VII or better

6. Such additional or different insurance as CSXT may require

II. Additional Terms

1. Contractor must submit the complete Railroad Protective Liability policy, Certificates of Insurance and all notices and correspondence regarding the insurance policies in an electronic format to:

   insurancedocuments@csx.com

Neither Agency nor Contractor may begin work on or about CSXT property until written approval of the required insurance has been received from CSXT or CSXT's Insurance Compliance vendor, Ebix.

APPENDIX

CSX Transportation

CSXT SPECIAL PROVISIONS

Public Projects Group
Jacksonville, FL
Date Issued: May 9, 2011

CSXT SPECIAL PROVISIONS

AUTHORITY OF CSXT ENGINEER
The CSXT Representative shall have final authority in all matters affecting the safe maintenance of CSXT operations and CSXT property, and his or her approval shall be obtained by the Agency or its Contractor for methods of construction to avoid interference with CSXT operations and CSXT property and all other matters contemplated by the Agreement and these Special Provisions.

II. INTERFERENCE WITH CSXT OPERATIONS

A. Agency or its Contractor shall arrange and conduct its work so that there will be no interference with CSXT operations, including train, signal, telephone and telegraphic services, or damage to CSXT's property, or to poles, wires, and other facilities of tenants on CSXT's Property or right-of-way. Agency or its Contractor shall store materials so as to prevent trespassers from causing damage to trains, or CSXT Property. Whenever Work is likely to affect the operations or safety of trains, the method of doing such Work shall first be submitted to the CSXT Representative for approval, but such approval shall not relieve Agency or its Contractor from liability in connection with such Work.

B. If conditions arising from or in connection with the Project require that immediate and unusual provisions be made to protect train operation or CSXT's property, Agency or its Contractor shall make such provision. If the CSXT Representative determines that such provision is insufficient, CSXT may, at the expense of Agency or its Contractor, require or provide such provision as may be deemed necessary, or cause the Work to cease immediately.

III. NOTICE OF STARTING WORK. Agency or its Contractor shall not commence any work on CSXT Property or rights of-way until it has complied with the following conditions:

A. Notify CSXT in writing of the date that it intends to commence Work on the Project. Such notice must be received by CSXT at least ten business days in advance of the date Agency or its Contractor proposes to begin Work on CSXT property. The notice must refer to this Agreement by date. If flagging service is required, such notice shall be submitted at least thirty (30) business days in advance of the date scheduled to commence the Work.

B. Obtain authorization from the CSXT Representative to begin Work on CSXT property, such authorization to include an outline of specific conditions with which it must comply.

C. Obtain from CSXT the names, addresses and telephone numbers of CSXT's personnel who must receive notice under provisions in the Agreement. Where more than one individual is designated, the area of responsibility of each shall be specified.

IV. WORK FOR THE BENEFIT OF THE CONTRACTOR

A. No temporary or permanent changes to wire lines or other facilities (other than third party fiber optic cable transmission systems) on CSXT property that are considered necessary to the Work are anticipated or shown on the Plans. If any such changes are, or become, necessary in the opinion of CSXT or Agency, such changes will be covered by appropriate revisions to the Plans and by preparation of a force account estimate. Such force account estimate may be initiated by either CSXT or Agency, but must be approved by both CSXT and Agency. Agency or Contractor shall be responsible for arranging for the relocation of the third party fiber optic cable transmission systems, at no cost or expense to CSXT.

B. Should Agency or Contractor desire any changes in addition to the above, then it shall make separate arrangements with CSXT for such changes to be accomplished at the Agency or Contractor's expense.

V. HAUL ACROSS RAILROAD

A. If Agency or Contractor desires access across CSXT property or tracks at other than an existing and open public road crossing in or incident to construction of the Project, the Agency or Contractor must first obtain the permission of CSXT and shall execute a license agreement or right of entry satisfactory to CSXT, wherein Agency or Contractor agrees to bear all costs and liabilities related to such access.

B. Agency and Contractor shall not cross CSXT's property and tracks with vehicles or equipment of any kind or character, except at such crossing or crossings as may be permitted pursuant to this section.

VI. COOPERATION AND DELAYS

A. Agency or Contractor shall arrange a schedule with CSXT for accomplishing stage construction involving work by CSXT. In arranging its schedule, Agency or Contractor shall ascertain, from CSXT, the lead time required for assembling crews and materials and shall make due allowance therefor

B. Agency or Contractor may not charge any costs or submit any claims against CSXT for hindrance or delay caused by railroad traffic; work done by CSXT or other delay incident to or necessary for safe maintenance of railroad traffic; or for any delays due to compliance with these Special Provisions.

C. Agency and Contractor shall cooperate with others participating in the construction of the Project to the end that all work may be carried on to the best advantage.

D. Agency and Contractor understand and agree that CSXT does not assume any responsibility for work performed by others in connection the Project. Agency and Contractor further understand and agree that they shall have no claim whatsoever against CSXT for any inconvenience, delay or additional cost incurred by Agency or Contractor on account of operations by others.

VII. STORAGE OF MATERIALS AND EQUIPMENT

Agency and Contractor shall not store their materials or equipment on CSXT's property or where they may potentially interfere with CSXT's operations, unless Agency or Contractor has received CSXT Representative's prior written permission. Agency and Contractor understand and agree that CSXT will not be liable for any damage to such materials and equipment from any cause and that CSXT may move, or require Agency or Contractor to move, such material and equipment at Agency's or Contractor's sole expense. To minimize the possibility of damage to the railroad tracks resulting from the unauthorized use of equipment, all grading or other construction equipment that is left parked near the tracks unattended by watchmen shall be immobilized to the extent feasible so that it cannot be moved by unauthorized persons.

VIII. CONSTRUCTION PROCEDURES

A. General

1. Construction work on CSXT property shall be subject to CSXT's inspection and approval.

2. Construction work on CSXT property shall be in accord with CSXT's written outline of specific conditions and with these Special Provisions.

3. Contractor shall observe the terms and rules of the CSXT Safe Way manual, which Agency and Contractor shall be required to obtain from CSXT, and in accord with any other instructions furnished by CSXT or CSXT's Representative.

B. Blasting

1. Agency or Contractor shall obtain CSXT Representative's and Agency Representative's prior written approval for use of explosives on or adjacent to CSXT property. If permission for use of explosives is granted,Agency or Contractor must comply with the following:

a. Blasting shall be done with light charges under the direct supervision of a responsible officer or employee of Agency or Contractor.

b. Electric detonating fuses shall not be used because of the possibility of premature explosions resulting from operation of two-way train radios.

c. No blasting shall be done without the presence of an authorized representative of CSXT. At least 30 days' advance notice to CSXT Representative is required to arrange for the presence of an authorized CSXT representative and any flagging that CSXT may require.

d. Agency or Contractor must have at the Project site adequate equipment, labor and materials, and allow sufficient time, to (i) clean up (at Agency's expense) debris resulting from the blasting without any delay to trains; and (ii) correct (at Agency's expense) any track misalignment or other damage to CSXT's property resulting from the blasting, as directed by CSXT Representative, without delay to trains. If Agency's or Contractor's actions result in delay of any trains, including Amtrak passenger trains, Agency shall bear the entire cost thereof.

e. Agency and Contractor shall not store explosives on CSXT property.

2. CSXT Representative will:

a. Determine the approximate location of trains and advise Agency or Contractor of the approximate amount of time available for the blasting operation and clean-up.

b. Have the authority to order discontinuance of blasting if, in his or her opinion, blasting is too hazardous or is not in accord with these Special Provisions.

IX. MAINTENANCE OF DITCHES ADJACENT TO CSXT TRACKS

Agency or Contractor shall maintain all ditches and drainage structures free of silt or other obstructions that may result from their operations. Agency or Contractor shall provide erosion control measures during construction and use methods that accord with applicable state standard specifications for road and bridge construction, including either (1) silt fence; (2) hay or straw barrier; (3) berm or temporary ditches; (4) sediment basin; (5) aggregate checks; and (6) channel lining. All such maintenance and repair of damages due to Agency's or Contractor's operations shall be performed at Agency's expense.

X. FLAGGING / INSPECTION SERVICE

A. CSXT has sole authority to determine the need for flagging required to protect its operations and property. In general, flagging protection will be required whenever Agency or Contractor or their equipment are, or are likely to be, working within fifty (50) feet of live track or other track clearances specified by CSXT, or over tracks.

B. Agency shall reimburse CSXT directly for all costs of flagging that is required on account of construction within CSXT property shown in the Plans, or that is covered by an approved plan revision, supplemental agreement or change order.

C. Agency or Contractor shall give a minimum of 30 days' advance notice to CSXT Representative for anticipated need for flagging service. No work shall be undertaken until the flag person(s) is/are at the job site. If it is necessary for CSXT to advertise a flagging job for bid, it may take up to 90-days to obtain this service, and CSXT shall not be liable for the cost of delays attributable to obtaining such service.

D. CSXT shall have the right to assign an individual to the site of the Project to perform inspection service whenever, in the opinion of CSXT Representative, such inspection may be necessary. Agency shall reimburse CSXT for the costs incurred by CSXT for such inspection service. Inspection service shall not relieve Agency or Contractor from liability for its Work.

E. CSXT shall render invoices for, and Agency shall pay for, the actual pay rate of the flagpersons and inspectors used, plus standard additives, whether that amount is above or below the rate provided in the Estimate. If the rate of pay that is to be used for inspector or flagging service is changed before the work is started or during the progress of the work, whether by law or agreement between CSXT and its employees, or if the tax rates on labor are changed, bills will be rendered by CSXT and paid by Agency using the new rates. Agency and Contractor shall perform their operations that require flagging protection or inspection service in such a manner and sequence that the cost of such will be as economical as possible.

XI. UTILITY FACILITIES ON CSXT PROPERTY

Agency shall arrange, upon approval from CSXT, to have any utility facilities on or over CSXT Property changed as may be necessary to provide clearances for the proposed trackage.

XII. CLEAN-UP

Agency or Contractor, upon completion of the Project, shall remove from CSXT's Property any temporary grade crossings, any temporary erosion control measures used to control drainage, all machinery, equipment, surplus materials, falsework, rubbish, or temporary buildings belonging to Agency or Contractor. Agency or Contractor, upon completion of the Project, shall leave CSXT Property in neat condition, satisfactory to CSXT Representative.

XIII. FAILURE TO COMPLY

If Agency or Contractor violate or fail to comply with any of the requirements of these Special Provisions, (a) CSXT may require Agency and/or Contractor to vacate CSXT Property; and (b) CSXT may withhold monies due Agency and/or Contractor; (c) CSXT may require Agency to withhold monies due Contractor; and (d) CSXT may cure such failure and the Agency shall reimburse CSXT for the cost of curing such failure.

APPENDIX

CSX Transportation

CONSTRUCTION SUBMISSION CRITERIA

Public Projects Group
Jacksonville, FL
Date Issued: February 23, 2015

TABLE OF CONTENTS

INTRODUCTION
SECTION I: Definitions
SECTION II: Construction Submissions
SECTION III: Hoisting Operations
SECTION IV: Demolition Procedure
SECTION V: Erection Procedure
SECTION VI: Temporary Excavation and Shoring
SECTION VII: Track Monitoring

INTRODUCTION

The intent of this document is to guide outside agencies and their Contractors when performing work on, over, or with potential to impact CSXT property (ROW). Work plans shall be submitted for review to the designated CSXT Engineering Representative for all work which presents the potential to affect CSXT property or operations; this document shall serve as a guide in preparing these work plans. All work shall be performed in a manner that does not adversely impact CSXT operations or safety; as such, the requirements of this document shall be strictly adhered to, in addition to all other applicable standards associated with the construction. Applicable standards include, but are not limited to, CSXT Standards and Special Provisions, CSXT Insurance Requirements, CSXT Pipeline Occupancy Criteria, as well as the governing local, county, state and federal requirements. It shall be noted that this document and all other CSXT standards are subject to change without notice, and future revisions will be made available at the CSXT website: www.csx.com.

I. DEFINITIONS

1. *Agency* – The project sponsor (i.e., State DOT, Local Agencies, Private Developer, etc.)

2. *AREMA* – American Railway Engineering and Maintenance-of-Way Association – the North American railroad industry standards group. The use of this term shall be in specific reference to the AREMA Manual for Railway Engineering.

3. *Construction Submission* – The Agency or its representative shall submit six (6) sets of plans, supporting calculations, and detailed means and methods procedures for the specific proposed activity. All plans, specifications, and supporting calculations shall be signed/sealed by a Professional Engineer as defined below.

4. *Controlled Demolition* – Removal of an existing structure or subcomponents in a manner that positively prevents any debris or material from falling, impacting, or otherwise affecting CSXT employees, equipment or property. Provisions shall be made to ensure that there is no impairment of railroad operations or CSXT's ability to access its property at all times.

5. *Contractor* – The Agency's representative retained to perform the project work.

6. *Engineer* – CSXT Engineering Representative or a GEC authorized to act on the behalf of CSXT.

7. *Flagman* – A qualified CSXT employee with the sole responsibility to direct or restrict movement of trains, at or through a specific location, to provide protection for workers.

8. *GEC* – General Engineering Consultant who has been authorized to act on the behalf of CSXT.

9. *Horizontal Clearance* – Distance measured perpendicularly from centerline of any track to the nearest obstruction at any elevation between TOR and the maximum vertical clearance of the track.

10. *Professional Engineer* – An engineer who is licensed in State or Commonwealth in which the project is to occur. All plans, specifications, and supporting calculations shall be prepared by the Licensed Professional Engineer and shall bear his/her seal and signature.

11. *Potential to Foul* – Work having the possibility of impacting CSXT property or operations; defined as one or more of the following:
    a. Any activity where access onto CSXT property is required.
    b. Any activity where work is being performed on CSXT ROW.
    c. Any excavation work adjacent to CSXT tracks or facilities, within the Theoretical Railroad Live Load Influence Zone, or where the active earth pressure zone extends within the CSXT property limits.
    d. The use of any equipment where, if tipped and laid flat in any direction (360 degrees) about its center pin, can encroach within twenty five feet (25'-0") of the nearest track centerline. This is based upon the proposed location of

the equipment during use, and may be a function of the equipment boom length. Note that hoisting equipment with the potential to foul must satisfy the 150% factor of safety requirement for lifting capacities.

e. Any work where the scatter of debris, or other materials has the potential to encroach within twenty five feet (25'-0") of the nearest track centerline.
f. Any work where significant vibration forces may be induced upon the track structure or existing structures located under, over, or adjacent to the track structure.
g. Any other work which poses the potential to disrupt rail operations, threaten the safety of railroad employees, or otherwise negatively impact railroad property, as determined by CSXT.

12. *ROW* – Right of Way; Refers to CSXT Right-of-Way as well as all CSXT property and facilities. This includes all aerial space within the property limits, and any underground facilities.

13. *Submission Review Period* - a minimum of thirty (30) days in advance of start of work. Up to thirty (30) days will be required for the initial review response. Up to an additional thirty (30) days may be required to review any/all subsequent submissions or resubmission.

14. *Theoretical Railroad Live Load Influence Zone* – A 1½ horizontal to 1 vertical theoretical slope line starting 18 inches (1'-6") below top of tie elevation and twelve feet (12'-0") from the centerline of the nearest track.

15. *TOR* – Top of Rail. This is the base point for clearance measurements. It refers to the crown (top) of the steel rail; the point where train wheels bear on the steel rails.

16. *Track Structure* – All load bearing elements which support the train. This includes, but is not limited to, the rail, ties, appurtenances, ballast, sub-ballast, embankment, retaining walls, and bridge structures.

17. *Vertical Clearance* – Distance measured from TOR to the lowest obstruction within six feet (6'-0") of the track centerline, in either direction.

II. GENERAL SUBMISSION REQUIREMENTS

A. A construction work plan is required to be submitted by the Agency or its Contractor, for review and acceptance, prior to accessing or performing any work with Potential to Foul.

B. The Agency or its representative shall submit six (6) sets of plans, specifications, supporting calculations, and detailed means and methods procedures for the specific proposed work activity.

C. Construction submissions shall include all information relevant to the work activity, and shall clearly and concisely explain the nature of the work, how it is being performed, and what measures are being taken to ensure that railroad property and operations are continuously maintained.

D. All construction plans shall include a map of the work site, depicting the CSXT tracks, the CSXT right of way, proposed means of access, proposed locations for equipment and material staging (dimensioned from nearest track centerline), as well as all other relevant project information. An elevation drawing may also be necessary in order to depict clearances or other components of the work.

E. Please note that CSXT will not provide pricing to individual contractors involved in bidding projects. Bidding contractors shall request information from the agency and not CSXT.

F. The Contractor shall install a geotextile fabric ballast protection system to prevent construction or demolition debris and fines from fouling ballast. The geotextile ballast protection system shall be installed and maintained by the Contractor to the satisfaction of the Engineer.

G. The Engineer shall be kept aware of the construction schedule. The Contractor shall provide timely communication to the Engineer when scheduling the work such that the Engineer may be present during the work. The Contractor's schedule shall not dictate the work plan review schedule, and flagging shall not be scheduled prior to receipt of an accepted work plan.

H. At any time during construction activities, the Engineer may require revisions to the previously approved procedures to address weather, site conditions or other circumstances that may create a potential hazard to rail operations or CSXT facilities. Such revisions may require immediate interruption or termination of ongoing activities until such time the issue is resolved to the Engineer's satisfaction. CSXT and its GEC shall not be responsible for any additional costs or time claims associated with such revisions.

I. Blasting will not be permitted to demolish a structure over or within CSXT's right-of-way. When blasting off of CSXT property but with Potential to Foul, vibration monitoring, track settlement surveying, and/or other protective measures may be required as determined by the Engineer.

J. Blasting is not permitted adjacent to CSXT right-of-way without written approval from the Chief Engineer, CSXT.

K. Mechanical and chemical means of rock removal must be explored before blasting is considered. If written permission for the use of explosives is granted, the Agency or Contractor must submit a work plan satisfying the following requirements:

1. Blasting shall be done with light charges under the direct supervision of a responsible officer or employee of the Agency or Contractor.

2. Electronic detonating fuses shall not be used because of the possibility of premature explosions resulting from operation of two-way train radios.

3. No blasting shall be done without the presence of an authorized representative of CSXT. Advance notice to the Engineer is required to arrange for the presence of an authorized CSXT representative and any flagging that CSXT may require.

4. Agency or Contractor must have at the project site adequate equipment, labor and materials, and allow sufficient time, to clean up debris resulting from the blasting and correct any misalignment of tracks or other damage to CSXT property resulting from the blasting. Any corrective measures required must be performed as directed by the Engineer at the Agency's or Contractor's expense without any delay to trains. If Agency's or Contractor's actions result in the delay of any trains including passenger trains, the Agency or Contractor shall bear the entire cost thereof.

5. The Agency or Contractor may not store explosives on CSXT property.

6. At any time during blasting activities, the Engineer may require revisions to the previously approved procedures to address weather, site conditions or other circumstances that may create a potential hazard to rail operations or CSXT facilities. Such revisions may require immediate interruption or termination of ongoing activities until such time the issue is resolved to the Engineer's satisfaction. CSXT and its GEC shall not be responsible for any additional costs or time claims associated with such revisions.

III. HOISTING OPERATIONS

A. All proposed hoisting operations with Potential to Foul shall be submitted in accordance with the following:

1. A plan view drawing shall depict the work site, the CSXT track(s), the proposed location(s) of the lifting equipment, as well as the proposed locations for picking, any intermediate staging, and setting the load(s). All locations shall be dimensioned from centerline of the nearest track. Crane locations shall also be dimensioned from a stationary point at the work site for field confirmation.

2. Computations showing the anticipated weight of all picks. Computations shall be made based upon the field-verified plans of the existing structure. Pick weights shall account for the weight of concrete rubble or other materials attached to the component being removed; this includes the weight of subsequent rigging devices/components. Rigging components shall be sized for the subsequent pick weight.

3. All lifting equipment, rigging devices, and other load bearing elements shall have a rated (safe lifting) capacity that is greater than or equal to 150% of the load it is carrying, as a factor of safety. Supporting calculations shall be furnished to verify the minimum capacity requirement is maintained for the duration of the hoisting operation.

4. Dynamic hoisting operations are prohibited when carrying a load with the Potential to Foul. Cranes or other lifting equipment shall remain stationary during lifting. (i.e., no moving picks).

5. For lifting equipment, the manufacturer's capacity charts, including crane, counterweight, maximum boom angle, and boom nomenclature is to be submitted.

6. A schematic rigging diagram must be provided to clearly call out each rigging component from crane hook to the material being hoisted. Copies of catalog or information sheets shall be provided to verify rigging weights and capacities.

7. For built-up rigging devices, the contractor shall submit the following:

   i. Details of the device, calling out material types, sizes, connections and other properties.
   ii. Load test certification documents and/or design computations bearing the seal and signature of a Professional Engineer. Load test shall be performed in the configuration of its intended use as part of the subject demolition procedure.
   iii. Copies of the latest inspection reports of the rigging device. The device shall be inspected within one (1) calendar year of the proposed date for use.

8. A detail shall be provided showing the crane outrigger setup, including dimensions from adjacent slopes or facilities. The detail shall indicate requirements for bearing surface preparation, including material requirements and compaction efforts. As a minimum, outriggers and/or tracks shall bear on mats, positioned on level material with adequate bearing capacity.

9. A complete written narrative that describes the sequence of events, indicating the order of lifts and any repositioning or re-hitching of the crane(s).

IV. DEMOLITION PROCEDURE

A. The Agency or its Contractor shall submit a detailed procedure for a controlled demolition of any structure on, over, or adjacent to the ROW. The controlled demolition procedure must be approved by the Engineer prior to beginning work on the project.

B. Existing Condition of structure being demolished:

   1. The Contractor shall submit as-built plans for the structure(s) being demolished.
   2. If as-built plans are unavailable, the Contractor shall perform an investigation of the structure, including any foundations, substructures, etc. The field measurements are to be made under the supervision of the Professional Engineer submitting the demolition procedure. Findings shall be submitted as part of the demolition means and methods submittal for review by the Engineer.
   3. Any proposed method for temporary stabilization of the structure during the demolition shall be based on the existing plans or investigative findings, and submitted as part of the demolition means and methods for review by the Engineer.

C. Demolition work plans shall include a schematic plan depicting the proposed locations of the following, at various stages of the demolition:

   1. All cranes and equipment, calling out the operating radii.
   2. All proposed access and staging locations with all dimensions referenced from the center line of the nearest track.
   3. Proposed locations for stockpiling material or locations for truck loading.
   4. The location, with relevant dimensions, of all tracks, other railroad facilities; wires, poles, adjacent structures, or buried utilities that could be affected, showing that the proposed lifts are clear of these obstructions.
   5. Note that no crane or equipment may be set on the CSXT rails or track structure and no material may be dropped on CSXT property.

D. Demolition submittal shall also include the following information:

   1. All hoisting details, as dictated by Section III of this document.
   2. A time schedule for each of the various stages must be shown as well as a schedule for the entire lifting procedure. The proposed time frames for all critical subtasks (i.e., torch/saw cutting various portions of the superstructure or

substructure, dismantling splices, installing temporary bracing, etc.) shall be furnished so that the potential impact(s) to CSXT operations may be assessed and eliminated or minimized.

3. The names and experience of the key Contractor personnel involved in the operation shall be included in the Contractor's means and methods submission.
4. Design and supporting calculations shall be prepared, signed, and sealed by the Professional Engineer for items including the temporary support of components or intermediate stages shall be submitted for review. A guardrail will be required to be installed in a track in the proximity of temporary bents or shoring towers, when located within twelve feet (12'-0") from the centerline of the track. The guardrail will be installed by CSXT forces, at the expense of the Agency or its contractor.

E. Girders or girder systems shall be stable at all times during demolition. Temporary bracing shall be provided at the piers, abutments, or other locations to resist overturning and/or buckling of the member(s). The agency shall submit a design and details of the proposed temporary bracing system, for review by the Engineer. Lateral wind forces for the temporary conditions shall be considered in accordance with AREMA, Chapter 8, Section 28.6.2. The minimum lateral wind pressure shall be fifteen pounds per square foot (15 psf).

F. Existing, obsolete, bridge piers shall be removed to a minimum of three feet (3'-0") below the finished grade, final ditch line invert, or as directed by the Engineer.

G. A minimum quantity of twenty five (25) tons of CSXT approved granite track ballast may be required to be furnished and stockpiled on site by the Contractor, or as directed by the Engineer.

H. The use of acetylene gas is prohibited for use on or over CSXT property. Torch cutting shall be performed utilizing other materials such as propane.

I. CSXT's tracks, signals, structures, and other facilities shall be protected from damage during demolition of existing structure or replacement of deck slab.

J. Demolition Debris Shield

1. On-track or ground-level debris shields (such as crane mats) are prohibited for use by CSXT.

2. Demolition Debris Shield shall be installed prior to the demolition of the bridge deck or other relevant portions of the structure. The demolition debris shield shall be erected from the underside of the bridge over the track area to catch all falling debris. The debris shield shall not be the primary means of debris containment.

   i. The demolition debris shield design and supporting calculations, all signed/sealed by a Professional Engineer, shall be submitted for review and acceptance.
   ii. The demolition debris shield shall have a minimum design load of 50 pounds per square foot (50 psf) plus the weight of the equipment, debris, personnel, and all other loads.
   iii. The Contractor shall verify the maximum particle size and quantity of the demolition debris generated during the procedure does not exceed the shield design loads. Shield design shall account for loads induced by particle impact; however the demolition procedure shall be such that impact forces are minimized. The debris shield shall not be the primary means of debris containment.
   iv. The Contractor shall include installation/removal means and methods for the demolition debris shield as part of the proposed Controlled Demolition procedure submission.
   v. The demolition debris shield shall provide twenty three feet (23'-0") minimum vertical clearance, or maintain the existing vertical clearance if the existing clearance is less than twenty three feet (23'-0").
   vi. Horizontal clearance to the centerline of the track should not be reduced unless approved by the Engineer.
   vii. The Contractor shall clean the demolition debris shield daily or more frequently as dictated either by the approved design parameters or as directed by the Engineer.

K. Vertical Demolition Debris Shield

1. This type of shield may be required for substructure removals in close proximity to CSXT track and other facilities, as determined by the Engineer.
2. The Agency or its Contractor shall submit detailed plans with detailed calculations, prepared, signed, and sealed by a Professional Engineer, of the protection shield.

V. ERECTION PROCEDURE

A. The Agency or its Contractor shall submit a detailed procedure for erection of a structure with Potential to Foul. The erection procedure must be approved by the Engineer prior to beginning work on the project.

B. Erection work plans shall include a schematic plan depicting the following, at all stages of the construction:
   1. All proposed locations of all cranes and equipment, calling out the operating radii.
   2. All proposed access and staging locations with all dimensions referenced from the center line of the nearest track.
   3. All proposed locations for stockpiling material or locations for truck loading.
   4. The location, with relevant dimensions, of all tracks, other railroad facilities; wires, poles, adjacent structures, or buried utilities that could be affected, showing that the proposed lifts are clear of these obstructions.

C. No crane or equipment may be set on the CSXT rails or track structure and no material may be dropped on CSXT property.

D. For erection of a structure over the tracks, the following information shall be submitted for review and acceptance by the Engineer, at least thirty (30) days prior to erection:
   1. As-built beam seat elevations – field surveyed upon completion of pier/abutment construction.
   2. Current Top of Rail (TOR) elevations – field measured at the time of as-built elevation collection.
   3. Computations verifying the anticipated minimum vertical clearance in the final condition which accounts for all deflection and camber, based upon the current TOR and as-built beam seat elevations. The anticipated minimum vertical clearance shall be greater than or equal to that which is indicated by the approved plans. Vertical clearance (see definitions) is measured from TOR to the lowest point on the overhead structure at any point within six feet (6'-0") from centerline of the track. Calculations shall be signed and sealed by a Professional Engineer.

E. Girders or girder systems shall be stable at all times during erection. No crane may unhook prior to stabilizing the beam or girder.
   1. Lateral wind forces for the temporary conditions shall be considered in accordance with AREMA, Chapter 8, Section 28.6.2. The minimum lateral wind pressure shall be fifteen pounds per square foot (15 psf).
   2. Temporary bracing shall be provided at the piers, abutments, or other locations to resist overturning and/or buckling of the member(s). The agency shall submit a design and details of the proposed temporary bracing system, for review by the Engineer.
   3. Temporary bracing shall not be removed until sufficient lateral bracing or diaphragm members have been installed to establish a stable condition. Supporting calculations, furnished by the Professional Engineer, shall confirm the stable condition.

F. Erection procedure submissions shall also include the following information:
   1. All hoisting details, as dictated by Section III of this document.
   2. A time schedule for each of the various stages must be shown as well as a schedule for the entire lifting procedure. The proposed time frames for all critical subtasks (i.e., performing aerial splices, installing temporary bracing, installation of diaphragm members, etc.) shall be furnished so that the potential impact(s) to CSXT operations may be assessed and eliminated or minimized.
   3. The names and experience of the key Contractor personnel involved in the operation shall be included in the Contractor's means and methods submission.
   4. A guardrail will be required to be installed in a track in the proximity of temporary bents or shoring towers, when located within twelve feet (12'-0") from the centerline of the track. The guardrail will be installed by CSXT forces, at the expense of the Agency or its Contractor.
   5. Design and supporting calculations prepared by the Professional Engineer for items including the temporary support of components or intermediate stages shall be submitted for review.

VI. TEMPORARY EXCAVATION AND SHORING

A. The Agency or its Contractor shall submit a detailed design and procedure for the installation of a sheeting/shoring system adjacent to the tracks. Shoring protection shall be provided when excavating with Potential to Foul, or as otherwise determined by CSXT. Shoring shall be provided in accordance with the AREMA, except as noted below.

B. Shoring may not be required if all of the following conditions are satisfied:
   1. The excavation does not encroach within the Theoretical Live Load Influence Zone. Please refer to Figure 1.
   2. The track structure is situated on level ground, or in a cut section, and on stable soil.
   3. The excavation does not adversely impact the stability of a CSXT facility (i.e. signal bungalow, drainage facility,

undergrade bridge, building, etc), or the stability of any structure on, over, or adjacent to CSXT property with potential to foul.

4. Shoring is not required by any governing federal, state, local or other construction code.

C. Shoring is required when excavating the toe of an embankment. Excavation of any embankment which supports an active CSXT track structure without shoring will not be permitted.

D. Trench boxes are not an acceptable means of shoring. Trench boxes are prohibited for use on CSXT property or within the Theoretical Railroad Live Load Influence Zone.

E. Shoring shall be a cofferdam-type, which completely encloses the excavation. However, where justified by site or work conditions, partial cofferdams with open sides away from the track may be permissible, as determined by the Engineer.

F. Cofferdams shall be constructed using interlocking steel sheet piles, or when approved by the Engineer, steel soldier piles with timber lagging. Wales and struts shall be included when dictated by the design.

G. The use of tiebacks can be permissible for temporary shoring systems, when conditions warrant. Tiebacks shall have a minimum clear cover of 6'-0", measured from the bottom of the rail. Upon completion of the work, tiebacks shall be grouted, cut off, and remain in place.

H. All shoring systems on, or adjacent to CSXT right-of-way, shall be equipped with railings or other fall protection, compliant with the governing federal, state or local requirements. Area around pits shall be graded to eliminate all potential tripping hazards.

I. Interlocking steel sheet piles shall be used for shoring systems qualifying one or more of the following conditions:
   1. Within 18'-0" of the nearest track centerline
   2. Within the live load influence zone
   3. Within slopes supporting the track structure
   4. As otherwise deemed necessary by the Engineer.

J. Sheet piles qualifying for one or more of the requirements listed in Section VI.I (above) of this document shall not be removed. Sheet piles shall be left in place and cut off a minimum of 3'-0" below the finished grade, the ditch line invert, or as otherwise directed by the Engineer. The ground shall be backfilled and compacted immediately after sheet pile is cut off.

K. The following design considerations shall be considered when preparing the shoring design package:
   1. Shoring shall be designed to resist a vertical live load surcharge of 1,880 lbs. per square foot, in addition to active earth pressure. The surcharge shall be assumed to act on a continuous strip, eight feet six inches (8'-6") wide. Lateral pressures due to surcharge shall be computed using the strip load formula shown in *AREMA Manual for Railway Engineering*, Chapter 8, Part 20.
   2. Allowable stresses in materials shall be in accordance with AREMA Chapter 7, 8, and 15.3.
   3. A minimum horizontal clearance of ten feet (10'-0") from centerline of the track to face of nearest point of shoring shall be maintained, provided a twelve feet (12'-0") roadbed is maintained with a temporary walkway and handrail system.
   4. For temporary shoring systems with Potential to Foul, piles shall be plumb under full dead load. Maximum deflection at the top of wall, under full live load, shall be as follows:
      i. One-half (1/2) inch for walls within twelve feet (12'-0") of track centerline (Measured from centerline of the nearest track to the nearest point of the supporting structure).
      ii. One (1) inch for walls located greater than twelve feet (12'-0") from track centerline

L. Shoring work plans shall be submitted in accordance with Section II of this document, as well as the following additional requirements:
   1. The work plan shall include detailed drawings of the shoring systems calling out the sizes of all structural members, details of all connections. Both plan and elevation drawings shall be provided, calling out dimensions from the face of shoring relative to the nearest track centerline. The elevation drawing shall also show the height of shoring, and track elevation in relation to bottom of excavation.
   2. Full design calculations for the shoring system shall be furnished.
   3. A procedure for cutting off the sheet pile, backfilling and restoring the embankment.

VII. TRACK MONITORING

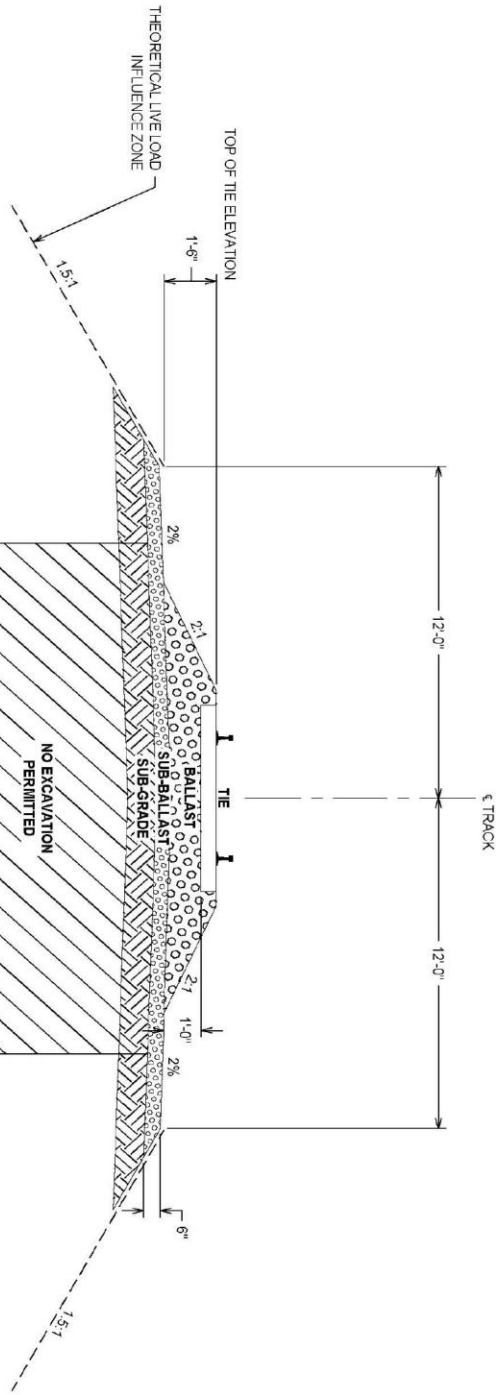
A. When work being performed has the potential to disrupt the track structure, a work plan must be submitted detailing a track monitoring program which will serve to monitor and detect both horizontal and vertical movement of the CSXT track and roadbed.

B. The program shall specify the survey locations, the distance between the location points, and frequency of monitoring before, during, and after construction. CSXT reserves to the right to modify the survey locations and monitoring frequency as necessary during the project.

C. The survey data shall be collected in accordance with the approved frequency and immediately furnished to the Engineer for analysis.

D. If any movement has occurred as determined by the Engineer, CSXT will be immediately notified. CSXT, at its sole discretion, shall have the right to immediately require all contractor operations to be ceased, have the excavated area immediately backfilled and/or determine what corrective action is required. Any corrective action required by CSXT or performed by CSXT including the monitoring of corrective action of the contractor will be at project expense.

FIGURE 1: Theoretical Live Load Influence Zone



THEORETICAL LIVE LOAD INFLUENCE ZONE

NTS

SHORING IS REQUIRED FOR EXCAVATION WITHIN THE THEORETICAL LIVE LOAD INFLUENCE ZONE

NOTES:

1. THEORETICAL LIVE LOAD INFLUENCE ZONE IS A 1 $\frac{1}{2}$ HORIZONTAL TO 1 VERTICAL THEORETICAL SLOPE LINE STARTING 1'-6" BELOW TOP OF TIE ELEVATION AND 12'-0" FROM THE CENTERLINE OF THE NEAREST TRACK.
2. REFER TO CONSTRUCTION SUBMISSION CRITERIA FOR ADDITIONAL REQUIREMENTS.
3. SHORING SHALL BE DESIGNED TO RESIST A VERTICAL LIVE LOAD SURCHARGE OF 1,880 LBS. PER SQUARE FOOT, IN ADDITION TO ACTIVE EARTH PRESSURE. THE SURCHARGE SHALL BE ASSUMED TO ACT ON A CONTINUOUS STRIP, 8'-6" WIDE. LATERAL PRESSURES DUE TO SURCHARGE SHALL BE COMPUTED USING THE STRIP LOAD FORMULA SHOWN IN AREMA MANUAL FOR RAILWAY ENGINEERING, CHAPTER 8, PART 20.

CONSTRUCTION REQUIREMENTS

When performing work on, under or adjacent to CSX Transportation ("CSXT") right-of-way or operations, the City of Winchester ("City") selected contractor ("Contractor") must abide by the current CSXT Special Provisions, CSXT Construction Submission Criteria and the following additional requirements.

1. All construction related correspondence will be directed to AECOM, acting as the Construction Monitoring Representative ("CMR") on behalf of CSXT, with the following contact and address:

   Brian V. Harrison
   Manager – Construction Services
   AECOM
   1700 Market Street, Suite 1600
   Philadelphia, PA 19103
   Brian.harrison@aecom.com
   (215) 735-0832

   Upon receipt of notification, the CMR will direct the Contractor to the local CSXT construction contact for the project.

2. Prior to construction, City or its Contractor shall provide two (2) hard copy sets as well as one (1) digital/electronic copy (CD preferred) of the Final Approved-For-Construction Plans for the subject project to AECOM, at the address listed above. Any subsequent revisions to the Final Approved-For-Construction Plans shall also be provided.

3. Prior to any construction activities on or about CSXT, the Contractor shall have a pre-construction meeting with CSXT's designated representative and the CMR to discuss potential On-Track Safety issues during project construction activities.

4. Construction procedures for all work in the vicinity of CSXT property, that has the potential of affecting CSXT property or operations, shall be submitted to CSXT, and the CMR, prior to the work being performed. The Contractor shall obtain written acceptance of the submitted construction procedures from CSXT or their representative before proceeding with construction.

   All construction submittals shall be directed to Brian V. Harrison (contact information above) and:

   Assunta Daprano
   AECOM
   1700 Market Street, Suite 1600
   Philadelphia, PA 19103
   Assunta.Daprano@aecom.com
   (215) 965-2220

   Up to thirty (30) days will be required to review all construction submissions. Up to an additional thirty (30) days will be required to review any subsequent submissions returned not approved with requests for additional information. Work will not be permitted to commence until the Contractor has provided CSXT with a satisfactory plan for the associated work, detailing how the work will be undertaken without impacting scheduling, performance or safety related issues.

NOTE: All construction work shall be performed in accordance with the construction procedure reviewed and accepted by CSXT or the CMR. Revisions to Contractor submissions may not be field approved. Any deviation(s) from a previously accepted plan including equipment substitutions will require a formal resubmission of the procedure for review and acceptance prior to performing any work.

The Contractor shall submit, as separate submittals, the following construction procedures and documents, and any additional construction procedures determined to be necessary by the CSXT or the CMR.

a. Means and Methods – The Contractor shall develop separate detailed submissions for each work items presenting the potential to impact CSXT property or operations. The work items requiring submissions should be coordinated with the CMR prior to their development and submission. Each submission shall:
    i. Indicate the progression of work with specific times when tasks will be performed during the project.
    ii. Provide a listing of the anticipated equipment to be used, a marked up plan with relevant dimensions detailing the location of all equipment to be used, and a contingency plan of action should a primary piece of equipment malfunction.
    iii. Include a detailed narrative discussing the project level coordination of specific work operations and project safety issues between the City, Contractor, CSXT and the CMR.
    iv. If determined by CSXT or the CMR to be necessary, include a walkthrough at which time CSXT and/or the CMR will be present.

    Anticipated means and methods submissions include, but are not limited to, equipment operations, culvert installation, roadway paving, and temporary works.

b. Ballast Protection – A ballast protection system may be required at the sole discretion of CSXT depending on the contractor's proposed methods to perform the work. The system shall use filter fabric and indicate the anchorage system. The ballast protection is to extend a minimum of 25' beyond the proposed limit of work or greater as determined by CSXT and be continuously maintained to prevent all contaminants from entering the ballast section of all tracks for the entire duration of the project.

c. Contractor shall perform all drainage work on and adjacent to CSXT property in strict compliance with the approved project plans. The Contractor shall ensure that proper erosion control is implemented on and adjacent to CSXT right-of-way during construction. The Contractor must prevent silt and debris accumulation in the railroad roadbed, ditches and other railroad facilities. The Contractor may be required to submit a detailed erosion control plan for review and acceptance by CSXT or the CMR prior to performing any work. CSXT reserves the right to require additional drainage or grading modifications if as-built conditions do not address drainage and erosion in a manner satisfactory to CSXT.

d. Construction Schedule – Within 30 days of the pre-construction meeting, Contractor shall submit a detailed construction schedule for the duration of the project clearly indicating the time periods while working on and around CSXT right-of-way. As the work progresses, this schedule shall be updated and resubmitted as necessary to reflect changes in work sequence, duration and

method, etc.

e. Insurance – Submit all necessary insurance information in accordance with the current CSXT Insurance Requirements for approval. The Certificate of Insurance shall be prepared in keeping with the sample included in Exhibit A of this document. The complete original policies should be submitted to:

insurancedocuments@csx.com

with a copy to the CMR. The insurance policies will be required to be in place and approved prior to any work commencing on or that could potentially impact CSXT right-of-way. As information for use in obtaining the required CSXT insurance, please note that CSXT operates approximately 1 total freight train per week at a maximum authorized speed of 10 mph at the project location.

f. Emergency Action Plan – Submit an emergency action plan indicating the location of the site, contact numbers, access to the site, instructions for emergency response and location of the nearest hospitals. This plan should cover all items required in the event of an emergency at the site including fire suppression. Coordinate the Emergency Action Plan with the safety related discussion of the Means and Methods submission discussed above. The plan should also include a method to provide this information to each project worker for each day on site.

5. **CSXT Emergency Number:** The CSXT telephone number for emergencies is 800-232-0144. Reference the CSXT Milepost and DOT # for the project, as shown in the subject project description above, when calling.

6. No stormwater from the project may discharge onto the CSXT right-of-way at any time during construction.

7. The Contractor shall not remove any existing CSXT owned material (including, but not limited to, soil, stone, bridge and retaining wall elements, communications and signals device components, and drainage facilities) from CSXT right-of-way without prior authorization from CSXT. In the event that such material cannot be relocated within CSXT's right-of-way in a manner to satisfactory to CSXT, the material shall be properly tested by CSXT for contamination and disposed of in accordance with the attached CSX disposal policy and cost associate with all testing, coordination and/or disposal will be back charged to the Contractor. Initial environmental related requests should be made with the CMR at least thirty (30) days in advance.

8. The Contractor must not use CSXT right-of-way for storage of materials or equipment during construction. The CSXT right-of-way must remain clear for railroad use at all times. Equipment may not be positioned to block the railroad access road, track area or any part of the CSXT right-of-way without prior CSXT approval.

9. No temporary or permanent reductions to the existing horizontal and vertical clearances shall be permitted without prior CSXT approval. All Contractor work shall be performed in strict compliance with CSXT clearance requirements.

10. The Contractor will be required to abide by the provisions of the City/CSXT Construction Agreement. Periodically, throughout the project duration, the Contractor will be required to meet, discuss and, if necessary, take immediate action at the discretion of CSXT

personnel and/or the CMR to comply with provisions of that agreement and these specifications.

11. This project will require use of CSXT Flagmen to protect train operations from project activity in the area of the tracks. While CSXT cannot guarantee the availability of flagmen at all requested times, every accommodation will be extended to the Contractor when forces are available. Flagging requests should be made to CSXT Roadmaster Curtis Black, at telephone (724)-757-5228 at least thirty (30) days in advance. Termination or cancellation of a flagman requires ten (10) days notice to avoid incurring costs.

12. All equipment operations that could potentially impact CSXT right-of-way must be coordinated with the CSXT Flagman.

13. Prior to starting work on, under or adjacent to CSXT right of way, the Contractor shall execute Schedule I (Contractor's Acceptance) which is part of the Construction Agreement to be executed between the City and CSXT

14. City and/or its contractor shall be responsible for the maintenance of vehicular traffic, detouring, and full crossing/roadway closures during the necessary crossing work by CSXT forces.

Exhibit A

Project insurances shall be submitted in accordance with Section 4.e of these Construction Requirements, and the below provided sample certificate.

CERTIFICATE OF LIABILITY INSURANCE

Date: MM/DD/YY

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Phone:
Fax:
Name & Address of Producer

CONTACT NAME:
PHONE (A/C, No, Ext): FAX (A/C, No):
E-MAIL ADDRESS:
PRODUCER CUSTOMER ID #:

INSURED
Name & Address of Insured

INSURER(S) AFFORDING COVERAGE		NAIC #
INSURER A:	**AM Best Rating A-, Or Better**	**provide**
INSURER B:	**AM Best Rating A-, Or Better**	**provide**
INSURER C:	**AM Best Rating A-, Or Better**	**provide**
INSURER D:	**AM Best Rating A-, Or Better**	**provide**

COVERAGES CERTIFICATE NUMBER: REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF DATE (MM/DD/YY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	**GENERAL LIABILITY**						EACH OCCURRENCE	$5,000,000
	COMMERCIAL GENERAL LIABILITY	✓					DAMAGE TO RENTED PREMISES (Ea occurrence)	
	___ CLAIMS MADE ✓ OCCUR						MED EXP (Any one person)	
	___						PERSONAL & ADV INJURY	
	GENERAL AGG. LIABILITY APPLIES PER:						GENERAL AGGREGATE	
	POLICY PROJECT ✓ LOC						PRODUCTS -COMP/OP AGG	
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$1,000,000
	✓ ANY AUTO	✓					BODILY INJURY (Per person)	
	ALL OWNED AUTOS						BODILY INJURY (Per accident)	
	✓ SCHEDULED AUTOS						PROPERTY DAMAGE (Per accident)	
	✓ HIRED AUTOS							
	✓ NON-OWNED AUTOS							
	CA 20 70							
	___ **UMBRELLA FORM** ✓ OCCUR						EACH OCCURRENCE	
	EXCESS LIAB CLAIMS_ MADE						AGGREGATE	
	DEDUCTIBLE							
	RETENTION							
D	**WORKERS COMPENSATION AND EMPLOYER'S LIABILITY**	N/A	Y				✓ WC STATUTORY LIMITS	OTHER
	ANY PROPRIETOR/PARTNER/ EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH)	Y/N					E.L.EACH ACCIDENT	$1,000,000
	If yes, describe under DESCRIPTION OF OPERATIONS below						DISEASE - EA EMPLOYEE	$1,000,000
							E.L.DISEASE - POLICY LIMIT	$1,000,000

Railroad Protective Coverage Each Occurence $5,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES

CSX Transportation is listed as an Additional Insured.

CERTIFICATE HOLDER

CSX Transportation
Insurance Compliance
500 Water Street, Speed Code J-907
Jacksonville, FL 32202
RenewalCOI@CSX.com

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Certificate Must be Signed

Project: Winchester, Virginia – Proposed elimination of the Papermill Road (DOT# 139454M) and Tevis Street (DOT# 139455U) at-grade crossings with CSXT at Mileposts BAD-33.91 & 34.12; and construction of the new Hope Drive at-grade crossing (DOT# 938231C) with CSXT at Milepost BAD-33.98; Central Zone, Shenandoah Subdivision; CSXT OP# VA0547

CONSTRUCTION AGREEMENT

This Construction Agreement ("**Agreement**") is made as of _____, 20__, by and between CSX TRANSPORTATION, INC., a Virginia corporation with its principal place of business in Jacksonville, Florida ("**CSXT**"), and CITY OF WINCHESTER a body corporate and political subdivision of the Commonwealth of Virginia ("**Agency**").

EXPLANATORY STATEMENT

1. Agency has proposed to eliminate, or to cause to be eliminated, the Papermill Road (DOT# 139454M) and Tevis Street (DOT# 139455U) at-grade crossings with CSXT at Mileposts BAD-33.91 and BAD-34.12, respectively, in the Shenandoah Subdivision of the Central Zone in Winchester Virginia. Agency has also proposed to construct or to cause to be constructed, the new Hope Drive (DOT# 938231C) at-grade crossing with CSXT at Milepost BAD-33.98 in the Shenandoah Subdivision of the Central Zone in Winchester, Virginia (the "**Project**").

2. Agency has obtained, or will obtain, all authorizations, permits and approvals from all local, state and federal agencies (including Agency), and their respective governing bodies and regulatory agencies, necessary to proceed with the Project and to appropriate all funds necessary to construct the Project.

3. Agency acknowledges that: (i) by entering into this Agreement, CSXT will provide services and accommodations to promote public interest in this Project, without profit or other economic inducement typical of other Agency contractors; (ii) neither CSXT nor its affiliates (including their respective directors, officers, employees or agents) will incur any costs, expenses, losses or liabilities in excess of payments made to CSXT, by or on behalf of Agency or its contractors, pursuant to this Agreement; and (iii) CSXT retains the paramount right to regulate all activities affecting its property and operations.

4. The Project will be initially constructed in accordance with the terms and conditions of this Agreement.

5. Upon completion of the Project, Agency will use, maintain, repair, relocate, reconstruct or remove the public at-grade crossing resulting from the Project in accordance with the terms and conditions of that certain public at-grade crossing maintenance agreement executed simultaneously with this Agreement by Agency and CSXT.

6. It is the purpose of this Agreement to provide for the terms and conditions upon which the Project may proceed.

NOW, THEREFORE, in consideration of the foregoing Explanatory Statement and other good and valuable consideration, the receipt and sufficiency of which are acknowledged by the parties, the parties agree as follows:

1. Project Plans and Specifications

   1.1 Preparation and Approval. Pursuant to Exhibit A of this Agreement, all plans, specifications, drawings and other documents necessary or appropriate to the design and construction of the Project shall be prepared, at Agency's sole cost and expense, by Agency or CSXT or their

respective contractors. Project plans, specifications and drawings prepared by or on behalf of Agency shall be subject, at CSXT's election, to the review and approval of CSXT. Such plans, specifications and drawings, as prepared or approved by CSXT, are referred to as the "**Plans**", and shall be incorporated and deemed a part of this Agreement. Plans prepared or submitted to and approved by CSXT as of the date of this Agreement are set forth in Exhibit B to this Agreement.

1.2 Effect of CSXT Approval or Preparation of Plans. By its review, approval or preparation of Plans pursuant to this Agreement, CSXT signifies only that such Plans and improvements constructed in accordance with such Plans satisfy CSXT's requirements. CSXT expressly disclaims all other representations and warranties in connection with the Plans, including, but not limited to, the integrity, suitability or fitness for the purposes of Agency or any other persons of the Plans or improvements constructed in accordance with the Plans.

