



**ARLINGTON COUNTY, VIRGINIA
OFFICE OF THE PURCHASING AGENT
2100 CLARENDON BOULEVARD, SUITE 500
ARLINGTON, VA 22201
(703) 228-3410**

INVITATION TO BID (ITB) NO. 22-DES-ITBPW-693

**TWO (2) TRAFFIC SIGNAL UPGRADE PROJECTS
AT
ARLINGTON BLVD. & N. MONTAGUE ST. & FAIRFAX DR. & N. MONROE ST.**

ELECTRONIC SEALED BIDS WILL BE RECEIVED BY ARLINGTON COUNTY VIA [VENDOR REGISTRY](#) UNTIL 1:00 P.M. ON THE 19TH DAY OF MAY 2022. REGISTRATION IS NOT REQUIRED TO DOWNLOAD THE ITB. IN ORDER TO SUBMIT A RESPONSE TO THIS ITB, REGISTRATION IS REQUIRED. NO RESPONSES WILL BE ACCEPTED AFTER THE BID DUE DATE AND TIME.

THERE IS A NONMANDATORY PREBID CONFERENCE ON APRIL 27, 2022, AT 10:30 A.M.:

Join on your computer or mobile app

[Click here to join the meeting](#)

Or call in (audio only)

[+1 347-973-6905, 614387539#](#) United States, New York City

Phone Conference ID: 614 387 539 #

A virtual Prebid conference will be held at 10:30 a.m., APRIL 27, 2022, on Microsoft Teams to allow potential Bidders an opportunity to obtain clarification of the specifications and requirements of the solicitation. To join the meeting, please click the link above or join by dialing the phone number and enter the Conference ID above. ATTENDANCE AT THE PREBID CONFERENCE IS OPTIONAL. Minutes of the Prebid conference will be recorded by the County and may be incorporated into the solicitation documents through an Addendum. All Bidders are strongly encouraged to attend.

The County will conduct a virtual bid opening via Microsoft Teams Application (APP). Bidders interested in viewing the public bid opening must download the APP and join the meeting via the Microsoft Teams APP and enable audio, video or both. The link to join the virtual bid opening is provided below:

PUBLIC BID OPENING ON MAY 19, 2022, AT 1:00 P.M.:

Join on your computer or mobile app

[Click here to join the meeting](#)

Or call in (audio only)

[+1 347-973-6905, 203212317#](#) United States, New York City

Phone Conference ID: 203 212 317#

Bid Surety in the amount of not less than 5% of the bid must be submitted with the bid. Performance and Payment Bonds in the amount of 100% of the award will be required of the successful bidder.

NOTICE: ANY BIDDER ORGANIZED AS A STOCK OR NONSTOCK CORPORATION, LIMITED LIABILITY COMPANY, BUSINESS TRUST, OR LIMITED PARTNERSHIP OR REGISTERED AS A LIMITED LIABILITY PARTNERSHIP MUST BE AUTHORIZED TO TRANSACT BUSINESS IN THE COMMONWEALTH OF VIRGINIA PRIOR TO SUBMITTING A BID (REFER TO AUTHORITY TO TRANSACT BUSINESS SECTION IN THE SOLICITATION FOR FURTHER INFORMATION)

Arlington County reserves the right to reject any and all bids, cancel this solicitation, and to waive any informalities or irregularities in procedure. A bidder's submission of a bid indicates acceptance of these terms.

Arlington County, Virginia
Office of the Purchasing Agent

Tomeka D. Price, VCO, VCA
Procurement Officer
tprice@arlingtonva.us

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I. INFORMATION FOR BIDDERS

1. QUESTIONS AND ADDENDA

BIDDERS MUST BE REGISTERED IN VENDOR REGISTRY TO SUBMIT A QUESTION FOR THIS INVITATION TO BID (ITB).

All communications relating to this solicitation must be submitted online using Vendor Registry. For a question to be considered, the question must be entered in the Question Section of **ITB No. 22-DES-ITBPW-693**. Prior to the award of a contract resulting from this solicitation, bidders are prohibited from contacting any County staff other than those assigned to the Office of the Purchasing Agent.

QUESTIONS REGARDING THE ORIGINAL SOLICITATION MUST BE SUBMITTED BY MAY 4, 2022, AT 5:00 PM EASTERN TIME TO BE CONSIDERED. ALL QUESTIONS RECEIVED BY THE QUESTION DEADLINE WILL BE RESPONDED TO WITHIN VENDOR REGISTRY AND POSTED FOR ALL BIDDERS. THE SYSTEM WILL NOT ACCEPT ANY QUESTIONS AFTER THIS DATE AND TIME.

If any questions or responses require revisions to this solicitation, such revisions will be by formal Addendum only. Bidders are cautioned not to rely on any written, electronic, or oral representations made by any County representative or other person, including the County's technical contact, that appear to change any portion of the solicitation unless the change is ratified by a written Addendum to this solicitation issued by the Office of the Purchasing Agent.

2. INTEREST IN MORE THAN ONE BID AND COLLUSION

Reasonable grounds for believing that a Bidder is interested in more than one bid for a solicitation, including both as a Bidder and as a subcontractor for another Bidder, or that collusion exists between two or more Bidders, will result in rejection of all affected bids. However, an individual or entity acting only as a subcontractor may be included as a subcontractor on bids of two or more different Bidders. Bidders rejected under the above provision will also be disqualified if they respond to a re-solicitation for the same work.