1.3 Compliance with Plans. The Project shall be constructed in accordance with the Plans.

2. Allocation and Conduct of Work

Work in connection with the Project shall be allocated and conducted as follows:

2.1 CSXT Work. Subject to timely payment of Reimbursable Expenses as provided by Section 4, CSXT shall provide, or cause to be provided, the services as set forth by Exhibit A to this Agreement. Agency agrees that CSXT shall provide all services that CSXT deems necessary or appropriate (whether or not specified by Exhibit A) to preserve and maintain its property and operations, without impairment or exposure to liability of any kind and in compliance with all applicable federal, state and local regulations and CSXT's contractual obligations, including, but not limited to, CSXT's existing or proposed third party agreements and collective bargaining agreements.

2.2 Agency Work. Agency shall perform, or cause to be performed, all work as set forth by Exhibit A, at Agency's sole cost and expense.

2.3 Conduct of Work. CSXT shall commence its work under this Agreement following: (i) delivery to CSXT of a notice to proceed from Agency; (ii) payment of Reimbursable Expenses (as provided by Section 4.1) as required by CSXT prior to the commencement of work by CSXT; (iii) issuance of all permits, approvals and authorizations necessary or appropriate for such work; and (iv) delivery of proof of insurance acceptable to CSXT, as required by Section 9. The initiation of any services by CSXT pursuant to this Agreement, including, but not limited to, the issuance of purchase orders or bids for materials or services, shall constitute commencement of work for the purposes of this Section. The parties intend that all work by CSXT or on CSXT property shall conclude no later than **December 31, 2022**, unless the parties mutually agree to extend such date.

3. Special Provisions. Agency shall observe and abide by, and shall require its contractors ("**Contractors**") to observe and abide by the terms, conditions and provisions set forth in Exhibit C to this Agreement (the "Special Provisions"). To the extent that Agency performs Project work itself, Agency shall be deemed a Contractor for purposes of this Agreement. Agency further agrees that, prior to the commencement of Project work by any third party Contractor, such Contractor shall

execute and deliver to CSXT Schedule I to this Agreement to acknowledge Contractor's agreement to observe and abide by the terms and conditions of this Agreement.

4. Cost of Project and Reimbursement Procedures

4.1 Reimbursable Expenses. Agency shall reimburse CSXT for all costs and expenses incurred by CSXT in connection with the Project, including, without limitation: (1) all out of pocket expenses, (2) travel and lodging expenses, (3) telephone, facsimile, and mailing expenses, (4) costs for equipment, tools, materials and supplies, (5) sums paid to CSXT's consultants and subcontractors, and (6) CSXT labor in connection with the Project, together with CSXT labor overhead percentages established by CSXT pursuant to applicable law (collectively, "**Reimbursable Expenses**"). Reimbursable Expenses shall also include expenses incurred by CSXT prior to the date of this Agreement to the extent identified by the Estimate provided pursuant to Section 4.2.

4.2 Estimate. CSXT has estimated the total Reimbursable Expenses for the Project as shown on Exhibit D (the "**Estimate**", as amended or revised). In the event CSXT anticipates that actual Reimbursable Expenses for the Project may exceed such Estimate, it shall provide Agency with the revised Estimate of the total Reimbursable Expenses, together with a revised Payment Schedule (as defined by Section 4.3.1), for Agency's approval and confirmation that sufficient funds have been appropriated to cover the total Reimbursable Expenses of such revised Estimate. CSXT may elect, by delivery of notice to Agency, to immediately cease all further work on the Project, unless and until Agency provides such approval and confirmation.

4.3 Payment Terms.

4.3.1 Agency shall pay CSXT for Reimbursable Expenses as set forth in the Payment Schedule as shown on Exhibit E (the "Payment Schedule", as revised pursuant to Section 4.2).

4.3.2 Following completion of the Project, CSXT shall submit to Agency a final invoice that reconciles the total Reimbursable Expenses incurred by CSXT against the total payments received from Agency. Agency shall pay to CSXT the amount by which Reimbursable Expenses exceed total payments as shown by the final invoice, within thirty (30) days following delivery of such invoice to Agency. In the event that the payments received by CSXT from Agency exceed the Reimbursable Expenses, CSXT shall remit such excess to Agency.

4.3.3 In the event that Agency fails to pay CSXT any sums due CSXT under this Agreement: (i) Agency shall pay CSXT interest at the lesser of 1.0% per month or the maximum rate of interest permitted by applicable law on the delinquent amount until paid in full; and (ii) CSXT may elect, by delivery of notice to Agency: (A) to immediately cease all further work on the Project, unless and until Agency pays the entire delinquent sum, together with accrued interest; and/or (B) to terminate this Agreement.

4.3.4 All invoices from CSXT shall be delivered to Agency in accordance with Section 16 of this Agreement. All payments by Agency to CSXT shall be made by certified check and mailed to the following address or such other address as designated by CSXT's notice to Agency:

CSX Transportation, Inc.
P. O. Box 530192
Atlanta. GA 30353-0192

4.4 Effect of Termination. Agency's obligation to pay to CSXT Reimbursable Expenses in accordance with Section 4 shall survive termination of this Agreement for any reason.

5. Appropriations Agency represents to CSXT that: (i) Agency has appropriated funds sufficient to reimburse CSXT for the Reimbursable Expenses encompassed by the Estimate attached as Exhibit D; (ii) Agency shall use its best efforts to obtain appropriations necessary to cover Reimbursable Expenses encompassed by subsequent Estimates approved by Agency; and (iii) Agency shall promptly notify CSXT in the event that Agency is unable to obtain such appropriations.

6. Easements, Licenses, and Agreements

6.1 Agency Obligation. Agency shall acquire all necessary licenses, permits and easements required for the Project.

6.2 Temporary Construction Licenses. Insofar as it has the right to do so, CSXT hereby grants Agency a nonexclusive license to access and cross CSXT's property, to the extent necessary for the construction of the Project (excluding ingress or egress over public grade crossings), along such routes and upon such terms as may be defined and imposed by CSXT and as may be designated on the Plans approved by CSXT.

6.3 Temporary Construction Easements. CSXT may grant without warranty to Agency if required a temporary non-exclusive easement for access to the extent necessary for the project on terms and conditions and at a price acceptable to the parties.

6.4 Maintenance Agreement. Contemporaneous with the execution of this Agreement, CSXT and Agency have executed that certain Grade Crossing Maintenance Agreement, providing for Agency's ongoing use maintenance, repair, renewal and removal of the Project.

6.5 Permanent Easements. Insofar as it has the right to do so, CSXT shall grant, without warranty to Agency, easements for the use and maintenance (in accordance with the provisions of the Grade Crossing Maintenance Agreement) of the Project wholly or partly on CSXT property as shown on the Plans approved by CSXT, if any, on terms and conditions and at a price acceptable to the parties. Upon request by CSXT, Agency shall furnish to CSXT descriptions and plat plans for the easements.

7. Permits At its sole cost and expense, Agency shall procure all permits and approvals required by any federal, state, or local governments or governmental agencies for the construction, maintenance and use of the Project, copies of which shall be provided to CSXT.

8. Termination

8.1 By Agency. For any reason, Agency may, as its sole remedy, terminate this Agreement by delivery of notice to CSXT. Agency shall not be entitled to otherwise pursue claims for

consequential, direct, indirect or incidental damages or lost profits as a consequence of CSXT's default or termination of this Agreement or Work on the Project by either party.

8.2 By CSXT. In addition to the other rights and remedies available to CSXT under this Agreement, CSXT may terminate this Agreement by delivery of notice to Agency in the event Agency or its Contractors fail to observe the terms or conditions of this Agreement and such failure continues more than ten (10) business days following delivery of notice of such failure by CSXT to Agency.

8.3 Consequences of Termination. If the Agreement is terminated by either party pursuant to this Section or any other provision of this Agreement, the parties understand that it may be impractical for them to immediately stop the Work. Accordingly, they agree that, in such instance a party may continue to perform Work until it has reached a point where it may reasonably and safely suspend the Work. Agency shall reimburse CSXT pursuant to this Agreement for the Work performed, plus all costs reasonably incurred by CSXT to discontinue the Work and protect the Work upon full suspension of the same, the cost of returning CSXT's property to its former condition, and all other costs of CSXT incurred as a result of the Project up to the time of full suspension of the Work. Termination of this Agreement or Work on the Project, for any reason, shall not diminish or reduce Agency's obligation to pay CSXT for Reimbursable Expenses incurred in accordance with this Agreement. In the event of the termination of this Agreement or the Work for any reason, CSXT's only remaining obligation to Agency shall be to refund to Agency payments made to CSXT in excess of Reimbursable Expenses in accordance with Section 4.

9. Insurance In addition to the insurance that Agency requires of its Contractor, Agency shall acquire or require its Contractor to purchase and maintain insurance in compliance with CSXT's insurance requirements attached to this Agreement as Exhibit F. Neither Agency nor Contractor shall commence work on the Project until such policy or policies have been submitted to and approved by CSXT's Risk Management Department.

10. Ownership and Maintenance

10.1 By Agency. Agency shall own, maintain and repair, at its sole cost and expense, all parts comprising the permanent aspects of the Project, as shown by the Plans and not covered under the Grade Crossing Maintenance Agreement. In the event Agency fails to do so after reasonable notice from CSXT (no more than thirty (30) days, unless an emergency condition exists or is imminent in the opinion of CSXT, that requires immediate action), CSXT may perform such maintenance and repair, at Agency's sole cost and expense. Upon the cessation of use of the Project by Agency, Agency shall remove the structure and restore CSXT's property to its original condition, at Agency's sole cost and expense, to CSXT's satisfaction.

10.2 The Grade Crossing Maintenance Agreement, will govern Agency's other ongoing use maintenance, repair, renewal and removal of the Project.

10.3 Alterations. Agency shall not undertake any alteration, modification or expansion of the Project, without the prior written approval of CSXT, which may be withheld for any reason, and the execution of such agreements as CSXT may require. CSXT may undertake alterations of its property, track or facilities and shall be reimbursed by Agency for the expenses incurred

by CSXT with respect to the removal and restoration of the crossing in connections with such alteration.

11. Indemnification

11.1 Generally. To the maximum extent permitted by applicable law, Agency shall require its Contractors to indemnify, defend, and hold CSXT and its affiliates harmless from and against all claims, demands, payments, suits, actions, judgments, settlements, and damages of every nature, degree, and kind (including direct, indirect, consequential, incidental, and punitive damages), for any injury to or death to any person(s) (including, but not limited to the employees of CSXT, its affiliates, Agency or its Contractors), for the loss of or damage to any property whatsoever (including but not limited to property owned by or in the care, custody, or control of CSXT, its affiliates, Agency or its Contractors, and environmental damages and any related remediation brought or recovered against CSXT and its affiliates), arising directly or indirectly from the negligence, recklessness or intentional wrongful misconduct of the Contractors, Agency, and their respective agents, employees, invitees, contractors, or its contractors' agents, employees or invitees in the performance of work in connection with the Project or activities incidental thereto, or from their presence on or about CSXT's property. The foregoing indemnification obligation shall not be limited to the insurance coverage required by this Agreement, except to the extent required by law or otherwise expressly provided by this Agreement.

11.2 Compliance with Laws. Agency shall comply, and shall require its Contractors to comply, with any federal, state, or local laws, statutes, codes, ordinances, rules, and regulations applicable to its construction and maintenance of the Project. Agency's Contractors shall indemnify, defend, and hold CSXT and its affiliates harmless with respect to any fines, penalties, liabilities, or other consequences arising from breaches of this Section.

11.3 "CSXT Affiliates". For the purpose of this Section 11, CSXT's affiliates include CSX Corporation and all entities, directly or indirectly, owned or controlled by or under common control of CSXT or CSX Corporation and their respective officers, directors, employees and agents.

11.4 Notice of Incidents. Agency and its Contractor shall notify CSXT promptly of any loss, damage, injury or death arising out of or in connection with the Project work.

11.5 Survival. The provisions of this Section 11 shall survive the termination or expiration of this Agreement.

12. Independent Contractor The parties agree that neither Agency nor its Contractors shall be deemed either agents or independent contractors of CSXT. Except as otherwise provided by this Agreement, CSXT shall exercise no control whatsoever over the employment, discharge, compensation of, or services rendered by Agency or Agency's Contractors, or the construction practices, procedures, and professional judgment employed by Agency or its Contractor to complete the Project. Notwithstanding the foregoing, this Section 12 shall in no way affect the absolute authority of CSXT to prohibit Agency or its Contractors or anyone from entering CSXT's property, or to require the removal of any person from its property, if it determines, in its sole discretion, that such person is not acting in a safe manner or that actual or potential hazards in, on or about the Project exist.

13. "Entire Agreement" This Agreement embodies the entire understanding of the parties, may not be waived or modified except in a writing signed by authorized representatives of both parties, and supersedes all prior or contemporaneous written or oral understandings, agreements or negotiations regarding its subject matter. In the event of any inconsistency between this Agreement and the Exhibits, the more specific terms of the Exhibits shall be deemed controlling.

14. Waiver If either party fails to enforce its respective rights under this Agreement, or fails to insist upon the performance of the other party's obligations hereunder, such failure shall not be construed as a permanent waiver of any rights or obligations in this Agreement.

15. Assignment CSXT may assign this Agreement and all rights and obligations herein to a successor in interest, parent company, affiliate, or future affiliate. Upon assignment of this Agreement by CSXT and the assumption of CSXT's assignee of CSXT's obligations under this Agreement, CSXT shall have no further obligation under this Agreement. Agency shall not assign its rights or obligations under this Agreement without CSXT's prior consent, which consent may be withheld for any reason.

16. Notices All notices, consents and approvals required or permitted by this Agreement shall be in writing and shall be deemed delivered upon personal delivery, upon the expiration of three (3) days following mailing by first class U.S. mail, or upon the next business day following mailing by a nationally recognized overnight carrier, to the parties at the addresses set forth below, or such other addresses as either party may designate by delivery of prior notice to the other party:

If to CSXT:	CSX Transportation, Inc. 4900 Old Osborne Tpke., Suite 200 Richmond, VA 23231 Attn: Troy Creasy, Project Manager II - Public Projects
If to Agency:	City of Winchester 15 North Cameron Street Winchester, Virginia 22601 Attn: Perry Eisenach, Public Services Director

17. Severability The parties agree that if any part, term or provision of this Agreement is held to be illegal, unenforceable or in conflict with any applicable federal, state, or local law or regulation, such part, term or provision shall be severable, with the remainder of the Agreement remaining valid and enforceable.

Project: Winchester, Virginia – Proposed elimination of the Papermill Road (DOT# 139454M) and Tevis Street (DOT# 139455U) at-grade crossings with CSXT at Mileposts BAD-33.91 & 34.12; and construction of the new Hope Drive at-grade crossing (DOT# 938231C) with CSXT at Milepost BAD-33.98; Central Zone, Shenandoah Subdivision; CSXT OP# VA0547

18. Applicable Law This Agreement shall be governed by the laws of the Commonwealth of Virginia, exclusive of its choice of law rules. The parties further agree that the venue of all legal and equitable proceedings related to disputes under this Agreement shall be situated in Winchester, Virginia, and the parties agree to submit to the personal jurisdiction of any State or Federal court situated in Winchester, Virginia.

BY SIGNING THIS AGREEMENT, I certify that there have been no changes made to the content of this Agreement since its approval by the CSXT Legal Department on April 30, 2020.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed in duplicate, each by its duly authorized officers, as of the date of this Agreement.

CITY OF WINCHESTER

By: Mary T. P.
Print Name: Mary T. Price
Title: Interim City Manager

Approved as to Form:
Special Counsel to the City of Winchester, Virginia
Michael L. Bryan, Special Counsel to City of Winchester VA

CSX TRANSPORTATION, INC.

By:
Print Name:
Title:

Project: Winchester, Virginia – Proposed elimination of the Papermill Road (DOT# 139454M) and Tevis Street (DOT# 139455U) at-grade crossings with CSXT at Mileposts BAD-33.91 & 34.12; and construction of the new Hope Drive at-grade crossing (DOT# 938231C) with CSXT at Milepost BAD-33.98; Central Zone, Shenandoah Subdivision; CSXT OP# VA0547

EXHIBIT A

ALLOCATION OF WORK

Subject to Section 2.1, work to be performed in connection with the Project is allocated as follows:

A. Agency shall let by contract to its Contractors:

1. Removal of the approaches and restoration at the Papermill Road and Tevis Street at-grade crossings, up to 12.5' from the centerline of track.
2. Construction of approaches and necessary appurtenances within the CSXT right of way at the Hope Drive intersection up to the proposed concrete crossing surface
3. Construction of all other roadway and drainage facilities at Hope Drive outside the CSXT right of way
4. Detouring and Vehicular Traffic Control
5. Culvert installation at approximately the existing Tevis Street at-grade crossing location
6. Sediment and Erosion Control

B. CSXT shall perform or cause to be performed:

1. Installation of a new Hope Drive at-grade crossing, including concrete crossing surface, and all associated railroad communications and signal devices
2. Removal of the Papermill Road and Tevis Street at-grade crossings within 12.5 feet of the centerline of track
3. Railroad Flagging Services
4. Construction Monitoring/Inspection

Project: Winchester, Virginia – Proposed elimination of the Papermill Road (DOT# 139454M) and Tevis Street (DOT# 139455U) at-grade crossings with CSXT at Mileposts BAD-33.91 & 34.12; and construction of the new Hope Drive at-grade crossing (DOT# 938231C) with CSXT at Milepost BAD-33.98; Central Zone, Shenandoah Subdivision; CSXT OP# VA0547

EXHIBIT B

PLANS AND SPECIFICATIONS

Plans, Specifications and Drawings:

As of the date of this Agreement, the following plans, specifications and drawings have been submitted by Agency to CSXT for its review and approval:

Agency of Winchester – Plan and Profile of Proposed Hope Drive Extension Realignment and Safety Improvement; Plan, Profile and Cross Sections. Designed by: Rinker Design Associates, PC. Plans dated October 2018; Sheet 1 to 165.

Agency of Winchester – Hope Drive Extension Special Conditions, Technical Specifications, & Special Provisions; Page 1 to 119.

NOTE: **In the event subsequent plan submissions are made by Agency to CSXT for review and approval, once approved, said plans shall be considered to be incorporated into this Exhibit B as of the date of CSXT's written approval.**

Project: Winchester, Virginia – Proposed elimination of the Papermill Road (DOT# 139454M) and Tevis Street (DOT# 139455U) at-grade crossings with CSXT at Mileposts BAD-33.91 & 34.12; and construction of the new Hope Drive at-grade crossing (DOT# 938231C) with CSXT at Milepost BAD-33.98; Central Zone, Shenandoah Subdivision; CSXT OP# VA0547

EXHIBIT C

CSXT SPECIAL PROVISIONS

DEFINITIONS:

As used in these Special Provisions, all capitalized terms shall have the meanings ascribed to them by the Agreement, and the following terms shall have the meanings ascribed to them below:

"CSXT" shall mean CSX Transportation, Inc., its successors and assigns.

"CSXT Representative" shall mean the authorized representative of CSX Transportation, Inc.

"Agreement" shall mean the Agreement to which this Exhibit C is made a part thereof and as may be amended from time to time.

"Agency" shall mean the City of Winchester.

"Agency Representative" shall mean the authorized representative of City of Winchester.

"Contractor" shall have the meaning ascribed to such term by the Agreement.

"Work" shall mean the Project as described in the Agreement.

I. AUTHORITY OF CSXT ENGINEER

The CSXT Representative shall have final authority in all matters affecting the safe maintenance of CSXT operations and CSXT property, and his or her approval shall be obtained by the Agency or its Contractor for methods of construction to avoid interference with CSXT operations and CSXT property and all other matters contemplated by the Agreement and these Special Provisions.

II. INTERFERENCE WITH CSXT OPERATIONS

A. Agency or its Contractor shall arrange and conduct its work so that there will be no interference with CSXT operations, including train, signal, telephone and telegraphic services, or damage to CSXT's property, or to poles, wires, and other facilities of tenants on CSXT's Property or right-of-way. Agency or its Contractor shall store materials so as to prevent trespassers from causing damage to trains, or CSXT Property. Whenever Work is likely to affect the operations or safety of trains, the method of doing such Work shall first be submitted to the CSXT Representative for approval, but such approval shall not relieve Agency or its Contractor from liability in connection with such Work.

B. If conditions arising from or in connection with the Project require that immediate and unusual provisions be made to protect train operation or CSXT's property, Agency or its Contractor shall make such provision. If the CSXT Representative determines that such provision is insufficient, CSXT may, at the expense of Agency or its Contractor, require or provide such provision as may be deemed necessary, or cause the Work to cease immediately.

III. NOTICE OF STARTING WORK. Agency or its Contractor shall not commence any work on CSXT Property or right-of-way until it has complied with the following conditions:

A. Notify CSXT in writing of the date that it intends to commence Work on the Project. Such notice must be received by CSXT at least ten (10) business days in advance of the date Agency or its Contractor proposes to begin Work on CSXT property. The notice must refer to this Agreement by date. If flagging service is required, such notice shall be submitted at least thirty (30) business days in advance of the date scheduled to commence the Work.

B. Obtain authorization from the CSXT Representative to begin Work on CSXT property, such authorization to include an outline of specific conditions with which it must comply.

C. Obtain from CSXT the names, addresses and telephone numbers of CSXT's personnel who must receive notice under provisions in the Agreement. Where more than one individual is designated, the area of responsibility of each shall be specified.

IV. WORK FOR THE BENEFIT OF THE CONTRACTOR

A. No temporary or permanent changes to wire lines or other facilities (other than third party fiber optic cable transmission systems) on CSXT property that are considered necessary to the Work are anticipated or shown on the Plans. If any such changes are, or become, necessary in the opinion of CSXT or Agency, such changes will be covered by appropriate revisions to the Plans and by preparation of a force account estimate. Such force account estimate may be initiated by either CSXT or Agency, but must be approved by both CSXT and Agency. Agency or Contractor shall be responsible for arranging for the relocation of the third party fiber optic cable transmission systems, at no cost or expense to CSXT.

B. Should Agency or Contractor desire any changes in addition to the above, then it shall make separate arrangements with CSXT for such changes to be accomplished at the Agency or Contractor's expense.

V. HAUL ACROSS RAILROAD

A. If Agency or Contractor desires access across CSXT property or tracks at other than an existing and open public road crossing in or incident to construction of the Project, the Agency or Contractor must first obtain the permission of CSXT and shall execute a license agreement or right of entry satisfactory to CSXT, wherein Agency or Contractor agrees to bear all costs and liabilities related to such access.

B. Agency and Contractor shall not cross CSXT's property and tracks with vehicles or equipment of any kind or character, except at such crossing or crossings as may be permitted pursuant to this section.

VI. COOPERATION AND DELAYS

A. Agency or Contractor shall arrange a schedule with CSXT for accomplishing stage construction involving work by CSXT. In arranging its schedule, Agency or Contractor shall ascertain, from CSXT, the lead time required for assembling crews and materials and shall make due allowance therefor

B. Agency or Contractor may not charge any costs or submit any claims against CSXT for hindrance or delay caused by railroad traffic; work done by CSXT or other delay incident to or necessary for safe maintenance of railroad traffic; or for any delays due to compliance with these Special Provisions.

C. Agency and Contractor shall cooperate with others participating in the construction of the Project to the end that all work may be carried on to the best advantage.

D. Agency and Contractor understand and agree that CSXT does not assume any responsibility for work performed by others in connection with the Project. Agency and Contractor further understand and agree that they shall have no claim whatsoever against CSXT for any inconvenience, delay or additional cost incurred by Agency or Contractor on account of operations by others.

VII. STORAGE OF MATERIALS AND EQUIPMENT

Agency and Contractor shall not store their materials or equipment on CSXT's property or where they may potentially interfere with CSXT's operations, unless Agency or Contractor has received CSXT Representative's prior written permission. Agency and Contractor understand and agree that CSXT will not be liable for any damage to such materials and equipment from any cause and that CSXT may move, or require Agency or Contractor to move, such material and equipment at Agency's or Contractor's sole expense. To minimize the possibility of damage to the railroad tracks resulting from the unauthorized use of equipment, all grading or other construction equipment that is left parked near the tracks unattended by watchmen shall be immobilized to the extent feasible so that it cannot be moved by unauthorized persons.

VIII. CONSTRUCTION PROCEDURES

A. General

1. Construction work on CSXT property shall be subject to CSXT's inspection and approval.
2. Construction work on CSXT property shall be in accord with CSXT's written outline of specific conditions and with these Special Provisions.
3. Contractor shall observe the terms and rules of the CSXT Safe Way manual, which Agency and Contractor shall be required to obtain from CSXT, and in accord with any other instructions furnished by CSXT or CSXT's Representative.

B. Blasting

1. Agency or Contractor shall obtain CSXT Representative's and Agency Representative's prior written approval for use of explosives on or adjacent to CSXT property. If permission for use of explosives is granted, Agency or Contractor must comply with the following:

   a. Blasting shall be done with light charges under the direct supervision of a responsible officer or employee of Agency or Contractor.

   b. Electric detonating fuses shall not be used because of the possibility of premature explosions resulting from operation of two-way train radios.

   c. No blasting shall be done without the presence of an authorized representative of CSXT. At least thirty (30) days advance notice to CSXT Representative is required to arrange for the presence of an authorized CSXT representative and any flagging that CSXT may require.

   d. Agency or Contractor must have at the Project site adequate equipment, labor and materials, and allow sufficient time, to (i) clean up (at Agency's expense) debris resulting from the blasting without any delay to trains; and (ii) correct (at Agency's expense) any track misalignment or other damage to CSXT's property resulting from the blasting, as directed by CSXT Representative, without delay to trains. If Agency's or Contractor's actions result in delay of any trains, including Amtrak passenger trains, Agency shall bear the entire cost thereof.

   e. Agency and Contractor shall not store explosives on CSXT property.

2. CSXT Representative will:

   a. Determine the approximate location of trains and advise Agency or Contractor of the approximate amount of time available for the blasting operation and clean-up.

   b. Have the authority to order discontinuance of blasting if, in his or her opinion, blasting is too hazardous or is not in accord with these Special Provisions.

IX. MAINTENANCE OF DITCHES ADJACENT TO CSXT TRACKS

Agency or Contractor shall maintain all ditches and drainage structures free of silt or other obstructions that may result from their operations. Agency or Contractor shall provide erosion control measures during construction and use methods that accord with applicable state standard specifications for road and bridge construction, including either (1) silt fence; (2) hay or straw barrier; (3) berm or temporary ditches; (4) sediment basin; (5) aggregate checks; and (6) channel lining. All such maintenance and repair of damages due to Agency's or Contractor's operations shall be performed at Agency's expense.

X. FLAGGING / INSPECTION SERVICE

A. CSXT has sole authority to determine the need for flagging required to protect its operations and property. In general, flagging protection will be required whenever Agency or Contractor or their equipment are, or are likely to be, working within fifty (50) feet of live track or other track clearances specified by CSXT, or over tracks.

B. Agency shall reimburse CSXT directly for all costs of flagging that is required on account of construction within CSXT property shown in the Plans, or that is covered by an approved plan revision, supplemental agreement or change order.

C. Agency or Contractor shall give a minimum of thirty (30) days advance notice to CSXT Representative for anticipated need for flagging service. No work shall be undertaken until the flag person(s) is/are at the job site. If it is necessary for CSXT to advertise a flagging job for bid, it may take up to ninety (90) days to obtain this service, and CSXT shall not be liable for the cost of delays attributable to obtaining such service.

D. CSXT shall have the right to assign an individual to the site of the Project to perform inspection service whenever, in the opinion of CSXT Representative, such inspection may be necessary. Agency shall reimburse CSXT for the costs incurred by CSXT for such inspection service. Inspection service shall not relieve Agency or Contractor from liability for its Work.

E. CSXT shall render invoices for, and Agency shall pay for, the actual pay rate of the flagpersons and inspectors used, plus standard additives, whether that amount is above or below the rate provided in the Estimate. If the rate of pay that is to be used for inspector or flagging service is changed before the work is started or during the progress of the work, whether by law or agreement between CSXT and its employees, or if the tax rates on labor are changed, bills will be rendered by CSXT and paid by Agency using the new rates. Agency and Contractor shall perform their operations that require flagging protection or inspection service in such a manner and sequence that the cost of such will be as economical as possible.

XI. UTILITY FACILITIES ON CSXT PROPERTY

Agency shall arrange, upon approval from CSXT, to have any utility facilities on or over CSXT Property changed as may be necessary to provide clearances for the proposed trackage.

XII. CLEAN-UP

Agency or Contractor, upon completion of the Project, shall remove from CSXT's Property any temporary grade crossings, any temporary erosion control measures used to control drainage, all machinery, equipment, surplus materials, falsework, rubbish, or temporary buildings belonging to Agency or Contractor. Agency or Contractor, upon completion of the Project, shall leave CSXT Property in neat condition, satisfactory to CSXT Representative.

XIII. FAILURE TO COMPLY

If Agency or Contractor violate or fail to comply with any of the requirements of these Special

Project: Winchester, Virginia – Proposed elimination of the Papermill Road (DOT# 139454M) and Tevis Street (DOT# 139455U) at-grade crossings with CSXT at Mileposts BAD-33.91 & 34.12; and construction of the new Hope Drive at-grade crossing (DOT# 938231C) with CSXT at Milepost BAD-33.98; Central Zone, Shenandoah Subdivision; CSXT OP# VA0547

Provisions, (a) CSXT may require Agency and/or Contractor to vacate CSXT Property; and (b) CSXT may withhold monies due Agency and/or Contractor; (c) CSXT may require Agency to withhold monies due Contractor; and (d) CSXT may cure such failure and the Agency shall reimburse CSXT for the cost of curing such failure.

Project: Winchester, Virginia – Proposed elimination of the Papermill Road (DOT# 139454M) and Tevis Street (DOT# 139455U) at-grade crossings with CSXT at Mileposts BAD-33.91 & 34.12; and construction of the new Hope Drive at-grade crossing (DOT# 938231C) with CSXT at Milepost BAD-33.98; Central Zone, Shenandoah Subdivision; CSXT OP# VA0547

EXHIBIT D

INITIAL ESTIMATE
ATTACHED

ACCT. CODE : 709 - VA0547

Form Revision 10/07/19

ESTIMATE SUBJECT TO REVISION AFTER: 3/31/2021 **DOT NO.:** 139454M, 139455U, & 938231C

CITY: Winchester **COUNTY:** **STATE:** VA

DESCRIPTION: Proposed elimination of the Papermill Road (DOT# 139454M) and Tevis Street (DOT# 139455U) at-grade crossings with CSXT at Mileposts BAD-33.91 & 34.12; and construction of the new Hope Drive at-grade crossing (DOT# 938231C) with CSXT at Milepost BAD-33.98

ZONE: Central **SUB-DIV:** Shenandoah **MILE POST:** BAD-33.91, 33.98 & 34.12

AGENCY PROJECT NUMBER:

	PRELIMINARY ENGINEERING:						
212	Contracted & Administrative Engineering Services					$	-
	Subtotal					**$**	**-**
	CONSTRUCTION ENGINEERING/INSPECTION:						
212	Contracted & Administrative Engineering Services					$	160,600
	Subtotal					**$**	**160,600**
	FLAGGING SERVICE: (Contract Labor)						
70	Labor (Conductor-Flagman)		0	Days @	$ 350.00	$	-
50	Labor (Foreman/Inspector)		180	Days @	$ 504.00	$	90,720
70	Additive	209.30% (Transportation Department)				$	-
50	Additive	188.70% (Engineering Department)				$	171,189
230	Expenses	(Engineering Department)	180	Days @	$ 75.00	$	13,500
230	Expenses	(Transportation Department)	0	Days @	$ 45.00	$	-
	Subtotal					**$**	**275,409**
	SIGNAL & COMMUNICATIONS WORK:					**$**	**415,429**
	TRACK WORK:					**$**	**166,684**
	PROJECT SUBTOTAL:					**$**	**1,018,122**
900	**CONTINGENCIES:**	10.00%				$	101,812
	PROJECT TOTAL:	**********				$	1,119,934
	CURRENT AUTHORIZED BUDGET:	**********				$	-
	TOTAL SUPPLEMENT REQUESTED:	**********				**$**	**1,119,934**
	DIVISION OF COST:						
	Agency	100.00%				$	1,119,934
	Railroad	0.00%				$	-

NOTE: Estimate is based on FULL CROSSING CLOSURE during work by Railroad Forces.
This estimate has been prepared based on site conditions, anticipated work duration periods, material prices, labor rates, manpower and resource availability, and other factors known as of the date prepared. The actual cost for CSXT work may differ based upon the agency's requirements, their contractor's work procedures, and/or other conditions that become apparent once construction commences or during the progress of the work

Office of Chief Engineer Public Projects--Jacksonville, Florida

Estimated prepared by: AECOM **Approved by:** *TC* **CSXT Public Project Group**

DATE: 03/31/20 **REVISED:** 01/00/00 **DATE:** 01/00/00

Project: Winchester, Virginia – Proposed elimination of the Papermill Road (DOT# 139454M) and Tevis Street (DOT# 139455U) at-grade crossings with CSXT at Mileposts BAD-33.91 & 34.12; and construction of the new Hope Drive at-grade crossing (DOT# 938231C) with CSXT at Milepost BAD-33.98; Central Zone, Shenandoah Subdivision; CSXT OP# VA0547

EXHIBIT E

PAYMENT SCHEDULE

Upon execution and delivery of the fully executed Construction Agreement, Agency will deposit with CSXT a sum equal to the Reimbursable Expenses, as shown by the Estimate. If CSXT anticipates that it may incur Reimbursable Expenses in excess of the deposited amount, CSXT will request an additional deposit equal to the then remaining Reimbursable Expenses which CSXT estimates that it will incur. CSXT shall request such additional deposit by delivery of invoices to Agency. Agency shall make such additional deposit within thirty (30) days following delivery of such invoice to Agency.

Project: Winchester, Virginia – Proposed elimination of the Papermill Road (DOT# 139454M) and Tevis Street (DOT# 139455U) at-grade crossings with CSXT at Mileposts BAD-33.91 & 34.12; and construction of the new Hope Drive at-grade crossing (DOT# 938231C) with CSXT at Milepost BAD-33.98; Central Zone, Shenandoah Subdivision; CSXT OP# VA0547

EXHIBIT F

INSURANCE REQUIREMENTS

I. Insurance Policies:

Agency and Contractor, if and to the extent that either is performing work on or about CSXT's property, shall procure and maintain the following insurance policies:

1. Commercial General Liability coverage at their sole cost and expense with limits of not less than $5,000,000 in combined single limits for bodily injury and/or property damage per occurrence, and such policies shall name CSXT as an additional named insured. The policy shall include endorsement ISO CG 24 17 evidencing that coverage is provided for work within 50 feet of a railroad. If such endorsement is not included, railroad protective liability insurance must be provided as described in item 4 below.

2. Statutory Worker's Compensation and Employers Liability Insurance with limits of not less than $1,000,000, which insurance must contain a waiver of subrogation against CSXT and its affiliates (if permitted by state law).

3. Commercial automobile liability insurance with limits of not less than $1,000,000 combined single limit for bodily injury and/or property damage per occurrence, and such policies shall name CSXT as an additional named insured. The policy shall include endorsement ISO CA 20 70 evidencing that coverage is provided for work within 50 feet of a railroad. If such endorsement is not included, railroad protective liability insurance must be provided as described in item 4 below.

4. Railroad protective liability insurance with limits of not less than $5,000,000 combined single limit for bodily injury and/or property damage per occurrence and an aggregate annual limit of $10,000,000, which insurance shall satisfy the following additional requirements:

   a. The Railroad Protective Insurance Policy must be on the ISO/RIMA Form of Railroad Protective Insurance - Insurance Services Office (ISO) Form CG 00 35.

   b. CSX Transportation must be the named insured on the Railroad Protective Insurance Policy.

   c. Name and Address of Contractor and Agency must appear on the Declarations page.

   d. Description of operations must appear on the Declarations page and must match the Project description.

e. Authorized endorsements must include the Pollution Exclusion Amendment - CG 28 31, unless using form CG 00 35 version 96 and later.

f. Authorized endorsements may include:

(i). Broad Form Nuclear Exclusion - IL 00 21
(ii) 30-day Advance Notice of Non-renewal or cancellation
(iii) Required State Cancellation Endorsement
(iv) Quick Reference or Index - CL/IL 240

g. Authorized endorsements may not include:

(i) A Pollution Exclusion Endorsement except CG 28 31
(ii) A Punitive or Exemplary Damages Exclusion
(iii) A "Common Policy Conditions" Endorsement
(iv) Any endorsement that is not named in Section 4 (e) or (f) above.
(v) Policies that contain any type of deductible

5. All insurance companies must be A. M. Best rated A- and Class VII or better.

6. The CSX OP number or CSX contract number, as applicable, must appear on each Declarations page and/or certificates of insurance.

7. Such additional or different insurance as CSXT may require.

II. Additional Terms

1. Contractor must submit the original Railroad Protective Liability policy, Certificates of Insurance and all notices and correspondence regarding the insurance policies to:

Insurance Department
CSX Transportation, Inc.
500 Water Street, C-907
Jacksonville, FL 32202

OR

insurancedocuments@csx.com

2. Neither Agency nor Contractor may begin work on the Project until it has received CSXT's written approval of the required insurance.

Project: Winchester, Virginia – Proposed elimination of the Papermill Road (DOT# 139454M) and Tevis Street (DOT# 139455U) at-grade crossings with CSXT at Mileposts BAD-33.91 & 34.12; and construction of the new Hope Drive at-grade crossing (DOT# 938231C) with CSXT at Milepost BAD-33.98; Central Zone, Shenandoah Subdivision; CSXT OP# VA0547

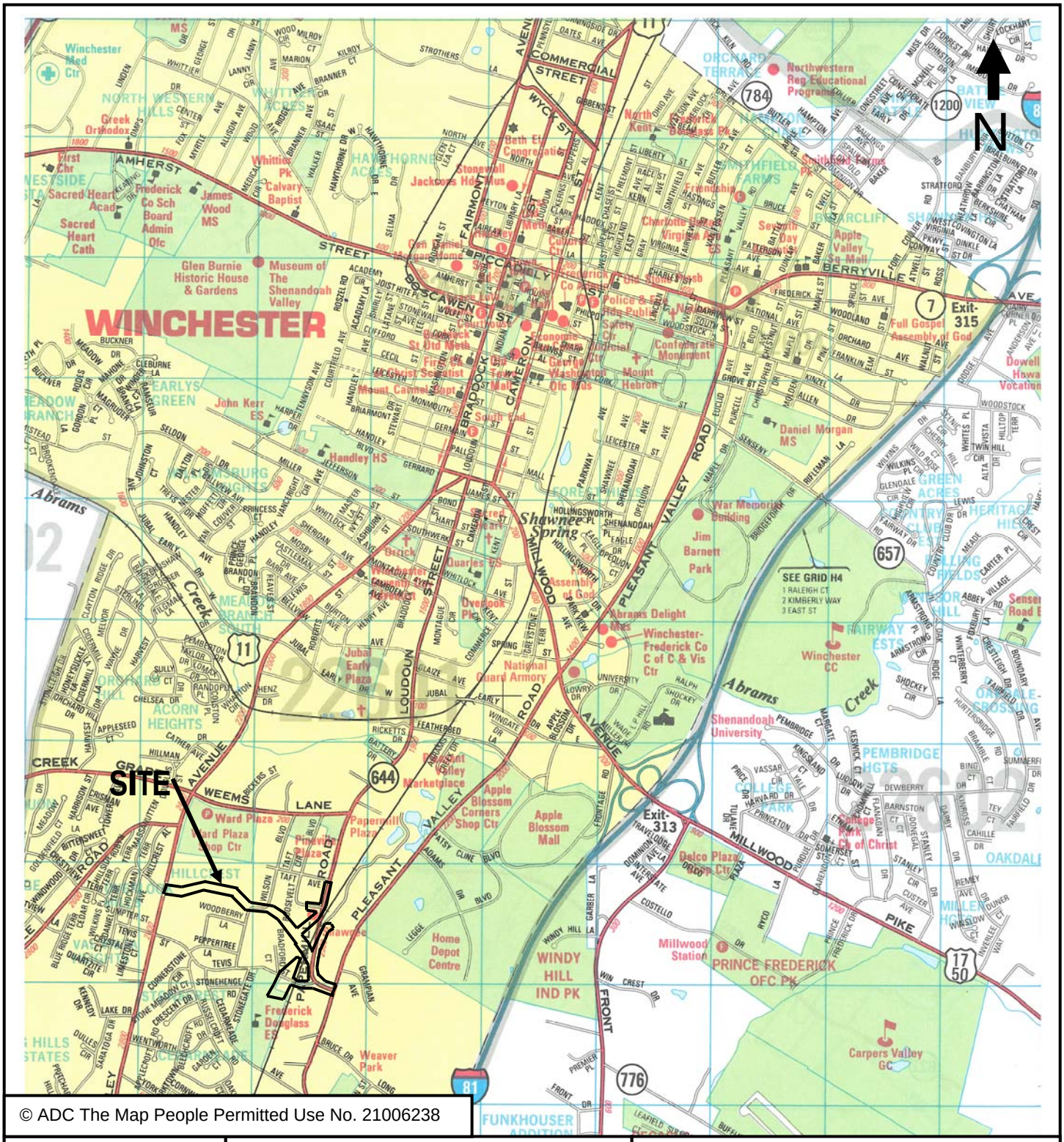
SCHEDULE I

CONTRACTOR'S ACCEPTANCE

To and for the benefit of CSX Transportation, Inc. ("CSXT") and to induce CSXT to permit Contractor on or about CSXT's property for the purposes of performing work in accordance with the Agreement dated _____, 20__, between CITY OF WINCHESTER and CSXT, Contractor hereby agrees to abide by and perform all applicable terms of the Agreement, including, but not limited to Exhibits C and F to the Agreement, and Sections 3, 9 and 11 of the Agreement.

Contractor: _____

By: _____
Name: _____
Title: _____
Date: _____



© ADC The Map People Permitted Use No. 21006238

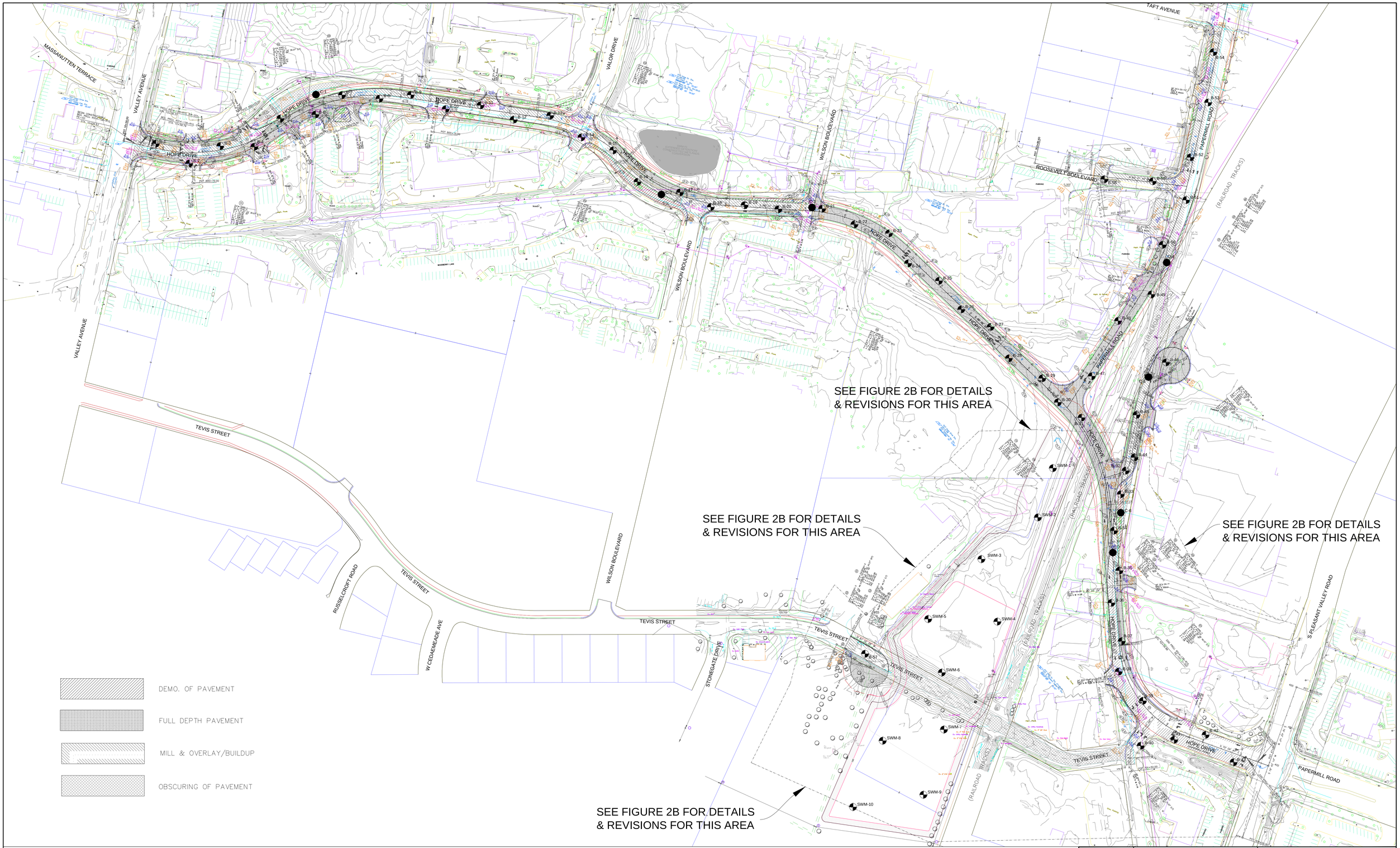
GEO-TECHNOLOGY ASSOCIATES, INC.
Geotechnical and Environmental Consultants

43760 Trade Center Place, Suite 110
Sterling, Virginia 20166
(703) 478-0055
Fax (703) 478-0137

Figure 1
Site Vicinity Map

Hope Drive
City of Winchester, Frederick County, Virginia

SCALE	DATE	SOURCE	REVIEWED BY	GTA PROJECT NO.
1"=±2,000	September 2017	ADC	GTA	31170078



LEGEND:

- APPROXIMATE GTA SPT BORING LOCATION - April 2017
- APPROXIMATE GTA ASPHALT CORE LOCATION - April 2017

GRAPHIC SCALE

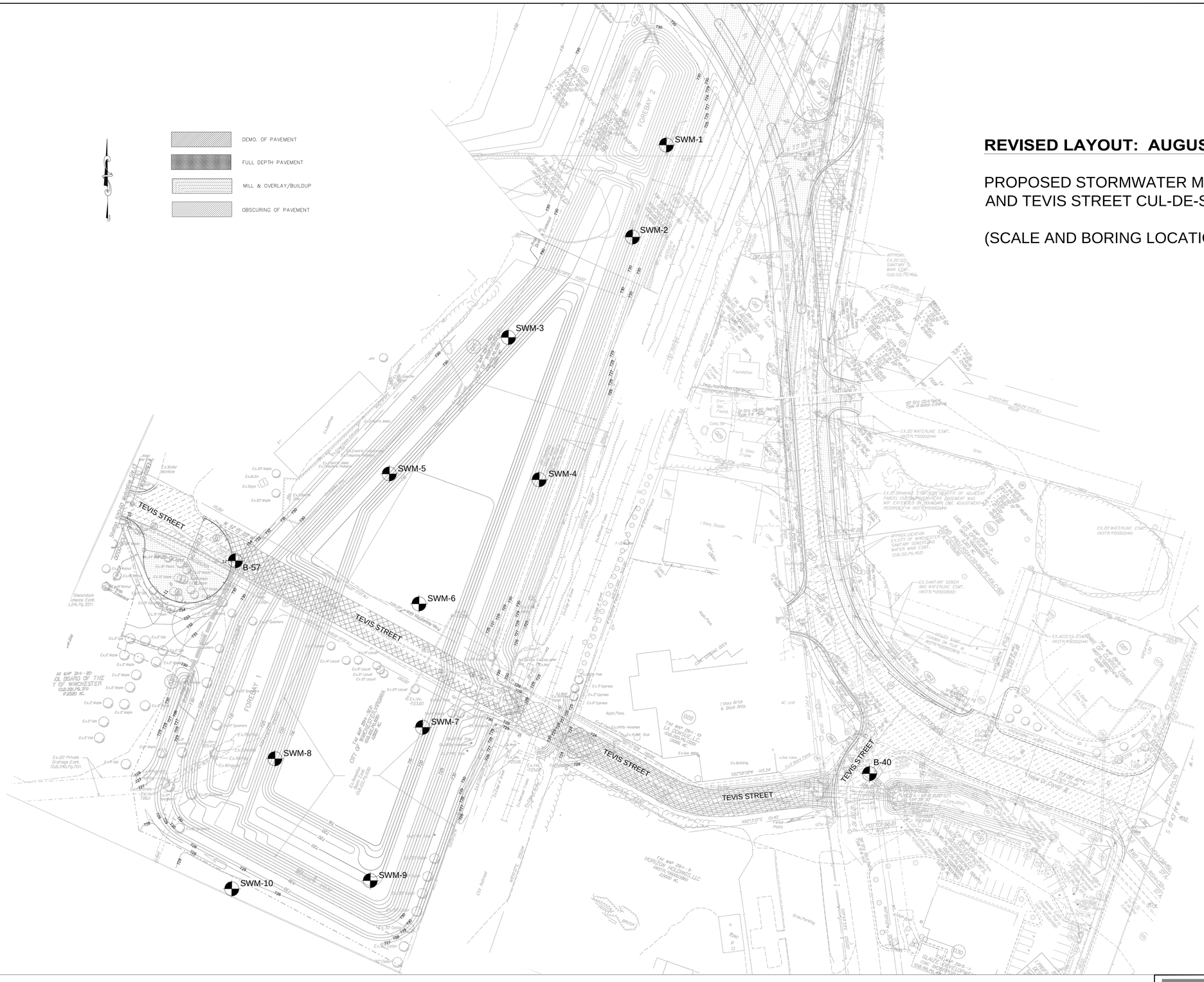
0 100 200

(IN FEET)
1 inch = 100 feet

GEO-TECHNOLOGY ASSOCIATES, INC.
Geotechnical and Environmental Consultants
43760 Trade Center Place, Suite 110
Sterling, Virginia 20166
(703) 478-0055
Fax (703) 478-0137

Hope Drive
EXPLORATION LOCATION PLAN
City of Winchester, Frederick County, Virginia

SCALE	DATE	JOB NO.	SOURCE	REVIEWED BY	FIGURE
1" = 100'	Aug. 8, 2017	31170078	RDA (1/16/2017)	AR	2A



REVISED LAYOUT: AUGUST 2, 2017

PROPOSED STORMWATER MANAGEMENT FACILITY
AND TEVIS STREET CUL-DE-SAC

(SCALE AND BORING LOCATIONS ARE APPROXIMATE)

LEGEND:

- APPROXIMATE GTA SPT BORING LOCATION - April 2017

GRAPHIC SCALE

0 50 100

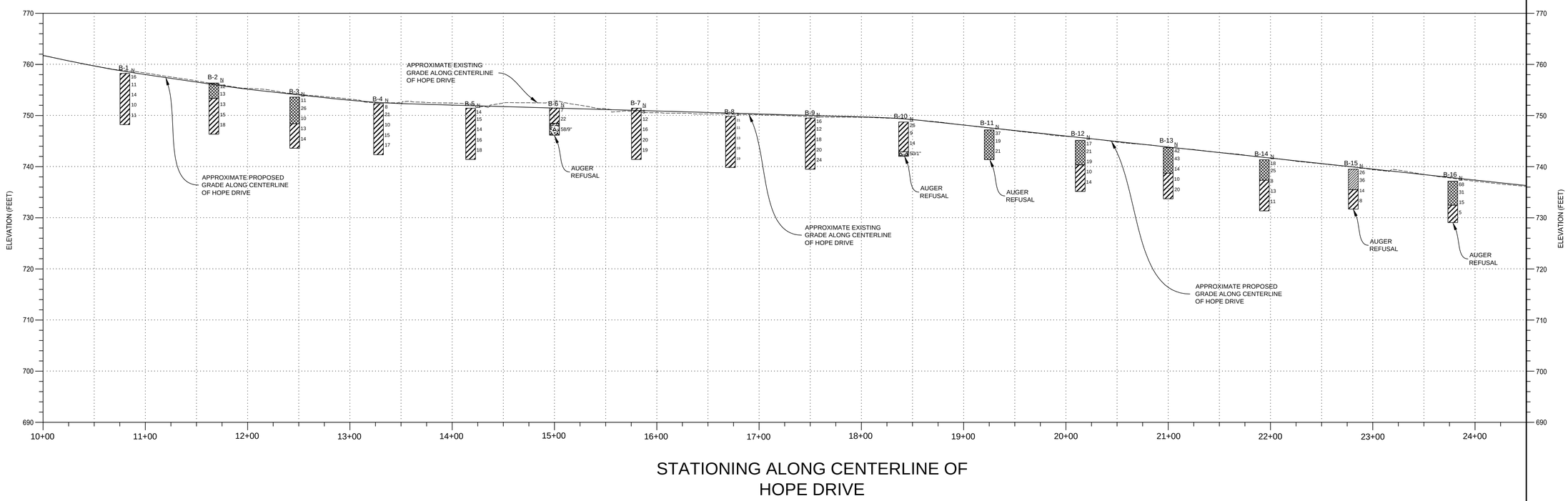
(IN FEET)
1 inch = 50 feet

GEO-TECHNOLOGY ASSOCIATES, INC.
Geotechnical and Environmental Consultants
43760 Trade Center Place, Suite 110
Sterling, Virginia 20166
(703) 478-0055
Fax (703) 478-0137

Hope Drive
EXPLORATION LOCATION PLAN
City of Winchester, Frederick County, Virginia

APPROXIMATE SCALE	DATE	JOB NO.	SOURCE	REVIEWED BY	FIGURE
1" = 50'	Aug. 8, 2017	31170078	RDA (8/2/2017)	AR	2B

HOPE DRIVE
SUBSURFACE PROFILE



STATIONING ALONG CENTERLINE OF HOPE DRIVE

MATCHLINE TO FIGURE 4

GRAPHIC SYMBOL KEY:

- EXISTING FILL
- CL - LEAN CLAY
- CH - FAT CLAY
- SC - CLAYEY SAND
- HIGHLY WEATHERED ROCK

GEO-TECHNOLOGY ASSOCIATES, INC.
Geotechnical and Environmental Consultants
43760 Trade Center Place, Suite 110
Sterling, Virginia 20166
(703) 478-0055
Fax (703) 478-0137

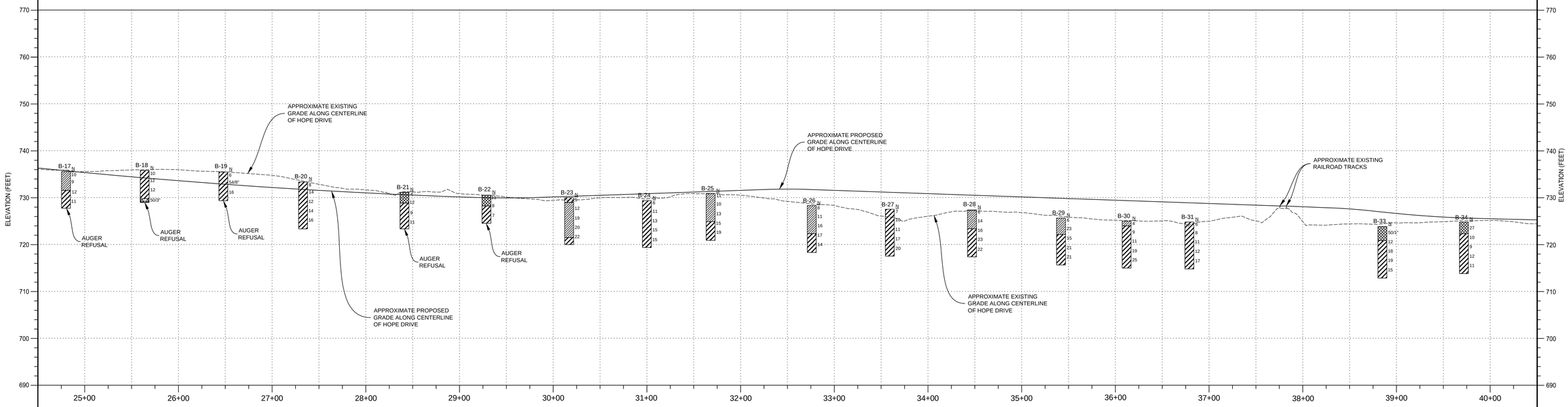
Hope Drive

SUBSURFACE PROFILE

City of Winchester, Frederick County, Virginia

SCALE	DATE	JOB NO.	SOURCE	REVIEWED BY	
H: 1" = 50' V: 1" = 10'	AUG. 8, 2017	31170078	RDA (8/2/2017)	AR	FIGURE 3

HOPE DRIVE
SUBSURFACE PROFILE



STATIONING ALONG CENTERLINE OF HOPE DRIVE

GRAPHIC SYMBOL KEY:

- EXISTING FILL
- CL - LEAN CLAY
- CH - FAT CLAY
- SC - CLAYEY SAND
- HIGHLY WEATHERED ROCK

GEO-TECHNOLOGY ASSOCIATES, INC.
Geotechnical and Environmental Consultants
43760 Trade Center Place, Suite 110
Sterling, Virginia 20166
(703) 478-0055
Fax (703) 478-0137

Hope Drive

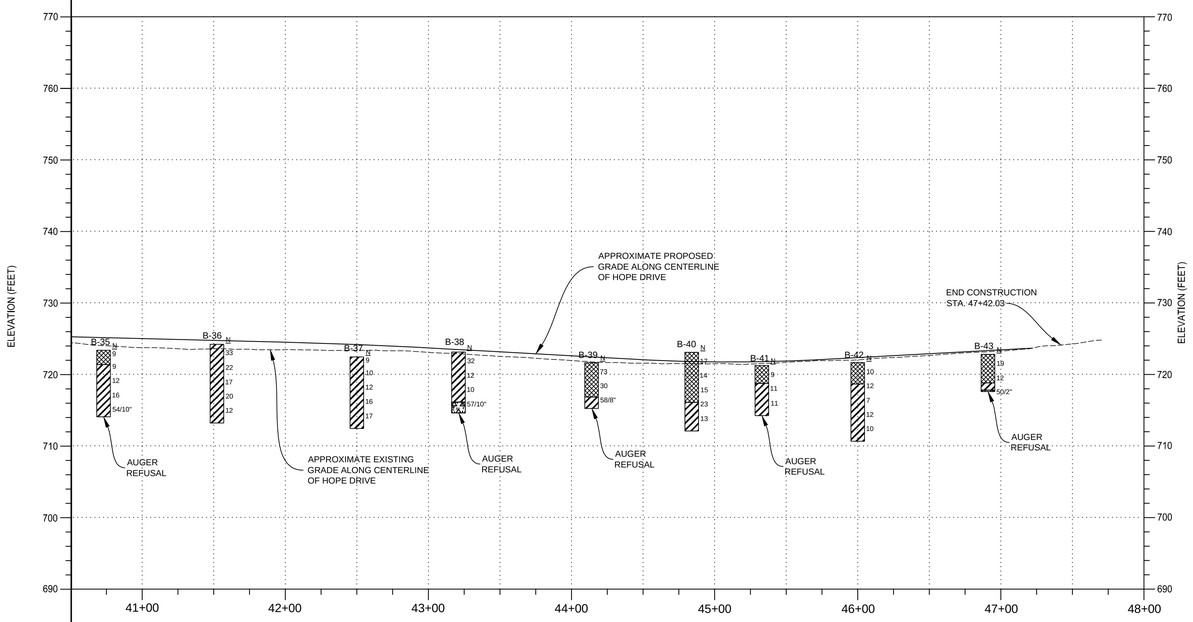
SUBSURFACE PROFILE

City of Winchester, Frederick County, Virginia

SCALE	DATE	JOB NO.	SOURCE	REVIEWED BY	
H: 1" = 50' V: 1" = 10'	AUG. 8, 2017	31170078	RDA (8/2/2017)	AR	FIGURE 4

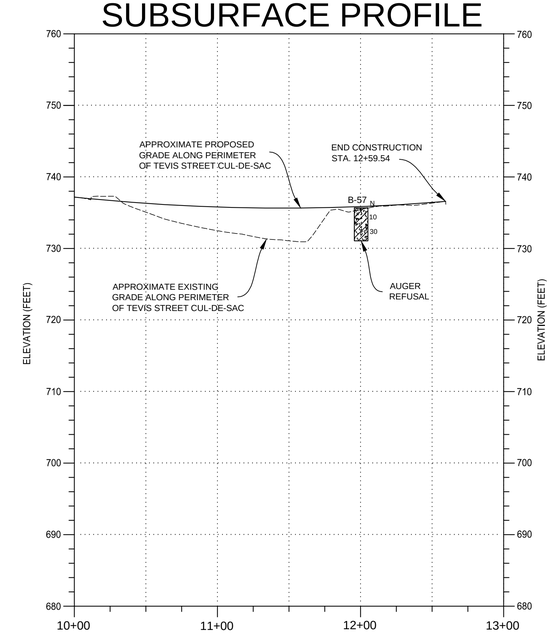
MATCHLINE TO FIGURE 4

HOPE DRIVE SUBSURFACE PROFILE



STATIONING ALONG CENTERLINE OF HOPE DRIVE

TEVIS STREET SUBSURFACE PROFILE



STATIONING ALONG PERIMETER OF TEVIS STREET CUL-DE-SAC

GRAPHIC SYMBOL KEY:

- EXISTING FILL
- CL - LEAN CLAY
- CH - FAT CLAY
- SC - CLAYEY SAND
- HIGHLY WEATHERED ROCK

GEO-TECHNOLOGY ASSOCIATES, INC.
Geotechnical and Environmental Consultants
43760 Trade Center Place, Suite 110
Sterling, Virginia 20166
(703) 478-0055
Fax (703) 478-0137

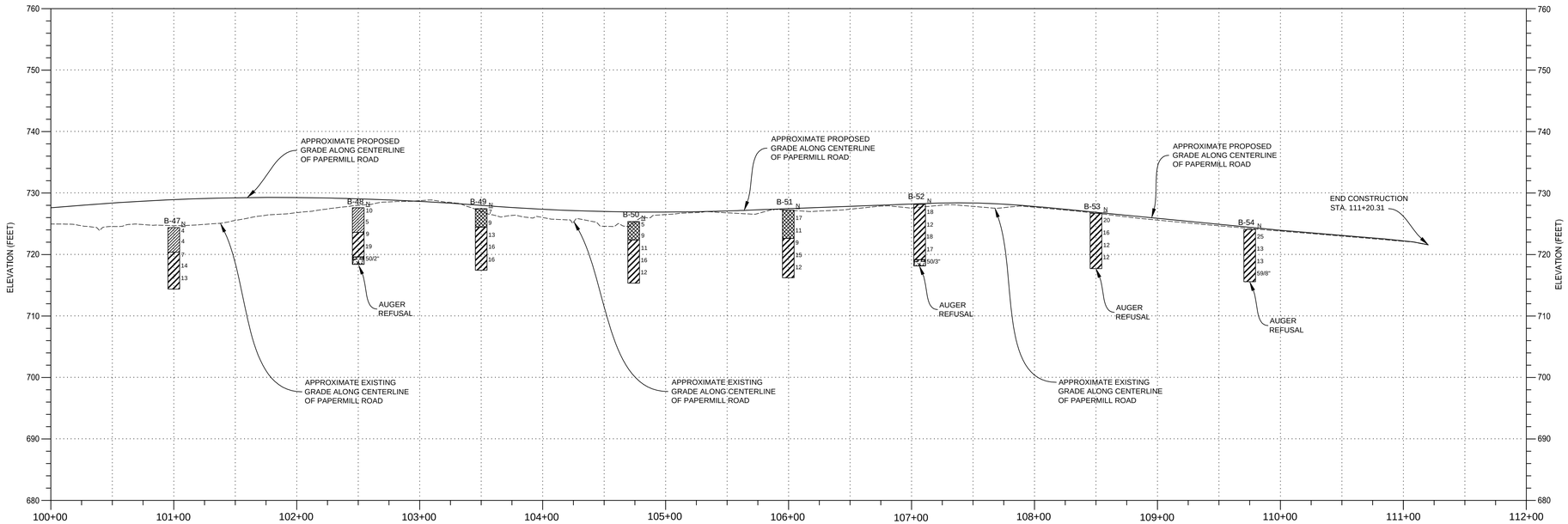
Hope Drive

SUBSURFACE PROFILE

City of Winchester, Frederick County, Virginia

SCALE	DATE	JOB NO.	SOURCE	REVIEWED BY	
H: 1" = 50' V: 1" = 10'	AUG. 8, 2017	31170078	RDA (8/2/2017)	AR	FIGURE 5

PAPERMILL ROAD
SUBSURFACE PROFILE



STATIONING ALONG CENTERLINE OF PAPERMILL ROAD

GRAPHIC SYMBOL KEY:

- EXISTING FILL
- CL - LEAN CLAY
- CH - FAT CLAY
- SC - CLAYEY SAND
- HIGHLY WEATHERED ROCK

GEO-TECHNOLOGY ASSOCIATES, INC.
Geotechnical and Environmental Consultants
43760 Trade Center Place, Suite 110
Sterling, Virginia 20166
(703) 478-0055
Fax (703) 478-0137

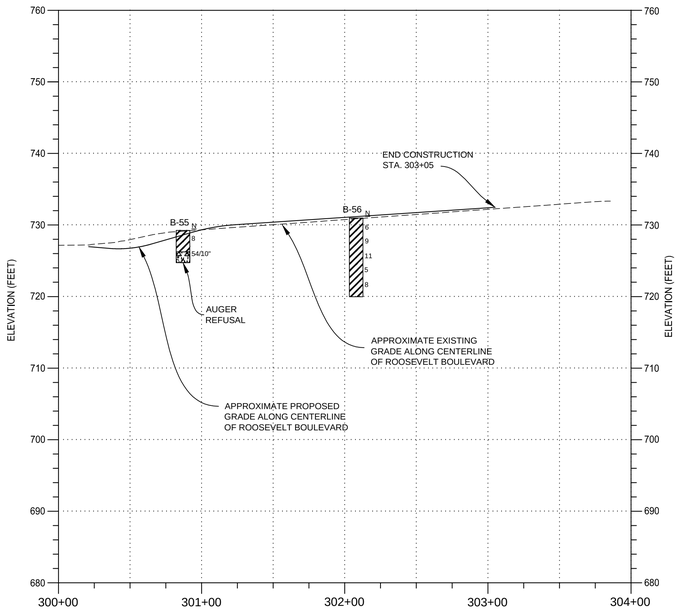
Hope Drive

SUBSURFACE PROFILE

City of Winchester, Frederick County, Virginia

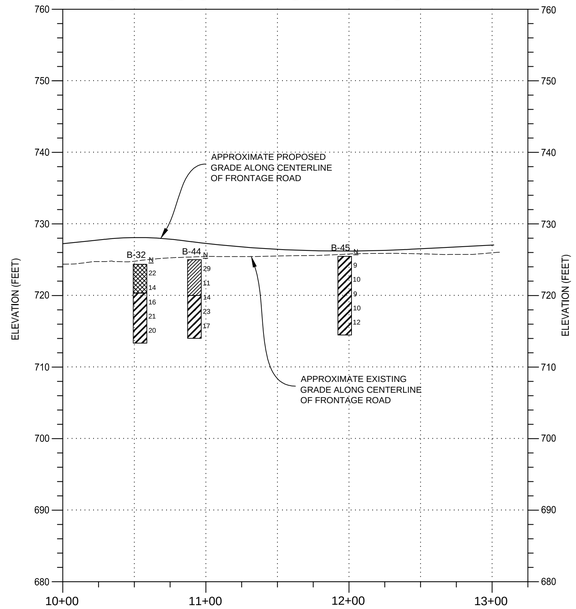
SCALE	DATE	JOB NO.	SOURCE	REVIEWED BY	
H: 1" = 50' V: 1" = 10'	AUG. 8, 2017	31170078	RDA (8/2/2017)	AR	FIGURE 6

ROOSEVELT BOULEVARD SUBSURFACE PROFILE



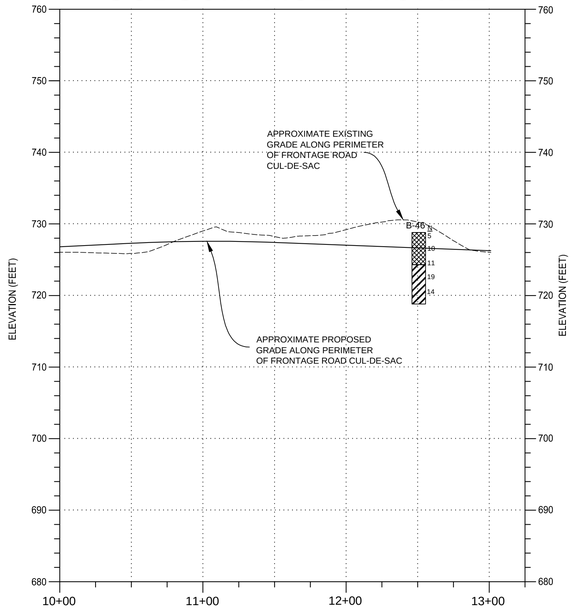
STATIONING ALONG CENTERLINE OF ROOSEVELT BOULEVARD

FRONTAGE ROAD SUBSURFACE PROFILE



STATIONING ALONG CENTERLINE OF FRONTAGE ROAD

FRONTAGE ROAD SUBSURFACE PROFILE



STATIONING ALONG PERIMETER OF FRONTAGE ROAD CUL-DE-SAC

GRAPHIC SYMBOL KEY:

- EXISTING FILL
- CL - LEAN CLAY
- CH - FAT CLAY
- SC - CLAYEY SAND
- HIGHLY WEATHERED ROCK

GEO-TECHNOLOGY ASSOCIATES, INC.
Geotechnical and Environmental Consultants
43760 Trade Center Place, Suite 110
Sterling, Virginia 20166
(703) 478-0055
Fax (703) 478-0137

Hope Drive

SUBSURFACE PROFILE

City of Winchester, Frederick County, Virginia

SCALE	DATE	JOB NO.	SOURCE	REVIEWED BY	
H: 1" = 50' V: 1" = 10'	AUG. 8, 2017	31170078	RDA (8/2/2017)	AR	FIGURE 7

APPENDIX B

BORING LOGS

Table B-1
Summary of Weathered Rock, Auger Refusal and Groundwater
31170078 - Hope Drive

		WEATHERED ROCK		AUGER REFUSAL		GROUNDWATER	
Boring No.	Approximate Existing Grade (ft)[a]	Approximate Depth to Weathered Rock (ft)[b]	Approximate Elevation of Weathered Rock (ft)	Approximate Depth to Auger Refusal (ft)	Approximate Elevation of Auger Refusal (ft)	Approximate Depth to Groundwater (ft)	Approximate Elevation at Top of Highest Groundwater (ft)
B-1	758.2	-----	-----	-----	-----	-----	-----
B-2	756.4	-----	-----	-----	-----	-----	-----
B-3	753.6	-----	-----	-----	-----	-----	-----
B-4	752.3	-----	-----	-----	-----	-----	-----
B-5	751.4	-----	-----	-----	-----	-----	-----
B-6	751.4	3.0	748.4	5.3	746.1	-----	-----
B-7	751.4	-----	-----	-----	-----	-----	-----
B-8	749.8	-----	-----	-----	-----	-----	-----
B-9	749.5	-----	-----	-----	-----	-----	-----
B-10	748.7	5.8	742.9	6.7	742.0	-----	-----
B-11	747.2	-----	-----	5.8	741.4	-----	-----
B-12	745.2	-----	-----	-----	-----	-----	-----
B-13	743.7	-----	-----	-----	-----	-----	-----
B-14	741.4	-----	-----	-----	-----	-----	-----
B-15	739.5	-----	-----	7.8	731.7	-----	-----
B-16	737.2	-----	-----	8.1	729.1	-----	-----
B-17	735.5	-----	-----	7.8	727.7	-----	-----
B-18	735.7	6.0	729.7	6.8	728.9	-----	-----
B-19	735.5	-----	-----	6.1	729.4	-----	-----
B-20	733.4	-----	-----	-----	-----	-----	-----
B-21	731.2	-----	-----	7.8	723.4	-----	-----
B-22	730.6	-----	-----	6.0	724.6	-----	-----
B-23	730.0	-----	-----	-----	-----	-----	-----
B-24	729.4	-----	-----	-----	-----	-----	-----
B-25	730.9	-----	-----	-----	-----	-----	-----
B-26	728.3	-----	-----	-----	-----	-----	-----
B-27	727.5	-----	-----	-----	-----	-----	-----
B-28	727.4	-----	-----	-----	-----	-----	-----
B-29	725.7	-----	-----	-----	-----	-----	-----
B-30	725.0	-----	-----	-----	-----	-----	-----

Table B-1
Summary of Weathered Rock, Auger Refusal and Groundwater
31170078 - Hope Drive

		WEATHERED ROCK		AUGER REFUSAL		GROUNDWATER	
Boring No.	Approximate Existing Grade (ft)[a]	Approximate Depth to Weathered Rock (ft)[b]	Approximate Elevation of Weathered Rock (ft)	Approximate Depth to Auger Refusal (ft)	Approximate Elevation of Auger Refusal (ft)	Approximate Depth to Groundwater (ft)	Approximate Elevation at Top of Highest Groundwater (ft)
B-31	724.8	-----	-----	-----	-----	-----	-----
B-32	724.4	-----	-----	-----	-----	-----	-----
B-33	723.9	-----	-----	-----	-----	-----	-----
B-34	724.8	-----	-----	-----	-----	-----	-----
B-35	723.4	-----	-----	9.3	714.1	-----	-----
B-36	724.2	-----	-----	-----	-----	-----	-----
B-37	722.5	-----	-----	-----	-----	-----	-----
B-38	723.1	7.0	716.1	8.5	714.6	-----	-----
B-39	721.7	-----	-----	6.4	715.3	-----	-----
B-40	723.1	-----	-----	-----	-----	-----	-----
B-41	721.3	-----	-----	7.0	714.3	-----	-----
B-42	721.7	-----	-----	-----	-----	-----	-----
B-43	722.8	5.0	717.8	5.2	717.6	-----	-----
B-44	725.0	-----	-----	-----	-----	-----	-----
B-45	725.5	-----	-----	-----	-----	-----	-----
B-46	728.8	-----	-----	-----	-----	-----	-----
B-47	724.4	-----	-----	-----	-----	-----	-----
B-48	727.6	8.0	719.6	9.2	718.4	-----	-----
B-49	727.5	-----	-----	-----	-----	-----	-----
B-50	725.4	-----	-----	-----	-----	-----	-----
B-51	727.3	-----	-----	-----	-----	-----	-----
B-52	728.2	9.0	719.2	10.0	718.2	-----	-----
B-53	726.6	-----	-----	9.0	717.6	-----	-----
B-54	724.1	-----	-----	8.5	715.6	-----	-----
B-55	729.2	3.0	726.2	4.5	724.7	-----	-----
B-56	731.0	-----	-----	-----	-----	-----	-----
B-57	735.7	-----	-----	4.6	731.1	-----	-----
SWM-1	725.1	-----	-----	-----	-----	11.3	713.8
SWM-2	724.8	-----	-----	-----	-----	-----	-----
SWM-3	723.9	-----	-----	-----	-----	-----	-----

Table B-1
Summary of Weathered Rock, Auger Refusal and Groundwater
31170078 - Hope Drive

		WEATHERED ROCK		AUGER REFUSAL		GROUNDWATER	
Boring No.	Approximate Existing Grade (ft)[a]	Approximate Depth to Weathered Rock (ft)[b]	Approximate Elevation of Weathered Rock (ft)	Approximate Depth to Auger Refusal (ft)	Approximate Elevation of Auger Refusal (ft)	Approximate Depth to Groundwater (ft)	Approximate Elevation at Top of Highest Groundwater (ft)
SWM-4	723.5	-----	-----	4.6	718.9	-----	-----
SWM-5	724.5	-----	-----	-----	-----	10.7	713.8
SWM-6	725.4	-----	-----	12.2	713.2	8.0	717.4
SWM-7	724.4	-----	-----	-----	-----	3.0	721.4
SWM-8	726.3	17.0	709.3	18.8	707.5	4.5	721.8
SWM-9	725.9	-----	-----	-----	-----	13.8	712.1
SWM-10	727.9	-----	-----	-----	-----	10.6	717.3

Notes:

a - Elevation above MSL. Existing ground surface elevations surveyed by RDA

b - Weathered Rock refers to partially to completed weathered bedrock with SPT N" value of 50 blows per foot, or greater.

NOTES FOR TEST BORING LOGS

KEY TO USCS TERMINOLOGY AND GRAPHIC SYMBOLS

MAJOR DIVISIONS (BASED UPON ASTM D 2487-00)				SYMBOLS GRAPHIC	SYMBOLS LETTER
COARSE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LESS THAN 15% PASSING THE NO. 200 SIEVE)			GW
					GP
		GRAVELS WITH FINES (MORE THAN 15% PASSING THE NO. 200 SIEVE)			GM
					GC
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LESS THAN 15% PASSING THE NO. 200 SIEVE)			SW
					SP
		SANDS WITH FINES (MORE THAN 15% PASSING THE NO. 200 SIEVE)			SM
					SC
FINE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILT OR CLAY (<15% RETAINED ON THE NO. 200 SIEVE) SILT OR CLAY WITH SAND OR GRAVEL (15% TO 30% RETAINED ON THE NO. 200 SIEVE) SANDY OR GRAVELLY SILT OR CLAY (>30% RETAINED ON THE NO. 200 SIEVE)		SILTS AND LEAN CLAYS LIQUID LIMIT LESS THAN 50		ML
					CL
					OL
			ELASTIC SILTS AND FAT CLAYS LIQUID LIMIT GREATER THAN 50		MH
					CH
					OH
HIGHLY ORGANIC SOILS					PT

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

ADDITIONAL TERMINOLOGY AND GRAPHIC SYMBOLS

	DESCRIPTION		GRAPHIC SYMBOLS
ADDITIONAL DESIGNATIONS	TOPSOIL		
	MAN MADE FILL		
	GLACIAL TILL		
	COBBLES AND BOULDERS		
RESIDUAL SOIL DESIGNATIONS	DESCRIPTION	"N" VALUE	
	HIGHLY WEATHERED ROCK	50 TO 50/1"	
	PARTIALLY WEATHERED ROCK	MORE THAN 50 BLOWS FOR 1" OF PENETRATION OR LESS, AUGER PENETRABLE	

COARSE-GRAINED SOILS
(GRAVEL AND SAND)

DESIGNATION	BLOWS PER FOOT (BPF) "N"
VERY LOOSE	0 - 4
LOOSE	5 - 10
MEDIUM DENSE	11 - 30
DENSE	31 - 50
VERY DENSE	>50

FINE-GRAINED SOILS
(SILT AND CLAY)

CONSISTENCY	BPF "N"
VERY SOFT	<2
SOFT	2 - 4
MEDIUM STIFF	5 - 8
STIFF	9 - 15
VERY STIFF	16 - 30
HARD	>30

NOTE: ADDITIONAL DESIGNATIONS TO ADVANCE SAMPLER INDICATED IN BLOW COUNT COLUMN:
WOH = WEIGHT OF HAMMER
WOR = WEIGHT OF ROD(S)

SAMPLE TYPE

DESIGNATION	SYMBOL
SOIL SAMPLE	S-
SHELBY TUBE	U-
ROCK CORE	R-

WATER DESIGNATION

DESCRIPTION	SYMBOL
ENCOUNTERED DURING DRILLING	▽
UPON COMPLETION OF DRILLING	▼
24 HOURS+ AFTER COMPLETION	▼

NOTE: WATER OBSERVATIONS WERE MADE AT THE TIME INDICATED. POROSITY OF SOIL STRATA, WEATHER CONDITIONS, SITE TOPOGRAPHY, ETC. MAY CAUSE WATER LEVEL CHANGES.

REVISED AUGUST 2012

LOG OF BORING NO. B-1

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/7/2017**
DATE COMPLETED: **4/7/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/7/17**
CAVED (ft): **7.7**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **758.23**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					758.2	0	CH		Reddish-brown, moist, very stiff, Fat CLAY. (CH)	Asphalt: 7 inches. Base: 7 inches.
S1	0.5	18	18-9-7	16						
S2	2.0	20	5-5-6-9	11					---, stiff.	
S3	4.0	22	6-6-8-8	14		5				
S4	6.0	18	5-5-5-6	10						
S5	8.0	20	4-5-6-6	11						
					748.2	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 10+80)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-1

LOG OF BORING NO. B-2

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/10/2017**
DATE COMPLETED: **4/10/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/10/17**
CAVED (ft): **7.6**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **756.36**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					756.4	0	FILL		Dark brown and gray, moist, stiff, Sandy Lean CLAY, with rock fragments. (CL) (FILL)	Asphalt: 6.5 inches. Base: 6 inches.
S1	0.5	14	19-7-5	12						
S2	2.0	16	5-6-7-7	13	753.4		CH		Reddish-brown and tan, moist, stiff, Fat CLAY. (CH)	
S3	4.0	18	6-6-7-7	13		5				
S4	6.0	24	7-7-8-8	15						
S5	8.0	14	8-8-10-10	18					---, very stiff.	
					746.4	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 11+67)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-2

LOG OF BORING NO. B-3

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/7/2017**
DATE COMPLETED: **4/7/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/7/17**
CAVED (ft): **7.8**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **753.60**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					753.6	0	FILL		Dark brown and black, moist, stiff, Sandy Lean CLAY, with rock fragments. (CL) (FILL)	Asphalt: 6 inches. Base: 5 inches.
S1	0.5	16	11-3-8	11						
S2	2.0	20	24-15-11-10	26					---, very stiff.	
S3	4.0	18	5-5-5-6	10					---, stiff.	
					748.4	5	CH		Reddish-brown and tan, moist, stiff, Fat CLAY. (CH)	
S4	6.0	20	6-6-7-9	13						
S5	8.0	22	6-7-7-9	14						
					743.6	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 12+46)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-3

LOG OF BORING NO. B-4

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/10/2017**
DATE COMPLETED: **4/10/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/10/17**
CAVED (ft): **7.8**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **752.34**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					752.3	0	CH		Reddish-brown and black, moist, medium stiff, Fat CLAY. (CH)	Asphalt: 7 inches. Base: 7 inches.
S1	0.5	16	16-4-4	8						
S2	2.0	16	5-8-13-20	21					---, very stiff, with dark gray rock fragments.	
S3	4.0	18	7-5-5-6	10		5			---, stiff.	
S4	6.0	16	6-7-8-9	15						
S5	8.0	18	8-8-9-10	17					---, very stiff.	
					742.3	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 13+28)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-4

LOG OF BORING NO. B-5

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/10/2017**
DATE COMPLETED: **4/10/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/10/17**
CAVED (ft): **7.7**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **751.43**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					751.4	0	CH		Reddish-brown, tan and black, moist, stiff, Fat CLAY. (CH)	Asphalt: 7 inches. Base: 8 inches.
S1	0.5	18	25-9-5	14						
S2	2.0	16	6-7-8-9	15						
S3	4.0	20	6-7-7-8	14		5				
S4	6.0	18	6-7-9-10	16					---, red, yellow and white, very stiff.	
S5	8.0	24	7-9-9-10	18					---, with gray weathered rock fragments.	
					741.4	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 14+18)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-5

LOG OF BORING NO. B-6

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/10/2017**
DATE COMPLETED: **4/10/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/10/17**
CAVED (ft): **3.5**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **751.43**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S1	0.0	12	3-3-4-4	7	751.4	0	CH		Reddish-brown, moist, medium stiff, Fat CLAY, with rock fragments. (CH) ---, light gray, very stiff, with weathered rock.	Topsoil: 4 inches.
S2	2.0	14	5-9-13-26	22	748.4		HW		Light gray, Highly Weathered Rock.	
S3	4.0	10	5-8-50/3"	58/9"	746.1	5			Auger refusal @ 5.3 feet.	Groundwater not encountered during drilling.
						10				
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 15+00)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-6

LOG OF BORING NO. B-7

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/10/2017**
DATE COMPLETED: **4/10/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/10/17**
CAVED (ft): **7.8**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **751.43**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					751.4	0	CH		Brown, tan and black, moist, medium stiff, Fat CLAY. (CH)	Asphalt: 6.5 inches. Base: 6 inches.
S1	0.5	14	15-4-4	8						
S2	2.0	16	5-5-7-7	12					---, stiff.	
S3	4.0	24	7-7-9-11	16		5			---, very stiff.	
S4	6.0	22	7-9-11-11	20						
S5	8.0	16	9-9-10-10	19						
					741.4	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 15+80)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-7

LOG OF BORING NO. B-8

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/10/2017**
DATE COMPLETED: **4/10/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/10/17**
CAVED (ft): **7.7**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **749.84**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					749.8	0	CH		Red, tan and gray, moist, very stiff, Fat CLAY, with rock fragments. (CH)	Asphalt: 6 inches. Base: 7 inches.
S1	0.5	16	21-15-6	21					---, stiff.	
S2	2.0	14	5-5-6-8	11					---, reddish-brown and tan.	
S3	4.0	18	6-6-7-9	13		5			---, very stiff.	
S4	6.0	18	8-9-10-12	19						
S5	8.0	20	9-9-10-12	19						
					739.8	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 16+72)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-8

LOG OF BORING NO. B-9

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/7/2017**
DATE COMPLETED: **4/7/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/7/17**
CAVED (ft): **7.8**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **749.50**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					749.5	0	CH		Reddish-brown, tan and black, moist, very stiff, Fat CLAY. (CH)	Asphalt: 6 inches. Base: 7 inches.
S1	0.5	14	13-12-4	16						
S2	2.0	12	5-5-7-8	12					---, stiff.	
S3	4.0	16	6-9-9-11	18		5			---, very stiff.	
S4	6.0	20	8-9-11-14	20						
S5	8.0	22	8-11-13-15	24						
					739.5	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 17+50)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-9

LOG OF BORING NO. B-10

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/10/2017**
DATE COMPLETED: **4/10/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/10/17**
CAVED (ft): **4.4**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **748.73**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					748.7	0	CH		Brown and gray, moist, very stiff, Fat CLAY, with rock fragments. (CH)	Asphalt: 8 inches. Base: 8 inches.
S1	0.5	16	40-19-7	26						
S2	2.0	14	4-4-5-6	9					---, reddish-brown and tan, stiff.	
S3	4.0	16	5-5-9-13	14		5			---, with weathered rock.	
S4	6.0	4	50/1"	50/1"	742.9		HW		Gray, Highly Weathered Rock.	
					742.0				Auger refusal @ 6.7 feet.	Groundwater not encountered during drilling.
						10				
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 18+41)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-10

LOG OF BORING NO. B-11

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/7/2017**
DATE COMPLETED: **4/7/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/7/17**
CAVED (ft): **3.8**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **747.19**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					747.2	0	FILL		Gray, moist, dense, Silty, Clayey SAND, with gravel. (SC-SM) (FILL)	Asphalt: 6 inches. Base: 8 inches.
S1	0.5	16	21-20-17	37						
S2	2.0	12	7-9-10-11	19					---, medium dense.	
S3	4.0	20	10-10-11-50/3"	21		5				
					741.4				Auger refusal @ 5.8 feet.	Groundwater not encountered during drilling.
						10				
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 19+25)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-11

LOG OF BORING NO. B-12

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/10/2017**
DATE COMPLETED: **4/10/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/10/17**
CAVED (ft): **7.5**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **745.16**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					745.2	0	FILL		Brown and gray, moist, medium dense, Silty, Clayey SAND, with gravel. (SC-SM) (FILL)	Asphalt: 7 inches. Base: 8 inches.
S1	0.5	18	17-10-7	17						
S2	2.0	20	6-8-13-14	21						
S3	4.0	18	18-13-6-4	19	740.4	5	CH		Reddish-brown, moist, stiff, Fat CLAY. (CH)	
S4	6.0	20	4-5-5-6	10						
S5	8.0	18	6-6-8-9	14						
					735.2	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 20+14)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-12

LOG OF BORING NO. B-13

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/7/2017**
DATE COMPLETED: **4/7/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/7/17**
CAVED (ft): **7.8**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **743.73**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					743.7	0	FILL		Gray, moist, dense, Silty, Clayey SAND, with gravel. (SC-SM) (FILL)	Asphalt: 6.5 inches. Base: 7 inches. Bag sample obtained 1-5 feet.
S1	0.5	20	28-26-16	42						
S2	2.0	18	21-19-24-23	43					---, medium dense.	
S3	4.0	16	17-10-4-4	14	738.7	5	CH		Reddish-brown, moist, stiff, Fat CLAY. (CH)	
S4	6.0	18	4-5-5-6	10						
S5	8.0	16	9-7-13-13	20					---, very stiff.	
					733.7	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 21+00)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-13

LOG OF BORING NO. B-14

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/10/2017**
DATE COMPLETED: **4/10/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/10/17**
CAVED (ft): **7.8**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **741.36**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					741.4	0	FILL		Gray, moist, medium dense, Silty, Clayey SAND, with gravel. (SC-SM) (FILL)	Asphalt: 7 inches. Base: 8 inches.
S1	0.5	16	18-9-9	18						
S2	2.0	16	6-12-13-11	25						
					737.4		CH		Reddish-brown and tan, moist, medium stiff, Fat CLAY. (CH)	
S3	4.0	0	3-4-4-5	8		5			---, stiff.	
S4	6.0	14	3-6-7-9	13						
S5	8.0	10	5-5-6-9	11						
					731.4	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 21+94)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-14

LOG OF BORING NO. B-15

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/7/2017**
DATE COMPLETED: **4/7/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/7/17**
CAVED (ft): **5.0**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **739.51**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					739.5	0	CL		Brown and gray, moist, very stiff, Sandy Lean CLAY, with rock fragments. (CL) ---, hard.	Asphalt: 6.5 inches. Base: 7 inches.
S1	0.5	18	22-15-11	26						
S2	2.0	18	20-19-17-9	36						
					735.5		CH		Brown, moist, stiff, Fat CLAY. (CH) ---, medium stiff, with rock fragments.	
S3	4.0	16	5-7-7-6	14		5				
S4	6.0	21	6-4-4-50/3"	8						
					731.7				Auger refusal @ 7.8 feet.	Groundwater not encountered during drilling.
						10				
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 22+81)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-15

LOG OF BORING NO. B-16

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/7/2017**
DATE COMPLETED: **4/7/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/7/17**
CAVED (ft): **7.3**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **737.18**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					737.2	0	FILL		Gray, moist, very dense, Silty, Clayey SAND, with gravel. (SC-SM) (FILL)	Asphalt: 7 inches. Base: 5 inches.
S1	0.5	20	36-32-36	68					---, dense	Bag sample obtained 1-5 feet.
S2	2.0	14	16-14-17-18	31						
S3	4.0	12	14-10-5-5	15	732.5	5	CH		Reddish-brown, moist, stiff, Fat CLAY. (CH)	
S4	6.0	6	2-2-3-4	5					---, medium stiff.	
					729.1				Auger refusal @ 8.1 feet.	Groundwater not encountered during drilling.
						10				
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 23+78)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-16

LOG OF BORING NO. B-17

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/7/2017**
DATE COMPLETED: **4/7/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/7/17**
CAVED (ft): **5.2**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **735.54**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S1	0.0	18	3-4-6-6	10	735.5	0	CL		Dark brown and gray, moist, stiff, Sandy Lean CLAY, with rock fragments. (CL)	Topsoil: 5 inches.
S2	2.0	20	4-4-5-5	9						
S3	4.0	18	4-5-7-8	12	731.5	5	CH		Reddish-brown, moist, stiff, Fat CLAY. (CH)	
S4	6.0	20	4-6-5-50/4"	11						
					727.7				Auger refusal @ 7.8 feet.	Groundwater not encountered during drilling.
						10				
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 24+80)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-17

LOG OF BORING NO. B-18

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/7/2017**
DATE COMPLETED: **4/7/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/7/17**
CAVED (ft): **4.7**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **735.74**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					735.7	0	CH		Reddish-brown, moist, stiff, Fat CLAY, with rock fragments. (CH)	Asphalt: 5.5 inches. Base: 5 inches.
S1	0.5	18	9-4-6	10						
S2	2.0	12	5-5-7-8	12						
S3	4.0	6	5-5-7-8	12		5				
9	6.0	5	50/3"	50/3"	729.7		HW		Gray, Highly Weathered Rock.	
					728.9				Auger refusal @ 6.8 feet.	Groundwater not encountered during drilling.
						10				
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 25+64)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-18

LOG OF BORING NO. B-19

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/7/2017**
DATE COMPLETED: **4/7/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/7/17**
CAVED (ft): **4.0**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **735.45**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					735.5	0	CH		Reddish-brown and black, moist, medium stiff, Fat CLAY. (CH)	Asphalt: 5 inches. Base: 4 inches.
S1	0.5	18	6-3-3	6						
S2	2.0	12	4-4-50/2"	54/8"					---, dark gray, hard, with rock fragments.	
S3	4.0	18	5-6-10-7	16		5			---, brown and black, very stiff.	
					729.4				Auger refusal @ 6.1 feet.	Groundwater not encountered during drilling.
						10				
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 26+48)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-19

LOG OF BORING NO. B-20

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/10/2017**
DATE COMPLETED: **4/10/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/10/17**
CAVED (ft): **7.7**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **733.35**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					733.4	0	CH		Brown and gray, moist, medium stiff, Fat CLAY. (CH)	Asphalt: 5 inches. Base: 5 inches.
S1	0.5	14	4-4-4	8					---, stiff.	
S2	2.0	16	5-5-9-9	14					---, reddish-brown and tan.	
S3	4.0	18	5-6-6-7	12		5			---, red, tan and gray.	
S4	6.0	18	6-7-7-8	14					---, very stiff.	
S5	8.0	20	7-7-9-9	16						
					723.4	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 27+33)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-20

LOG OF BORING NO. B-21

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/7/2017**
DATE COMPLETED: **4/7/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/7/17**
CAVED (ft): **5.0**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **731.15**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S1	0.0	12	1-2-2-3	4	731.2	0	FILL		Dark brown, moist, soft, Sandy Lean CLAY, with rock and brick fragments. (CL) (FILL)	Topsoil: 5 inches.
S2	2.0	20	3-5-7-10	12	728.9		CH		Brown and tan, moist, stiff, Fat CLAY. (CH)	
S3	4.0	22	4-4-5-5	9		5				
S4	6.0	20	7-7-4-50/3"	11					---, brown and gray, with weathered rock.	
					723.4				Auger refusal @ 7.8 feet.	Groundwater not encountered during drilling.
						10				
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 28+41)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-21

LOG OF BORING NO. B-22

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/7/2017**
DATE COMPLETED: **4/7/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/7/17**
CAVED (ft): **4.2**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **730.60**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S1	0.0	14	3-4-7-7	11	730.6	0	FILL		Dark brown, moist, stiff, Sandy Lean CLAY, with rock and brick fragments. (CL) (FILL)	Topsoil: 3 inches.
S2	2.0	20	3-3-5-5	8	728.3		CH		Brown, moist, medium stiff, Fat CLAY. (CH)	
S3	4.0	20	3-3-4-50/ 4"	7		5			---, with weathered rock.	
					724.6				Auger refusal @ 6 feet.	Groundwater not encountered during drilling.
						10				
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 29+29)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-22

LOG OF BORING NO. B-23

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/11/2017**
DATE COMPLETED: **4/11/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/11/17**
CAVED (ft): **7.7**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **730.04**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					730.0	0	CH		Brown, moist, medium stiff, Fat CLAY. (CH)	Topsoil: 8 inches.
S1	0.0	20	2-2-3-3	5	729.0		CL		Brown, tan and black, moist, medium stiff, Lean CLAY, with sand. (CL)	
S2	2.0	24	5-5-7-8	12					---, stiff.	Bag sample obtained 1-5 feet.
S3	4.0	24	7-9-10-10	19		5			---, very stiff.	
S4	6.0	18	7-9-11-13	20						
S5	8.0	20	6-9-13-13	22	721.5		CH		Reddish-brown and tan, moist, very stiff, Fat CLAY. (CH)	
					720.0	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 30+17)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-23

LOG OF BORING NO. B-24

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/11/2017**
DATE COMPLETED: **4/11/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/11/17**
CAVED (ft): **7.0**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **729.36**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S1	0.0	12	2-3-3-4	6	729.4	0	CH		Reddish-brown, tan and gray, moist, medium stiff, Fat CLAY. (CH) ---, stiff.	Topsoil: 8 inches.
S2	2.0	20	5-5-6-6	11						
S3	4.0	24	5-6-7-7	13		5				
S4	6.0	20	7-7-8-8	15						
S5	8.0	22	7-7-8-9	15						
					719.4	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 31+00)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-24

LOG OF BORING NO. B-25

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/11/2017**
DATE COMPLETED: **4/11/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/11/17**
CAVED (ft): **7.6**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **730.90**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					730.9	0	CL		Reddish-brown, moist, stiff, Sandy Lean CLAY, with rock fragments. (CL)	Topsoil: 10 inches.
S1	0.0	18	2-5-6-8	11					---, brown, black and gray.	
S2	2.0	18	4-5-5-6	10						
S3	4.0	20	5-6-7-9	13		5				
					724.9		CH		Brown and gray, moist, stiff, Fat CLAY. (CH)	
S4	6.0	12	6-7-8-8	15						
S5	8.0	18	7-9-10-10	19					---, very stiff.	
					720.9	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 31+86)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-25

LOG OF BORING NO. B-26

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/11/2017**
DATE COMPLETED: **4/11/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/11/17**
CAVED (ft): **7.7**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **728.31**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S1	0.0	20	3-4-4-5	8	728.3	0	CL		Dark brown, moist, medium stiff, Sandy Lean CLAY. (CL) ---, brown, black and tan, stiff.	Topsoil: 12 inches.
S2	2.0	20	4-5-6-6	11						Bag sample obtained 1-5 feet.
S3	4.0	16	5-8-8-10	16		5			---, very stiff.	
S4	6.0	16	7-8-9-10	17	722.3		CH		Brown and black, moist, very stiff, Fat CLAY. (CH)	
S5	8.0	24	4-6-8-10	14					---, stiff.	
					718.3	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 32+76)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-26

LOG OF BORING NO. B-27

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/11/2017**
DATE COMPLETED: **4/11/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/11/17**
CAVED (ft): **7.8**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **727.53**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					727.5	0	CH		Reddish-brown, moist, medium stiff, Fat CLAY. (CH)	Topsoil: 9 inches.
S1	0.0	12	3-3-4-4	7						
									---, brown and gray, stiff.	
S2	2.0	16	4-4-6-8	10						
S3	4.0	14	5-5-6-7	11		5				
									---, reddish-brown and gray, very stiff.	
S4	6.0	14	7-8-9-10	17						
									---, brown, gray and black.	
S5	8.0	16	9-9-11-12	20						
					717.5	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 33+60)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-27

LOG OF BORING NO. B-28

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/6/2017**
DATE COMPLETED: **4/6/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/6/17**
CAVED (ft): **7.8**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **727.38**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					727.4	0	CL		Brown, moist, medium stiff, Sandy Lean CLAY. (CL)	Topsoil: 6 inches.
S1	0.0	12	1-2-4-4	6						
S2	2.0	15	5-6-8-8	14					---, stiff, with rock fragments.	
					723.4		CH		Brown, tan and gray, moist, very stiff, Fat CLAY. (CH)	
S3	4.0	6	6-7-9-10	16		5				
S4	6.0	15	9-10-13-15	23						
S5	8.0	17	10-10-12-13	22						
					717.4	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 34+47)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-28

LOG OF BORING NO. B-29

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/6/2017**
DATE COMPLETED: **4/6/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/6/17**
CAVED (ft): **7.4**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **725.65**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					725.7	0	CL		Reddish-brown, moist, medium stiff, Sandy Lean CLAY. (CL)	Topsoil: 6 inches.
S1	0.0	16	2-2-4-5	6					---, very stiff, with rock fragments.	
S2	2.0	18	7-9-14-10	23	722.2		CH		Brown, tan and black, moist, stiff, Fat CLAY. (CH)	
S3	4.0	17	6-7-8-8	15		5			---, very stiff.	
S4	6.0	14	9-10-11-12	21						
S5	8.0	19	9-9-12-12	21						
					715.7	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 35+42)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-29

LOG OF BORING NO. B-30

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/6/2017**
DATE COMPLETED: **4/6/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/6/17**
CAVED (ft): **7.8**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **724.97**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					725.0	0	CL		Brown, moist, soft, Sandy Lean CLAY. (CL)	Topsoil: 7 inches.
S1	0.0	16	1-2-2-4	4	724.0		CH		Reddish-brown and black, moist, stiff, Fat CLAY. (CH)	
S2	2.0	20	4-4-5-9	9						Bag sample obtained 1-5 feet.
S3	4.0	17	5-5-6-8	11		5				
S4	6.0	14	7-9-10-12	19					---, brown and black, very stiff.	
S5	8.0	18	9-10-15-15	25						
					715.0	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 36+12)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-30

LOG OF BORING NO. B-31

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/6/2017**
DATE COMPLETED: **4/6/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/6/17**
CAVED (ft): **7.8**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **724.80**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S1	0.0	3	3-3-3-4	6	724.8	0	CH		Reddish-brown, moist, medium stiff, Fat CLAY. (CH)	Topsoil: 7 inches.
S2	2.0	10	4-4-4-6	8						
S3	4.0	17	5-5-6-6	11		5			---, stiff.	
S4	6.0	16	6-6-6-7	12						
S5	8.0	15	8-8-9-10	17					---, very stiff, with light gray weathered rock.	
					714.8	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 36+79)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-31

LOG OF BORING NO. B-32

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/3/2017**
DATE COMPLETED: **4/3/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/3/17**
CAVED (ft): **8.0**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **724.35**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					724.4	0	FILL		Brown and gray, moist, very stiff, Fat CLAY, with rock fragments. (CH) (FILL)	Asphalt: 6 inches. Base: 7 inches.
S1	1.0	16	9-11-11-7	22						
S2	3.0	18	6-6-8-9	14	720.4				---, stiff.	
							CH		Brown, tan and black, moist, very stiff, Fat CLAY. (CH)	
S3	5.0	18	3-6-10-12	16		5				
S4	7.0	24	7-8-13-12	21						
S5	9.0	20	8-9-11-12	20		10				
					713.4				Boring terminated @ 11 feet.	Groundwater not encounterd during drilling. Fuel odor noted by drillers 1-11 feet.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Frontage Road: Sta. 10+54)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-32

LOG OF BORING NO. B-33

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/3/2017**
DATE COMPLETED: **4/3/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/3/17**
CAVED (ft): **7.8**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **723.85**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					723.9	0	FILL		Gray and brown, moist, very dense, Silty GRAVEL. (GM) (FILL)	Asphalt: 6 inches. Base: 7 inches.
S1	1.0	6	15-50/1"	50/1"						
					720.9		CH		Brown and tan, moist, stiff, Fat CLAY, with sand. (CH)	
S2	3.0	20	4-5-7-7	12						
						5			---, very stiff.	
S3	5.0	24	6-8-10-12	18						
S4	7.0	24	6-8-11-13	19						
									---, stiff.	
S5	9.0	24	5-6-9-10	15		10				
					712.9				Boring terminated @ 11 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 38+85)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-33

LOG OF BORING NO. B-34

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/4/2017**
DATE COMPLETED: **4/4/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/4/17**
CAVED (ft): **8.0**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **724.80**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					724.8	0	FILL		Gray and brown, moist, medium dense, Silty GRAVEL. (GM) (FILL)	Asphalt: 6 inches. Base: 6 inches.
S1	1.0	20	10-13-14-7	27	722.3		CH		Reddish-brown and tan, moist, stiff, Fat CLAY, with sand. (CH)	
S2	3.0	22	4-4-6-8	10		5				
S3	5.0	24	4-4-5-6	9						
S4	7.0	24	4-5-7-9	12						
S5	9.0	20	4-5-6-8	11		10				
					713.8				Boring terminated @ 11 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 39+72)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-34

LOG OF BORING NO. B-35

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/5/2017**
DATE COMPLETED: **4/5/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/5/17**
CAVED (ft): **7.4**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **723.37**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S1	0.0	20	3-3-6-5	9	723.4	0	FILL		Reddish-brown, moist, loose, Silty SAND. (SM) (FILL)	Topsoil: 5 inches.
S2	2.0	20	4-4-5-6	9	721.4		CH		Light brown and gray, moist, stiff, Fat CLAY. (CH)	
S3	4.0	21	5-6-6-8	12		5				
S4	6.0	16	6-7-9-10	16					---, very stiff.	
S5	8.0	16	9-4-50/4"	54/10"					---, hard.	
					714.1	10			Auger refusal @ 9.3 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 40+73)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-35

LOG OF BORING NO. B-36

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/4/2017**
DATE COMPLETED: **4/4/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/4/17**
CAVED (ft): **7.8**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **724.21**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					724.2	0	CH		Brown and tan, moist, hard, Fat CLAY, with sand. (CH)	Asphalt: 6 inches. Base: 7 inches.
S1	1.0	18	15-21-12-12	33						
S2	3.0	24	9-10-12-12	22					---, very stiff.	Bag sample obtained 1-5 feet.
S3	5.0	24	4-5-12-18	17		5				
S4	7.0	18	8-9-11-11	20					---, brown.	
S5	9.0	24	5-5-7-7	12		10			---, stiff.	
					713.2				Boring terminated @ 11 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 41+52)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-36

LOG OF BORING NO. B-37

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/5/2017**
DATE COMPLETED: **4/5/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/5/17**
CAVED (ft): **7.5**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **722.45**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					722.5	0	CH		Brown, tan and gray, moist, stiff, Fat CLAY. (CH)	Topsoil: 2 inches.
S1	0.0	18	5-5-4-6	9						
S2	2.0	16	4-5-5-5	10						
S3	4.0	16	5-6-6-7	12		5				
S4	6.0	16	6-8-8-8	16					---, very stiff.	
S5	8.0	18	6-8-9-9	17						
					712.5	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 42+50)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-37

LOG OF BORING NO. B-38

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/4/2017**
DATE COMPLETED: **4/4/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/4/17**
CAVED (ft): **6.8**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **723.13**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					723.1	0	CH		Brown and gray, moist, hard, Fat CLAY. (CH)	Asphalt: 6 inches. Base: 9 inches.
S1	1.0	19	26-20-12-10	32						
S2	3.0	12	5-5-7-6	12					---, stiff.	
S3	5.0	16	3-4-6-7	10		5				
S4	7.0	17	8-7-50/5"	57/10"	716.1		HW		Gray, Highly Weathered Rock.	
					714.6				Auger refusal @ 8.5 feet.	Groundwater not encountered during drilling.
						10				
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 43+21)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-38

LOG OF BORING NO. B-39

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/5/2017**
DATE COMPLETED: **4/5/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/5/17**
CAVED (ft): **4.5**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **721.65**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					721.7	0	FILL		Gray, moist, very dense, Silty GRAVEL. (GM) (FILL)	Asphalt: 5 inches. Base: 7 inches.
S1	1.0	22	41-36-37-27	73						
S2	3.0	18	21-17-13-12	30					---, medium dense.	
S3	5.0	14	4-8-50/2"	58/8"	716.9	5	CH		Brown and black, moist, hard, Fat CLAY, with weathered rock. (CH)	
					715.3				Auger refusal @ 6.4 feet.	Groundwater not encountered during drilling.
						10				
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 44+14)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-39

LOG OF BORING NO. B-40

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/4/2017**
DATE COMPLETED: **4/4/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/4/17**
CAVED (ft): **8.0**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **723.10**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					723.1	0	FILL		Grayish-brown, moist, medium dense, Silty, Clayey SAND, with gravel (SC-SM) (FILL)	Asphalt: 8 inches. Base: 8 inches.
S1	1.0	20	10-8-9-10	17						
S2	3.0	18	5-7-7-7	14		5				
S3	5.0	22	5-6-9-9	15						
S4	7.0	24	12-11-12-13	23	716.1		CH		Reddish-brown, moist, very stiff, Fat CLAY, with rock fragments. (CH) ---, brown and tan, stiff.	
S5	9.0	24	3-5-8-10	13		10				
					712.1				Boring terminated @ 11 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 44+84)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-40

LOG OF BORING NO. B-41

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/4/2017**
DATE COMPLETED: **4/4/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/4/17**
CAVED (ft): **5.8**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **721.25**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					721.3	0	FILL		Gray and brown, moist, loose, Clayey GRAVEL. (GC) (FILL)	Asphalt: 6 inches. Base: 8 inches.
S1	1.0	14	15-5-4-4	9	718.8		CH		Brown and gray, moist, stiff, Fat CLAY. (CH)	
S2	3.0	12	4-5-6-6	11		5				
S3	5.0	14	4-4-7-10	11	714.3				Auger refusal @ 7 feet.	Groundwater not encountered during drilling.
						10				
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 45+33)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-41

LOG OF BORING NO. B-42

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/5/2017**
DATE COMPLETED: **4/5/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/5/17**
CAVED (ft): **8.0**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **721.66**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					721.7	0	FILL		Brown, gray and black, moist, stiff, Fat CLAY, with gravel. (CH) (FILL)	Asphalt: 5 inches. Base: 5 inches.
S1	1.0	20	9-5-5-7	10						
					718.7		CH		Brown and gray, moist, stiff, Fat CLAY. (CH)	Bag sample obtained 1-6 feet.
S2	3.0	14	4-5-7-8	12		5			---, medium stiff.	
S3	5.0	14	1-3-4-6	7					---, stiff.	
S4	7.0	20	4-5-7-9	12						
S5	9.0	24	4-5-5-6	10		10				
					710.7				Boring terminated @ 11 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 46+00)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-42

LOG OF BORING NO. B-43

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/4/2017**
DATE COMPLETED: **4/4/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/4/17**
CAVED (ft): **3.8**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **722.81**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					722.8	0	FILL		Gray and brown, moist, medium dense, Clayey GRAVEL. (GC) (FILL)	Asphalt: 8 inches. Base: 6 inches.
S1	1.0	18	15-8-11-9	19						
S2	3.0	22	4-5-7-8	12	718.8		CH		Brown, moist, stiff, Fat CLAY. (CH)	
S3	5.0	2	50/2"	50/2"	717.8	5	HW		Gray, Highly Weathered Rock.	
					717.6				Auger refusal @ 5.2 feet.	Groundwater not encountered during drilling.
						10				
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Hope Drive: Sta. 46+91)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-43

LOG OF BORING NO. B-44

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/5/2017**
DATE COMPLETED: **4/5/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/5/17**
CAVED (ft): **8.0**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **725.01**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					725.0	0	CL		Reddish-brown and black, moist, very stiff, Sandy Lean CLAY. (CL)	Asphalt: 5 inches. Base: 6 inches.
S1	1.0	20	19-15-14-9	29						
S2	3.0	18	4-5-6-8	11					---, stiff.	
					720.0	5	CH		Brown and black, moist, stiff, Fat CLAY. (CH)	
S3	5.0	20	4-5-9-9	14						
S4	7.0	20	7-10-13-15	23					---, very stiff.	
S5	9.0	22	5-8-9-10	17		10				
					714.0				Boring terminated @ 11 feet.	Groundwater not encounterd during drilling. Fuel odor noted by drillers 1-11 feet.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Frontage Road: Sta. 10+92)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-44

LOG OF BORING NO. B-45

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/3/2017**
DATE COMPLETED: **4/3/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/3/17**
CAVED (ft): **7.8**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **725.48**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					725.5	0	CH		Reddish-brown and gray, moist, stiff, Fat CLAY. (CH)	Asphalt: 7 inches. Base: 6 inches.
S1	1.0	20	3-4-5-8	9						
S2	3.0	18	4-5-5-6	10						Bag sample obtained 1-5 feet.
S3	5.0	24	3-4-5-7	9		5				
S4	7.0	24	3-4-6-7	10						
S5	9.0	24	5-5-7-7	12		10				
					714.5				Boring terminated @ 11 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Frontage Road: Sta. 11+97)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-45

LOG OF BORING NO. B-46

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/4/2017**
DATE COMPLETED: **4/4/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/4/17**
CAVED (ft): **8.0**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **728.81**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S1	0.0	20	2-2-3-4	5	728.8	0	FILL		Reddish-brown, moist, medium stiff, Sandy Lean CLAY. (CL) (FILL)	Topsoil: 5 inches.
S2	2.0	20	4-5-5-6	10					---, stiff.	
S3	4.0	24	5-5-6-6	11	724.3	5	CH		Reddish-brown and black, moist, stiff, Fat CLAY. (CH)	
S4	6.0	12	7-9-10-11	19					---, very stiff.	
S5	8.0	24	5-6-8-10	14					---, stiff.	
					718.8	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Frontage Road: Sta. 14+60, within cul-de-sac)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-46

LOG OF BORING NO. B-47

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/3/2017**
DATE COMPLETED: **4/3/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft):	Dry	Dry	
DATE:	4/3/17	4/4/17	
CAVED (ft):	7.8	7.8	

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **724.37**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					724.4	0	CL		Dark brown, moist, soft, Sandy Lean CLAY. (CL)	Topsoil: 8 inches.
S1	0.0	18	2-2-2-3	4						
S2	2.0	20	2-2-2-2	4						
					720.4		CH		Brown and tan, moist, medium stiff, Fat CLAY. (CH)	
S3	4.0	20	2-3-4-4	7		5				
S4	6.0	20	6-6-8-9	14					---, stiff.	
S5	8.0	24	5-5-8-11	13						
					714.4	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Papermill Road: Sta. 101+00)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-47

LOG OF BORING NO. B-48

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/3/2017**
DATE COMPLETED: **4/3/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft):	Dry	Dry	
DATE:	4/3/17	4/4/17	
CAVED (ft):	7.8	7.8	

WATER ENCOUNTERED DURING DRILLING (ft): **Dry**
GROUND SURFACE ELEVATION: **727.61**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					727.6	0	CL		Dark brown, moist, stiff, Sandy Lean CLAY. (CL)	Gravel: 6 inches.
S1	0.0	18	9-5-5-4	10						
S2	2.0	20	2-2-3-4	5					---, medium stiff.	
					723.6		CH		Reddish-brown, moist, stiff, Fat CLAY. (CH)	
S3	4.0	24	4-4-5-6	9		5				
S4	6.0	18	7-9-10-11	19					---, very stiff.	
S5	8.0	8	4-50/2"	50/2"	719.6		HW		Light gray, Highly Weathered Rock.	
					718.4				Auger refusal @ 9.2 feet.	Groundwater not encountered during drilling.
						10				
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Papermill Road: Sta. 102+50)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-48

LOG OF BORING NO. B-49

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/3/2017**
DATE COMPLETED: **4/3/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/3/17**
CAVED (ft): **8.0**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **727.45**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S1	0.0	14	2-2-5-6	7	727.5	0	FILL		Reddish-brown and gray, moist, medium stiff, Fat CLAY, with rock fragments. (CH)	Topsoil: 5 inches.
S2	2.0	19	4-4-5-6	9	724.5		CH		Reddish-brown and tan, moist, stiff, Fat CLAY. (CH)	
S3	4.0	22	6-6-7-8	13		5				
S4	6.0	22	7-7-9-10	16					---, very stiff.	
S5	8.0	24	4-6-10-10	16						
					717.5	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Papermill Road: Sta. 103+50)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-49

LOG OF BORING NO. B-50

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/3/2017**
DATE COMPLETED: **4/3/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/3/17**
CAVED (ft): **7.8**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **725.35**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S1	0.0	16	2-2-3-3	5	725.4	0	FILL		Dark brown, moist, medium stiff, Sandy Lean CLAY. (CL) (FILL)	Topsoil: 6 inches.
S2	2.0	20	4-4-5-7	9	722.4		CH		Reddish-brown and tan, moist, stiff, Fat CLAY. (CH)	
S3	4.0	24	4-5-6-8	11		5				
S4	6.0	14	7-7-9-9	16					---, very stiff.	
S5	8.0	20	4-5-7-14	12					---, stiff, with light gray weathered rock.	
					715.4	10			Boring terminated @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Papermill Road: Sta. 104+74)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-50

LOG OF BORING NO. B-51

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/3/2017**
DATE COMPLETED: **4/3/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/3/17**
CAVED (ft): **7.8**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **727.28**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					727.3	0	FILL		Dark gray and brown, moist, very stiff, Sandy Lean CLAY. (CL) (FILL)	Asphalt: 10 inches. Base: 4 inches.
S1	1.0	18	4-9-8-7	17						
S2	3.0	22	6-6-5-7	11					---, stiff.	
					722.7	5	CH		Reddish-brown, moist, stiff, Fat CLAY. (CH)	
S3	5.0	22	3-4-5-8	9						
S4	7.0	20	5-6-9-10	15						
S5	9.0	22	5-5-7-9	12		10				
					716.3				Boring terminated @ 11 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Papermill Road: Sta. 106+00)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-51

LOG OF BORING NO. B-52

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/3/2017**
DATE COMPLETED: **4/3/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/3/17**
CAVED (ft): **7.8**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **728.16**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					728.2	0	CH		Reddish-brown and tan, moist, very stiff, Fat CLAY. (CH)	Asphalt: 7 inches. Base: 4 inches.
S1	1.0	20	5-8-10-12	18						
S2	3.0	22	5-5-7-9	12					---, stiff.	
S3	5.0	20	3-6-12-14	18		5			---, very stiff.	
S4	7.0	22	7-7-10-13	17						
S5	9.0	9	5-50/3"	50/3"	719.2		HW		Light gray, Highly Weathered Rock.	
					718.2	10			Auger refusal @ 10 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Papermill Road: Sta. 107+06)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-52

LOG OF BORING NO. B-53

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/3/2017**
DATE COMPLETED: **4/3/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/3/17**
CAVED (ft): **7.4**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **726.60**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					726.6	0	CH		Reddish-brown and tan, moist, very stiff, Fat CLAY. (CH)	Asphalt: 11 inches. Base: 9 inches.
S1	1.0	16	17-11-9-7	20						Bag sample obtained 2-6 feet.
S2	3.0	18	5-7-9-11	16						
						5			---, stiff.	
S3	5.0	20	6-5-7-8	12						
S4	7.0	20	6-5-7-50/ 1"	12					---, with light gray weathered rock.	
					717.6				Auger refusal @ 9 feet.	Groundwater not encountered during drilling.
						10				
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Papermill Road: Sta. 108+50)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-53

LOG OF BORING NO. B-54

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/3/2017**
DATE COMPLETED: **4/3/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/3/17**
CAVED (ft): **6.8**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **724.07**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					724.1	0	CH		Reddish-brown, moist, very stiff, Fat CLAY. (CH)	Asphalt: 11 inches. Base: 10 inches.
S1	1.0	16	25-15-10-8	25						
S2	3.0	18	8-7-6-10	13					---, stiff.	
S3	5.0	22	3-5-8-8	13		5				
S4	7.0	14	7-9-50/2"	59/8"					---, hard, with rock fragments.	
					715.6				Auger refusal @ 8.5 feet.	Groundwater not encountered during drilling.
						10				
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Papermill Road: Sta. 109+75)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-54

LOG OF BORING NO. B-55

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/5/2017**
DATE COMPLETED: **4/5/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/5/17**
CAVED (ft): **3.0**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **729.24**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					729.2	0	CH		Reddish-brown and tan, moist, medium stiff, Fat CLAY. (CH)	Asphalt: 4 inches. Base: 3 inches.
S1	1.0	20	3-3-5-6	8						
					726.2		HW		Light gray, Highly Weathered Rock.	Bag sample obtained 1-4 feet.
S2	3.0	16	3-4-50/4"	54/10"						
					724.7	5			Auger refusal @ 4.5 feet.	Groundwater not encountered during drilling.
						10				
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Roosevelt Boulevard: Sta. 300+87)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-55

LOG OF BORING NO. B-56

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/5/2017**
DATE COMPLETED: **4/5/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/5/17**
CAVED (ft): **8.0**
WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **730.98**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					731.0	0	CH		Brown, moist, medium stiff, Fat CLAY. (CH)	Asphalt: 4 inches. Base: 4 inches.
S1	1.0	16	9-4-2-2	6						
S2	3.0	6	4-4-5-5	9					---, reddish-brown, with gray rock fragments.	
S3	5.0	20	5-5-6-6	11		5			---, reddish-brown and tan.	
S4	7.0	24	3-3-2-3	5					---, medium stiff.	
S5	9.0	24	4-4-4-6	8		10				
					720.0				Boring terminated @ 11 feet.	Groundwater not encountered during drilling.
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Roosevelt Boulevard: Sta. 302+08)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-56

LOG OF BORING NO. B-57

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/4/2017**
DATE COMPLETED: **4/4/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft): **Dry**
DATE: **4/4/17**
CAVED (ft): **3.0**

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **735.71**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					735.7	0	SC		Grayish-brown, moist, loose, Clayey SAND. (SC)	Asphalt: 5 inches. Base: 5 inches.
S1	1.0	18	4-4-6-11	10						
S2	3.0	14	9-21-9-50/ 1"	30					---, medium dense, with rock fragments.	
					731.1	5			Auger refusal @ 4.6 feet.	Groundwater not encountered during drilling.
						10				
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA. (Tevis Street: Sta. 13+08, within cul-de-sac)**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. B-57

LOG OF BORING NO. SWM-1

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/6/2017**
DATE COMPLETED: **4/6/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft):	Dry	11.3	
DATE:	4/6/17	4/7/17	
CAVED (ft):	12.5	12.5	

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **725.09**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S1	0.0	16	2-2-3	5	725.1	0	CL		Dark Brown, moist, medium stiff, Sandy Lean CLAY. (CL)	Topsoil: 11 inches.
S2	2.5	18	4-8-15	23	722.6		SM		Reddish-brown and black, moist, medium dense, Silty SAND, with rock fragments. (SM)	
S3	5.0	18	9-10-14	24	720.6	5	CH		Brown, moist, very stiff, Fat CLAY. (CH)	
S4	8.5	16	4-4-5	9		10			---, stiff.	
S5	13.5	18	2-2-2	4					---, wet, soft.	
					710.1	15			Boring terminated @ 15 feet.	
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA.**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. SWM-1

LOG OF BORING NO. SWM-2

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/6/2017**
DATE COMPLETED: **4/6/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft):	Dry	Dry	
DATE:	4/6/17	4/7/17	
CAVED (ft):	12.8	12.5	

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **724.80**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S1	0.0	14	1-2-2	4	724.8	0	CL		Dark brown, moist, soft, Sandy Lean CLAY. (CL)	Topsoil: 10 inches.
S2	2.5	18	4-5-6	11	722.3		CH		Reddish-brown and black, moist, stiff, Fat CLAY, with rock fragments.	
S3	5.0	18	4-6-7	13		5				
S4	8.5	18	5-6-6	12					---, light gray and tan.	
						10				
S5	13.5	10	4-6-7	13						
					709.8	15			Boring terminated @ 15 feet.	Groundwater not encountered during drilling.
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA.**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. SWM-2

LOG OF BORING NO. SWM-3

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/5/2017**
DATE COMPLETED: **4/5/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft):	Dry	Dry	
DATE:	4/5/17	4/6/17	
CAVED (ft):	12.8	12.5	

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **723.86**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S1	0.0	14	3-4-8	12	723.9	0	CH		Brown, moist, stiff, Fat CLAY, with gray rock fragments. (CH)	Topsoil: 7 inches.
S2	2.5	6	5-4-4	8					---, medium stiff.	
S3	5.0	12	4-5-6	11		5			---, tan, gray and black, stiff.	
S4	8.5	18	4-6-7	13		10				
S5	13.5	18	4-8-9	17					---, dark gray, very stiff.	
					708.9	15			Boring terminated @ 15 feet.	Groundwater not encountered during drilling.
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA.**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. SWM-3

LOG OF BORING NO. SWM-4

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/5/2017**
DATE COMPLETED: **4/5/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft):	Dry	Dry	
DATE:	4/5/17	4/6/17	
CAVED (ft):	3.0	3.0	

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **723.51**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S1	0.0	8	4-50/3"	50/3"	723.5	0	CH		Brown, moist, hard, Fat CLAY, with gray rock fragments. (CH)	Topsoil: 6 inches.
S2	2.5	16	5-16-15	31						
					718.9	5			Auger refusal @ 4.6 feet.	Groundwater not encountered during drilling.
						10				
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA.**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. SWM-4

LOG OF BORING NO. SWM-5

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/5/2017**
DATE COMPLETED: **4/5/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft):	17.5	10.7	
DATE:	4/5/17	4/6/17	
CAVED (ft):	18.0	17.3	

WATER ENCOUNTERED DURING DRILLING (ft): **Dry**
GROUND SURFACE ELEVATION: **724.47**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S1	0.0	14	4-12-18	30	724.5	0	CH		Brown, moist, very stiff, Fat CLAY, with gray rock fragments. (CH)	Topsoil: 6 inches.
S2	2.5	6	13-50/3"	50/3"					---, hard.	
S3	5.0	18	3-5-8	13		5			---, tan and brown, stiff.	
S4	8.5	18	2-4-4	8					---, medium stiff.	
						10				
S5	13.5	18	3-3-5	8		15				
S6	18.5	18	3-4-5	9					---, stiff.	
					704.5	20			Boring terminated @ 20 feet.	
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA.**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. SWM-5

LOG OF BORING NO. SWM-6

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/6/2017**
DATE COMPLETED: **4/6/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft):	Dry	8.0	
DATE:	4/6/17	4/7/17	
CAVED (ft):	11.3	11.2	

WATER ENCOUNTERED DURING DRILLING (ft): **Dry**
GROUND SURFACE ELEVATION: **725.43**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S1	0.0	8	5-6-50/2"	56/8"	725.4	0	CH		Brown, moist, hard, Fat CLAY, with gray rock fragments and boulders. (CH)	Topsoil: 5 inches.
S2	2.5	14	4-6-6	12					---, stiff.	
S3	5.0	12	5-5-7	12		5				
S4	8.5	18	2-2-4	6					---, tan and gray, medium stiff.	
						10				
					713.2				Auger refusal @ 12.2 feet.	
						15				
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA.**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. SWM-6

LOG OF BORING NO. SWM-7

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/11/2017**
DATE COMPLETED: **4/11/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft):	16.0	3.0	
DATE:	4/11/17	4/12/17	
CAVED (ft):	16.8	16.8	

WATER ENCOUNTERED DURING DRILLING (ft) **17.5**
GROUND SURFACE ELEVATION: **724.43**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S1	0.0	16	1-2-4	6	724.4	0	CH		Brown and black, moist, medium stiff, Fat CLAY. (CH)	Topsoil: 9 inches.
S2	2.5	18	3-4-6	10					---, light gray, tan and black, stiff.	
S3	5.0	18	5-5-7	12		5				
S4	8.5	18	4-5-5	10		10				
S5	13.5	18	4-5-5	10		15			---, reddish-brown.	
S6	18.5	16	4-8-9	17					---, light gray and brown, wet, very stiff.	
					704.4	20			Boring terminated @ 20 feet.	
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA.**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. SWM-7

LOG OF BORING NO. SWM-8

PROJECT: **Hope Drive**
PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/11/2017**
DATE COMPLETED: **4/11/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft):	Dry	4.5	
DATE:	4/11/17	4/12/17	
CAVED (ft):	17.0	17.0	

WATER ENCOUNTERED DURING DRILLING (ft): **Dry**
GROUND SURFACE ELEVATION: **726.25**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S1	0.0	18	1-2-2	4	726.3	0	CH		Dark brown, moist, soft, Fat CLAY. (CH)	Topsoil: 9 inches.
S2	2.5	16	4-4-5	9					---, brown, stiff.	
S3	5.0	18	6-14-10	24		5			---, very stiff, with gray rock fragments.	
S4	8.5	18	3-3-5	8		10			---, brown and gray, medium stiff.	
S5	13.5	18	4-4-5	9		15			---, stiff.	
					709.3		HW		Light gray, Highly Weathered Rock.	
S6	18.5	1	50/1"	50/1"	707.5				Auger refusal @ 18.8 feet.	
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA.**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. SWM-8

LOG OF BORING NO. SWM-9

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/11/2017**
DATE COMPLETED: **4/11/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft):	Dry	13.8	
DATE:	4/11/17	4/12/17	
CAVED (ft):	17.4	17.3	

WATER ENCOUNTERED DURING DRILLING (ft) **Dry**
GROUND SURFACE ELEVATION: **725.87**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S1	0.0	17	5-5-6	11	725.9	0	CL		Light gray and brown, moist, stiff, Sandy Lean CLAY. (CL)	Topsoil: 9 inches.
S2	2.5	18	5-5-6	11					---, tan.	
S3	5.0	18	4-4-5	9	720.9	5	CH		Brown and gray, moist, stiff, Fat CLAY. (CH)	
S4	8.5	18	4-6-7	13		10				
S5	13.5	18	5-6-6	12		15			---, reddish-brown and black.	
S6	18.5	18	4-5-5	10					---, brown and gray.	
					705.9	20			Boring terminated @ 20 feet.	
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA.**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. SWM-9

LOG OF BORING NO. SWM-10

PROJECT: **Hope Drive**

PROJECT NO.: **31170078**
PROJECT LOCATION: **Winchester, Virginia**
DATE STARTED: **4/11/2017**
DATE COMPLETED: **4/11/2017**
DRILLING CONTRACTOR: **GTA**
DRILLER: **GTA**
DRILLING METHOD: **Hollow Stem Auger (3-1/4 in)**
SAMPLING METHOD: **Split Spoon (Automatic Hammer)**

WATER LEVEL (ft):	15.4	10.6	
DATE:	4/11/17	4/12/17	
CAVED (ft):	16.0	15.8	

WATER ENCOUNTERED DURING DRILLING (ft) **17.0**
GROUND SURFACE ELEVATION: **727.86**
DATUM: **MSL**
EQUIPMENT: **D-50**
LOGGED BY: **MF**
CHECKED BY: **TC**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S1	0.0	16	2-4-5	9	727.9	0	FILL		Dark brown, moist, stiff, Sandy Lean CLAY. (CL) (FILL)	Topsoil: 8 inches.
S2	2.5	14	3-4-5	9	725.4		CH		Brown, moist, stiff, Fat CLAY. (CH)	Bag sample obtained 3-7 feet.
S3	5.0	16	4-5-5	10		5			---, gray and brown.	
S4	8.5	12	4-6-6	12					---, tan and gray.	
						10				
S5	13.5	16	3-4-4	8					---, medium stiff.	
						15				
					710.7				Auger refusal @ 17.2 feet.	
						20				
						25				
						30				

NOTES: **Ground surface elevation surveyed by RDA.**

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

LOG OF BORING NO. SWM-10

APPENDIX C

LABORATORY TEST RESULTS

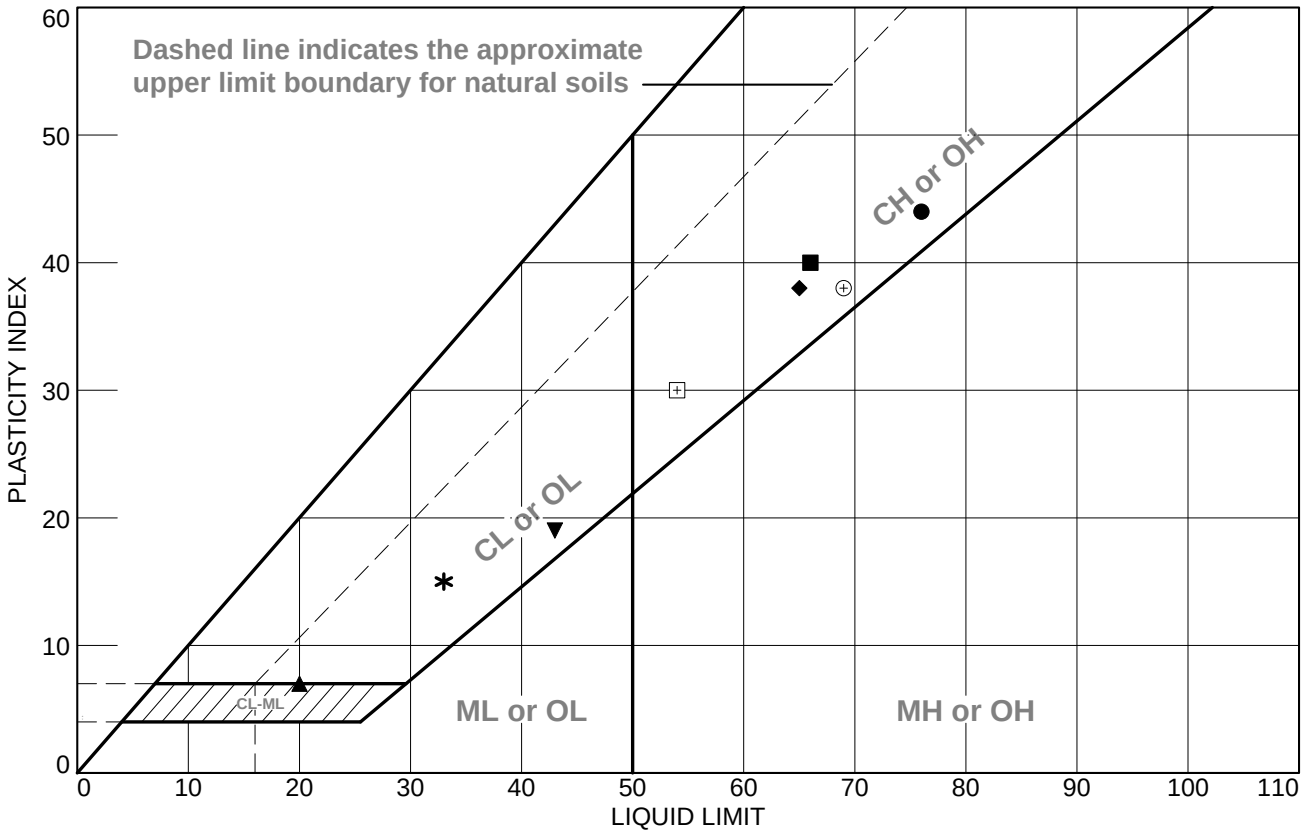
GEO-TECHNOLOGY ASSOCIATES, INC.
Natural Moisture Content Summary

Hope Drive
August 7, 2017
31170078

Boring No.	Sample No.	Depth (ft)	Natural Moisture Content (%)
B-1	S-1	0.5	28.4
B-2	S-1	0.5	15.0
B-3	S-1	0.5	10.8
B-4	S-1	0.5	16.2
B-5	S-1	0.5	27.7
B-5	S-4	6.0	36.4
B-6	S-1	0.5	20.9
B-7	S-1	0.5	22.2
B-8	S-1	0.5	26.8
B-9	S-1	0.5	28.9
B-10	S-1	0.5	25.2
B-12	S-4	6.0	27.5
B-13	S-1	0.5	2.0
B-15	S-1	0.5	7.7
B-16	Bulk	1.0	1.0
B-17	S-1	0.0	18.4
B-18	S-2	2.0	20.9
B-19	S-3	4.0	16.9
B-20	S-1	0.5	26.9
B-20	S-2	2.0	12.1
B-23	Bulk	1.0	19.9
B-24	S-1	0.0	23.7
B-25	S-2	2.0	26.0
B-26	Bulk	1.0	20.7
B-27	S-1	0.0	20.6
B-28	S-1	0.0	18.1
B-29	S-1	0.0	16.4
B-30	Bulk	1.0	27.8
B-31	S-2	2.0	34.3
B-34	S-1	1.0	4.8
B-35	S-1	0.0	15.3

B-36	Bulk	1.0	13.4
B-37	S-1	0.0	22.7
B-38	S-1	1.0	30.6
B-39	S-1	1.0	1.3
B-40	S-1	1.0	12.4
B-41	S-1	1.0	9.3
B-42	Bulk	1.0	26.0
B-43	S-1	1.0	7.8
B-45	Bulk	1.0	30.7
B-46	S-2	2.0	16.0
B-46	S-3	4.0	29.5
B-47	S-1	0.0	25.2
B-48	S-1	0.0	21.9
B-50	S-1	0.0	22.5
B-51	S-1	1.0	14.5
B-52	S-1	1.0	17.5
B-53	Bulk	2.0	35.3
B-55	S-1	1.0	34.0
B-56	S-1	1.0	18.5
B-57	S-1	1.0	25.5
SWM-2	S-3	5.0	17.8
SWM-5	S-3	5.0	27.4
SWM-7	S-4	8.5	31.2
SWM-10	S-3	5.0	29.3
Average Natural Moisture Content			**20.7**

LIQUID AND PLASTIC LIMITS TEST REPORT - ASTM D4318



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-5	S4	6'	36.4	32	76	44	CH
■	B-12	S4	6'	27.5	26	66	40	CH
▲	B-16	Bulk	1'-5'	1.0	13	20	7	SC-SM
◆	B-20	S1	0'	26.9	27	65	38	CH
▼	B-23	Bulk	1'-5'	19.9	24	43	19	CL
*	B-26	Bulk	1'-5'	20.7	18	33	15	CL
⊕	B-30	Bulk	1'-5'	27.8	31	69	38	CH
⊞	B-36	Bulk	1'-5'	13.4	24	54	30	CH

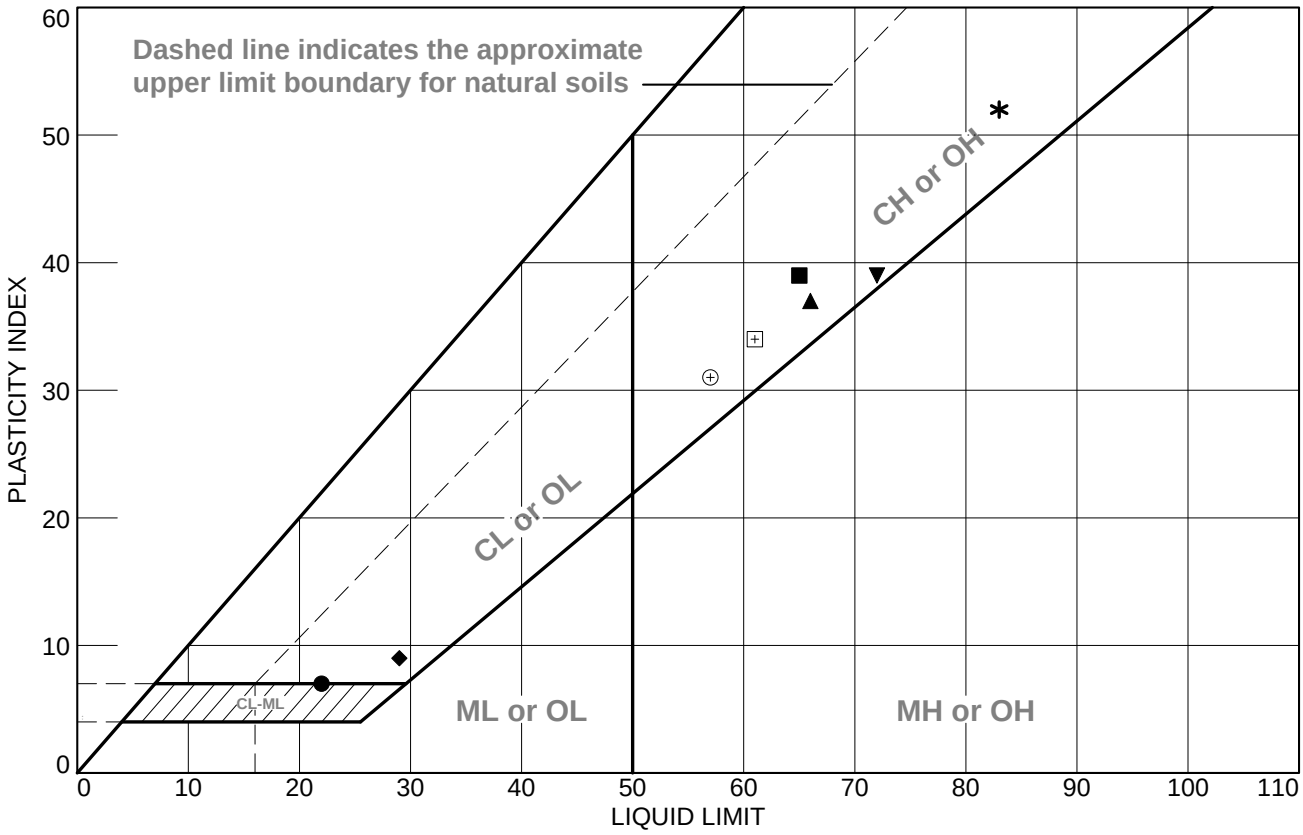
ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

Client: Rinker Design Associates, P.C.
Project: Hope Drive
Project No.: 31170078

Tested By: AMC **Checked By:** TC

LIQUID AND PLASTIC LIMITS TEST REPORT - ASTM D4318



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-40	S1	1'	12.4	15	22	7	SC-SM
■	B-42	Bulk	1'-6'	26.0	26	65	39	CH
▲	B-45	Bulk	1'-5'	30.7	29	66	37	CH
◆	B-47	S1	0'	25.2	20	29	9	CL
▼	B-53	Bulk	2'-6'	35.3	33	72	39	CH
*	B-55	S1	1'	34.0	31	83	52	CH
⊕	B-57	S1	1'	25.5	26	57	31	SC
⊞	SWM-10	S3	5'	29.3	27	61	34	CH

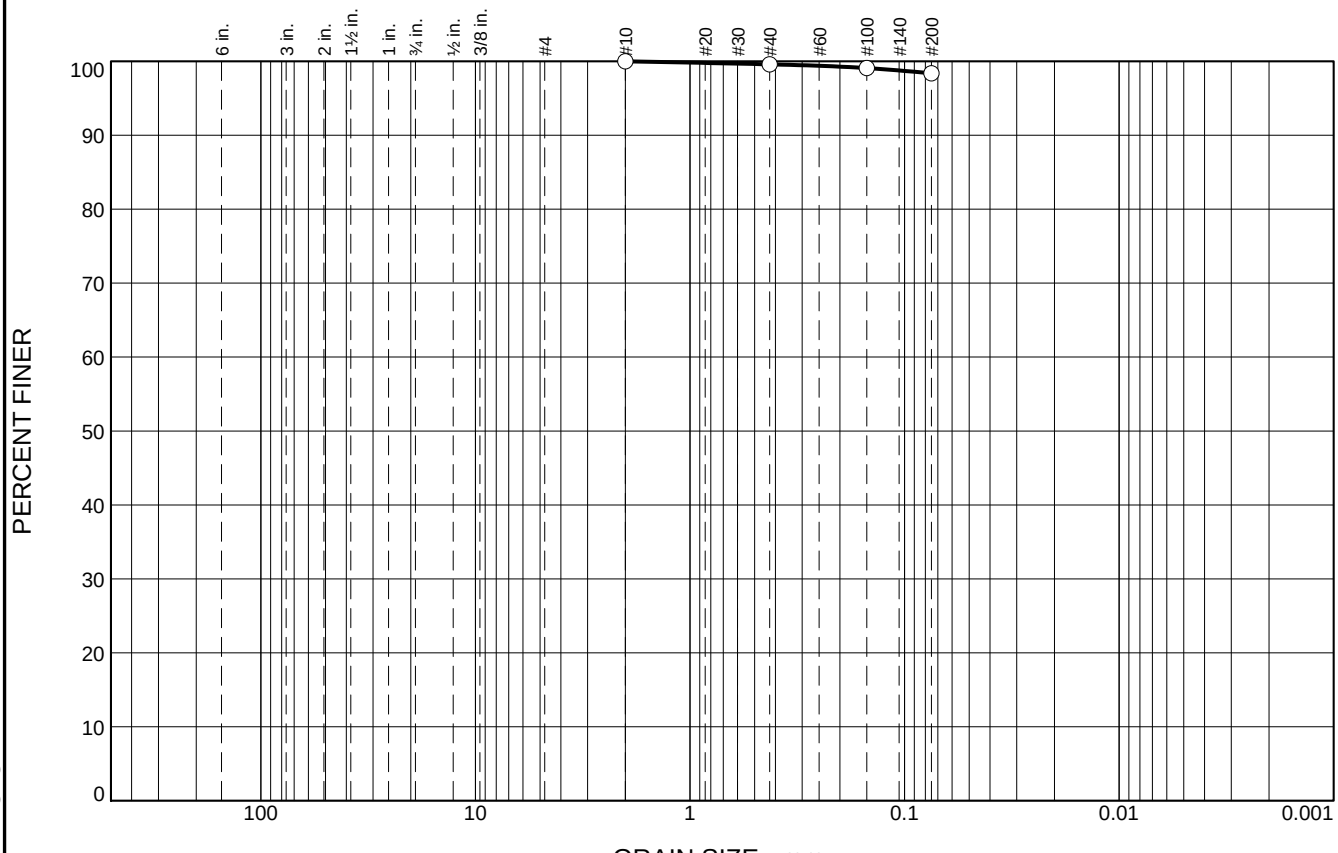
ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

Client: Rinker Design Associates, P.C.
Project: Hope Drive
Project No.: 31170078

Tested By: AMC **Checked By:** TC

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.4	1.2	98.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.6		
#100	99.1		
#200	98.4		

* (no specification provided)

Soil Description

Red, yellow and white, Fat CLAY. (CH)

Atterberg Limits

PL= 32 LL= 76 PI= 44 NM= 36.4

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-5(52)

Remarks

Source of Sample: B-5 **Depth:** 6'
Sample Number: S4 **Date:** 6/8/2017

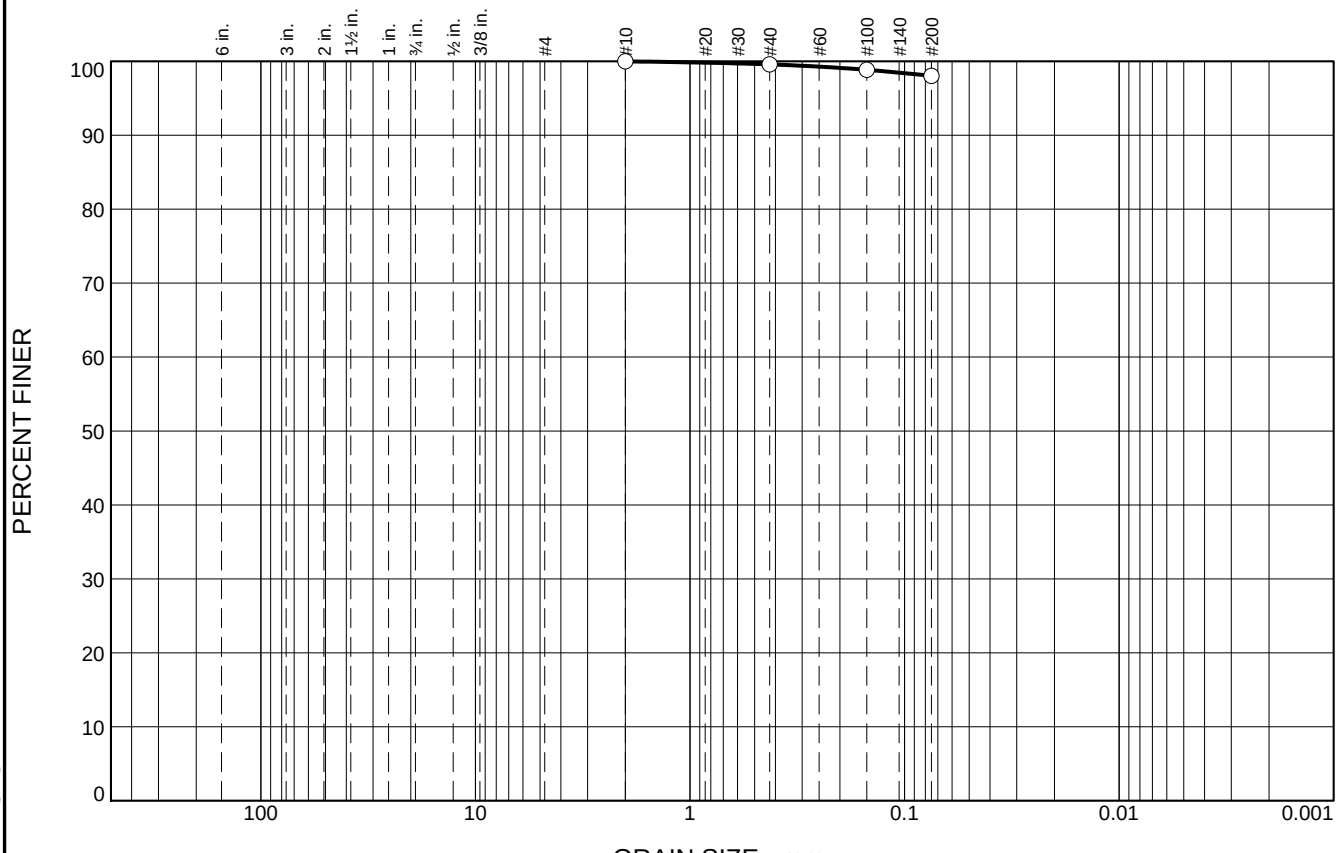
GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

Client: Rinker Design Associates, P.C.
Project: Hope Drive
Project No: 31170078

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Tested By: AMC **Checked By:** TC

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.4	1.6	98.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.6		
#100	98.8		
#200	98.0		

* (no specification provided)

Soil Description

Reddish-brown, Fat CLAY. (CH)

Atterberg Limits

PL= 26 LL= 66 PI= 40 NM= 27.5

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(46)

Remarks

Source of Sample: B-12 **Depth:** 6'
Sample Number: S4 **Date:** 6/8/2017

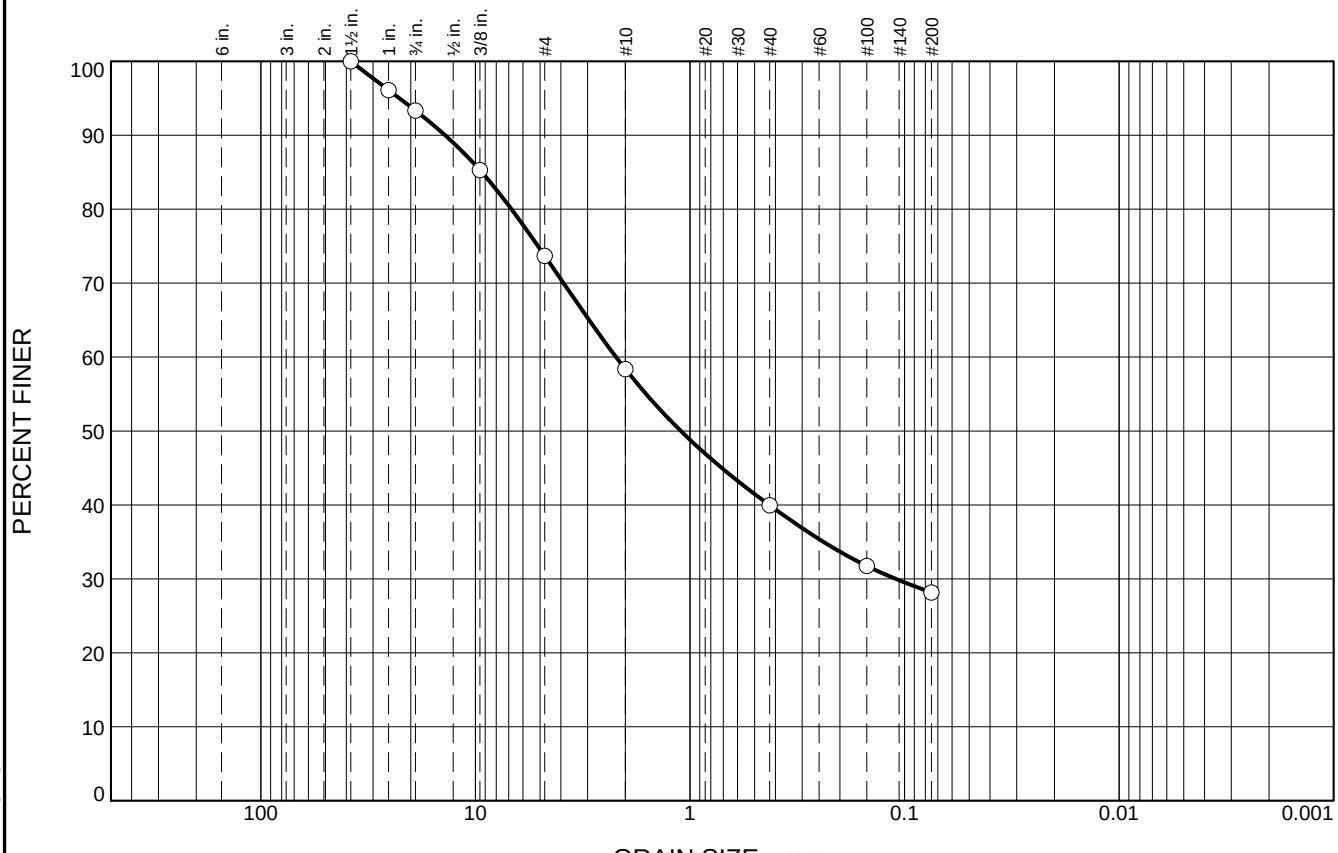
GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

Client: Rinker Design Associates, P.C.
Project: Hope Drive
Project No: 31170078

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Tested By: AMC **Checked By:** TC

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.7	19.6	15.3	18.4	11.9	28.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5"	100.0		
1"	96.1		
3/4"	93.3		
3/8"	85.3		
#4	73.7		
#10	58.4		
#40	40.0		
#100	31.7		
#200	28.1		

* (no specification provided)

Soil Description

Gray, Silty, Clayey SAND, with Gravel. (SC-SM) (FILL)

Atterberg Limits

PL= 13 LL= 20 PI= 7 NM= 1.0

Coefficients

D_{90}= 13.8362 D_{85}= 9.3349 D_{60}= 2.2105
D_{50}= 1.1025 D_{30}= 0.1099 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC-SM AASHTO= A-2-4(0)

Remarks

Source of Sample: B-16 **Depth:** 1'-5'
Sample Number: Bulk **Date:** 05/01/2017

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

Client: Rinker Design Associates, P.C.
Project: Hope Drive
Project No: 31170078

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Tested By: AMC **Checked By:** TC

MOISTURE-DENSITY RELATIONSHIP REPORT
AASHTO T 99 Method A, Standard Virginia VTM-1 corr.

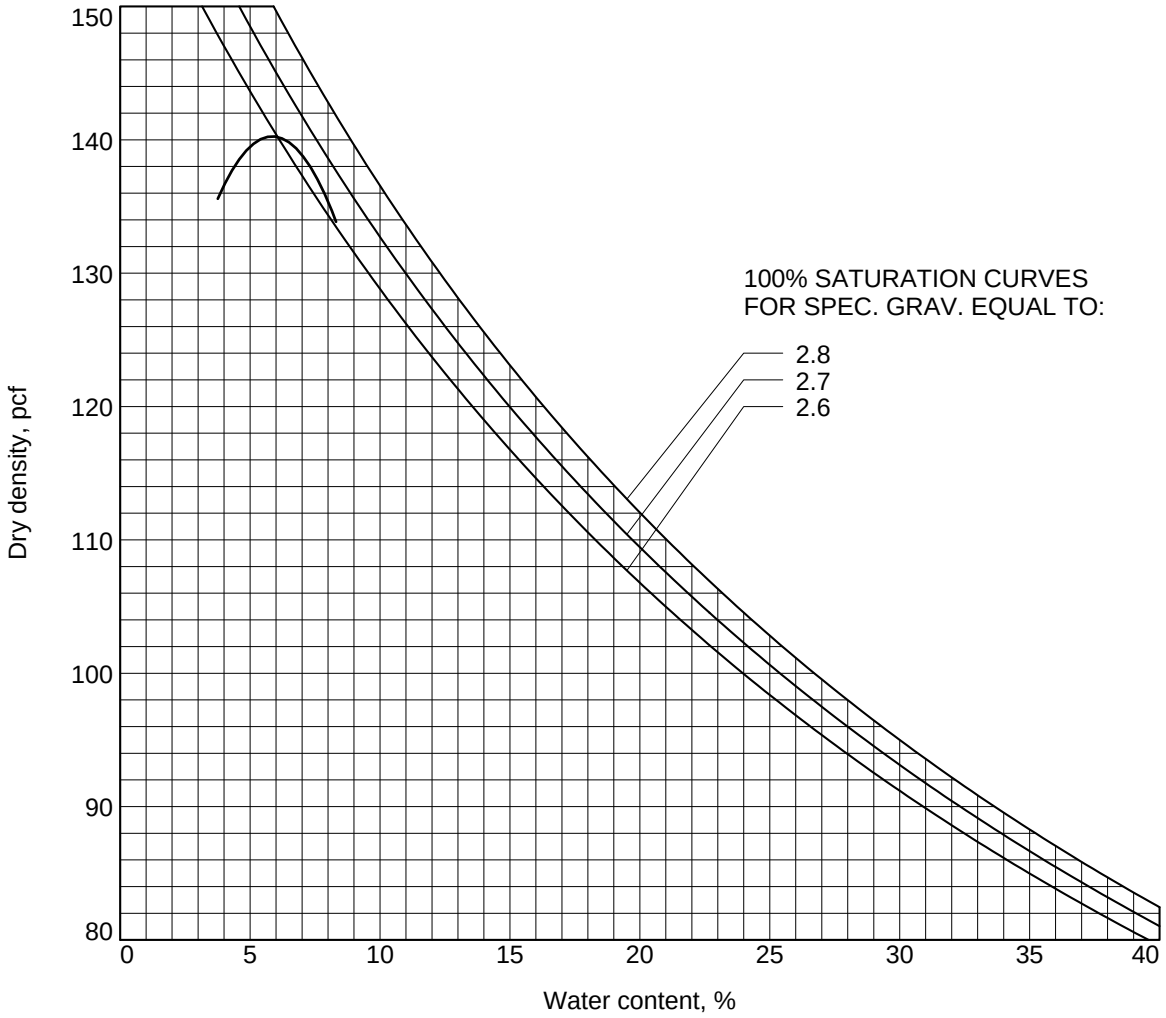
Project No.: 31170078 **Date:** 05/25/2017
Project: Hope Drive
Client: Rinker Design Associates, P.C.
Source of Sample: B-16 **Depth:** 1'-5'
Sample Number: Bulk
Remarks:

MATERIAL DESCRIPTION

Description: Gray, Silty, Clayey SAND, with Gravel. (SC-SM) (FILL)

Classifications - **USCS:** SC-SM **AASHTO:** A-2-4(0)
Nat. Moist. = 1.0 % **Sp.G. =** 2.7
Liquid Limit = 20 **Plasticity Index =** 7
% < No.200 = 28.1 %

ROCK CORRECTED TEST RESULTS	UNCORRECTED
Maximum dry density = 140.3 pcf	136.2 pcf
Optimum moisture = 5.9 %	7.6 %



ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Geo-Technology Associates, Inc.

Tested By: AMC **Checked By:** TC

GEO-TECHNOLOGY ASSOCIATES, INC.
STERLING, VIRGINIA
CBR (VTM-8) TEST RESULTS

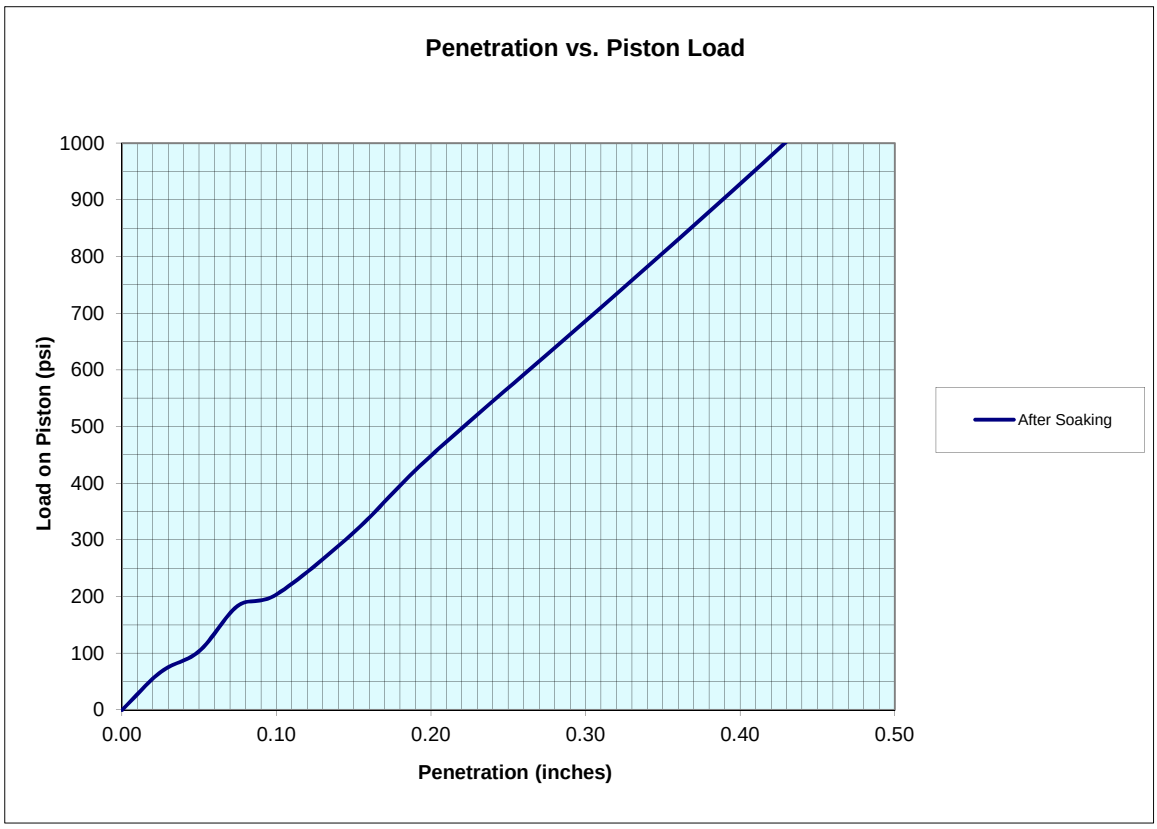
Project Name:	**Hope Drive**
Project Number:	**31170078**
Report Date:	**June 8, 2017**
Sample Location:	**B-16**
Sample Number:	**Bulk**
Depth, ft.:	**1'-5'**
USCS Classification:	**SC-SM**
AASHTO Classification	**A-2-4(0)**
Condition:	SOAKED
Surcharge Wt., lbs.	10
Soil + Mold + Base Plate, gm.	13591.6
Mold + Base Plate, gm.	7108.9
Compaction MC, %	5.4
Wet Density of Soil, pcf	**145.6**
Dry Density of Soil, pcf	**138.1**
Initial Swelling Reading, in.	0.684
Final Swelling Reading, in.	0.689
Swell, %	**0.083**
Final Moisture, %	7.0
Final Moisture, top 1", %	6.5
Proctor MDD, pcf	**140.3**
Optimum Moisture Content, %	**5.9**

	After Soaking	
Penetration	Load	Load
(in.)	lb.	psi.
0.000	0	0
0.025	201	67
0.050	312	104
0.075	552	184
0.100	612	204
0.150	940	313
0.200	1347	449
0.300	2060	687
0.400	2785	928
0.500	3540	1180

CBR Value 0-0.1 =	20.40
CBR Value 0.05-0.15 =	20.93
CBR Value 0.1-0.2 =	24.50

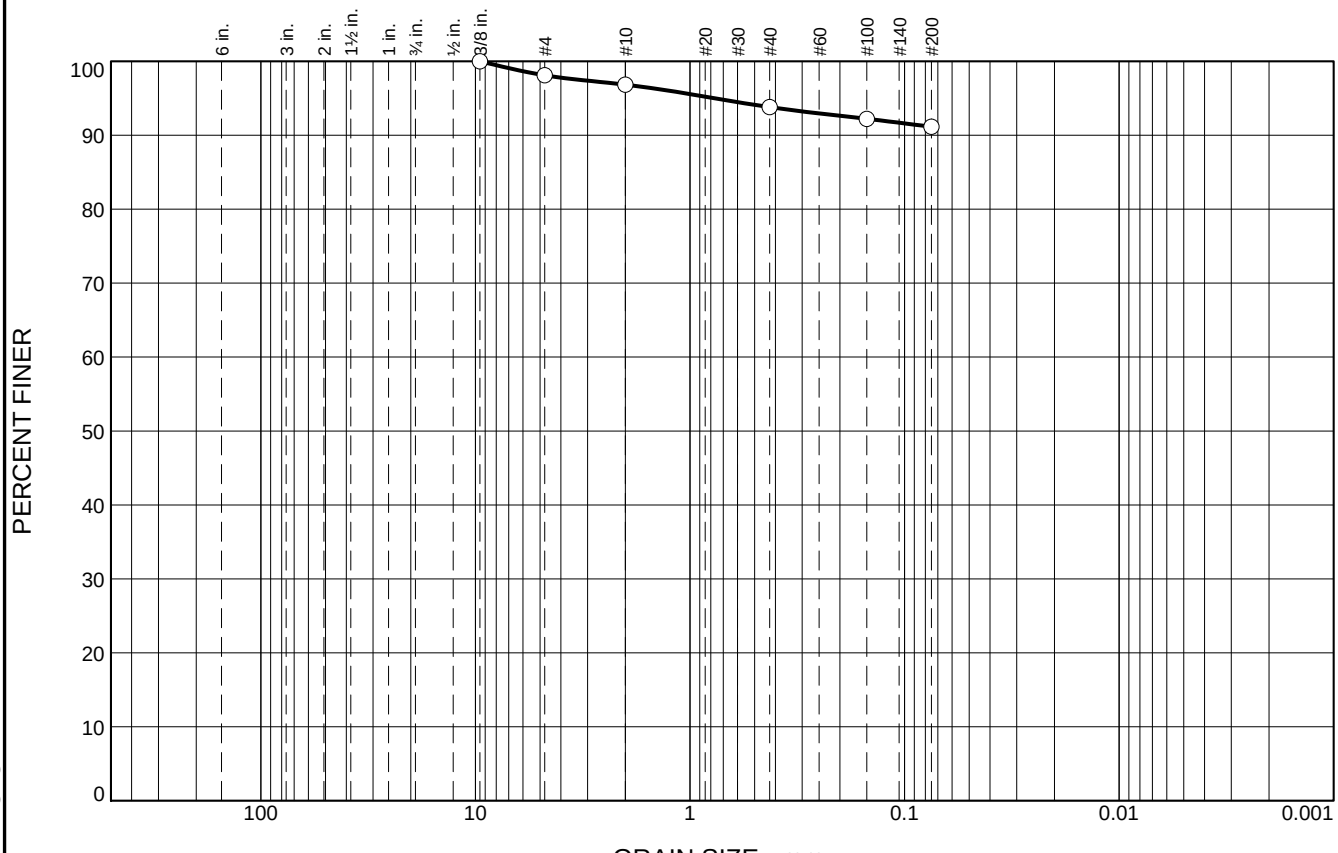
GEO-TECHNOLOGY ASSOCIATES, INC.
STERLING, VIRGINIA
CBR (VTM-8) TEST RESULTS

Project Name:	**Hope Drive**
Project Number:	**31170078**
Report Date:	**June 8, 2017**
Sample Location:	**B-16**
Sample Number:	**Bulk**
Depth, ft.:	**1'-5'**
USCS Classification:	**SC-SM**
AASHTO Classification	**A-2-4(0)**
Condition:	SOAKED
Surcharge Wt., lbs.	10
INITIAL DRY DENSITY, PCF	138.1
INITIAL MOISTURE, %	5.4
INITIAL COMPACTION, %	98.4
FINAL DRY DENSITY, PCF	136.1
FINAL MOISTURE, %	7.0
FINAL MOISTURE, TOP 1", %	6.5
FINAL COMPACTION, %	97.0
SWELL, %	0.083
CBR Value (After Soaking)	**20.4**
Resiliency Factor	**1**



Reviewed By: AR

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.9	1.3	3.0	2.6	91.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
#4	98.1		
#10	96.8		
#40	93.8		
#100	92.2		
#200	91.2		

* (no specification provided)

Soil Description

Brown and gray, Fat CLAY. (CH)

Atterberg Limits

PL= 27 LL= 65 PI= 38 NM= 26.9

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(39)

Remarks

Source of Sample: B-20 **Depth:** 0'
Sample Number: S1 **Date:** 6/8/2017

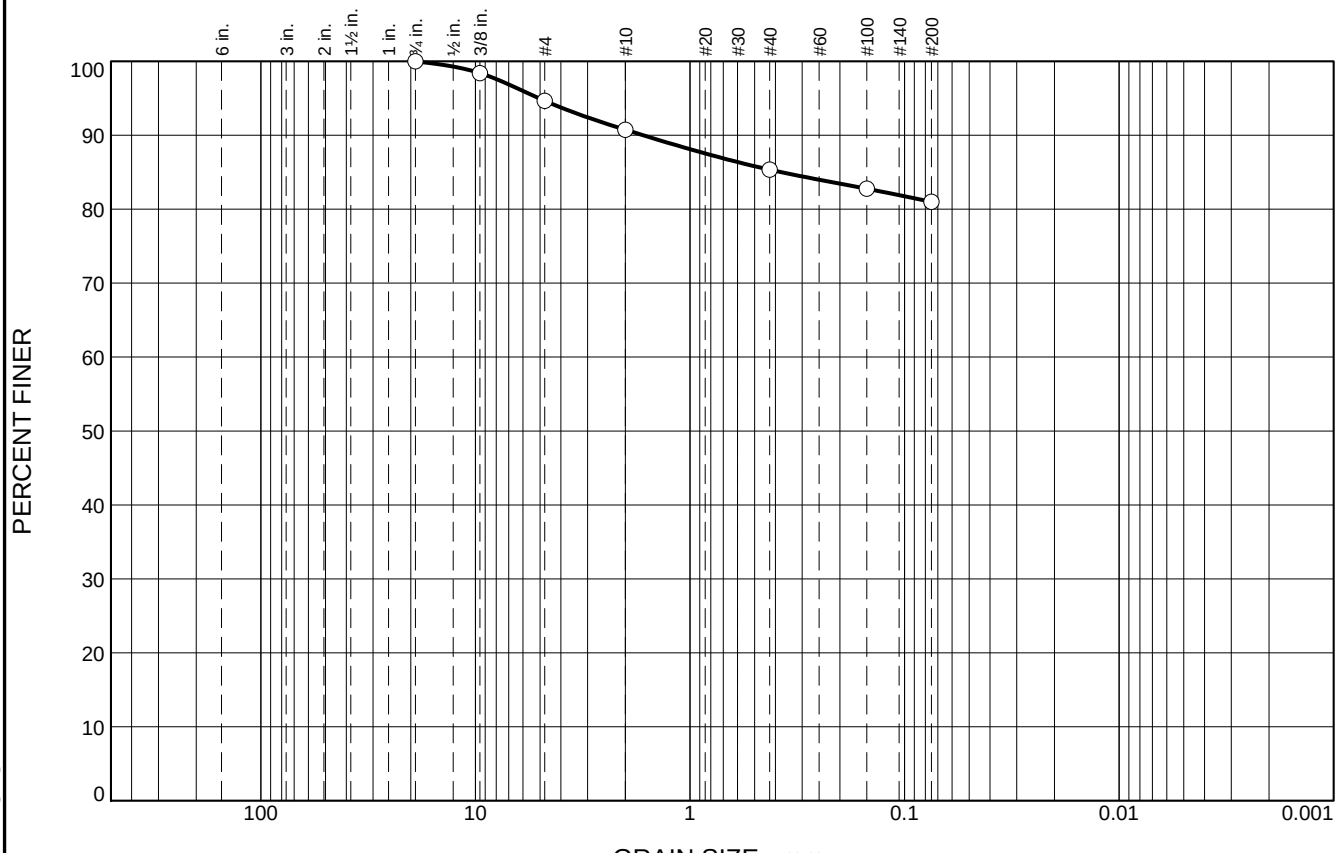
GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

Client: Rinker Design Associates, P.C.
Project: Hope Drive
Project No: 31170078

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Tested By: AMC **Checked By:** TC

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.3	3.9	5.5	4.3	81.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
3/8"	98.4		
#4	94.7		
#10	90.8		
#40	85.3		
#100	82.8		
#200	81.0		

* (no specification provided)

Soil Description

Brown, tan and black, Lean CLAY, with Sand. (CL)

Atterberg Limits

PL= 24 LL= 43 PI= 19 NM= 19.9

Coefficients

D_{90}= 1.6516 D_{85}= 0.3743 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(16)

Remarks

Source of Sample: B-23 **Depth:** 1'-5'
Sample Number: Bulk **Date:** 05/01/2017

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

Client: Rinker Design Associates, P.C.
Project: Hope Drive
Project No: 31170078

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Tested By: AMC **Checked By:** TC

MOISTURE-DENSITY RELATIONSHIP REPORT
AASHTO T 99 Method A, Standard Virginia VTM-1 corr.

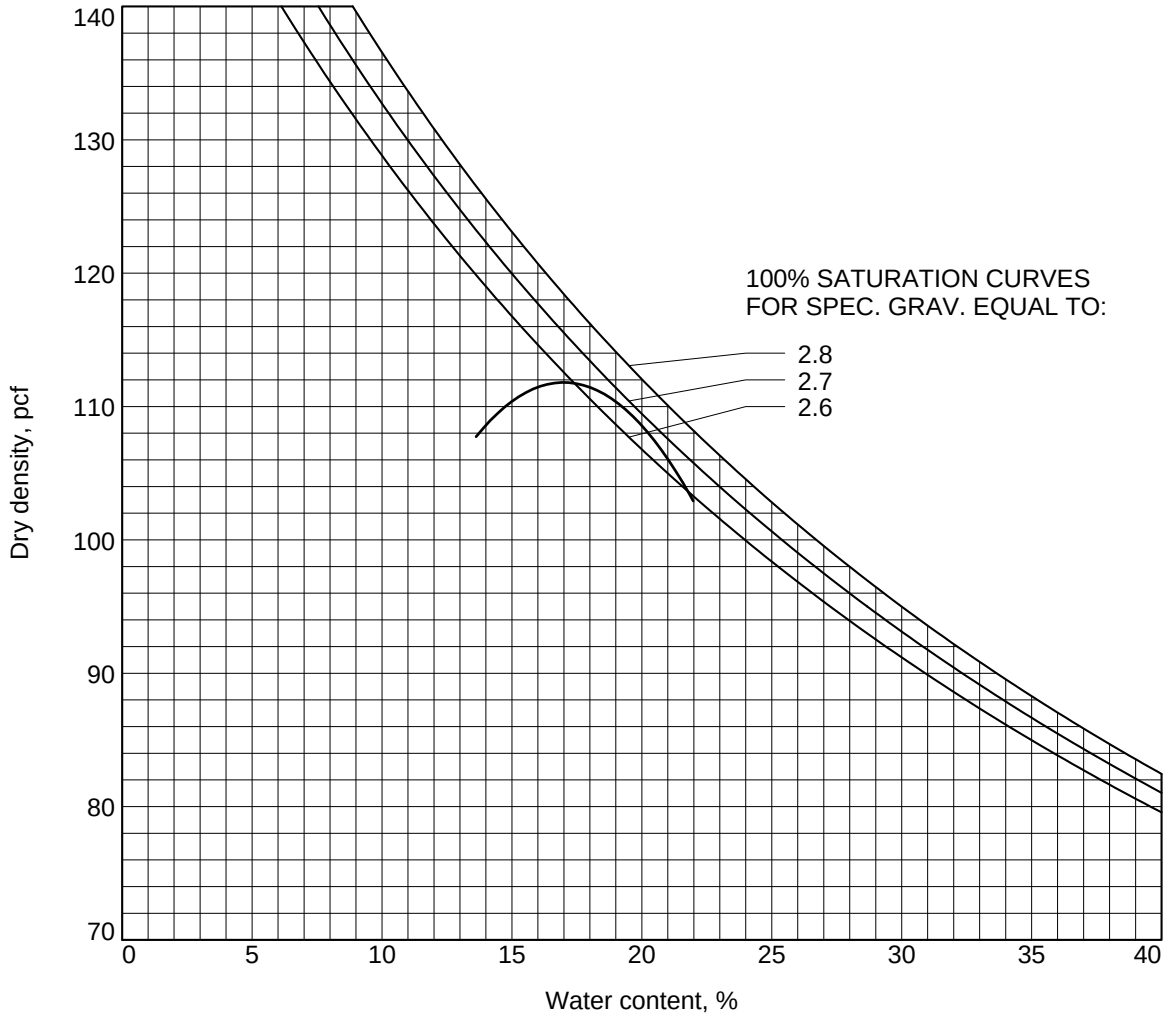
Project No.: 31170078 **Date:** 05/01/2017
Project: Hope Drive
Client: Rinker Design Associates, P.C.
Source of Sample: B-23 **Depth:** 1'-5'
Sample Number: Bulk
Remarks:

MATERIAL DESCRIPTION

Description: Brown, tan and black, Lean CLAY, with Sand. (CL)

Classifications - **USCS:** CL **AASHTO:** A-7-6(16)
Nat. Moist. = 19.9 % **Sp.G. =** 2.7
Liquid Limit = 43 **Plasticity Index =** 19
% < No.200 = 81.0 %

ROCK CORRECTED TEST RESULTS	UNCORRECTED
Maximum dry density = 111.8 pcf	109.6 pcf
Optimum moisture = 17.0 %	17.9 %



ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Geo-Technology Associates, Inc.

Tested By: AMC **Checked By:** TC

GEO-TECHNOLOGY ASSOCIATES, INC.
STERLING, VIRGINIA
CBR (VTM-8) TEST RESULTS

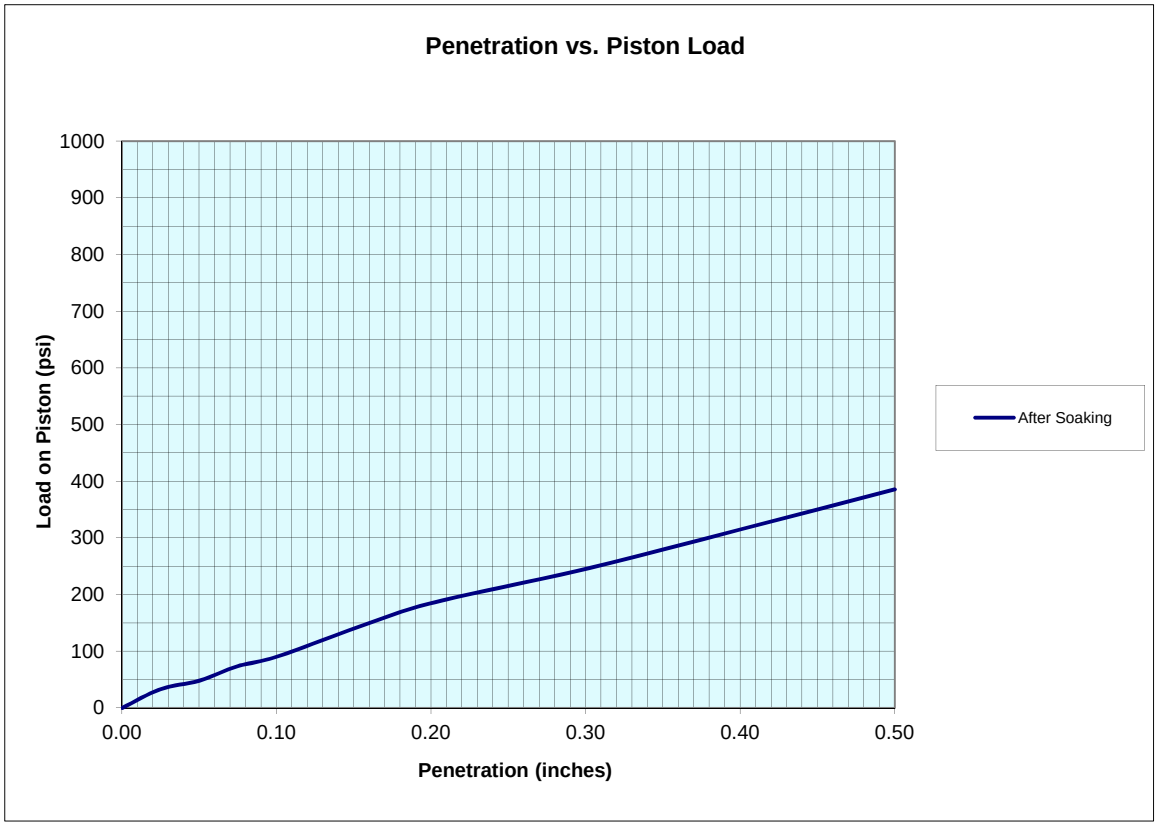
Project Name:	**Hope Drive**
Project Number:	**31170078**
Report Date:	**June 8, 2017**
Sample Location:	**B-23**
Sample Number:	**Bulk**
Depth, ft.:	**1'-5'**
USCS Classification:	**CL**
AASHTO Classification	**A-7-6(16)**
Condition:	SOAKED
Surcharge Wt., lbs.	10
Soil + Mold + Base Plate, gm.	13081.7
Mold + Base Plate, gm.	7269.1
Compaction MC, %	17.4
Wet Density of Soil, pcf	**130.5**
Dry Density of Soil, pcf	**111.2**
Initial Swelling Reading, in.	0.777
Final Swelling Reading, in.	0.790
Swell, %	**0.216**
Final Moisture, %	17.5
Final Moisture, top 1", %	16.7
Proctor MDD, pcf	**111.8**
Optimum Moisture Content, %	**17.0**

	After Soaking	
Penetration	Load	Load
(in.)	lb.	psi.
0.000	0	0
0.025	100	33
0.050	145	48
0.075	222	74
0.100	271	90
0.150	420	140
0.200	555	185
0.300	736	245
0.400	945	315
0.500	1157	386

CBR Value 0-0.1 =	9.03
CBR Value 0.05-0.15 =	9.17
CBR Value 0.1-0.2 =	9.47

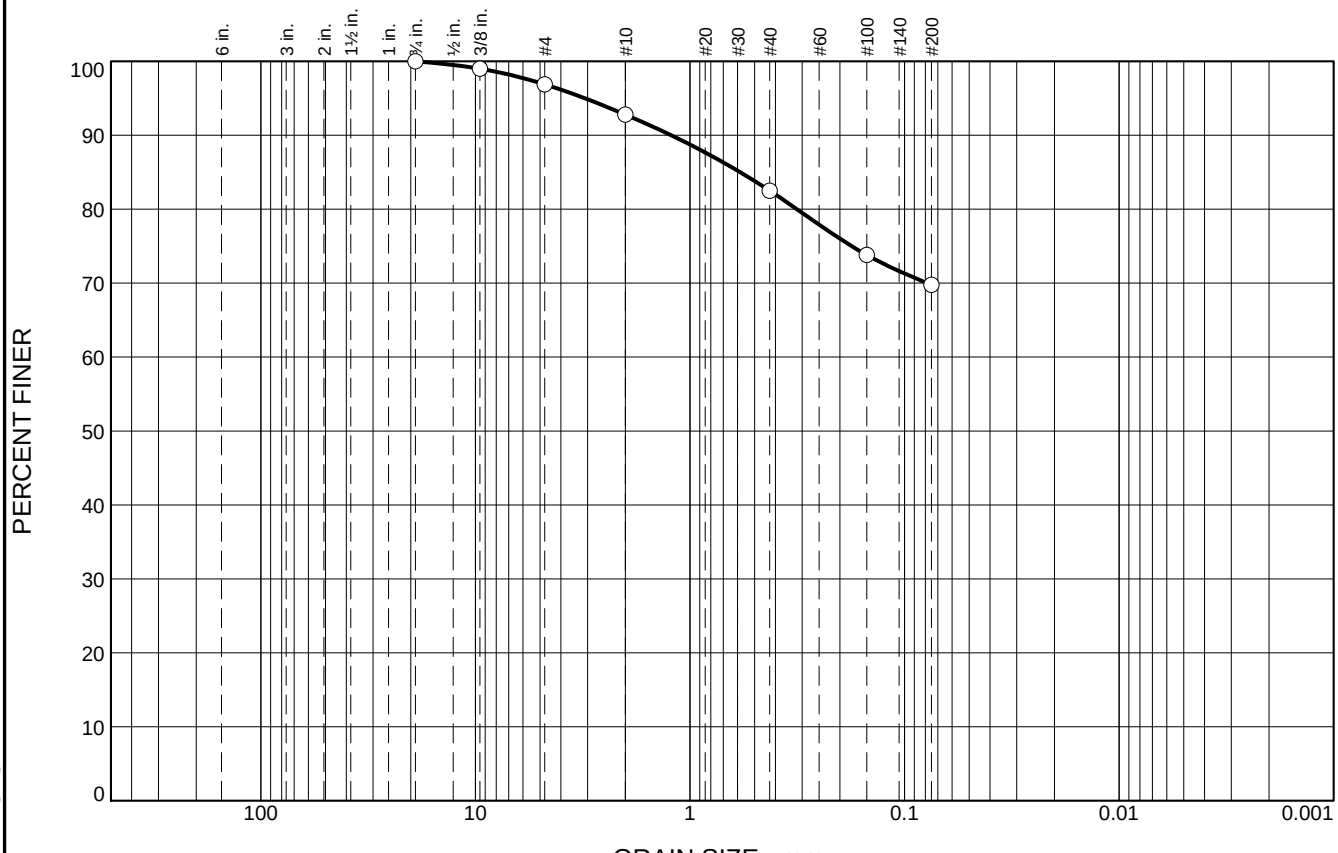
GEO-TECHNOLOGY ASSOCIATES, INC.
STERLING, VIRGINIA
CBR (VTM-8) TEST RESULTS

Project Name:	**Hope Drive**
Project Number:	**31170078**
Report Date:	**June 8, 2017**
Sample Location:	**B-23**
Sample Number:	**Bulk**
Depth, ft.:	**1'-5'**
USCS Classification:	**CL**
AASHTO Classification	**A-7-6(16)**
Condition:	SOAKED
Surcharge Wt., lbs.	10
INITIAL DRY DENSITY, PCF	111.2
INITIAL MOISTURE, %	17.4
INITIAL COMPACTION, %	99.4
FINAL DRY DENSITY, PCF	111.1
FINAL MOISTURE, %	17.5
FINAL MOISTURE, TOP 1", %	16.7
FINAL COMPACTION, %	99.4
SWELL, %	0.216
CBR Value (After Soaking)	**9.0**
Resiliency Factor	**1**



Reviewed By: AR

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.1	4.1	10.3	12.7	69.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
3/8"	99.0		
#4	96.9		
#10	92.8		
#40	82.5		
#100	73.8		
#200	69.8		

* (no specification provided)

Soil Description

Brown, black and tan, Sandy Lean CLAY. (CL)

Atterberg Limits

PL= 18 LL= 33 PI= 15 NM= 20.7

Coefficients

D_{90}= 1.2247 D_{85}= 0.5831 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(9)

Remarks

Source of Sample: B-26 **Depth:** 1'-5'
Sample Number: Bulk **Date:** 05/01/2017

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

Client: Rinker Design Associates, P.C.
Project: Hope Drive
Project No: 31170078

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Tested By: AMC **Checked By:** TC

MOISTURE-DENSITY RELATIONSHIP REPORT
AASHTO T 99 Method A, Standard Virginia VTM-1 corr.

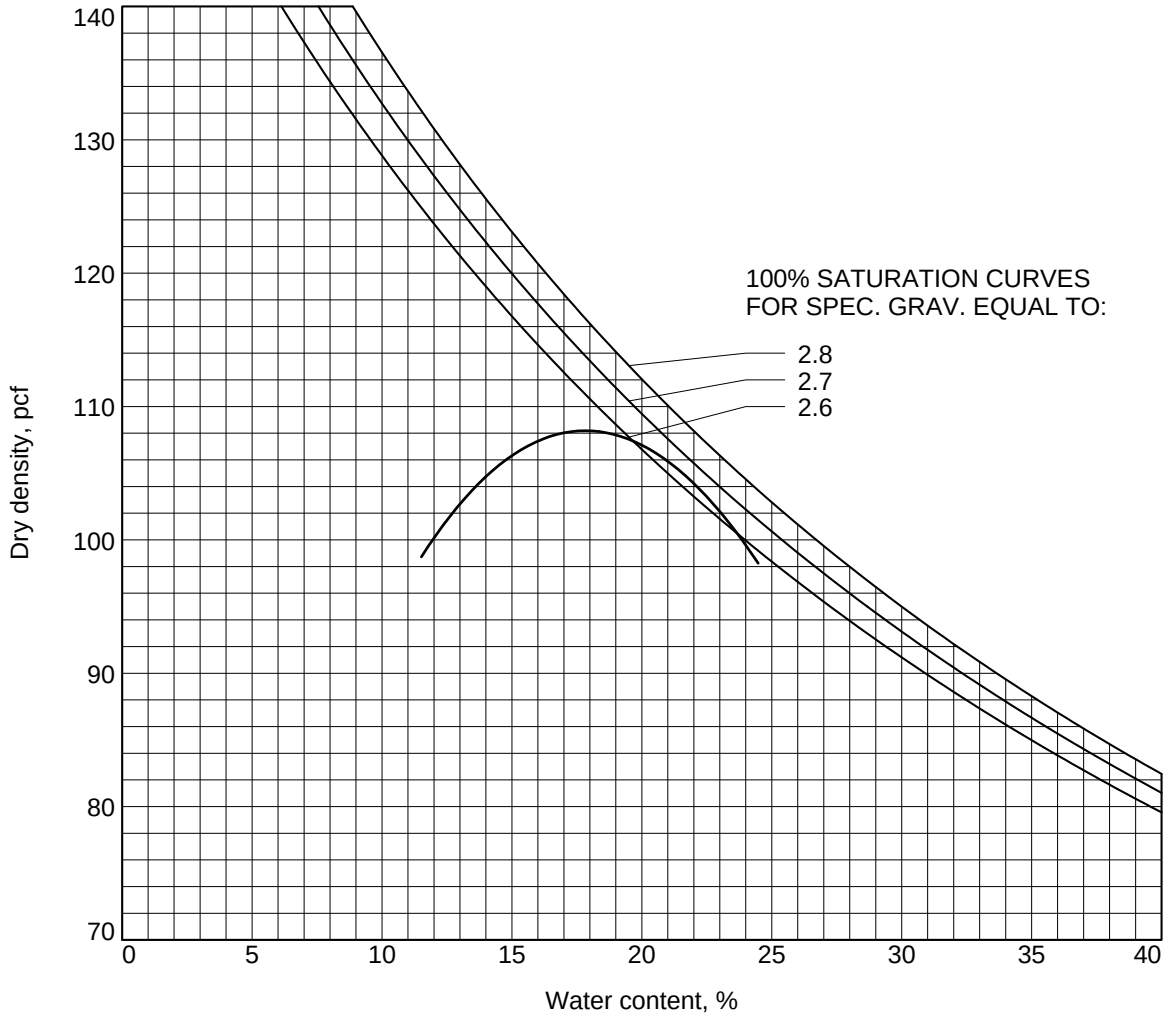
Project No.: 31170078 **Date:** 05/01/2017
Project: Hope Drive
Client: Rinker Design Associates, P.C.
Source of Sample: B-26 **Depth:** 1'-5'
Sample Number: Bulk
Remarks:

MATERIAL DESCRIPTION

Description: Brown, black and tan, Sandy Lean CLAY. (CL)

Classifications - **USCS:** CL **AASHTO:** A-6(9)
Nat. Moist. = 20.7 % **Sp.G. =** 2.7
Liquid Limit = 33 **Plasticity Index =** 15
% < No.200 = 69.8 %

ROCK CORRECTED TEST RESULTS	UNCORRECTED
Maximum dry density = 108.2 pcf	106.8 pcf
Optimum moisture = 17.8 %	18.4 %



ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Geo-Technology Associates, Inc.

Tested By: AMC **Checked By:** TC

GEO-TECHNOLOGY ASSOCIATES, INC.
STERLING, VIRGINIA
CBR (VTM-8) TEST RESULTS

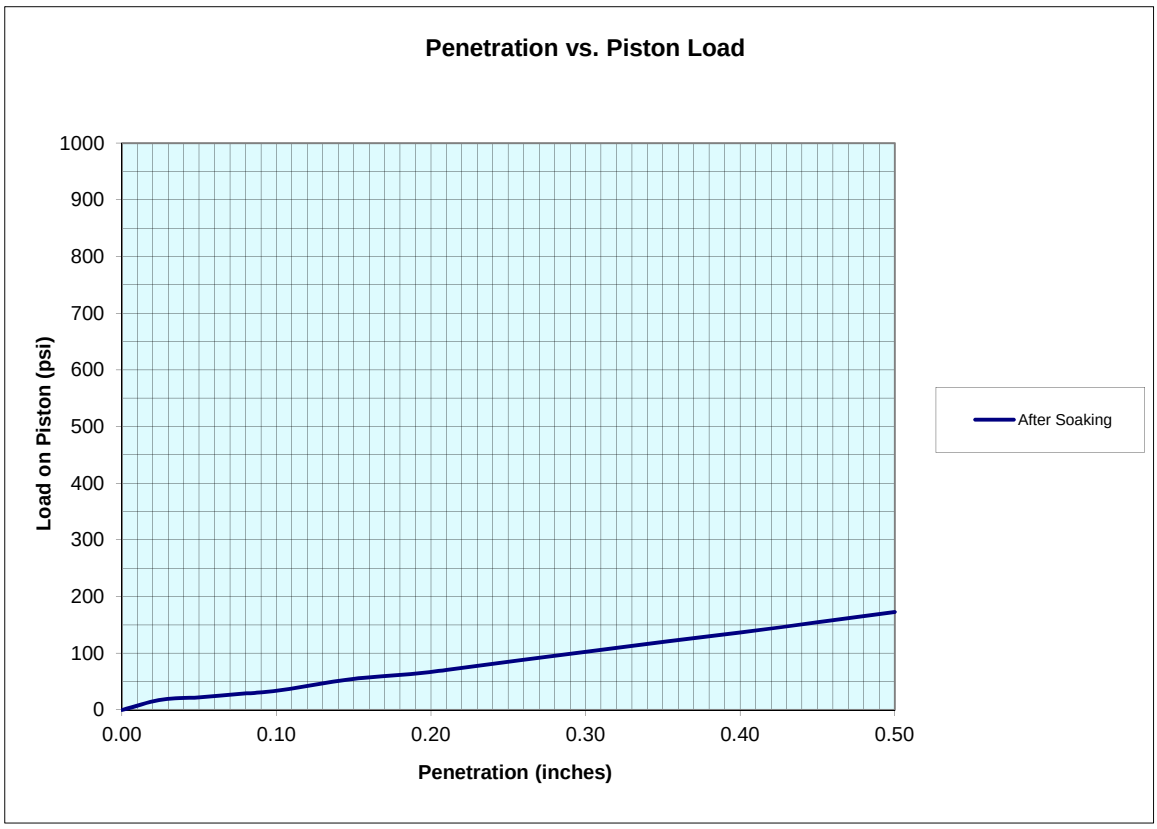
Project Name:	**Hope Drive**
Project Number:	**31170078**
Report Date:	**June 8, 2017**
Sample Location:	**B-26**
Sample Number:	**Bulk**
Depth, ft.:	**1'-5'**
USCS Classification:	**CL**
AASHTO Classification	**A-6(9)**
Condition:	SOAKED
Surcharge Wt., lbs.	10
Soil + Mold + Base Plate, gm.	12848.3
Mold + Base Plate, gm.	7249.5
Compaction MC, %	18.1
Wet Density of Soil, pcf	**125.7**
Dry Density of Soil, pcf	**106.5**
Initial Swelling Reading, in.	0.565
Final Swelling Reading, in.	0.620
Swell, %	**0.914**
Final Moisture, %	20.7
Final Moisture, top 1", %	20.9
Proctor MDD, pcf	**108.2**
Optimum Moisture Content, %	**17.8**

	After Soaking	
Penetration	Load	Load
(in.)	lb.	psi.
0.000	0	0
0.025	54	18
0.050	67	22
0.075	85	28
0.100	102	34
0.150	165	55
0.200	202	67
0.300	309	103
0.400	410	137
0.500	519	173

CBR Value 0-0.1 =	3.40
CBR Value 0.05-0.15 =	3.27
CBR Value 0.1-0.2 =	3.33

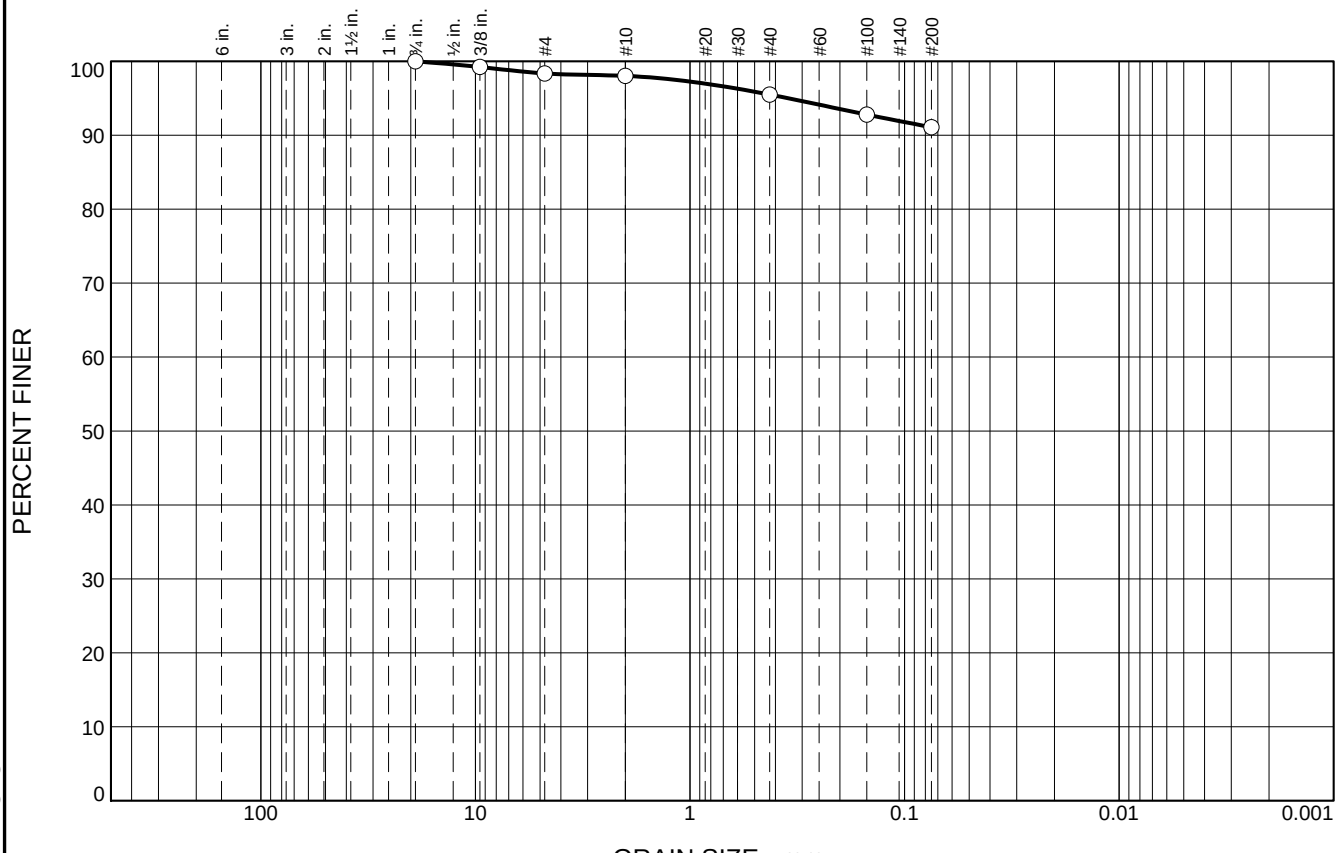
GEO-TECHNOLOGY ASSOCIATES, INC.
STERLING, VIRGINIA
CBR (VTM-8) TEST RESULTS

Project Name:	**Hope Drive**
Project Number:	**31170078**
Report Date:	**June 8, 2017**
Sample Location:	**B-26**
Sample Number:	**Bulk**
Depth, ft.:	**1'-5'**
USCS Classification:	**CL**
AASHTO Classification	**A-6(9)**
Condition:	SOAKED
Surcharge Wt., lbs.	10
INITIAL DRY DENSITY, PCF	106.5
INITIAL MOISTURE, %	18.1
INITIAL COMPACTION, %	98.4
FINAL DRY DENSITY, PCF	104.2
FINAL MOISTURE, %	20.7
FINAL MOISTURE, TOP 1", %	20.9
FINAL COMPACTION, %	96.3
SWELL, %	0.914
CBR Value (After Soaking)	**3.4**
Resiliency Factor	**1**



Reviewed By: AR

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.6	0.4	2.5	4.4	91.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
3/8"	99.2		
#4	98.4		
#10	98.0		
#40	95.5		
#100	92.8		
#200	91.1		

* (no specification provided)

Soil Description

Reddish-brown and black, Fat CLAY. (CH)

Atterberg Limits

PL= 31 LL= 69 PI= 38 NM= 27.8

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-5(41)

Remarks

Source of Sample: B-30 **Depth:** 1'-5'
Sample Number: Bulk **Date:** 05/01/2017

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

Client: Rinker Design Associates, P.C.
Project: Hope Drive
Project No: 31170078

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Tested By: AMC **Checked By:** TC

MOISTURE-DENSITY RELATIONSHIP REPORT
AASHTO T 99 Method A, Standard Virginia VTM-1 corr.

Project No.: 31170078 **Date:** 05/01/2017

Project: Hope Drive

Client: Rinker Design Associates, P.C.

Source of Sample: B-30 **Depth:** 1'-5'

Sample Number: Bulk

Remarks:

MATERIAL DESCRIPTION

Description: Reddish-brown and black, Fat CLAY. (CH)

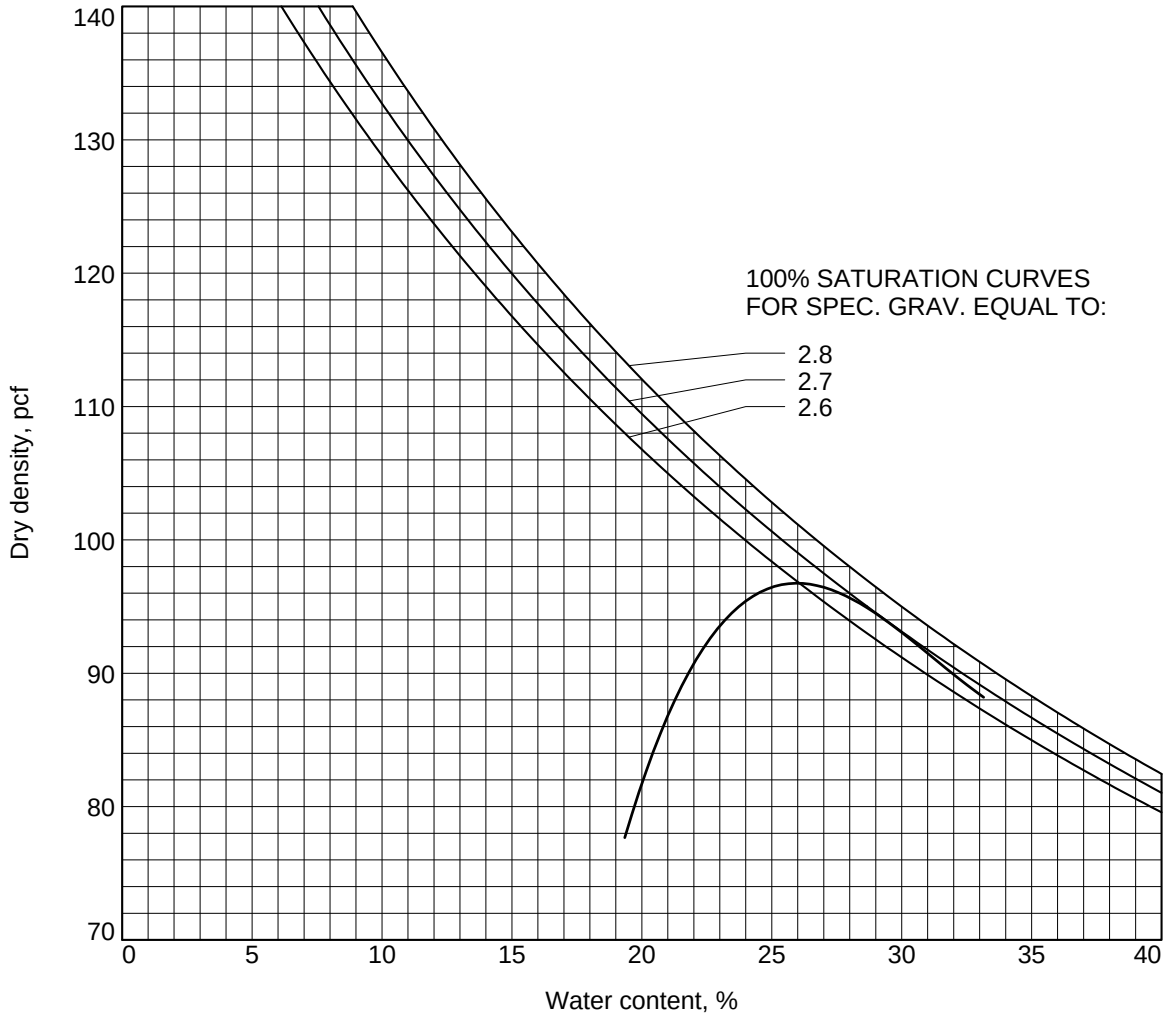
Classifications - **USCS:** CH **AASHTO:** A-7-5(41)

Nat. Moist. = 27.8 % **Sp.G. =** 2.7

Liquid Limit = 69 **Plasticity Index =** 38

% < No.200 = 91.1 %

ROCK CORRECTED TEST RESULTS	UNCORRECTED
Maximum dry density = 96.7 pcf	95.9 pcf
Optimum moisture = 26.0 %	26.4 %



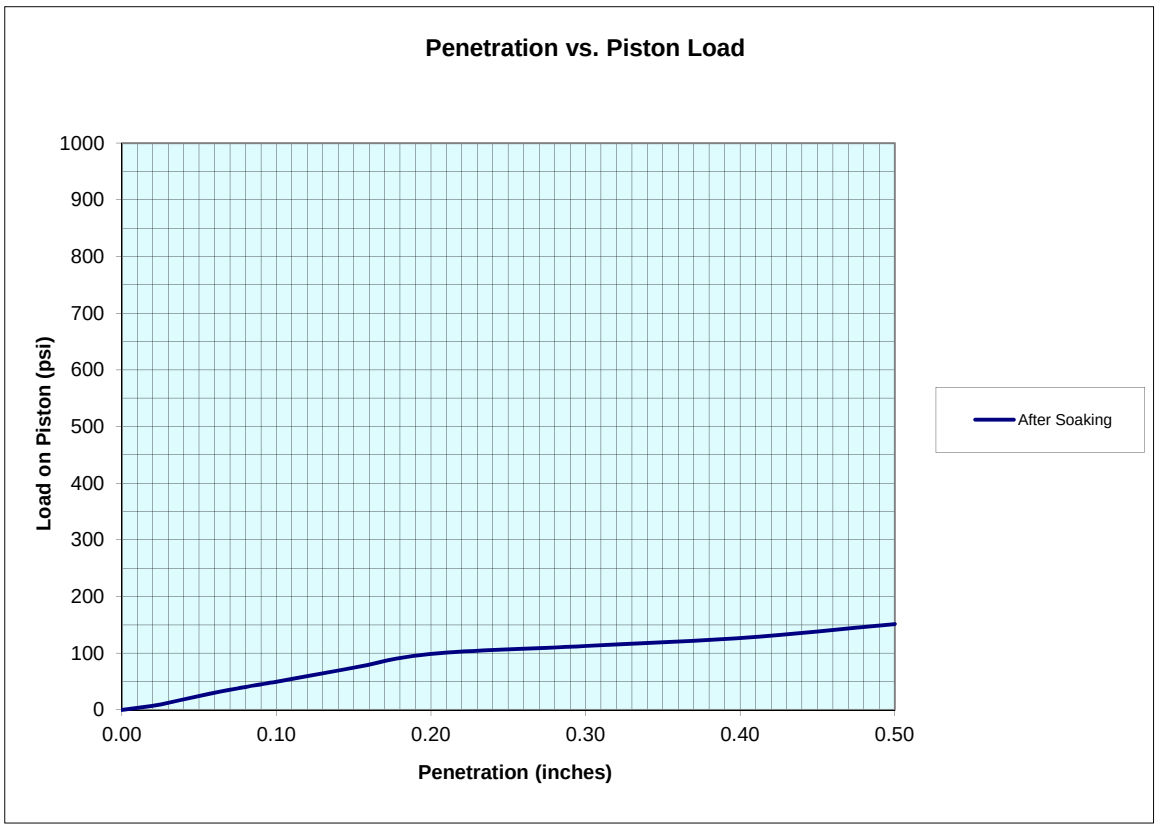
ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Geo-Technology Associates, Inc.

Tested By: AMC **Checked By:** TC

GEO-TECHNOLOGY ASSOCIATES, INC.
STERLING, VIRGINIA
CBR (VTM-8) TEST RESULTS

Project Name:	**Hope Drive**
Project Number:	**31170078**
Report Date:	**June 8, 2017**
Sample Location:	**B-30**
Sample Number:	**Bulk**
Depth, ft.:	**1'-5'**
USCS Classification:	**CH**
AASHTO Classification	**A-7-5(41)**
Condition:	SOAKED
Surcharge Wt., lbs.	10
INITIAL DRY DENSITY, PCF	96.0
INITIAL MOISTURE, %	26.5
INITIAL COMPACTION, %	99.2
FINAL DRY DENSITY, PCF	92.7
FINAL MOISTURE, %	30.9
FINAL MOISTURE, TOP 1", %	31.1
FINAL COMPACTION, %	95.9
SWELL, %	1.496
CBR Value (After Soaking)	**5.0**
Resiliency Factor	**1**



Reviewed By: AR

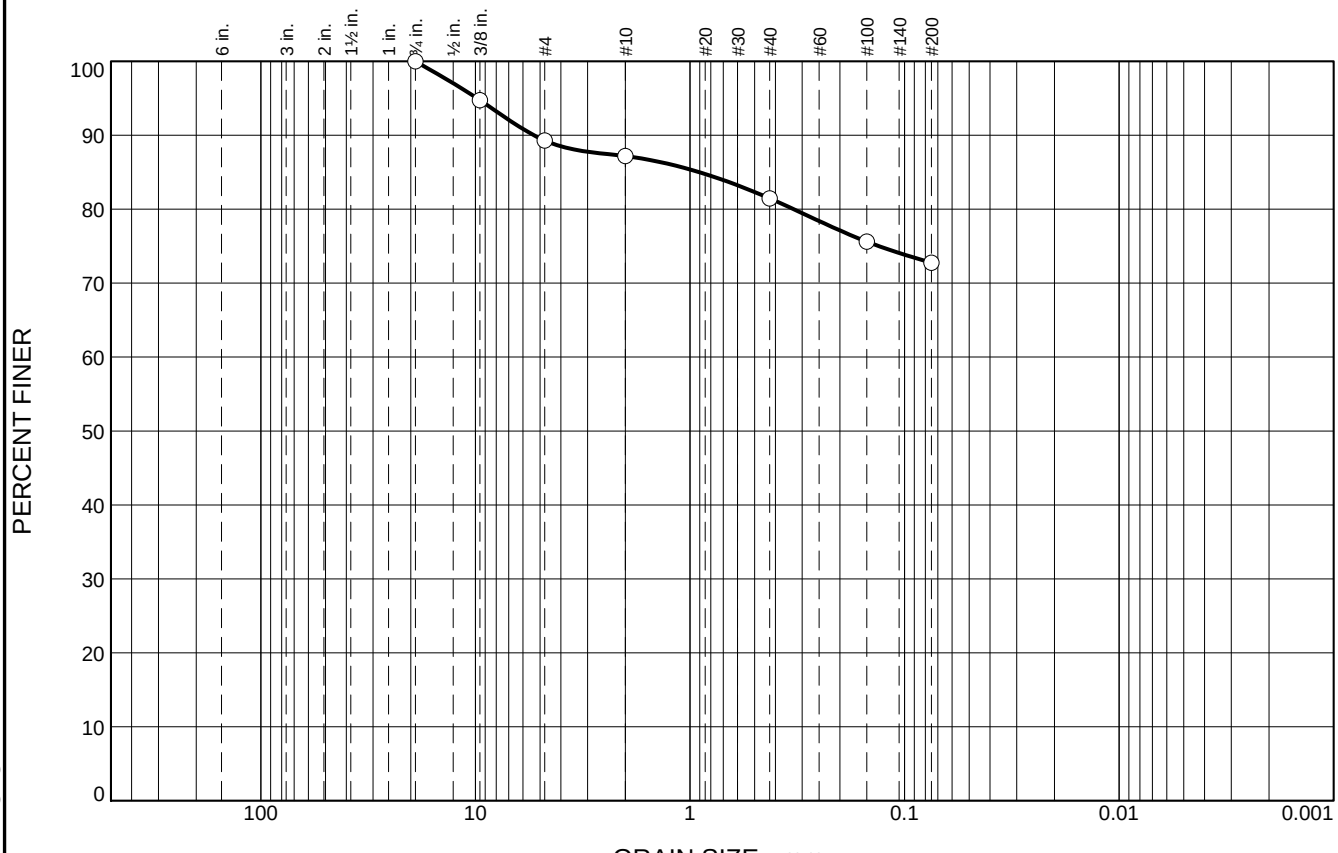
GEO-TECHNOLOGY ASSOCIATES, INC.
STERLING, VIRGINIA
CBR (VTM-8) TEST RESULTS

Project Name:	**Hope Drive**
Project Number:	**31170078**
Report Date:	**June 8, 2017**
Sample Location:	**B-30**
Sample Number:	**Bulk**
Depth, ft.:	**1'-5'**
USCS Classification:	**CH**
AASHTO Classification	**A-7-5(41)**
Condition:	SOAKED
Surcharge Wt., lbs.	10
Soil + Mold + Base Plate, gm.	12526.2
Mold + Base Plate, gm.	7120.9
Compaction MC, %	26.5
Wet Density of Soil, pcf	**121.4**
Dry Density of Soil, pcf	**96.0**
Initial Swelling Reading, in.	0.388
Final Swelling Reading, in.	0.478
Swell, %	**1.496**
Final Moisture, %	30.9
Final Moisture, top 1", %	31.1
Proctor MDD, pcf	**96.7**
Optimum Moisture Content, %	**26.0**

	After Soaking	
Penetration	Load	Load
(in.)	lb.	psi.
0.000	0	0
0.025	30	10
0.050	75	25
0.075	115	38
0.100	150	50
0.150	224	75
0.200	297	99
0.300	339	113
0.400	381	127
0.500	455	152

CBR Value 0-0.1 =	5.00
CBR Value 0.05-0.15 =	4.97
CBR Value 0.1-0.2 =	4.90

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	10.7	2.1	5.7	8.8	72.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
3/8"	94.7		
#4	89.3		
#10	87.2		
#40	81.5		
#100	75.6		
#200	72.7		

* (no specification provided)

Soil Description

Brown and tan, Fat CLAY, with Sand. (CH)

Atterberg Limits

PL= 24 LL= 54 PI= 30 NM= 13.4

Coefficients

D_{90}= 5.3363 D_{85}= 0.9040 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(22)

Remarks

Source of Sample: B-36 **Depth:** 1'-5'
Sample Number: Bulk

Date: 05/01/2017

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

Client: Rinker Design Associates, P.C.
Project: Hope Drive

Project No: 31170078

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Tested By: AMC **Checked By:** TC

MOISTURE-DENSITY RELATIONSHIP REPORT
AASHTO T 99 Method A, Standard Virginia VTM-1 corr.

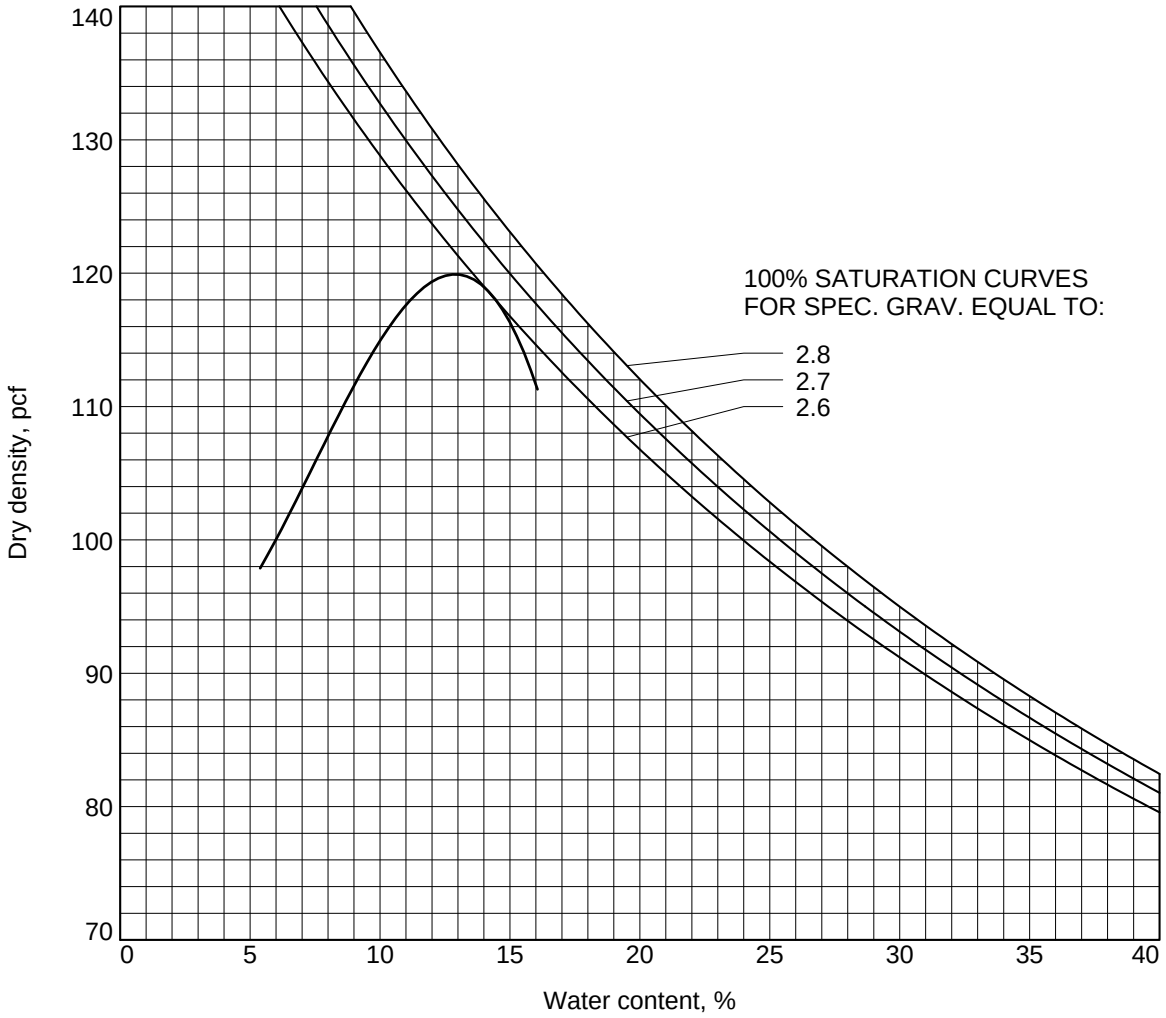
Project No.: 31170078 **Date:** 05/01/2017
Project: Hope Drive
Client: Rinker Design Associates, P.C.
Source of Sample: B-36 **Depth:** 1'-5'
Sample Number: Bulk
Remarks:

MATERIAL DESCRIPTION

Description: Brown and tan, Fat CLAY, with Sand. (CH)

Classifications - **USCS:** CH **AASHTO:** A-7-6(22)
Nat. Moist. = 13.4 % **Sp.G. =** 2.7
Liquid Limit = 54 **Plasticity Index =** 30
% < No.200 = 72.7 %

ROCK CORRECTED TEST RESULTS	UNCORRECTED
Maximum dry density = 119.9 pcf	116.1 pcf
Optimum moisture = 12.9 %	14.3 %



ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Geo-Technology Associates, Inc.

Tested By: AMC **Checked By:** TC

GEO-TECHNOLOGY ASSOCIATES, INC.
STERLING, VIRGINIA
CBR (VTM-8) TEST RESULTS

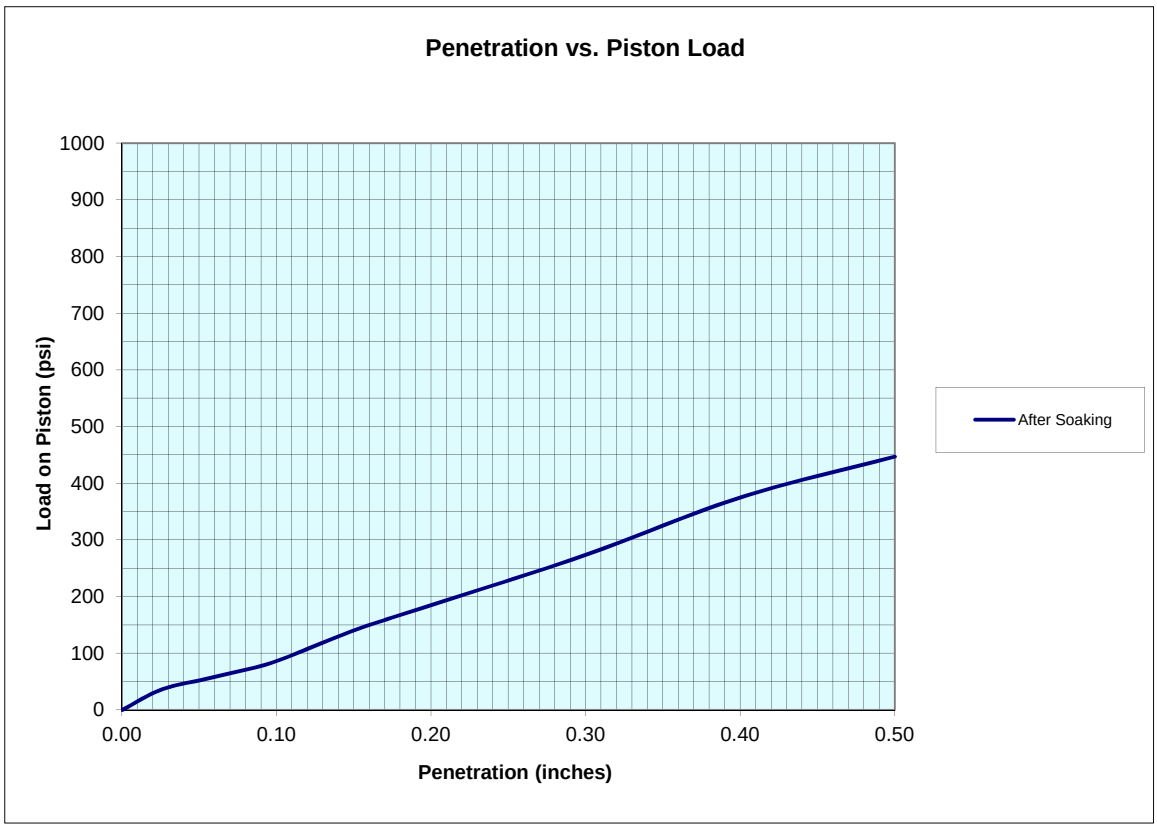
Project Name:	**Hope Drive**
Project Number:	**31170078**
Report Date:	**June 8, 2017**
Sample Location:	**B-36**
Sample Number:	**Bulk**
Depth, ft.:	**1'-5'**
USCS Classification:	**CH**
AASHTO Classification	**A-7-6(22)**
Condition:	SOAKED
Surcharge Wt., lbs.	10
Soil + Mold + Base Plate, gm.	13083
Mold + Base Plate, gm.	7102.3
Compaction MC, %	13.5
Wet Density of Soil, pcf	**134.3**
Dry Density of Soil, pcf	**118.3**
Initial Swelling Reading, in.	0.390
Final Swelling Reading, in.	0.412
Swell, %	**0.366**
Final Moisture, %	14.5
Final Moisture, top 1", %	14.0
Proctor MDD, pcf	**119.9**
Optimum Moisture Content, %	**12.9**

	After Soaking	
Penetration	Load	Load
(in.)	lb.	psi.
0.000	0	0
0.025	107	36
0.050	157	52
0.075	204	68
0.100	259	86
0.150	421	140
0.200	555	185
0.300	821	274
0.400	1125	375
0.500	1341	447

CBR Value 0-0.1 =	8.63
CBR Value 0.05-0.15 =	8.80
CBR Value 0.1-0.2 =	9.87

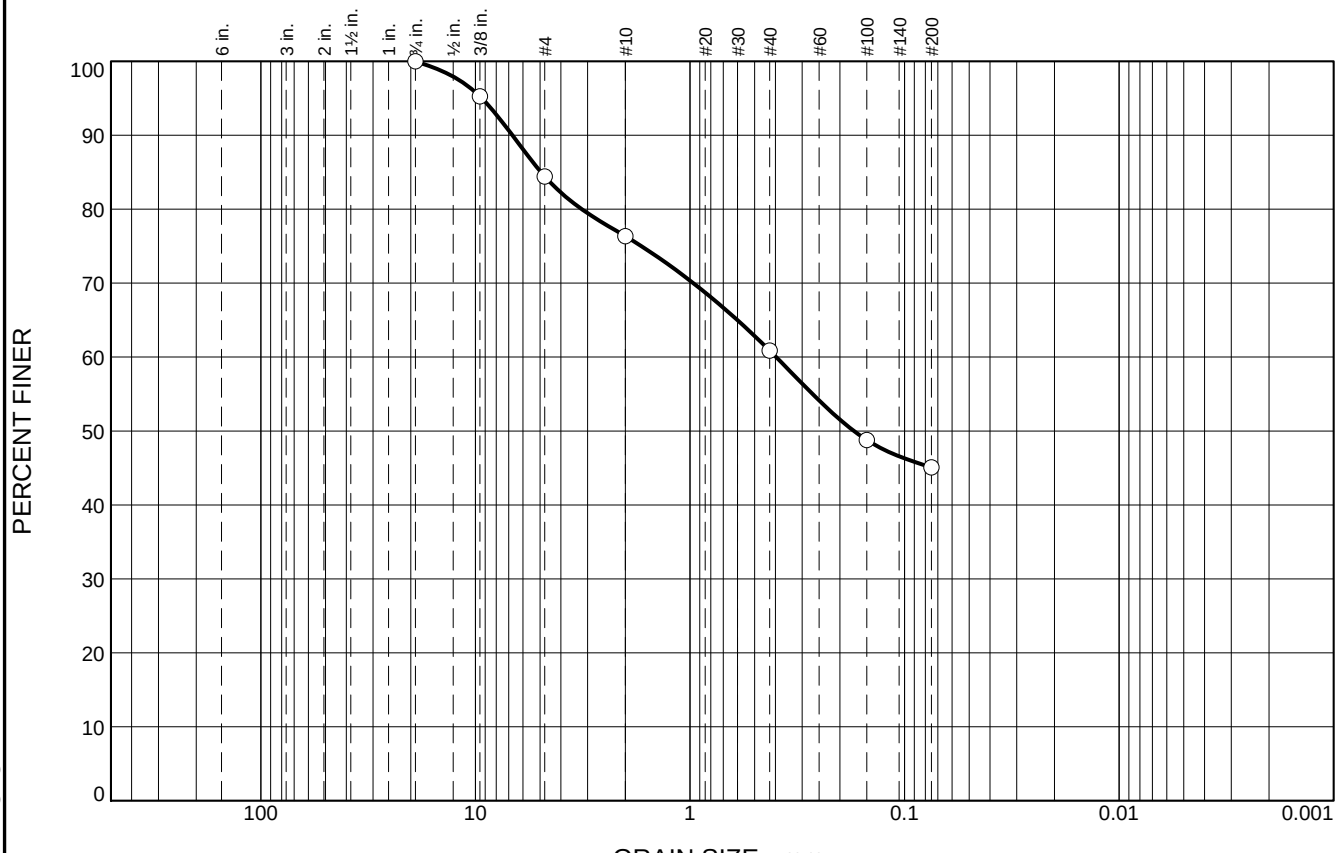
GEO-TECHNOLOGY ASSOCIATES, INC.
STERLING, VIRGINIA
CBR (VTM-8) TEST RESULTS

Project Name:	**Hope Drive**
Project Number:	**31170078**
Report Date:	**June 8, 2017**
Sample Location:	**B-36**
Sample Number:	**Bulk**
Depth, ft.:	**1'-5'**
USCS Classification:	**CH**
AASHTO Classification	**A-7-6(22)**
Condition:	SOAKED
Surcharge Wt., lbs.	10
INITIAL DRY DENSITY, PCF	118.3
INITIAL MOISTURE, %	13.5
INITIAL COMPACTION, %	98.7
FINAL DRY DENSITY, PCF	117.3
FINAL MOISTURE, %	14.5
FINAL MOISTURE, TOP 1", %	14.0
FINAL COMPACTION, %	97.8
SWELL, %	0.366
CBR Value (After Soaking)	**8.6**
Resiliency Factor	**1**



Reviewed By: AR

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	15.6	8.1	15.4	15.8	45.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
3/8"	95.3		
#4	84.4		
#10	76.3		
#40	60.9		
#100	48.8		
#200	45.1		

* (no specification provided)

Soil Description

Grayish-brown, Silty, Clayey SAND, with Gravel. (SC-SM) (FILL)

Atterberg Limits

PL= 15 LL= 22 PI= 7 NM= 12.4

Coefficients

D_{90}= 6.7246 D_{85}= 4.9418 D_{60}= 0.3968
D_{50}= 0.1721 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC-SM AASHTO= A-4(0)

Remarks

Source of Sample: B-40 **Depth:** 1'
Sample Number: S1 **Date:** 6/8/2017

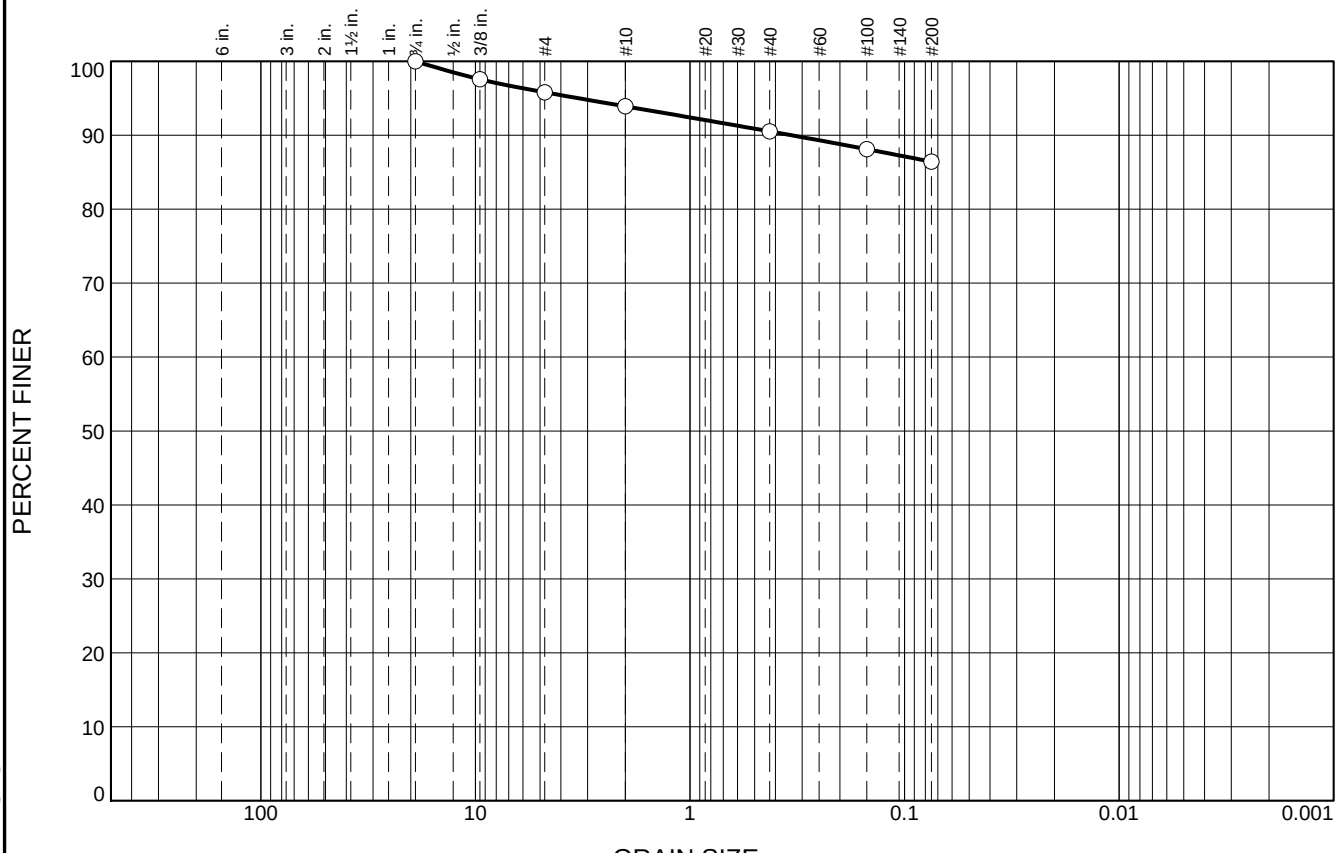
GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

Client: Rinker Design Associates, P.C.
Project: Hope Drive
Project No: 31170078

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Tested By: AMC **Checked By:** TC

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.2	1.9	3.4	4.1	86.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
3/8"	97.6		
#4	95.8		
#10	93.9		
#40	90.5		
#100	88.1		
#200	86.4		

* (no specification provided)

Soil Description

Brown and gray, Fat CLAY. (CH)

Atterberg Limits

PL= 26 LL= 65 PI= 39 NM= 26.0

Coefficients

D_{90}= 0.3367 D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(37)

Remarks

Source of Sample: B-42 **Depth:** 1'-6'
Sample Number: Bulk **Date:** 05/01/2017

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

Client: Rinker Design Associates, P.C.
Project: Hope Drive
Project No: 31170078

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Tested By: AMC **Checked By:** TC

MOISTURE-DENSITY RELATIONSHIP REPORT
AASHTO T 99 Method A, Standard Virginia VTM-1 corr.

Project No.: 31170078 **Date:** 05/01/2017

Project: Hope Drive

Client: Rinker Design Associates, P.C.

Source of Sample: B-42 **Depth:** 1'-6'

Sample Number: Bulk

Remarks:

MATERIAL DESCRIPTION

Description: Brown and gray, Fat CLAY. (CH)

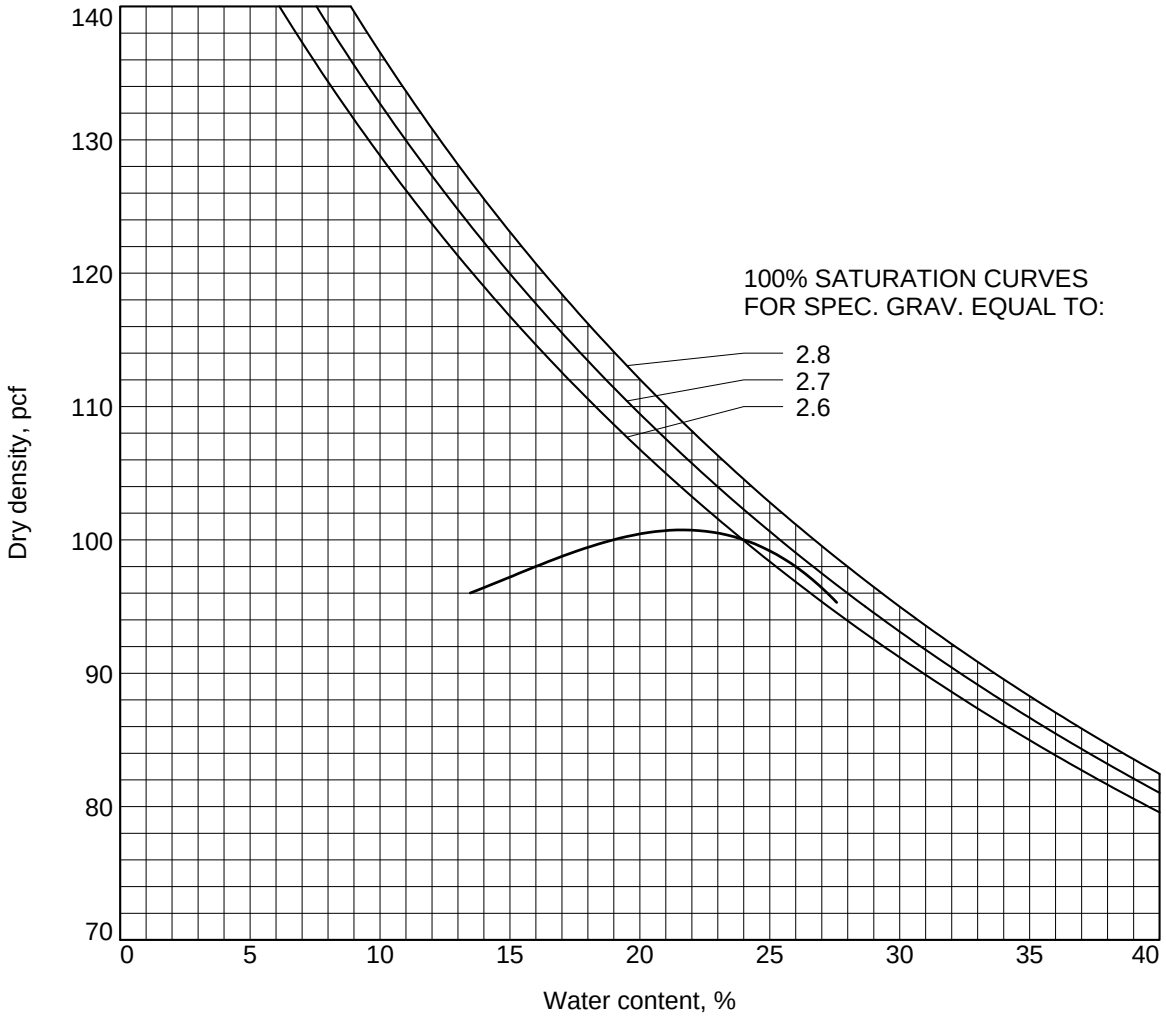
Classifications - **USCS:** CH **AASHTO:** A-7-6(37)

Nat. Moist. = 26.0 % **Sp.G. =** 2.7

Liquid Limit = 65 **Plasticity Index =** 39

% < No.200 = 86.4 %

ROCK CORRECTED TEST RESULTS	UNCORRECTED
Maximum dry density = 100.7 pcf	98.5 pcf
Optimum moisture = 21.7 %	22.6 %



ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Geo-Technology Associates, Inc.

Tested By: AMC **Checked By:** TC

GEO-TECHNOLOGY ASSOCIATES, INC.
STERLING, VIRGINIA
CBR (VTM-8) TEST RESULTS

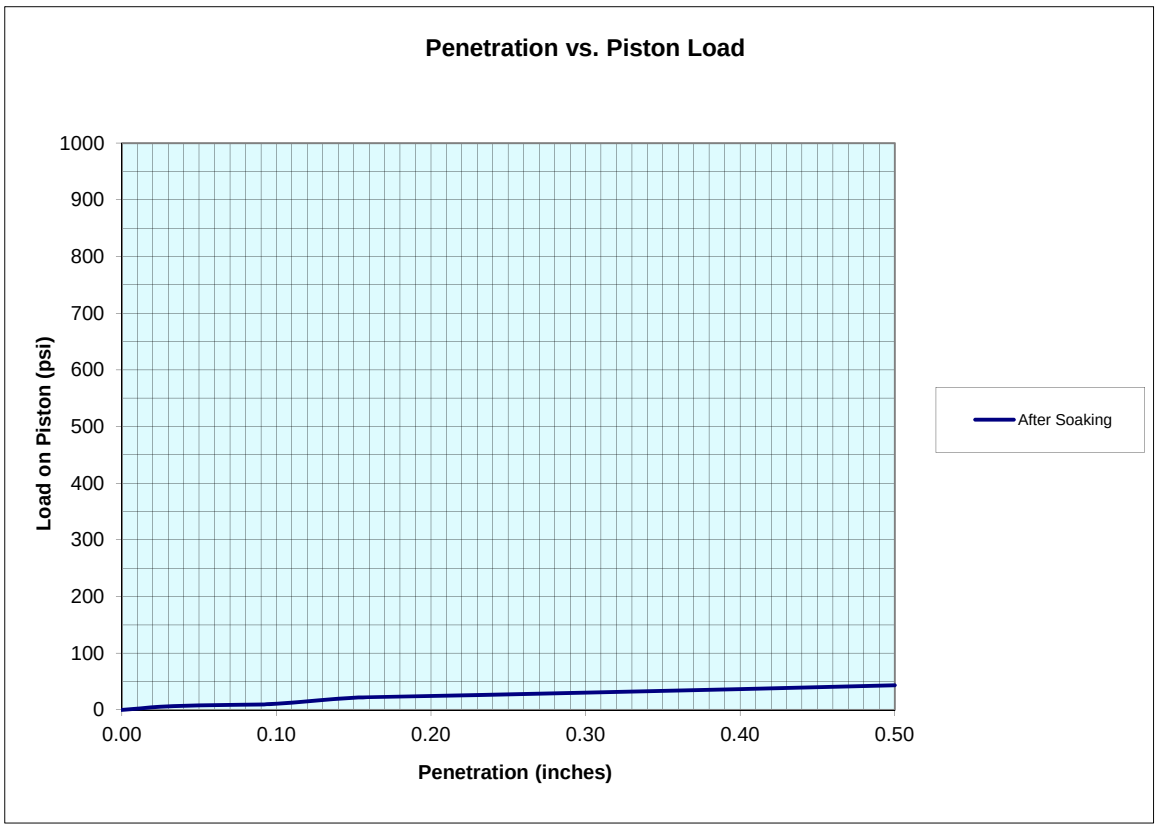
Project Name:	**Hope Drive**
Project Number:	**31170078**
Report Date:	**June 8, 2017**
Sample Location:	**B-42**
Sample Number:	**Bulk**
Depth, ft.:	**1'-6'**
USCS Classification:	**CH**
AASHTO Classification	**A-7-6(37)**
Condition:	SOAKED
Surcharge Wt., lbs.	10
Soil + Mold + Base Plate, gm.	12401.5
Mold + Base Plate, gm.	7137.3
Compaction MC, %	19.7
Wet Density of Soil, pcf	**118.2**
Dry Density of Soil, pcf	**98.8**
Initial Swelling Reading, in.	0.311
Final Swelling Reading, in.	0.523
Swell, %	**3.523**
Final Moisture, %	30.5
Final Moisture, top 1", %	30.7
Proctor MDD, pcf	**100.7**
Optimum Moisture Content, %	**21.7**

	After Soaking	
Penetration	Load	Load
(in.)	lb.	psi.
0.000	0	0
0.025	17	6
0.050	25	8
0.075	28	9
0.100	33	11
0.150	65	22
0.200	74	25
0.300	92	31
0.400	111	37
0.500	131	44

CBR Value 0-0.1 =	1.10
CBR Value 0.05-0.15 =	1.33
CBR Value 0.1-0.2 =	1.37

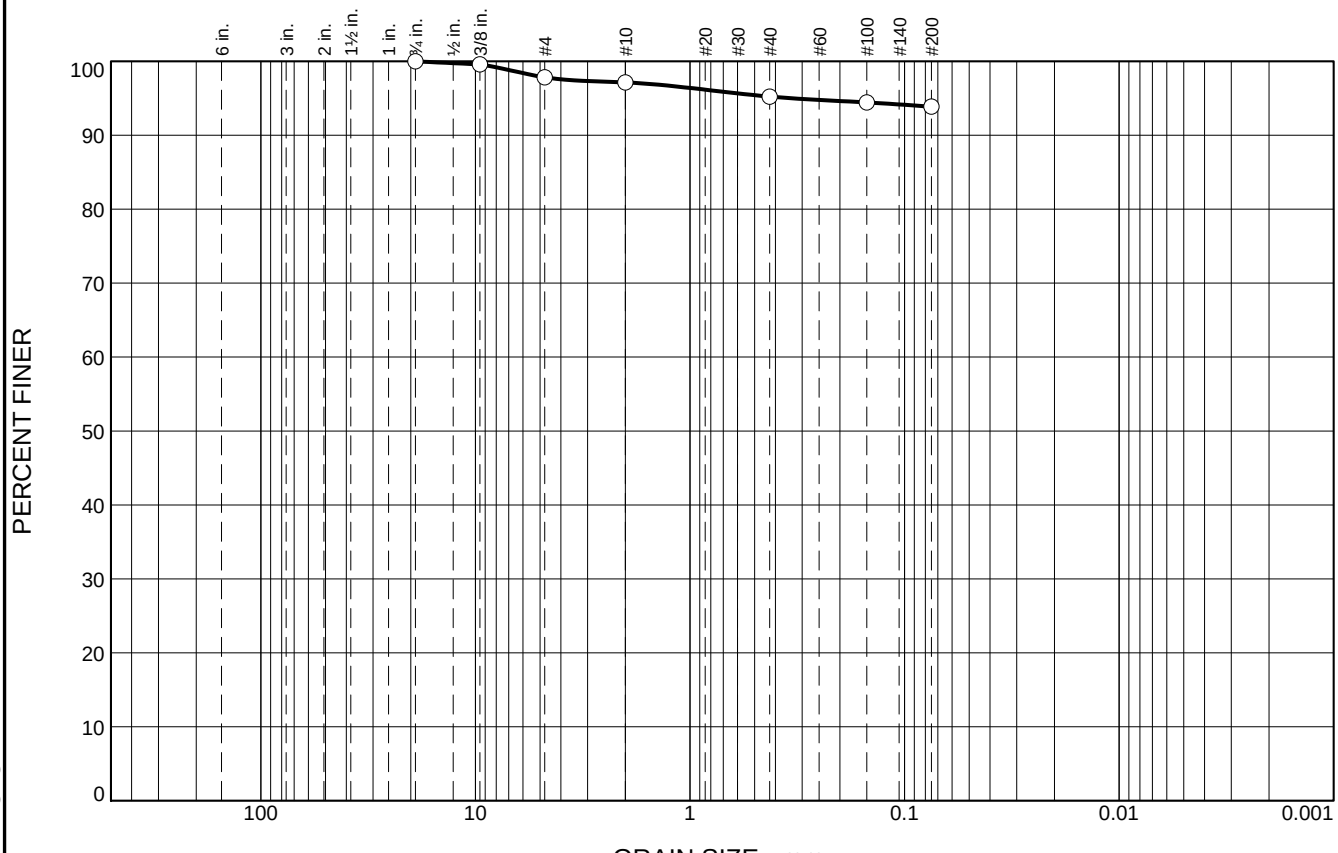
GEO-TECHNOLOGY ASSOCIATES, INC.
STERLING, VIRGINIA
CBR (VTM-8) TEST RESULTS

Project Name:	**Hope Drive**
Project Number:	**31170078**
Report Date:	**June 8, 2017**
Sample Location:	**B-42**
Sample Number:	**Bulk**
Depth, ft.:	**1'-6'**
USCS Classification:	**CH**
AASHTO Classification	**A-7-6(37)**
Condition:	SOAKED
Surcharge Wt., lbs.	10
INITIAL DRY DENSITY, PCF	98.8
INITIAL MOISTURE, %	19.7
INITIAL COMPACTION, %	98.1
FINAL DRY DENSITY, PCF	90.6
FINAL MOISTURE, %	30.5
FINAL MOISTURE, TOP 1", %	30.7
FINAL COMPACTION, %	90.0
SWELL, %	3.523
CBR Value (After Soaking)	**1.1**
Resiliency Factor	**1**



Reviewed By: AR

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.2	0.7	1.9	1.3	93.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
3/8"	99.6		
#4	97.8		
#10	97.1		
#40	95.2		
#100	94.4		
#200	93.9		

* (no specification provided)

Soil Description

Reddish-brown and gray, Fat CLAY. (CH)

Atterberg Limits

PL= 29 LL= 66 PI= 37 NM= 30.7

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(41)

Remarks

Source of Sample: B-45 **Depth:** 1'-5'
Sample Number: Bulk

Date: 05/01/2017

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

Client: Rinker Design Associates, P.C.
Project: Hope Drive

Project No: 31170078

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Tested By: AMC **Checked By:** TC

MOISTURE-DENSITY RELATIONSHIP REPORT
AASHTO T 99 Method A, Standard Virginia VTM-1 corr.

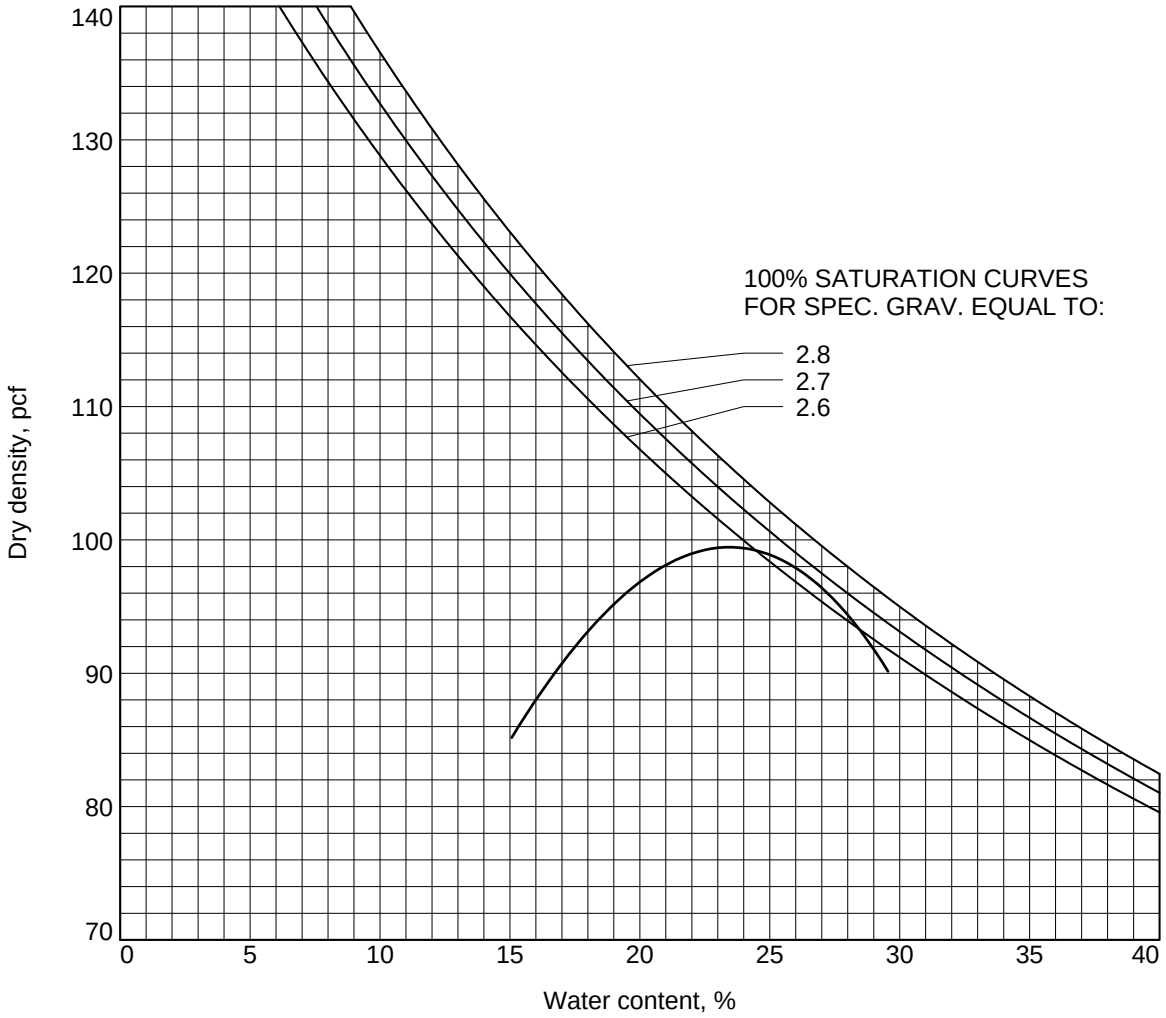
Project No.: 31170078 **Date:** 05/01/2017
Project: Hope Drive
Client: Rinker Design Associates, P.C.
Source of Sample: B-45 **Depth:** 1'-5'
Sample Number: Bulk
Remarks:

MATERIAL DESCRIPTION

Description: Reddish-brown and gray, Fat CLAY. (CH)

Classifications - **USCS:** CH **AASHTO:** A-7-6(41)
Nat. Moist. = 30.7 % **Sp.G. =** 2.7
Liquid Limit = 66 **Plasticity Index =** 37
% < No.200 = 93.9 %

ROCK CORRECTED TEST RESULTS	UNCORRECTED
Maximum dry density = 99.5 pcf	98.3 pcf
Optimum moisture = 23.5 %	24.0 %



ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Geo-Technology Associates, Inc.

Tested By: AMC **Checked By:** TC

GEO-TECHNOLOGY ASSOCIATES, INC.
STERLING, VIRGINIA
CBR (VTM-8) TEST RESULTS

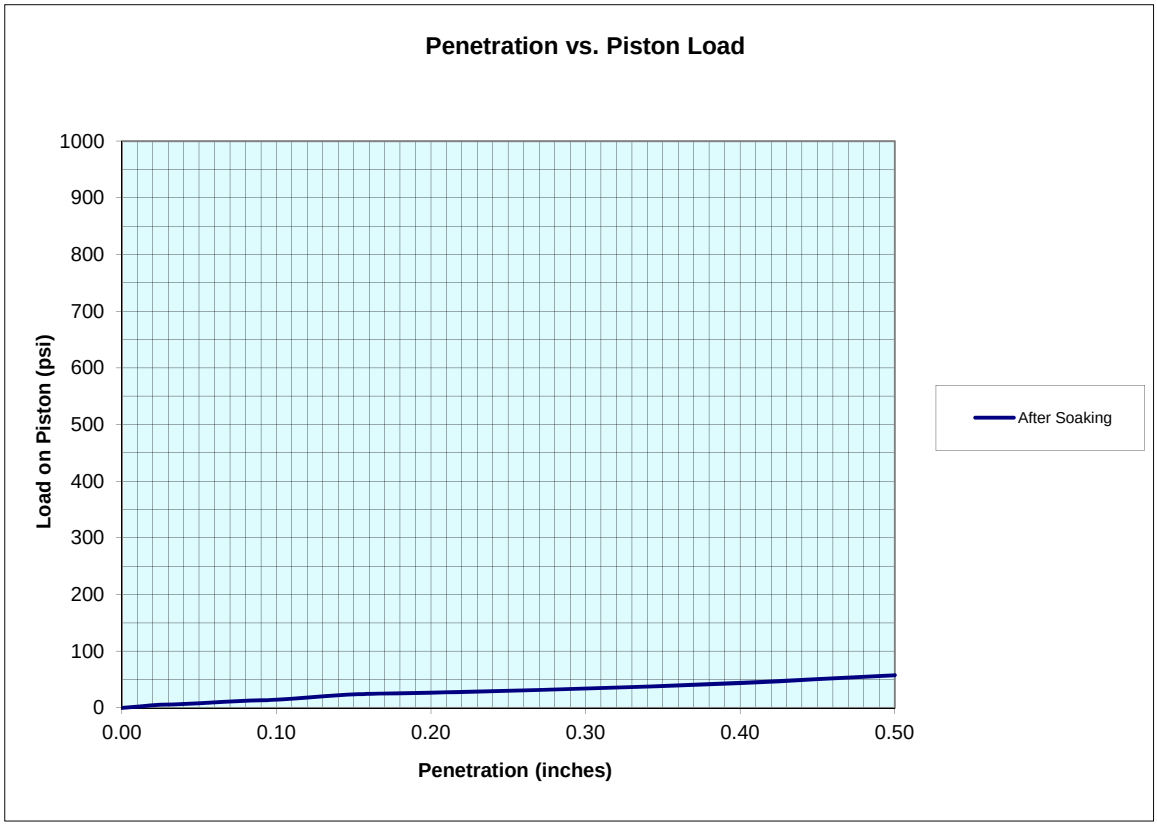
Project Name:	**Hope Drive**
Project Number:	**31170078**
Report Date:	**June 8, 2017**
Sample Location:	**B-45**
Sample Number:	**Bulk**
Depth, ft.:	**1'-5'**
USCS Classification:	**CH**
AASHTO Classification	**A-7-6(41)**
Condition:	SOAKED
Surcharge Wt., lbs.	10
Soil + Mold + Base Plate, gm.	12401.5
Mold + Base Plate, gm.	7137.3
Compaction MC, %	19.7
Wet Density of Soil, pcf	**118.2**
Dry Density of Soil, pcf	**98.8**
Initial Swelling Reading, in.	0.311
Final Swelling Reading, in.	0.523
Swell, %	**3.523**
Final Moisture, %	30.5
Final Moisture, top 1", %	30.7
Proctor MDD, pcf	**99.5**
Optimum Moisture Content, %	**23.5**

Penetration (in.)	After Soaking Load lb.	After Soaking Load psi.
0.000	0	0
0.025	17	6
0.050	25	8
0.075	37	12
0.100	44	15
0.150	72	24
0.200	81	27
0.300	103	34
0.400	132	44
0.500	174	58

CBR Value 0-0.1 =	1.47
CBR Value 0.05-0.15 =	1.57
CBR Value 0.1-0.2 =	1.23

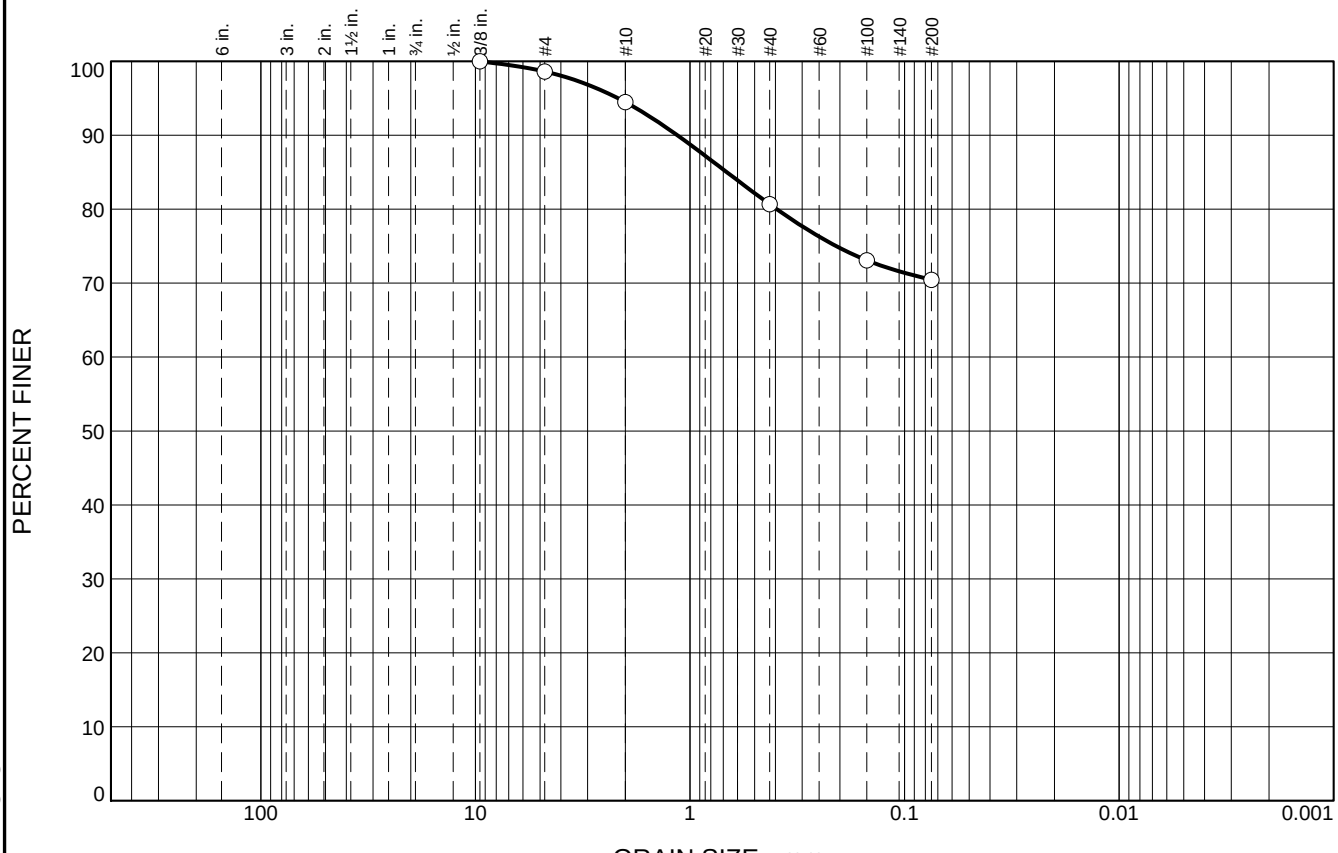
GEO-TECHNOLOGY ASSOCIATES, INC.
STERLING, VIRGINIA
CBR (VTM-8) TEST RESULTS

Project Name:	**Hope Drive**
Project Number:	**31170078**
Report Date:	**June 8, 2017**
Sample Location:	**B-45**
Sample Number:	**Bulk**
Depth, ft.:	**1'-5'**
USCS Classification:	**CH**
AASHTO Classification	**A-7-6(41)**
Condition:	SOAKED
Surcharge Wt., lbs.	10
INITIAL DRY DENSITY, PCF	98.8
INITIAL MOISTURE, %	19.7
INITIAL COMPACTION, %	99.3
FINAL DRY DENSITY, PCF	90.6
FINAL MOISTURE, %	30.5
FINAL MOISTURE, TOP 1", %	30.7
FINAL COMPACTION, %	91.0
SWELL, %	3.523
CBR Value (After Soaking)	**1.5**
Resiliency Factor	**1**



Reviewed By: AR

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.4	4.1	13.8	10.3	70.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
#4	98.6		
#10	94.5		
#40	80.7		
#100	73.1		
#200	70.4		

* (no specification provided)

Soil Description

Dark brown, Sandy Lean CLAY. (CL)

Atterberg Limits

PL= 20 LL= 29 PI= 9 NM= 25.2

Coefficients

D_{90}= 1.1455 D_{85}= 0.6732 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-4(5)

Remarks

Source of Sample: B-47 **Depth:** 0'
Sample Number: S1 **Date:** 6/8/2017

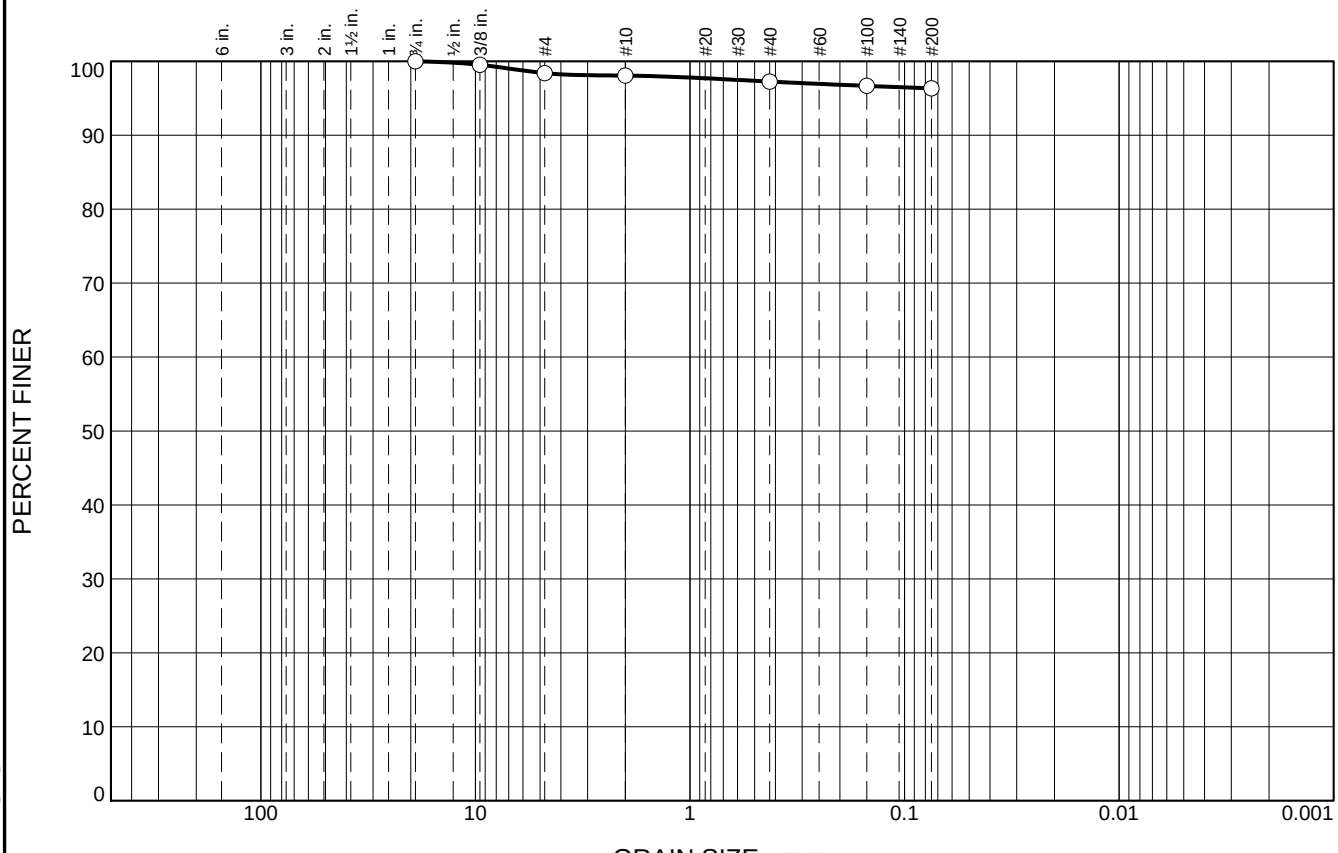
GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

Client: Rinker Design Associates, P.C.
Project: Hope Drive
Project No: 31170078

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Tested By: AMC **Checked By:** TC

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.6	0.3	0.8	1.0	96.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
3/8"	99.5		
#4	98.4		
#10	98.1		
#40	97.3		
#100	96.7		
#200	96.3		

* (no specification provided)

Soil Description

Reddish-brown and tan, Fat CLAY. (CH)

Atterberg Limits

PL= 33 LL= 72 PI= 39 NM= 35.3

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-5(45)

Remarks

Source of Sample: B-53 **Depth:** 2'-6'
Sample Number: Bulk **Date:** 05/01/2017

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

Client: Rinker Design Associates, P.C.
Project: Hope Drive
Project No: 31170078

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Tested By: AMC **Checked By:** TC

MOISTURE-DENSITY RELATIONSHIP REPORT
AASHTO T 99 Method A, Standard Virginia VTM-1 corr.

Project No.: 31170078 **Date:** 05/01/2017

Project: Hope Drive

Client: Rinker Design Associates, P.C.

Source of Sample: B-53 **Depth:** 2'-6'

Sample Number: Bulk

Remarks:

MATERIAL DESCRIPTION

Description: Reddish-brown and tan, Fat CLAY. (CH)

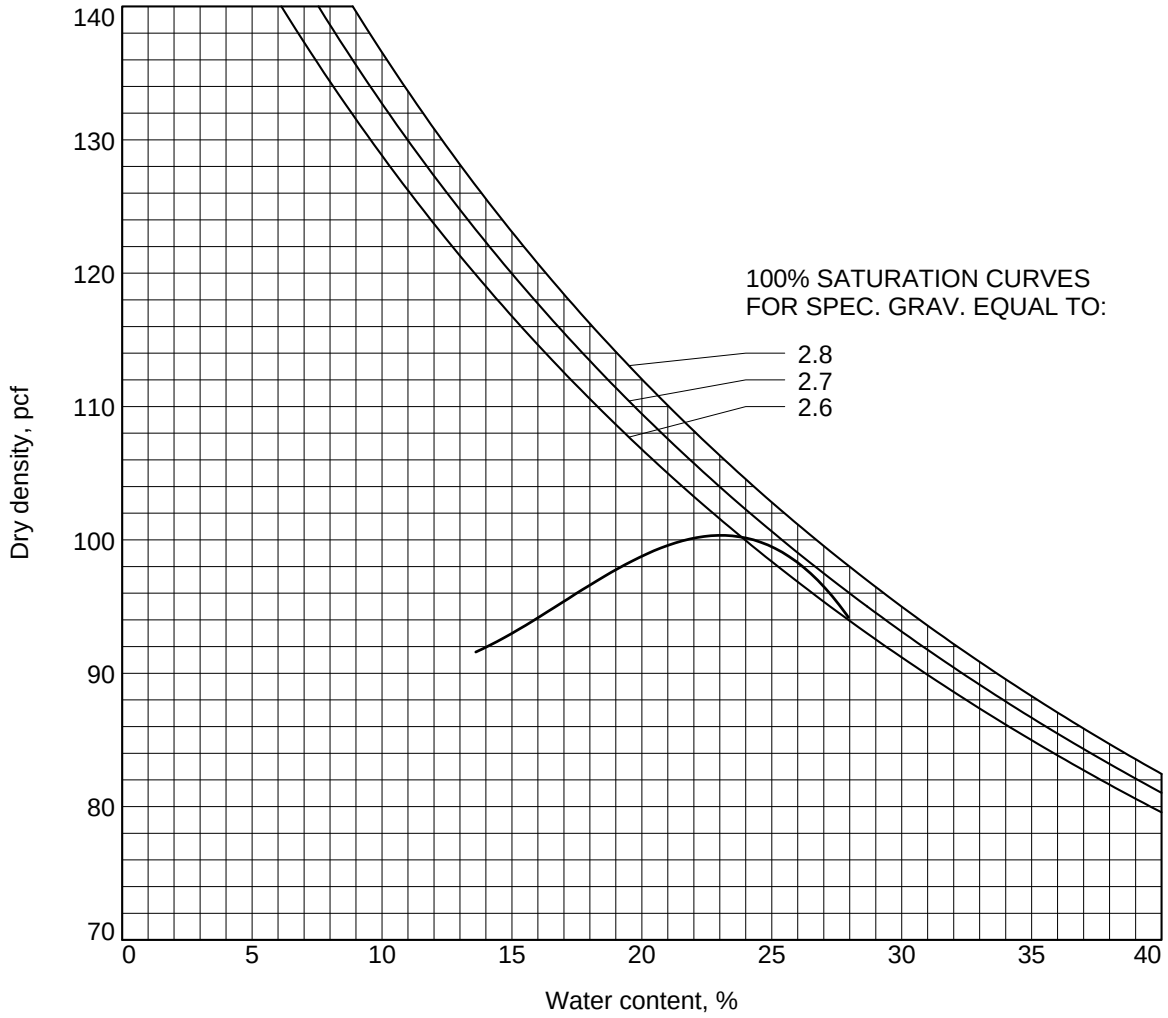
Classifications - **USCS:** CH **AASHTO:** A-7-5(45)

Nat. Moist. = 35.3 % **Sp.G. =** 2.7

Liquid Limit = 72 **Plasticity Index =** 39

% < No.200 = 96.3 %

ROCK CORRECTED TEST RESULTS	UNCORRECTED
Maximum dry density = 100.3 pcf	99.5 pcf
Optimum moisture = 23.0 %	23.4 %



ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Geo-Technology Associates, Inc.

Tested By: AMC **Checked By:** TC

GEO-TECHNOLOGY ASSOCIATES, INC.
STERLING, VIRGINIA
CBR (VTM-8) TEST RESULTS

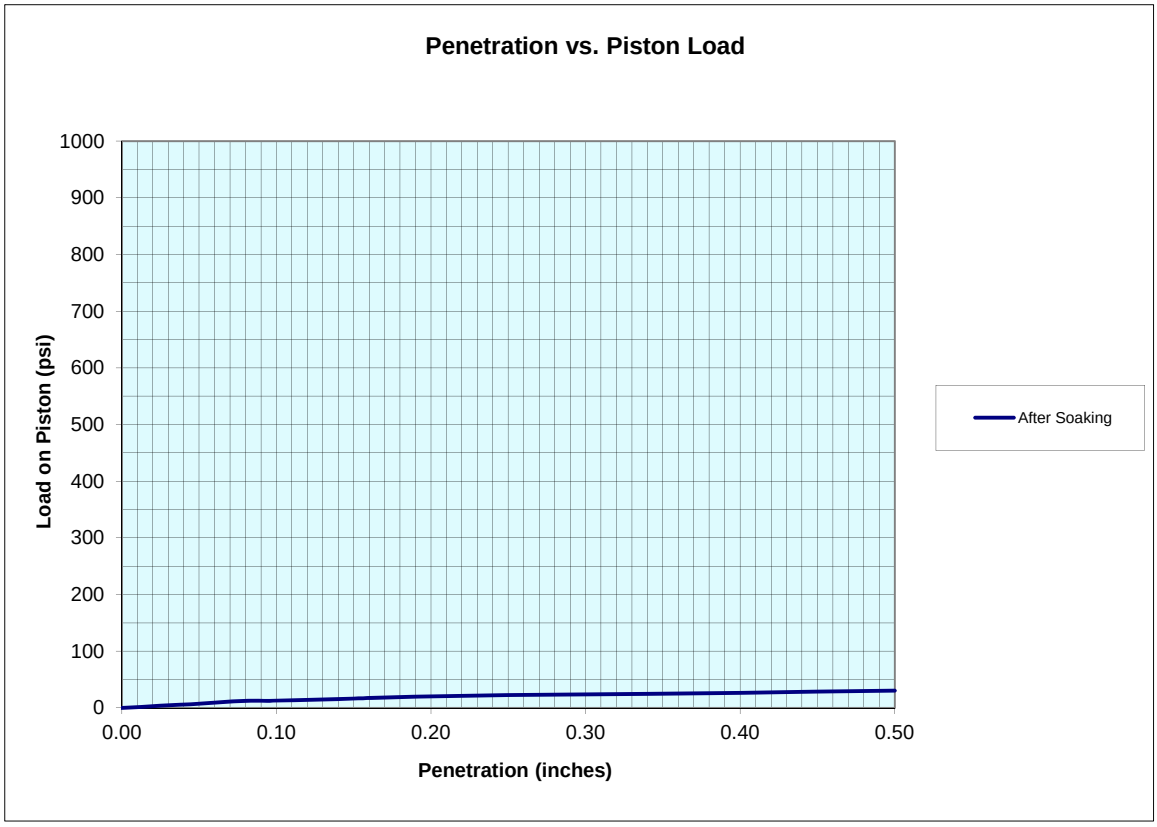
Project Name:	**Hope Drive**
Project Number:	**31170078**
Report Date:	**June 8, 2017**
Sample Location:	**B-53**
Sample Number:	**Bulk**
Depth, ft.:	**2'-6'**
USCS Classification:	**CH**
AASHTO Classification	**A-7-5(45)**
Condition:	SOAKED
Surcharge Wt., lbs.	10
Soil + Mold + Base Plate, gm.	12299.8
Mold + Base Plate, gm.	7006.5
Compaction MC, %	21.0
Wet Density of Soil, pcf	**118.9**
Dry Density of Soil, pcf	**98.2**
Initial Swelling Reading, in.	0.473
Final Swelling Reading, in.	0.711
Swell, %	**3.955**
Final Moisture, %	34.4
Final Moisture, top 1", %	35.5
Proctor MDD, pcf	**100.3**
Optimum Moisture Content, %	**23.0**

Penetration (in.)	After Soaking Load lb.	After Soaking Load psi.
0.000	0	0
0.025	12	4
0.050	22	7
0.075	37	12
0.100	39	13
0.150	50	17
0.200	62	21
0.300	73	24
0.400	81	27
0.500	92	31

CBR Value 0-0.1 =	1.30
CBR Value 0.05-0.15 =	0.93
CBR Value 0.1-0.2 =	0.77

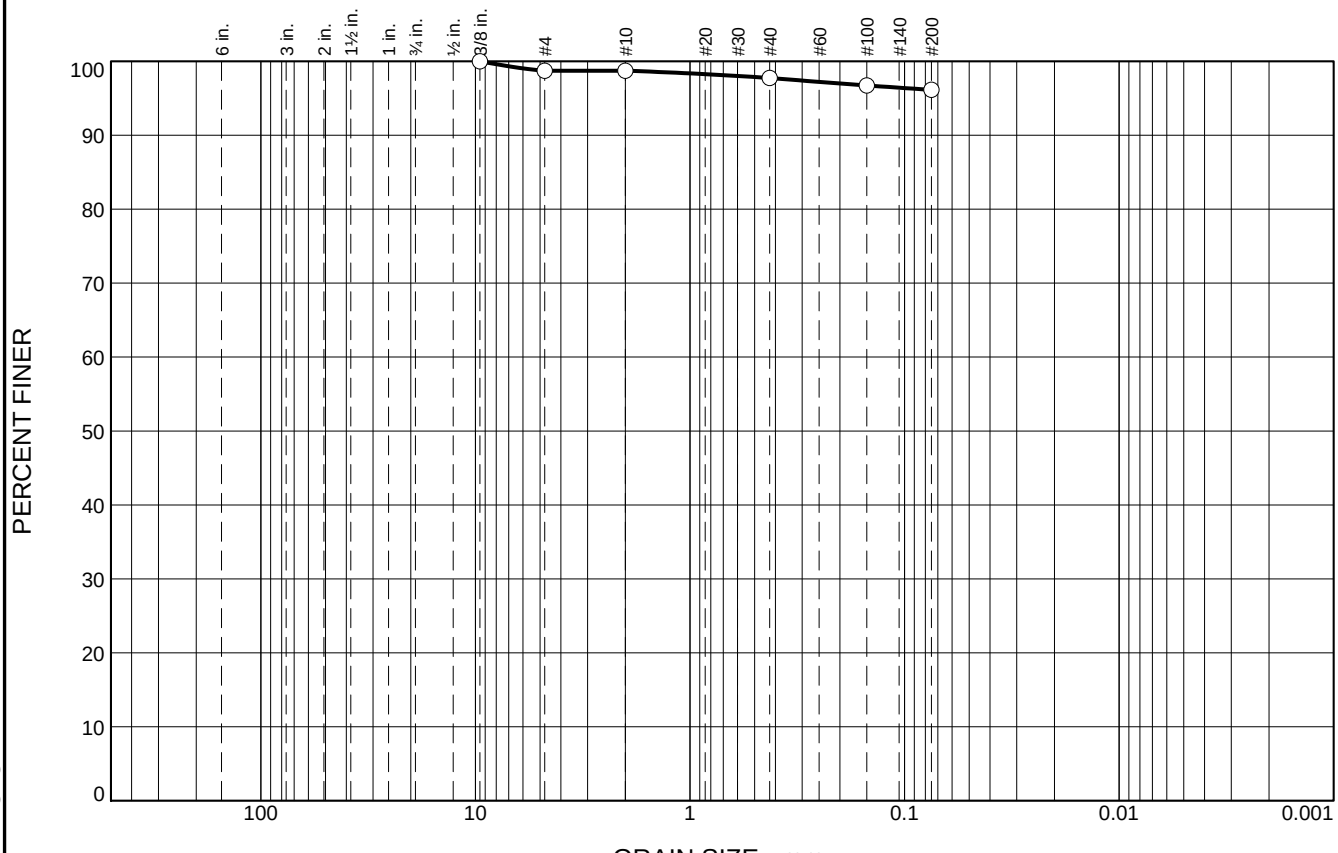
GEO-TECHNOLOGY ASSOCIATES, INC.
STERLING, VIRGINIA
CBR (VTM-8) TEST RESULTS

Project Name:	**Hope Drive**
Project Number:	**31170078**
Report Date:	**June 8, 2017**
Sample Location:	**B-53**
Sample Number:	**Bulk**
Depth, ft.:	**2'-6'**
USCS Classification:	**CH**
AASHTO Classification	**A-7-5(45)**
Condition:	SOAKED
Surcharge Wt., lbs.	10
INITIAL DRY DENSITY, PCF	98.2
INITIAL MOISTURE, %	21
INITIAL COMPACTION, %	97.9
FINAL DRY DENSITY, PCF	88.4
FINAL MOISTURE, %	34.4
FINAL MOISTURE, TOP 1", %	35.5
FINAL COMPACTION, %	88.2
SWELL, %	3.955
CBR Value (After Soaking)	**1.3**
Resiliency Factor	**1**



Reviewed By: AR

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.3	0.0	1.0	1.6	96.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100.0		
#4	98.7		
#10	98.7		
#40	97.7		
#100	96.7		
#200	96.1		

* (no specification provided)

Soil Description

Reddish-brown and tan, Fat CLAY. (CH)

Atterberg Limits

PL= 31 LL= 83 PI= 52 NM= 34.0

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-5(59)

Remarks

Source of Sample: B-55 **Depth:** 1'
Sample Number: S1 **Date:** 6/8/2017

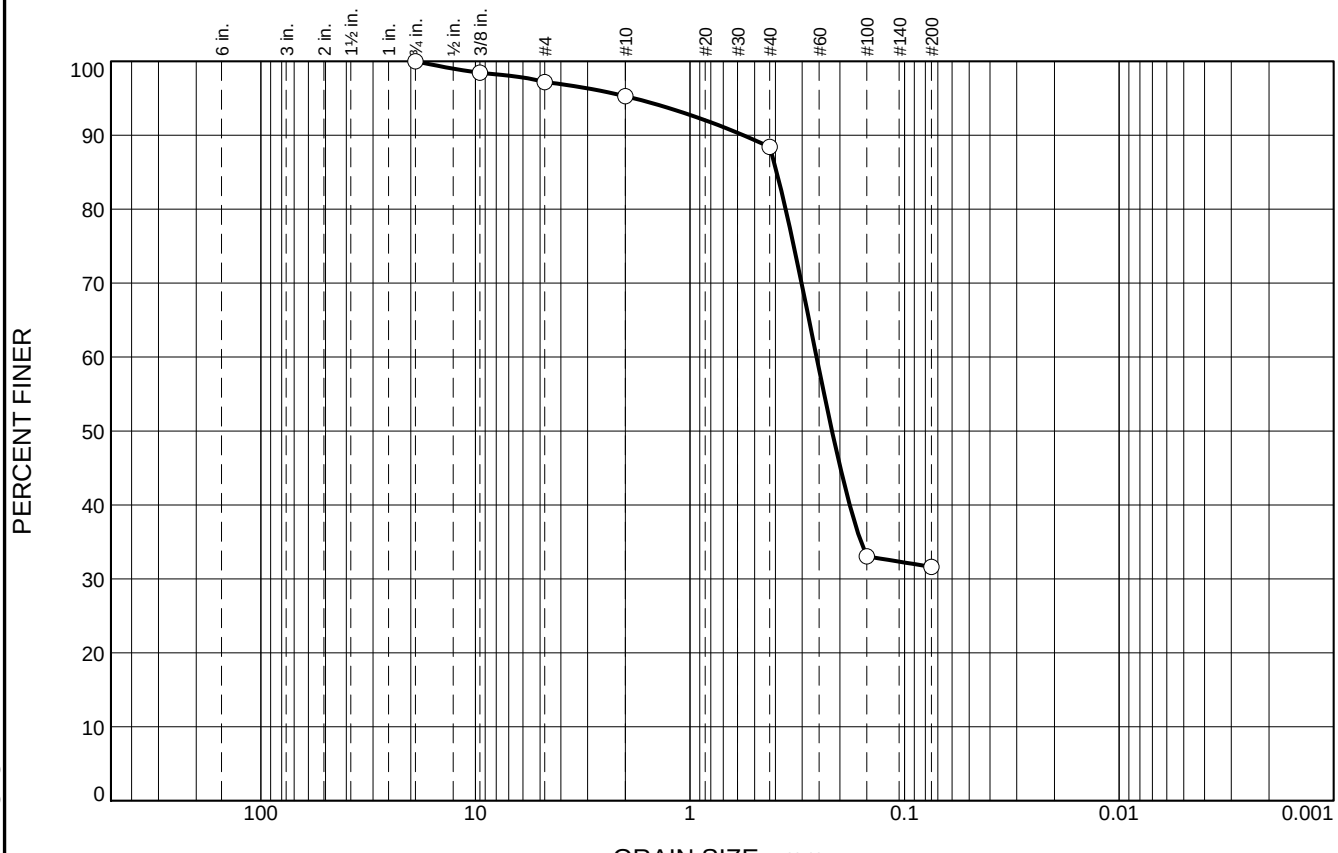
GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

Client: Rinker Design Associates, P.C.
Project: Hope Drive
Project No: 31170078

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Tested By: AMC **Checked By:** TC

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.8	1.9	6.9	56.8	31.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
3/8"	98.5		
#4	97.2		
#10	95.3		
#40	88.4		
#100	33.0		
#200	31.6		

* (no specification provided)

Soil Description

Grayish-brown, Clayey SAND. (SC)

Atterberg Limits

PL= 26 LL= 57 PI= 31 NM= 25.5

Coefficients

D_{90}= 0.5636 D_{85}= 0.3944 D_{60}= 0.2570
D_{50}= 0.2178 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-2-7(4)

Remarks

Source of Sample: B-57 **Depth:** 1'
Sample Number: S1 **Date:** 6/8/2017

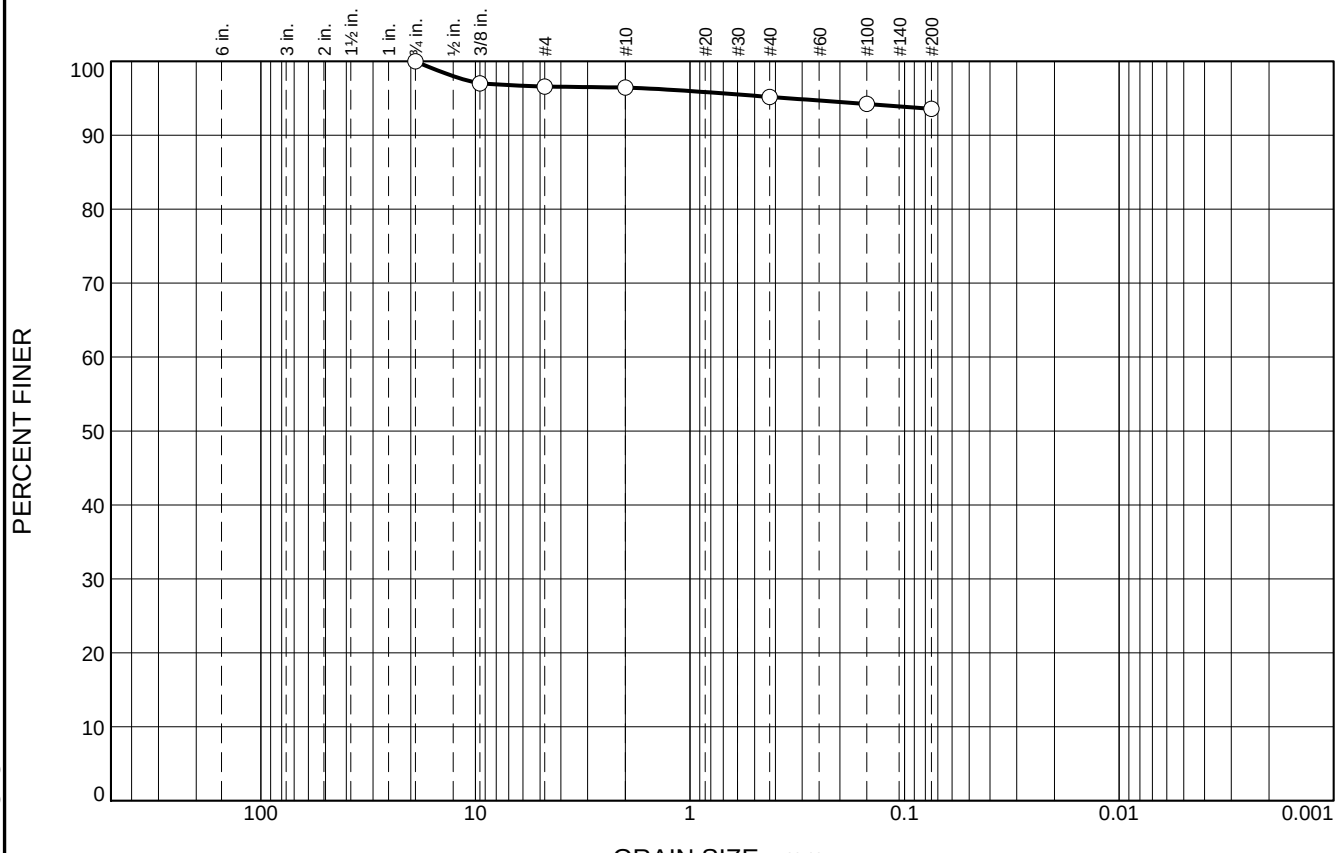
GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

Client: Rinker Design Associates, P.C.
Project: Hope Drive
Project No: 31170078

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Tested By: AMC **Checked By:** TC

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.4	0.1	1.3	1.6	93.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
3/8"	97.0		
#4	96.6		
#10	96.5		
#40	95.2		
#100	94.2		
#200	93.6		

* (no specification provided)

Soil Description

Gray and brown, Fat CLAY. (CH)

Atterberg Limits

PL= 27 LL= 61 PI= 34 NM= 29.3

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(37)

Remarks

Source of Sample: SWM-10 **Depth:** 5'
Sample Number: S3 **Date:** 6/8/2017

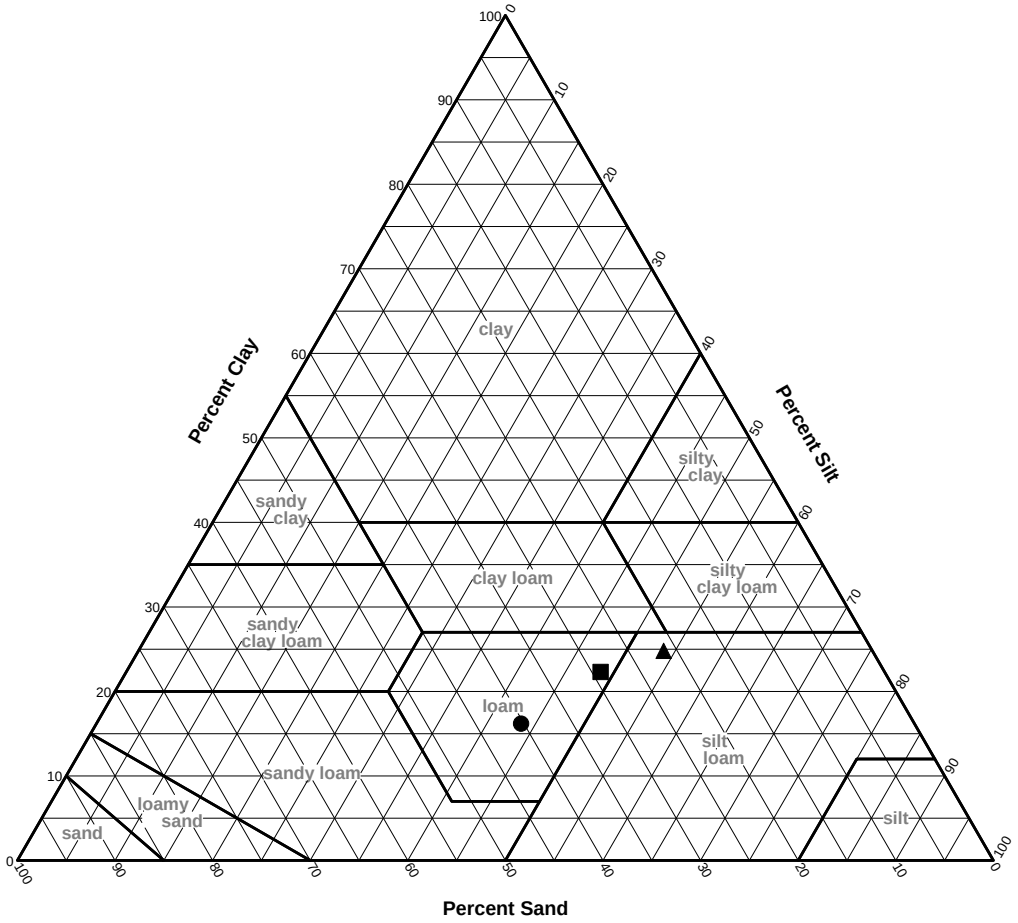
GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

Client: Rinker Design Associates, P.C.
Project: Hope Drive
Project No: 31170078

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Tested By: AMC **Checked By:** TC

USDA Soil Classification



ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

SOIL DATA

	Source	Sample No.	Depth	Percentages From Material Passing a #10 Sieve			Classification
				Sand	Silt	Clay	
●	SWM-2	S3	5'	40.3	43.4	16.2	Loam
■	SWM-5	S3	5'	29.1	48.6	22.3	Loam
▲	SWM-7	S4	8.5'	21.4	53.8	24.8	Silt loam

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

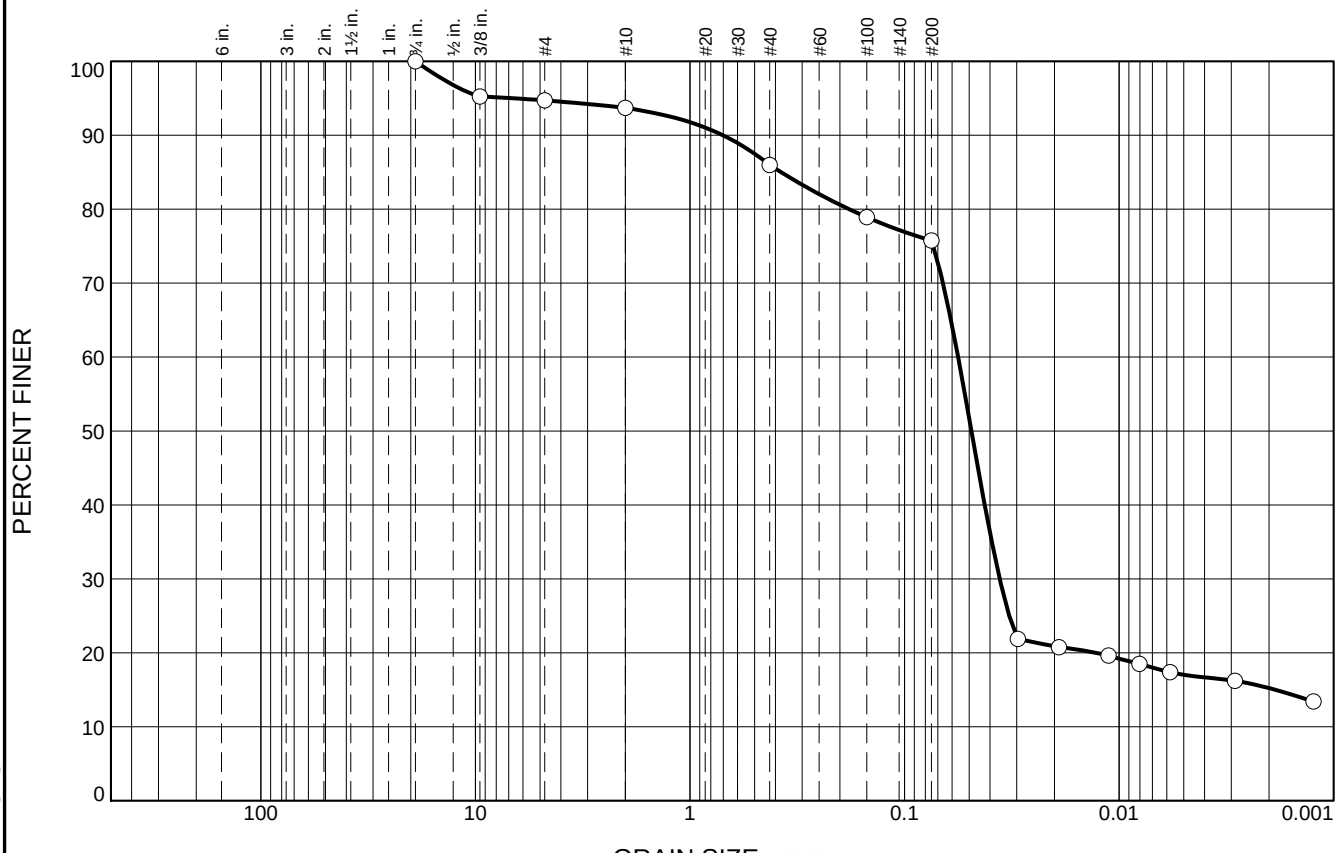
Client: Rinker Design Associates, P.C.

Project: Hope Drive

Project No.: 31170078

Checked By: TC

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.3	1.0	7.7	10.2	58.8	17.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
3/8"	95.3		
#4	94.7		
#10	93.7		
#40	86.0		
#100	78.9		
#200	75.8		
0.0297 mm.	21.9		
0.0191 mm.	20.8		
0.0112 mm.	19.6		
0.0080 mm.	18.5		
0.0058 mm.	17.4		
0.0029 mm.	16.2		
0.0012 mm.	13.4		

* (no specification provided)

Soil Description

Reddish-brown and black, Loam.

Atterberg Limits

PL= LL= PI= NM= 17.8

Coefficients

D_{90}= 0.7026 D_{85}= 0.3760 D_{60}= 0.0563
D_{50}= 0.0488 D_{30}= 0.0360 D_{15}= 0.0019
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Source of Sample: SWM-2 **Depth:** 5'
Sample Number: S3 **Date:** 06/09/2017

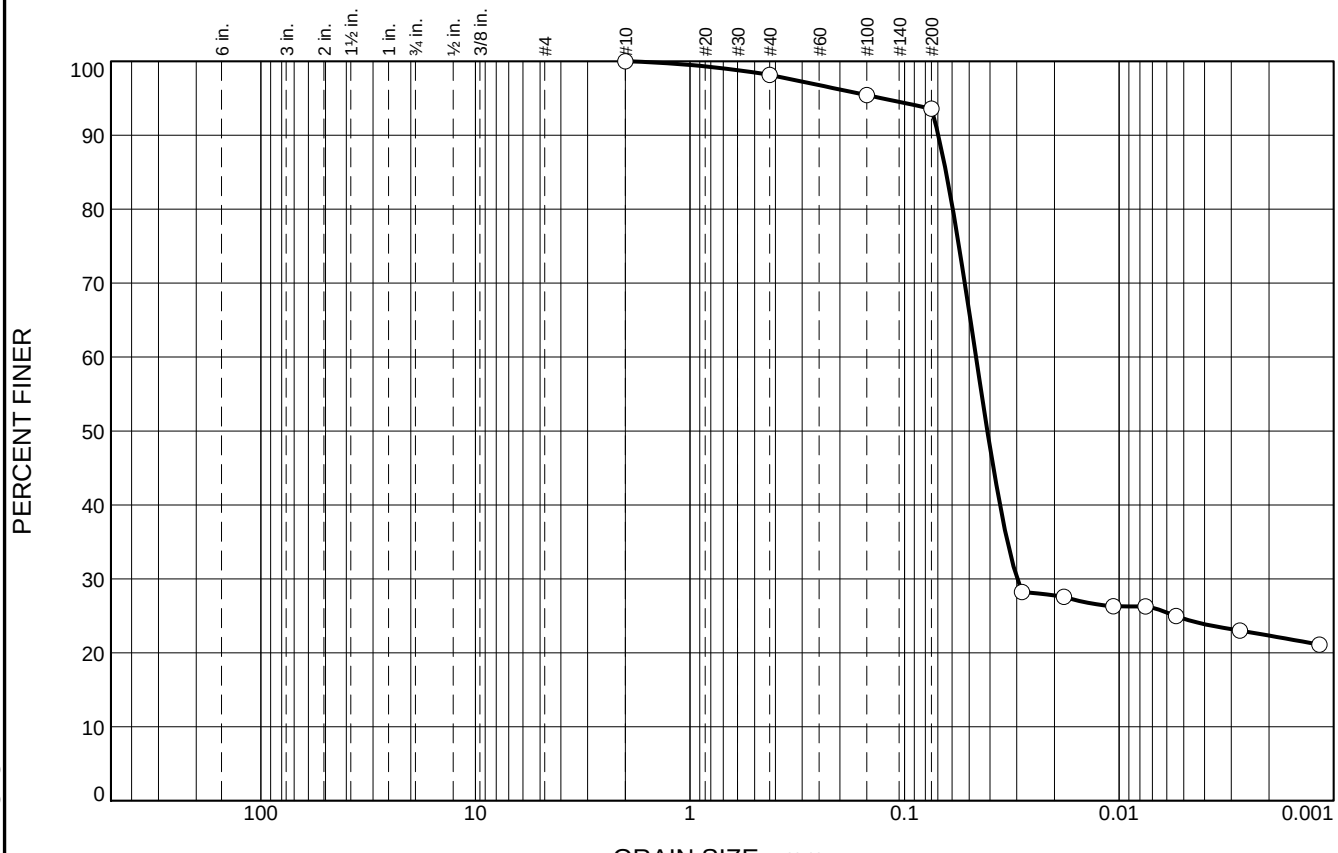
GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

Client: Rinker Design Associates, P.C.
Project: Hope Drive
Project No: 31170078

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Tested By: AMC **Checked By:** TC

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.8	4.6	69.0	24.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	98.2		
#100	95.4		
#200	93.6		
0.0283 mm.	28.2		
0.0181 mm.	27.6		
0.0106 mm.	26.3		
0.0075 mm.	26.3		
0.0054 mm.	25.0		
0.0027 mm.	23.0		
0.0012 mm.	21.1		

* (no specification provided)

Soil Description

Tan and brown, Loam.

Atterberg Limits

PL= LL= PI= NM= 27.4

Coefficients

D_{90}= 0.0696 D_{85}= 0.0640 D_{60}= 0.0464
D_{50}= 0.0411 D_{30}= 0.0299 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Source of Sample: SWM-5 **Depth:** 5'
Sample Number: S3 **Date:** 06/09/2017

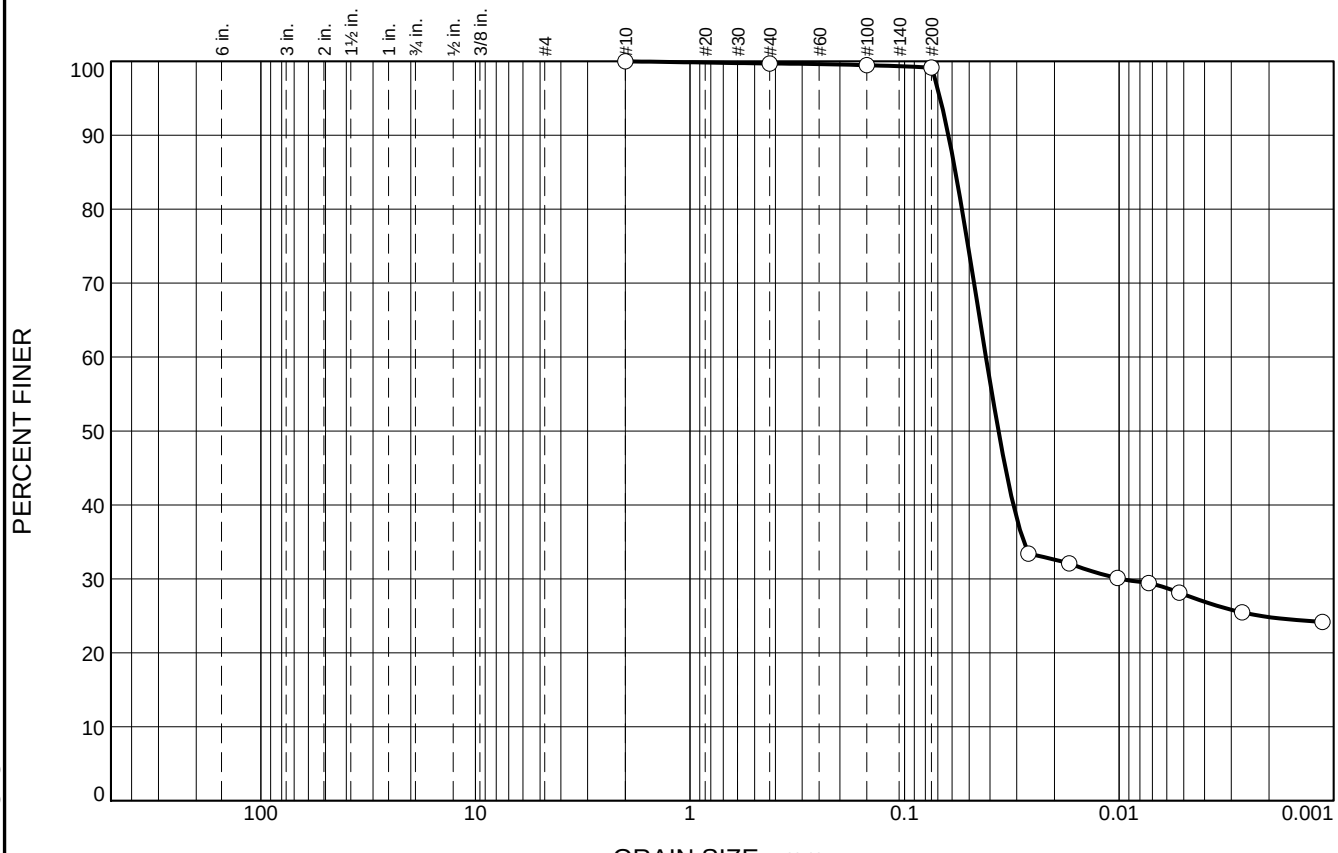
GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

Client: Rinker Design Associates, P.C.
Project: Hope Drive
Project No: 31170078

Tested By: AMC **Checked By:** TC

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.3	0.5	71.3	27.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.7		
#100	99.5		
#200	99.2		
0.0265 mm.	33.4		
0.0171 mm.	32.1		
0.0102 mm.	30.1		
0.0073 mm.	29.4		
0.0052 mm.	28.1		
0.0027 mm.	25.5		
0.0011 mm.	24.2		

* (no specification provided)

Soil Description

Light gray, tan and black, Silt loam.

Atterberg Limits

PL= LL= PI= NM= 31.2

Coefficients

D_{90}= 0.0625 D_{85}= 0.0579 D_{60}= 0.0418
D_{50}= 0.0365 D_{30}= 0.0098 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Source of Sample: SWM-7 **Depth:** 8.5'
Sample Number: S4 **Date:** 06/09/2017

GEO-TECHNOLOGY ASSOCIATES, INC.
43760 Trade Center Place, Suite 110
Sterling, VA 20166

Client: Rinker Design Associates, P.C.
Project: Hope Drive
Project No: 31170078

ASTM Specifications performed may include: D421, D422, D2216, D2217, and D4318.

Tested By: AMC **Checked By:** TC

APPENDIX D

PAVEMENT DESIGN

TRAFFIC LOADING WORK SHEET (VDOT)

Hope Drive (Valley Avenue to Wilson Boulevard)

Input		
ADT (2015)	3,400	(RDA)
Growth Rate	0.057	(VI-40)
%cars	97	(Assumed)
%trucks	2	(Assumed)
%tractor trailor	1	(Assumed)
# of lanes/direction	1	(VI-40)
life span (years)	25	(VI-39)

Flexible Pavement		
car factor	0.0002	(VI-40)
truck factor	0.46	(VI-40)
tractor trailor factor	1.05	(VI-40)

Rigid Pavement	
car factor	0.0002
truck factor	0.59
tractor trailor factor	1.59

Total W18 ESAL's - Flexible Pavement		
car	13686	
truck	649037	
tractor trailor	740748	
total	1403471	
lane distribution	1	
Distributed total	**1403471**	W18 ESAL's - Flexible Pavement

Total W18 ESAL's - Rigid Pavement		
car	13686	
truck	832460	
tractor trailor	1121705	
total	1967851	
lane distribution	1	
Distributed total	1967851	W18 ESAL's - Rigid Pavement

Year	ADT	Total for Year		
0	3400	1241000	0	ADT (2015)
1	3595	1312106	0	
2	3801	1387285	0	
3	4019	1466772	0	
4	4249	1550814	0	
5	4492	1639671	0	
6	4750	1733619	0	
7	5022	1832950	0	
8	5310	1937973	0	
9	5614	2049013	0	
10	5935	2166415	0	
11	6275	2290544	0	
12	6635	2421785	0	
13	7015	2560546	0	
14	7417	2707257	0	
15	7842	2862375	0	
16	8291	3026380	0	
17	8767	3199783	0	
18	9269	3383120	0	
19	9800	3576963	0	
20	10361	3781912	0	
21	10955	3998604	0	
22	11583	4227712	0	
23	12246	4469947	0	
24	12948	4726061	0	
25	**13690**	4996850	70547454	ADT (2040)
26	14474	5283154	0	
27	15304	5585863	0	
28	16181	5905916	0	
29	17108	6244307	0	
30	18088	6602087	0	

Lifetime Total = 70547454

	Year	ADT
From RDA:	2015	3,400
	2040	13,690

Growth Rate: See Eqn. VI-40

GR = 5.73 %

AASHTO PAVEMENT DESIGN - FULL DEPTH PAVEMENT

Hope Drive (Valley Avenue to Wilson Boulevard)

Job : Hope Drive
Job Number : 31170078
Design By : TC
Date : 12/8/2017

Full Depth Pavement

Road Name:
Hope Drive

Based on VDOT's Guidelines for AASHTO Pavement Design 1993, Revised May 2011

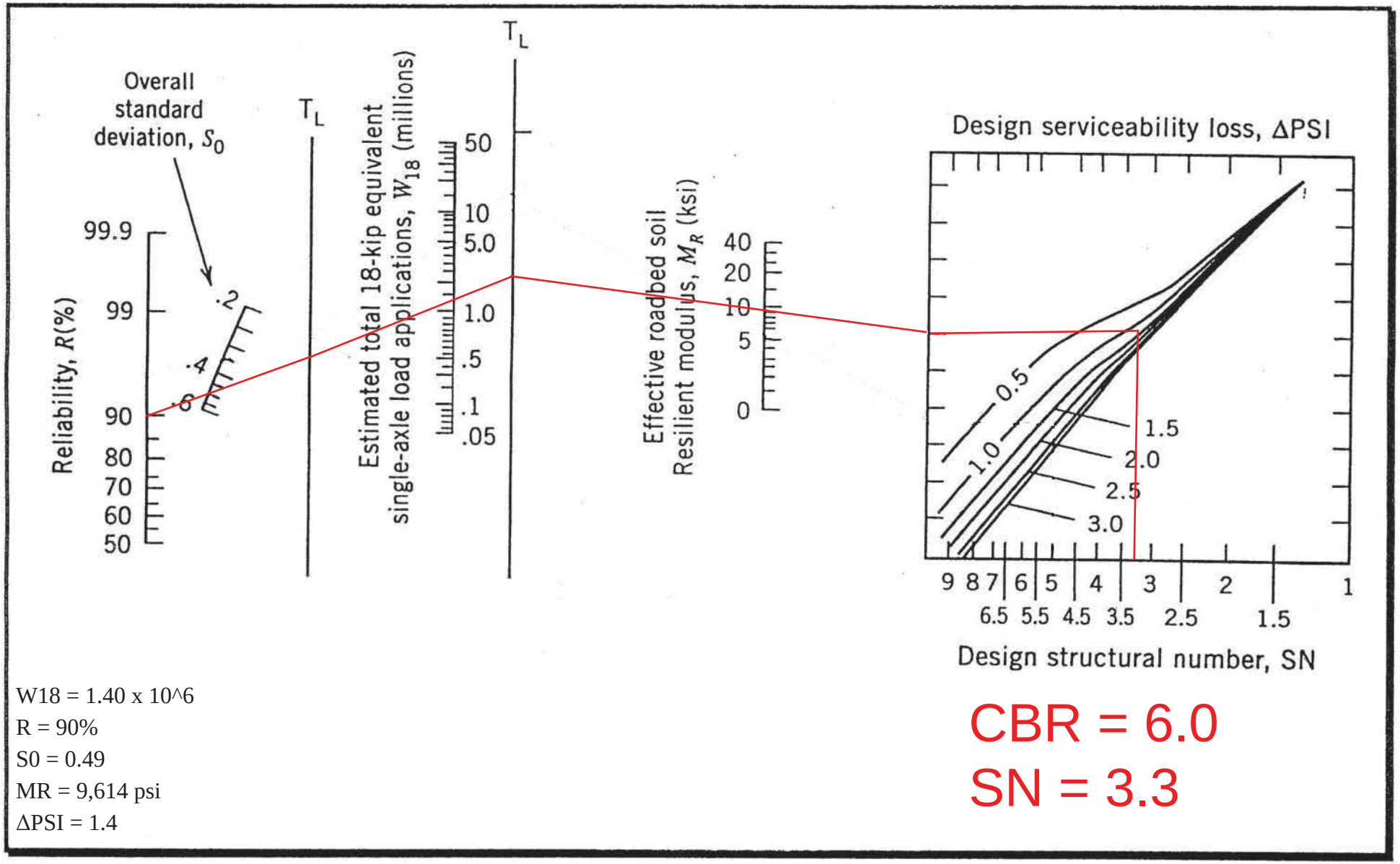
Design Life (yr) =		25	VI-39
Reliablity (%) =		90	VI-41
Standard Deviation =		0.49	VI-41
Serviceability Loss =	4.2 - 2.8 =	1.4	VI-41
CBR =	9	9.0	Specified
Design CBR =	(2/3) CBR =	6.0	VI-43
MR =	3000 x DCBR^(0.65) =	9,614	VI-43
ADT 2040 =		13,690	RDA
%Trucks =		2	Assumed
%Tractor Trailor =		1	Assumed
W18 =		1,403,471	Traffic Loading worksheet
SN (CBR=6.0) =		3.3	Flexible Pavement Nomograph

Full Depth Pavement Section Design		**Min. for SN=3.3**		**Max. to Match Existing**		
material	**a1**	**thickness**	**SN**	**thickness**	**SN**	
SM-9.5	0.44	1.5	0.66	1.5	0.66	
IM-19	0.44	0	0	0	0	
BM-25	0.44	4.5	1.98	6.5	2.86	
21A	0.12	0	0	0	0	
21B	0.12	6	0.72	8	0.96	(21B for ADT>1000)
OGDL	0.10	0	0	0	0	
CTA (21A)	0.2	0	0	0	0	
Total			3.36		4.48	
Check			pass		pass	

NOTES:

Max. Existing Asphalt Thickness = 8"
Max. Existing AggregateThickness = 8"

FULL DEPTH PAVEMENT SECTION



W18 = 1.40 x 10^6
R = 90%
S0 = 0.49
MR = 9,614 psi
ΔPSI = 1.4

CBR = 6.0
SN = 3.3

Flexible Pavement Nomograph Hope Drive (Valley Avenue to Wilson Boulevard)

Project: Hope Drive

Project No.: 31170078

Date: December 8, 2017

TRAFFIC LOADING WORK SHEET (VDOT)

Hope Drive (Wilson Boulevard to Papermill Road)

Input		
ADT (2015)	2,800	(Back-Calculated)
Growth Rate	0.0573	(VI-40)
%cars	97	(Assumed)
%trucks	2	(Assumed)
%tractor trailor	1	(Assumed)
# of lanes/direction	1	(VI-40)
life span (years)	25	(VI-39)

Flexible Pavement		
car factor	0.0002	(VI-40)
truck factor	0.46	(VI-40)
tractor trailor factor	1.05	(VI-40)

Rigid Pavement	
car factor	0.0002
truck factor	0.59
tractor trailor factor	1.59

Total W18 ESAL's - Flexible Pavement		
car	11268	
truck	534379	
tractor trailor	609890	
total	1155537	
lane distribution	1	
Distributed total	**1155537**	W18 ESAL's - Flexible Pavement

Total W18 ESAL's - Rigid Pavement		
car	11268	
truck	685400	
tractor trailor	923547	
total	1620215	
lane distribution	1	
Distributed total	1620215	W18 ESAL's - Rigid Pavement

Year	ADT	Total for Year		
0	2800	1022000	0	ADT (2015)
1	2960	1080542	0	
2	3130	1142437	0	
3	3309	1207877	0	
4	3499	1277066	0	
5	3699	1350219	0	
6	3911	1427561	0	
7	4135	1509334	0	
8	4372	1595791	0	
9	4622	1687200	0	
10	4887	1783846	0	
11	5167	1886027	0	
12	5463	1994061	0	
13	5776	2108284	0	
14	6107	2229050	0	
15	6457	2356733	0	
16	6827	2491730	0	
17	7218	2634461	0	
18	7631	2785366	0	
19	8068	2944916	0	
20	8530	3113606	0	
21	9019	3291958	0	
22	9536	3480526	0	
23	10082	3679896	0	
24	10659	3890686	0	
25	**11270**	4113550	58084722	ADT (2040)
26	11916	4349180	0	
27	12598	4598308	0	
28	13320	4861706	0	
29	14083	5140192	0	
30	14889	5434630	0	

Lifetime Total = 58084722

	Year	ADT
	2015	2,800
Fom RDA:	2040	11,270

Growth Rate: See Eqn. VI-40

GR = 5.73 %

*ADT 2015 back-calculated assuming same growth rate (5.73%) as Hope Drive between Valley Avenue and Wilson Boulevard

AASHTO PAVEMENT DESIGN - FULL DEPTH PAVEMENT

Hope Drive (Wilson Boulevard to Papermill Road)

Job : Hope Drive
Job Number : 31170078
Design By : TC
Date : 12/8/2017

Full Depth Pavement

Road Name:
Hope Drive

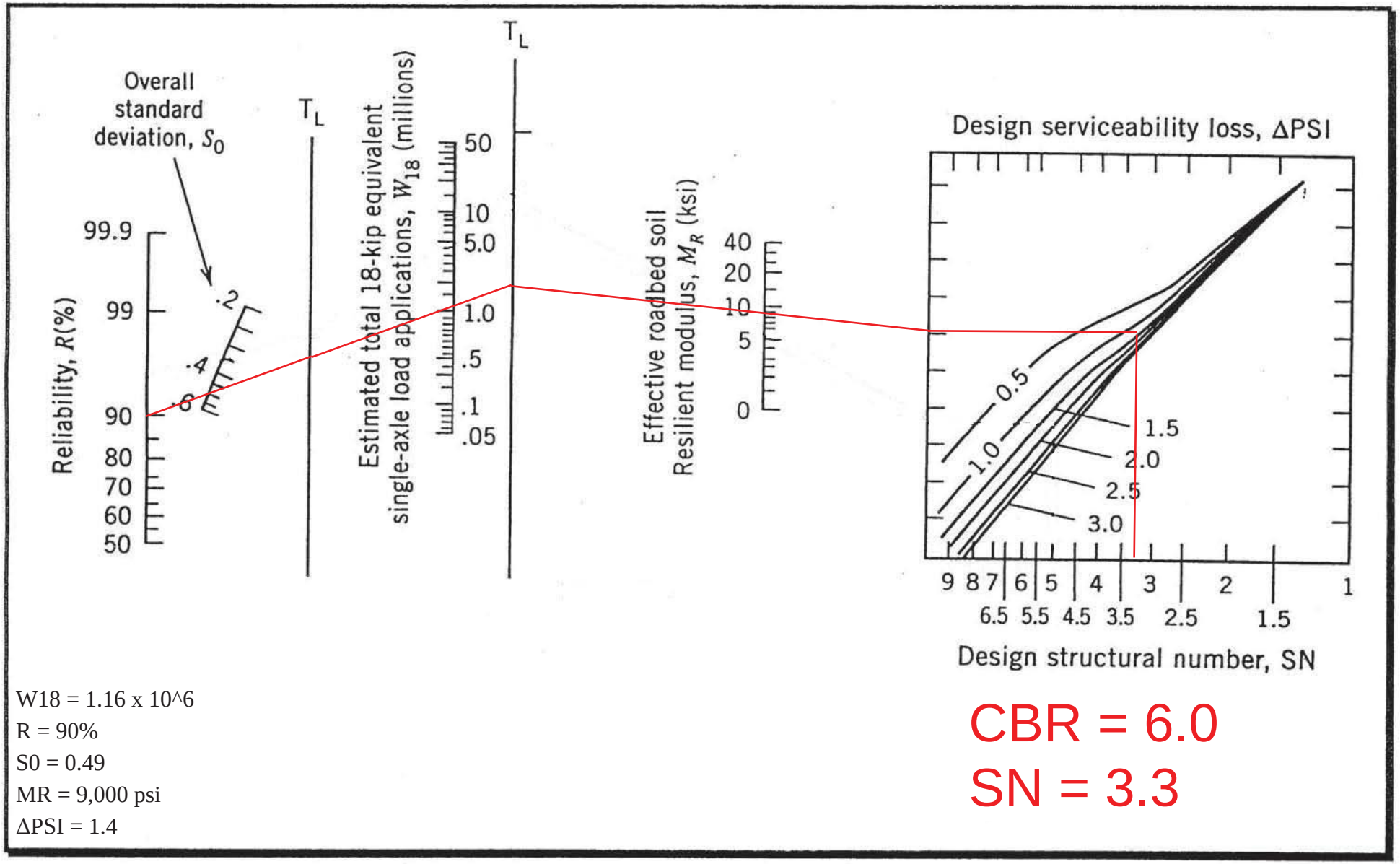
Based on VDOT's Guidelines for AASHTO Pavement Design 1993, Revised May 2011

Design Life (yr) =		25	VI-39
Reliablity (%) =		90	VI-41
Standard Deviation =		0.49	VI-41
Serviceability Loss =	4.2 - 2.8 =	1.4	VI-41
CBR =		9.0	Specified
Design CBR =	(2/3) CBR =	6.0	VI-43
MR =	1500 x DCBR =	9000	VI-43 fine-grained
ADT 2040 =		11,270	RDA
%Trucks =		2	Assumed
%Tractor Trailor =		1	Assumed
W18 =		1,155,537	Traffic Loading worksheet
SN (CBR=6.0) =		3.3	Flexible Pavement Nomograph

Full Depth Pavement Section Design		**Min. for SN=3.3**		
material	**a1**	**thickness**	**SN**	
SM-9.5	0.44	1.5	0.66	
IM-19	0.44	0	0	
BM-25	0.44	4.5	1.98	
21A	0.12	0	0	
21B	0.12	6	0.72	(21B for ADT>1000)
OGDL	0.10	0	0	
CTA (21A)	0.2	0	0	
Total			3.36	
Check			pass	

NOTES: Currently Unpaved Section

FULL DEPTH PAVEMENT SECTION



W18 = 1.16 x 10^6
R = 90%
S0 = 0.49
MR = 9,000 psi
ΔPSI = 1.4

CBR = 6.0
SN = 3.3

Flexible Pavement Nomograph Hope Drive (Wilson Boulevard to Papermill Road)

Project: Hope Drive

Project No.: 31170078

Date: December 8, 2017

TRAFFIC LOADING WORK SHEET (VDOT)

Hope Drive (Papermill Road to Pleasant Valley Road)

Input		
ADT (2015)	4,760	(Back-Calculated)
Growth Rate	0.0573	(VI-40)
%cars	97	(Assumed)
%trucks	2	(Assumed)
%tractor trailor	1	(Assumed)
# of lanes/direction	1	(VI-40)
life span (years)	25	(VI-39)

Flexible Pavement		
car factor	0.0002	(VI-40)
truck factor	0.46	(VI-40)
tractor trailor factor	1.05	(VI-40)

Rigid Pavement	
car factor	0.0002
truck factor	0.59
tractor trailor factor	1.59

Total W18 ESAL's - Flexible Pavement		
car	19163	
truck	908769	
tractor trailor	1037182	
total	1965114	
lane distribution	1	
Distributed total	**1965114**	W18 ESAL's - Flexible Pavement

Total W18 ESAL's - Rigid Pavement		
car	19163	
truck	1165595	
tractor trailor	1570590	
total	2755348	
lane distribution	1	
Distributed total	2755348	W18 ESAL's - Rigid Pavement

Year	ADT	Total for Year		
0	4760	1737400	0	ADT (2015)
1	5033	1836963	0	
2	5321	1942232	0	
3	5626	2053533	0	
4	5949	2171212	0	
5	6289	2295635	0	
6	6650	2427188	0	
7	7031	2566280	0	
8	7434	2713343	0	
9	7860	2868833	0	
10	8310	3033234	0	
11	8786	3207056	0	
12	9290	3390838	0	
13	9822	3585153	0	
14	10385	3790603	0	
15	10980	4007827	0	
16	11610	4237498	0	
17	12275	4480331	0	
18	12978	4737080	0	
19	13722	5008542	0	
20	14508	5295561	0	
21	15340	5599027	0	
22	16219	5919883	0	
23	17148	6259127	0	
24	18131	6617811	0	
25	**19170**	6997050	98779240	ADT (2040)
26	20269	7398021	0	
27	21430	7821971	0	
28	22658	8270215	0	
29	23957	8744146	0	
30	25329	9245236	0	

Lifetime Total = 98779240

	Year	ADT
	2015	4,760
Fom RDA:	2040	19,170

Growth Rate: See Eqn. VI-40

GR = 5.73 %

*ADT 2015 back-calculated assuming same growth rate (5.73%) as Hope Drive between Valley Avenue and Wilson Boulevard

AASHTO PAVEMENT DESIGN - FULL DEPTH PAVEMENT

Hope Drive (Papermill Road to Pleasant Valley Road)

Job : Hope Drive
Job Number : 31170078
Design By : TC
Date : 12/8/2017

Full Depth Pavement

Road Name:
Hope Drive

Based on VDOT's Guidelines for AASHTO Pavement Design 1993, Revised May 2011

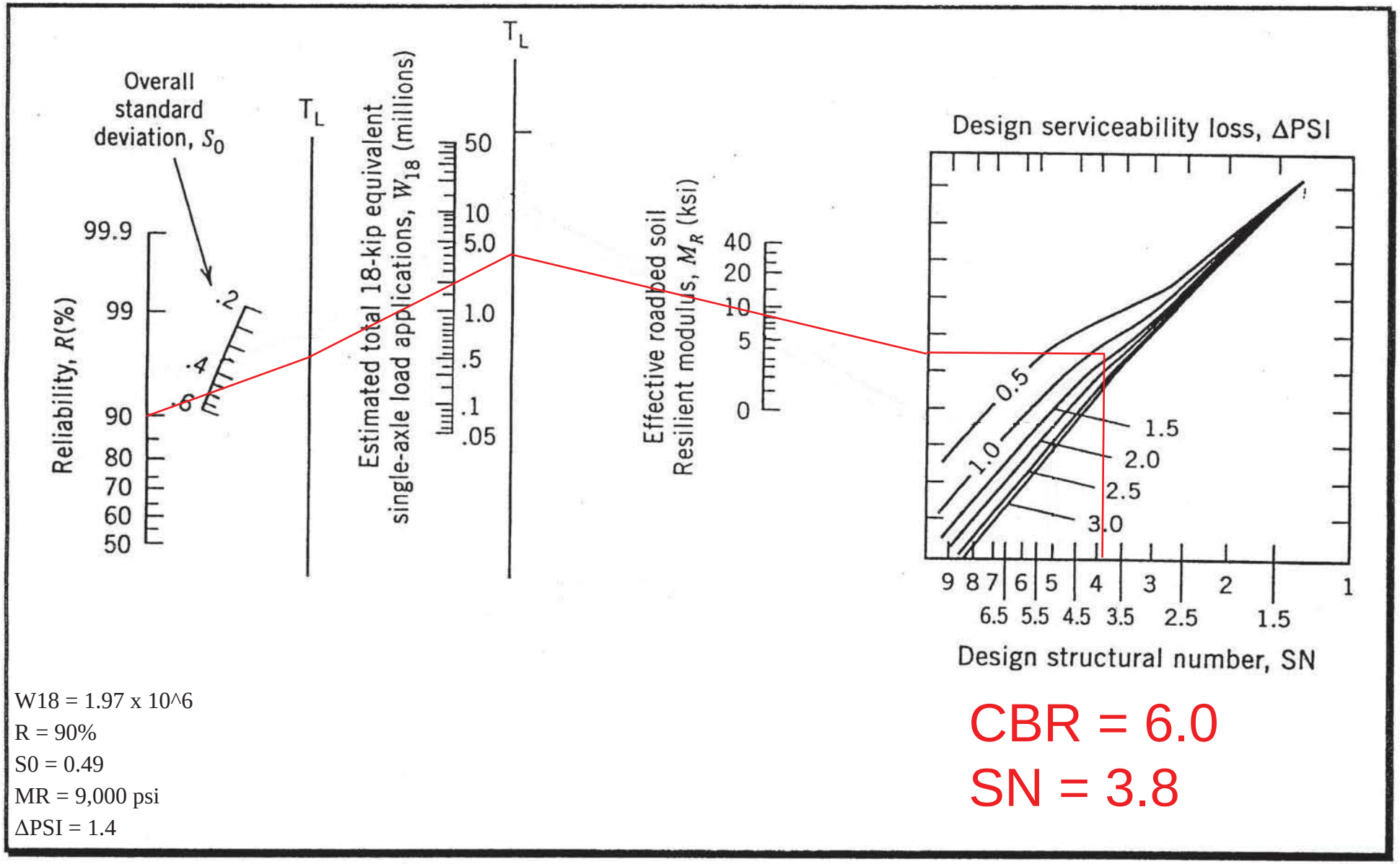
Design Life (yr) =		25	VI-39
Reliablity (%) =		90	VI-41
Standard Deviation =		0.49	VI-41
Serviceability Loss =	4.2 - 2.8 =	1.4	VI-41
CBR =		9.0	Specified
Design CBR =	(2/3) CBR =	6.0	VI-43
MR =	1500 x DCBR =	9000	VI-43 fine-grained
ADT 2040 =		19,170	RDA
%Trucks =		2	Assumed
%Tractor Trailor =		1	Assumed
W18 =		1,965,114	Traffic Loading worksheet
SN (CBR=6.0) =		3.8	Flexible Pavement Nomograph

Full Depth Pavement Section Design		**Min. for SN=3.8**		**Max. to Match Existing**		
material	**a1**	**thickness**	**SN**	**thickness**	**SN**	
SM-9.5	0.44	1.5	0.66	1.5	0.66	
IM-19	0.44	0	0	0	0	
BM-25	0.44	6	2.64	6.5	2.86	
21A	0.12	0	0	0	0	
21B	0.12	6	0.72	8	0.96	(21B for ADT>1000)
OGDL	0.10	0	0	0	0	
CTA (21A)	0.2	0	0	0	0	
Total			4.02		4.48	
Check			pass		pass	

NOTES:

Max. Existing Asphalt Thickness = 8"
Max. Existing AggregateThickness = 8"

FULL DEPTH PAVEMENT SECTION



W18 = 1.97 x 10^6
R = 90%
S0 = 0.49
MR = 9,000 psi
ΔPSI = 1.4

CBR = 6.0
SN = 3.8

Flexible Pavement Nomograph Hope Drive (Papermill Road to Pleasant Valley Road)

Project: Hope Drive

Project No.: 31170078

Date: December 8, 2017

TRAFFIC LOADING WORK SHEET (VDOT)

Papermill Road (Taft Avenue to Hope Drive)

Input		
ADT (2015)	6,700	(RDA)
Growth Rate	0.012	(VI-40)
%cars	97	(Assumed)
%trucks	2	(Assumed)
%tractor trailor	1	(Assumed)
# of lanes/direction	1	(VI-40)
life span (years)	25	(VI-39)

Flexible Pavement		
car factor	0.0002	(VI-40)
truck factor	0.46	(VI-40)
tractor trailor factor	1.05	(VI-40)

Rigid Pavement	
car factor	0.0002
truck factor	0.59
tractor trailor factor	1.59

Total W18 ESAL's - Flexible Pavement		
car	14394	
truck	682623	
tractor trailor	779081	
total	1476098	
lane distribution	1	
Distributed total	**1476098**	W18 ESAL's - Flexible Pavement

Total W18 ESAL's - Rigid Pavement		
car	14394	
truck	875538	
tractor trailor	1179751	
total	2069683	
lane distribution	1	
Distributed total	2069683	W18 ESAL's - Rigid Pavement

Year	ADT	Total for Year		
0	6700	2445500	0	ADT (2015)
1	6781	2475088	0	
2	6863	2505034	0	
3	6946	2535342	0	
4	7030	2566017	0	
5	7115	2597063	0	
6	7201	2628484	0	
7	7288	2660286	0	
8	7377	2692472	0	
9	7466	2725048	0	
10	7556	2758019	0	
11	7648	2791387	0	
12	7740	2825160	0	
13	7834	2859342	0	
14	7929	2893936	0	
15	8025	2928950	0	
16	8122	2964387	0	
17	8220	3000253	0	
18	8319	3036552	0	
19	8420	3073291	0	
20	8522	3110475	0	
21	8625	3148108	0	
22	8729	3186197	0	
23	8835	3224746	0	
24	8942	3263762	0	
25	**9050**	3303250	74198149	ADT (2040)
26	9159	3343216	0	
27	9270	3383665	0	
28	9382	3424604	0	
29	9496	3466037	0	
30	9611	3507973	0	

Lifetime Total = 74198149

	Year	ADT
From RDA:	2015	6,700
	2040	9,050

Growth Rate: See Eqn. VI-40

GR = 1.21 %

AASHTO PAVEMENT DESIGN - FULL DEPTH PAVEMENT

Papermill Road (Taft Avenue to Hope Drive)

Job : Hope Drive
Job Number : 31170078
Design By : TC
Date : 12/8/2017

Full Depth Pavement

Road Name:
Papermill Road

Based on VDOT's Guidelines for AASHTO Pavement Design 1993, Revised May 2011

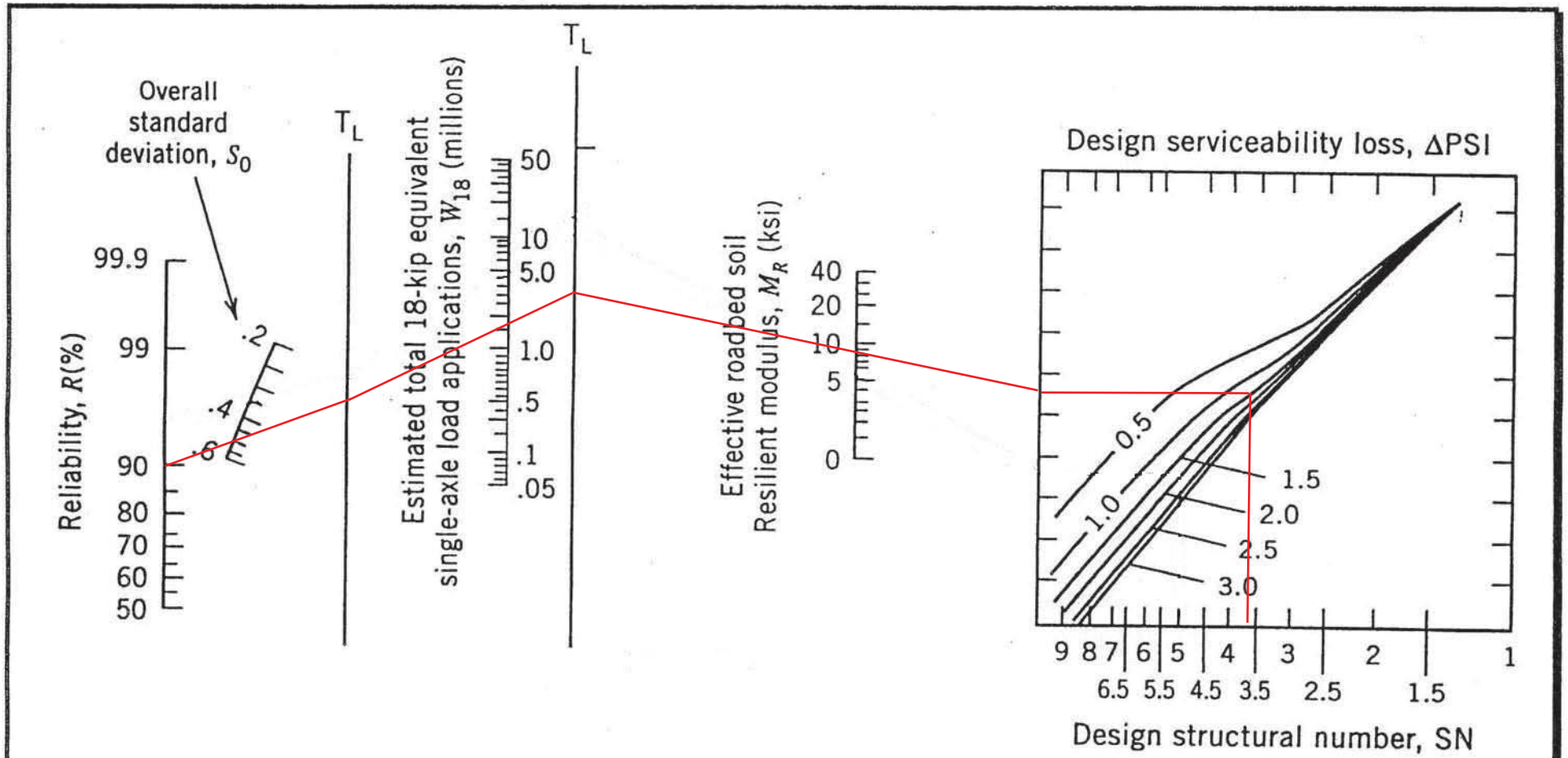
Design Life (yr) =		25	VI-39
Reliablity (%) =		90	VI-41
Standard Deviation =		0.49	VI-41
Serviceability Loss =	4.2 - 2.8 =	1.4	VI-41
CBR =		9.0	Specified
Design CBR =	(2/3) CBR =	6.0	VI-43
MR =	1500 x DCBR =	9000	VI-43 fine-grained
ADT 2040 =		9,050	RDA
%Trucks =		2	Assumed
%Tractor Trailor =		1	Assumed
W18 =		1,476,098	Traffic Loading worksheet
SN (CBR=6.0) =		3.6	Flexible Pavement Nomograph

Full Depth Pavement Section Design		**Min. for SN=3.6**		**Max. to Match Existing**		
material	**a1**	**thickness**	**SN**	**thickness**	**SN**	
SM-9.5	0.44	1.5	0.66	1.5	0.66	
IM-19	0.44	0	0	0	0	
BM-25	0.44	5.5	2.42	9.5	4.18	
21A	0.12	0	0	0	0	
21B	0.12	6	0.72	10	1.2	(21B for ADT>1000)
OGDL	0.10	0	0	0	0	
CTA (21A)	0.2	0	0	0	0	
Total			3.8		6.04	
Check			pass		pass	

NOTES:

Max. Existing Asphalt Thickness = 11"
Max. Existing AggregateThickness = 10"

FULL DEPTH PAVEMENT SECTION



W18 = 1.48 x 10^6
R = 90%
S0 = 0.49
MR = 9,000 psi
ΔPSI = 1.4

CBR = 6.0
SN = 3.6

Flexible Pavement Nomograph Papermill Road (Taft Avenue to Hope Drive)

Project: Hope Drive
Project No.: 31170078
Date: December 8, 2017

TRAFFIC LOADING WORK SHEET (VDOT)

Roosevelt Boulevard

Input		
ADT (2015)	500	(Assumed)
Growth Rate	0.0200	(VI-40)
%cars	97	(Assumed)
%trucks	2	(Assumed)
%tractor trailor	1	(Assumed)
# of lanes/direction	1	(VI-40)
life span (years)	25	(VI-39)

Flexible Pavement		
car factor	0.0002	(VI-40)
truck factor	0.46	(VI-40)
tractor trailor factor	1.05	(VI-40)

Rigid Pavement	
car factor	0.0002
truck factor	0.59
tractor trailor factor	1.59

Total W18 ESAL's - Flexible Pavement		
car	1192	
truck	56522	
tractor trailor	64509	
total	122223	
lane distribution	1	
Distributed total	**122223**	W18 ESAL's - Flexible Pavement

Total W18 ESAL's - Rigid Pavement		
car	1192	
truck	72496	
tractor trailor	97685	
total	171372	
lane distribution	1	
Distributed total	171372	W18 ESAL's - Rigid Pavement

Year	ADT	Total for Year		
0	500	182500	0	ADT (2015)
1	510	186147	0	
2	520	189867	0	
3	531	193662	0	
4	541	197532	0	
5	552	201480	0	
6	563	205506	0	
7	574	209613	0	
8	586	213803	0	
9	597	218075	0	
10	609	222434	0	
11	622	226879	0	
12	634	231413	0	
13	647	236038	0	
14	660	240755	0	
15	673	245567	0	
16	686	250474	0	
17	700	255480	0	
18	714	260586	0	
19	728	265793	0	
20	743	271105	0	
21	758	276523	0	
22	773	282050	0	
23	788	287686	0	
24	804	293436	0	
25	**820**	299300	6143705	ADT (2040)
26	836	305281	0	
27	853	311383	0	
28	870	317605	0	
29	888	323953	0	
30	905	330427	0	
Lifetime Total	=	6143705		

	Year	ADT
Assumed:	2015	500
Calculated:	2040	820

Growth Rate: See Eqn. VI-40

GR = 2.00 %

*ADT 2040 calculated assuming a 2% Growth Rate

ADT 2015 based on Traffic Count Data for similar roads in
2016 VDOT Special Locality Report 138 - City of Winchester.
ADT 2015 value of 500 +/- VPD verified acceptable by RDA

AASHTO PAVEMENT DESIGN - FULL DEPTH PAVEMENT
Roosevelt Boulevard

Job : Hope Drive
Job Number : 31170078
Design By : TC
Date : 12/8/2017

Full Depth Pavement

Road Name:
Roosevelt Boulevard

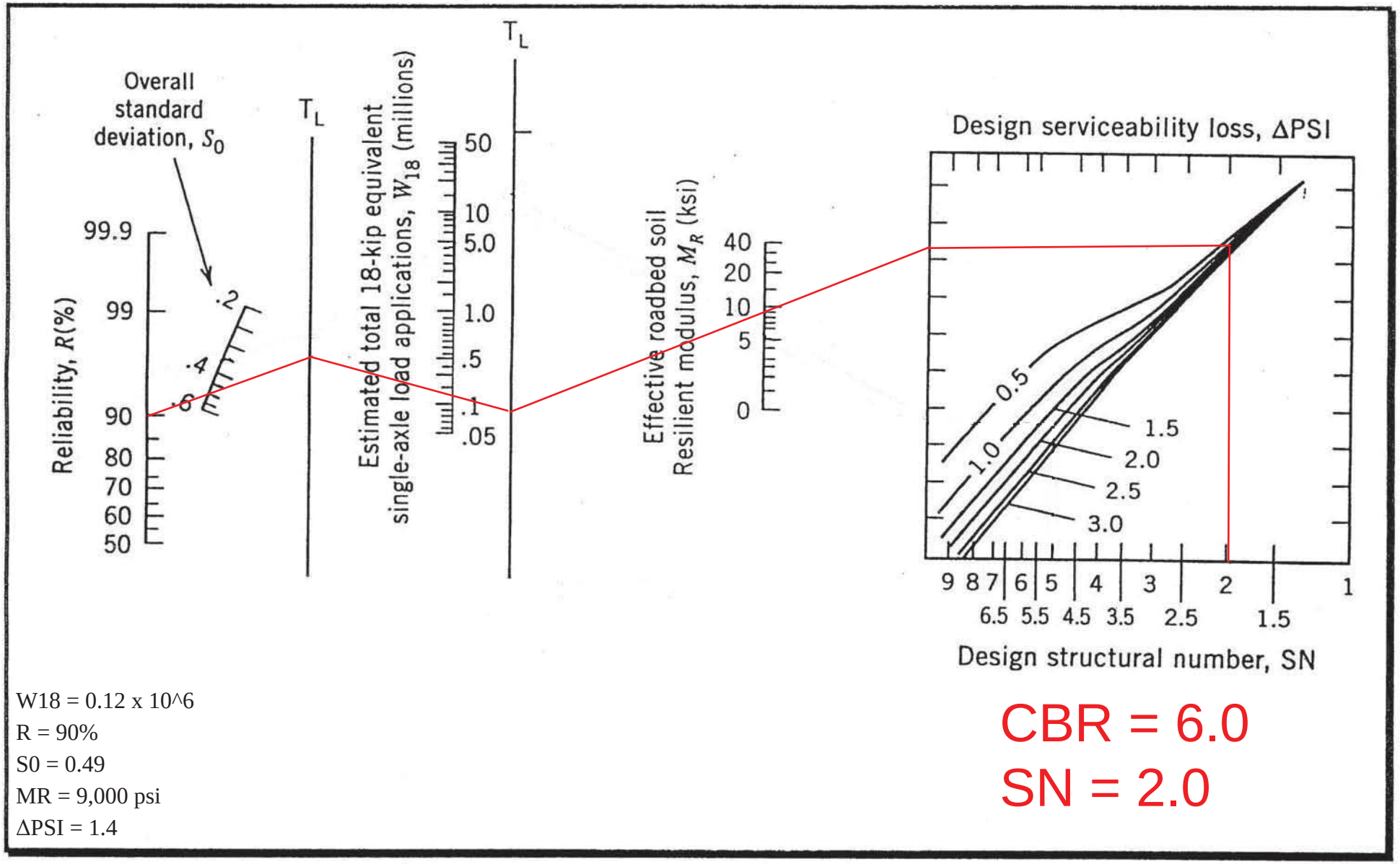
Based on VDOT's Guidelines for AASHTO Pavement Design 1993, Revised May 2011

Design Life (yr) =		25	VI-39
Reliablity (%) =		90	VI-41
Standard Deviation =		0.49	VI-41
Serviceability Loss =	4.2 - 2.8 =	1.4	VI-41
CBR =		9.0	Specified
Design CBR =	(2/3) CBR =	6.0	VI-43
MR =	1500 x DCBR =	9000	VI-43 fine-grained
AADT 2040 =		820	Estimated from VDOT Data
%Trucks =		2	Assumed
%Tractor Trailor =		1	Assumed
W18 =		122,223	Traffic Loading worksheet
SN (CBR=6.0) =		2.0	Flexible Pavement Nomograph

Full Depth Pavement Section Design		**Min. for SN=2.0**		**Max. to Match Existing**		
material	**a1**	**thickness**	**SN**	**thickness**	**SN**	
SM-9.5	0.44	1.5	0.66	1.5	0.66	
IM-19	0.44	0	0	0	0	
BM-25	0.44	2.5	1.1	2.5	1.1	
21A	0.12	3	0.36	3	0.36	(21A for ADT<1000)
21B	0.12	0	0	0	0	
OGDL	0.10	0	0	0	0	
CTA (21A)	0.2	0	0	0	0	
Total			2.12		2.12	
Check			pass		pass	

NOTES:
Max. Existing Asphalt Thickness = 4"
Max. Existing AggregateThickness = 3"

FULL DEPTH PAVEMENT SECTION



W18 = 0.12 x 10^6
R = 90%
S0 = 0.49
MR = 9,000 psi
ΔPSI = 1.4

CBR = 6.0
SN = 2.0

Flexible Pavement Nomograph Roosevelt Boulevard

Project: Hope Drive
Project No.: 31170078
Date: December 8, 2017

TRAFFIC LOADING WORK SHEET (VDOT)

Frontage Road

Input		
ADT (2015)	500	(Assumed)
Growth Rate	0.0200	(VI-40)
%cars	97	(Assumed)
%trucks	2	(Assumed)
%tractor trailor	1	(Assumed)
# of lanes/direction	1	(VI-40)
life span (years)	25	(VI-39)

Flexible Pavement		
car factor	0.0002	(VI-40)
truck factor	0.46	(VI-40)
tractor trailor factor	1.05	(VI-40)

Rigid Pavement	
car factor	0.0002
truck factor	0.59
tractor trailor factor	1.59

Total W18 ESAL's - Flexible Pavement		
car	1192	
truck	56522	
tractor trailor	64509	
total	122223	
lane distribution	1	
Distributed total	**122223**	W18 ESAL's - Flexible Pavement

Total W18 ESAL's - Rigid Pavement		
car	1192	
truck	72496	
tractor trailor	97685	
total	171372	
lane distribution	1	
Distributed total	171372	W18 ESAL's - Rigid Pavement

Year	ADT	Total for Year		
0	500	182500	0	ADT (2015)
1	510	186147	0	
2	520	189867	0	
3	531	193662	0	
4	541	197532	0	
5	552	201480	0	
6	563	205506	0	
7	574	209613	0	
8	586	213803	0	
9	597	218075	0	
10	609	222434	0	
11	622	226879	0	
12	634	231413	0	
13	647	236038	0	
14	660	240755	0	
15	673	245567	0	
16	686	250474	0	
17	700	255480	0	
18	714	260586	0	
19	728	265793	0	
20	743	271105	0	
21	758	276523	0	
22	773	282050	0	
23	788	287686	0	
24	804	293436	0	
25	**820**	299300	6143705	ADT (2040)
26	836	305281	0	
27	853	311383	0	
28	870	317605	0	
29	888	323953	0	
30	905	330427	0	
Lifetime Total	=	6143705		

	Year	ADT
Assumed:	2015	500
Calculated:	2040	820

Growth Rate: See Eqn. VI-40

GR = 2.00 %

*ADT 2040 calculated assuming a 2% Growth Rate

ADT 2015 based on Traffic Count Data for similar roads in
2016 VDOT Special Locality Report 138 - City of Winchester.
ADT 2015 value of 500 +/- VPD verified acceptable by RDA

AASHTO PAVEMENT DESIGN - FULL DEPTH PAVEMENT

Frontage Road (Hope Drive to Cul-de-Sac)

Job : Hope Drive
Job Number : 31170078
Design By : TC
Date : 12/8/2017

Full Depth Pavement

Road Name:
Frontage Road

Based on VDOT's Guidelines for AASHTO Pavement Design 1993, Revised May 2011

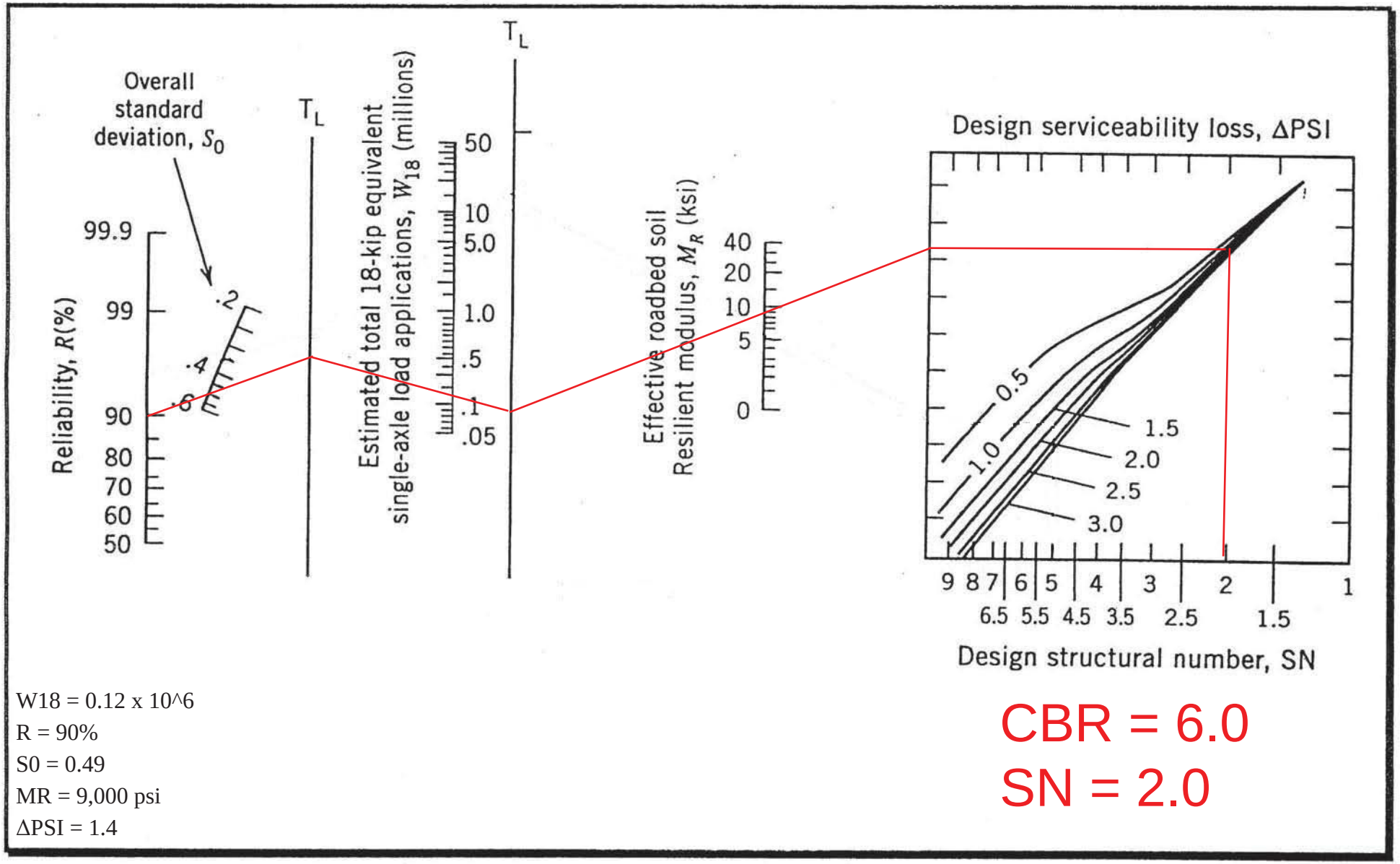
Design Life (yr) =		25	VI-39
Reliablity (%) =		90	VI-41
Standard Deviation =		0.49	VI-41
Serviceability Loss =	4.2 - 2.8 =	1.4	VI-41
CBR =		9.0	Specified
Design CBR =	(2/3) CBR =	6.0	VI-43
MR =	1500 x DCBR =	9000	VI-43 fine-grained
AADT 2040 =		820	Estimated from VDOT Data
%Trucks =		2	Assumed
%Tractor Trailor =		1	Assumed
W18 =		122,223	Traffic Loading worksheet
SN (CBR=6.0) =		2.0	Flexible Pavement Nomograph

Full Depth Pavement Section Design		**Min. for SN=2.0**		**Max. to Match Existing**		
material	**a1**	**thickness**	**SN**	**thickness**	**SN**	
SM-9.5	0.44	1.5	0.66	1.5	0.66	
IM-19	0.44	0	0	0	0	
BM-25	0.44	2.5	1.1	5.5	2.42	
21A	0.12	3	0.36	7	0.84	(21A for ADT<1000)
21B	0.12	0	0	0	0	
OGDL	0.10	0	0	0	0	
CTA (21A)	0.2	0	0	0	0	
Total			2.12		3.92	
Check			pass		pass	

NOTES:

Max. Existing Asphalt Thickness = 7"
Max. Existing AggregateThickness = 7"

FULL DEPTH PAVEMENT SECTION



W18 = 0.12 x 10^6
R = 90%
S0 = 0.49
MR = 9,000 psi
ΔPSI = 1.4

CBR = 6.0
SN = 2.0

Flexible Pavement Nomograph Frontage Road (Hope Drive to Cul-de-Sac)

Project: Hope Drive
Project No.: 31170078
Date: December 8, 2017

TRAFFIC LOADING WORK SHEET (VDOT)

Tevis Street (Wilson Boulevard to Cul-de-Sac)

Input		
ADT (2015)	1,830	(Back-Calculated)
Growth Rate	0.0200	(VI-40)
%cars	97	(Assumed)
%trucks	2	(Assumed)
%tractor trailor	1	(Assumed)
# of lanes/direction	1	(VI-40)
life span (years)	25	(VI-39)

Flexible Pavement		
car factor	0.0002	(VI-40)
truck factor	0.46	(VI-40)
tractor trailor factor	1.05	(VI-40)

Rigid Pavement	
car factor	0.0002
truck factor	0.59
tractor trailor factor	1.59

Total W18 ESAL's - Flexible Pavement		
car	4361	
truck	206826	
tractor trailor	236051	
total	447238	
lane distribution	1	
Distributed total	**447238**	W18 ESAL's - Flexible Pavement

Total W18 ESAL's - Rigid Pavement		
car	4361	
truck	265277	
tractor trailor	357449	
total	627087	
lane distribution	1	
Distributed total	627087	W18 ESAL's - Rigid Pavement

Year	ADT	Total for Year		
0	1830	667950	0	ADT (2015)
1	1867	681288	0	
2	1904	694892	0	
3	1942	708768	0	
4	1981	722922	0	
5	2020	737357	0	
6	2060	752081	0	
7	2102	767099	0	
8	2144	782417	0	
9	2186	798041	0	
10	2230	813977	0	
11	2275	830231	0	
12	2320	846809	0	
13	2366	863719	0	
14	2414	880966	0	
15	2462	898558	0	
16	2511	916501	0	
17	2561	934802	0	
18	2612	953469	0	
19	2664	972508	0	
20	2718	991928	0	
21	2772	1011735	0	
22	2827	1031938	0	
23	2884	1052545	0	
24	2941	1073562	0	
25	**3000**	1095000	22481065	ADT (2040)
26	3060	1116866	0	
27	3121	1139168	0	
28	3183	1161915	0	
29	3247	1185117	0	
30	3312	1208782	0	

Lifetime Total = 22481065

	Year	ADT
	2015	1,830
Fom RDA:	2040	3,000

Growth Rate: See Eqn. VI-40

GR = 2.00 %

*ADT 2015 back-calculated assuming a 2% Growth Rate

AASHTO PAVEMENT DESIGN - FULL DEPTH PAVEMENT

Tevis Street (Wilson Boulevard to Cul-de-Sac)

Job : Hope Drive
Job Number : 31170078
Design By : TC
Date : 12/8/2017

Full Depth Pavement

Road Name:
Tevis Street

Based on VDOT's Guidelines for AASHTO Pavement Design 1993, Revised May 2011

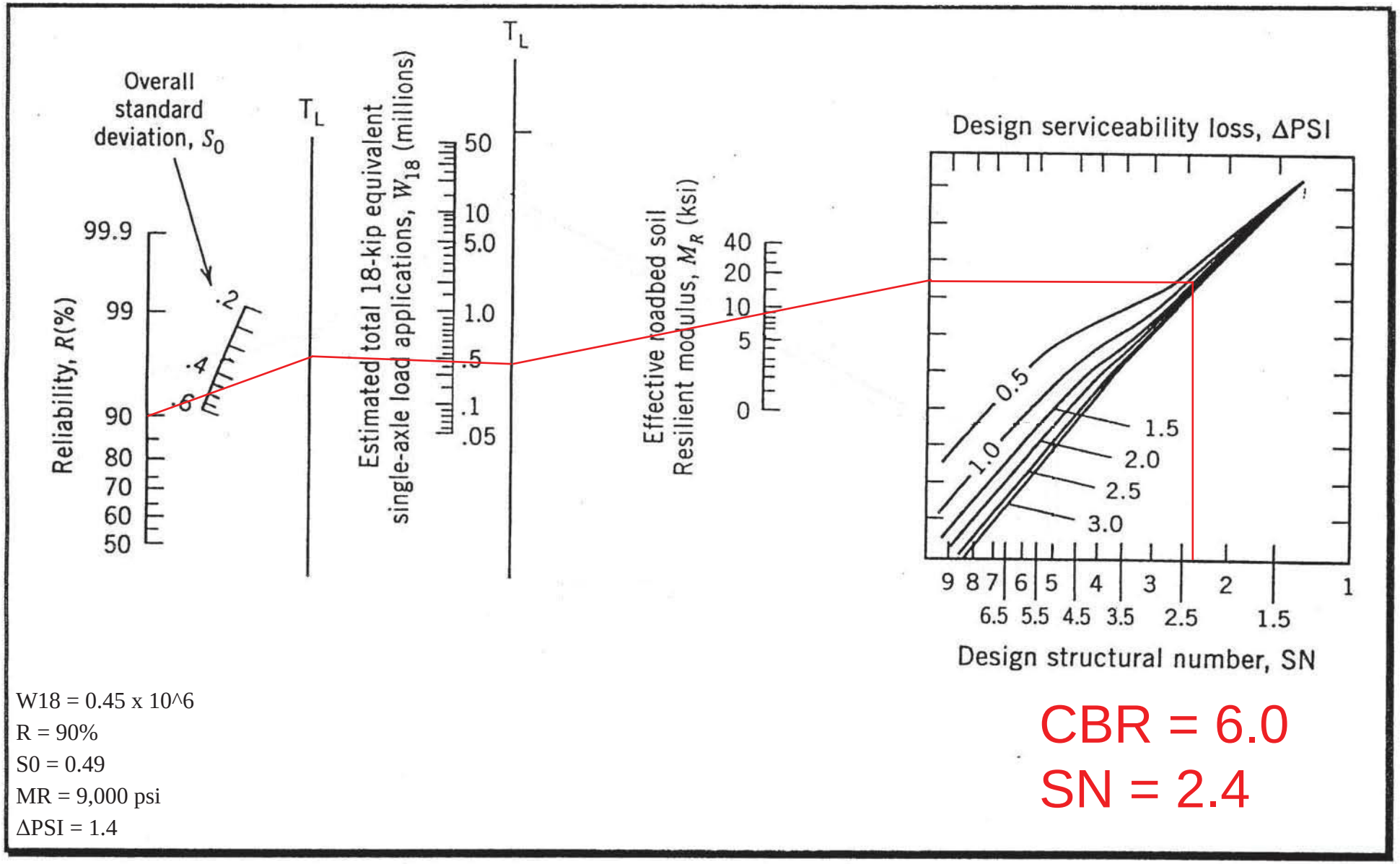
Design Life (yr) =		25	VI-39
Reliablity (%) =		90	VI-41
Standard Deviation =		0.49	VI-41
Serviceability Loss =	4.2 - 2.8 =	1.4	VI-41
CBR =		9.0	Specified
Design CBR =	(2/3) CBR =	6.0	VI-43
MR =	1500 x DCBR =	9000	VI-43 fine-grained
ADT 2040 =		3,000	RDA
%Trucks =		2	Assumed
%Tractor Trailor =		1	Assumed
W18 =		447,238	Traffic Loading worksheet
SN (CBR=6.0) =		2.4	Flexible Pavement Nomograph

Full Depth Pavement Section Design		**Min. for SN=2.4**		**Max. to Match Existing**		
material	**a1**	**thickness**	**SN**	**thickness**	**SN**	
SM-9.5	0.44	1.5	0.66	1.5	0.66	
IM-19	0.44	0	0	0	0	
BM-25	0.44	2.5	1.1	3.5	1.54	
21A	0.12	0	0	0	0	
21B	0.12	6	0.72	5	0.6	(21B for ADT>1000)
OGDL	0.10	0	0	0	0	
CTA (21A)	0.2	0	0	0	0	
Total			2.48		2.80	
Check			pass		pass	

NOTES:

Max. Existing Asphalt Thickness = 5"
Max. Existing AggregateThickness = 5"

FULL DEPTH PAVEMENT SECTION



W18 = 0.45 x 10^6
R = 90%
S0 = 0.49
MR = 9,000 psi
ΔPSI = 1.4

CBR = 6.0
SN = 2.4

Flexible Pavement Nomograph Tevis Street (Wilson Boulevard to Cul-de-Sac)

Project: Hope Drive
Project No.: 31170078
Date: December 8, 2017

Important Information About Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE-member geotechnical engineer for more information.

ASFE
The Best People on Earth

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@asfe.org www.asfe.org

Copyright 2004 by ASFE, Inc. Duplication, reproduction, or copying of this document, in whole or in part, by any means whatsoever, is strictly prohibited, except with ASFE's specific written permission. Excerpting, quoting, or otherwise extracting wording from this document is permitted only with the express written permission of ASFE, and only for purposes of scholarly research or book review. Only members of ASFE may use this document as a complement to or as an element of a geotechnical engineering report. Any other firm, individual, or other entity that so uses this document without being an ASFE member could be commiting negligent or intentional (fraudulent) misrepresentation.

IIGER06045.0M