3. TRADE SECRETS OR PROPRIETARY INFORMATION

Trade secrets or proprietary information that a bidder or contractor submits in connection with a procurement transaction may be exempted from public disclosure under the Virginia Freedom of Information Act ("VFOIA"). However, the bidder or contractor must invoke VFOIA protection clearly and in writing on the Bid Form for County review. The Bid Form must include at least the following: (1) the data or other materials sought to be protected and (2) specific reasons why the material is confidential or proprietary. It is the bidder's sole responsibility to defend such exemptions if challenged in a court of competent jurisdiction.

4. DEBARMENT STATUS

The Bidder must indicate on the Bid Form whether it or any of its principals is currently debarred from submitting bids to the County or to any other state or political subdivision and whether the Bidder is an agent of any person or entity that is currently debarred from submitting bids to the County or to any other state or political subdivision. An affirmative response may be considered grounds for rejection of the bid.

5. AUTHORITY TO TRANSACT BUSINESS

Any Bidder organized as a stock or nonstock corporation, limited liability company, business trust, or limited partnership or registered as a registered limited liability partnership must be authorized to

transact business in the Commonwealth of Virginia as a domestic or foreign business entity if so required by Title 13.1 or Title 50 of the Code of Virginia, or as otherwise required by law. The proper and full legal name of the entity and the identification number issued to the Bidder by the Virginia State Corporation Commission must be included on the Bid Form. Any Bidder that is not required to be authorized to transact business in the Commonwealth must include in its bid a statement describing why the Bidder is not required to be so authorized. The County may require a Bidder to provide documentation that 1) clearly identifies the complete name and legal form of the entity and 2) establishes that the entity is authorized by the State Corporation Commission to transact business in the Commonwealth of Virginia. Failure of a Bidder to provide such documentation will be a ground for rejection of the bid or cancellation of any award. For further information refer to the Commonwealth of Virginia State Corporation Commission website at: www.scc.virginia.gov.

6. ARLINGTON COUNTY BUSINESS LICENSES

The successful Bidder must comply with the provisions of Chapter 11 ("Licenses") of the Arlington County Code, if applicable. For information on the provisions of that Chapter and its applicability to this solicitation, contact the Arlington County Business License Division, Office of the Commissioner of the Revenue, at 2100 Clarendon Blvd., Suite 200, Arlington, Virginia, 22201, tel. (703) 228-3060, or e-mail business@arlingtonva.us.

7. COVID-19 VACCINATION POLICY FOR CONTRACTORS

Due to the ongoing COVID-19 pandemic, the County has taken various steps to protect the welfare, health, safety, and comfort of the workforce and public at large. As part of these steps, the County has implemented various requirements with respect to health and safety including policies with respect to social distancing, the use of face-coverings and vaccine mandates. To protect the County's workforce and the public at large, all employees and subcontractors of the Contractor who are assigned to this Contract, should be fully vaccinated against COVID-19. Any contractor employee or subcontractor who is not fully vaccinated should follow a weekly testing protocol as established by the Contractor, unless exempt pursuant to a valid reasonable accommodation under state or federal law. By submitting a bid, the Bidder certifies that it will comply with this provision and will ensure that its subcontractors, if any, do so as well.

8. VIRGINIA CONTRACTOR LICENSE

For all work that is classified as being performed by "Contractors" as defined by the Virginia State Board for Contractors, a Class A, B, or C License is required.

If a contract for performing or managing construction, removal, repair or improvements is for \$120,000 or more, or if the total value of all such construction, removal, repair, or improvements undertaken by the bidder within any twelve-month period is \$750,000 or more, the bidder is required under Title 54.1, Chapter 11, Code of Virginia, as amended, to be licensed as a "CLASS A CONTRACTOR."

If a contract for performing or managing construction, removal, repair or improvements is for \$10,000 or more, but less than \$120,000, or if the total value of all such construction, removal, repair, or improvements undertaken by the bidder within any twelve-month period is \$150,000 or more, but less than \$750,000, the bidder is required under Title 54.1, Chapter 11, Code of Virginia, as amended, to be licensed as a "CLASS B CONTRACTOR."

If a contract for performing construction, removal, repair or improvements is for \$1,000 or more, but no more than \$10,000 or if the total value of all such construction, removal, repair, or improvements undertaken by the bidder within any twelve-month period is less than \$150,000, the bidder is required

under Title 54.1, Chapter 11, Code of Virginia, as amended, to be licensed as a "CLASS C CONTRACTOR." Class C contractors shall not include electrical, plumbing, and heating, ventilation and air conditioning contractors.

For further information, contact the State Board for Contractors, 2 South Ninth Street, Richmond, VA 23219, (804) 367-8511.

9. ESTIMATED QUANTITIES/NON-EXCLUSIVITY OF CONTRACTOR

The contract that will result from this solicitation will not obligate the County to purchase a specific quantity of items or services during the Contract Term. Any quantities that are included in the contract documents are the present expectations the County for the period of the contract, and the County is under no obligation to buy that, or any, amount as a result of having provided this estimate or of having had any normal or otherwise measurable requirement in the past. The County may require more goods and/or services than the estimated annual amount, and any such additional quantities will not give rise to any claim for compensation other than at the unit prices and/or rates specified in the contract.

The items or services covered by this contract may be or become available under other County contract(s), and the County may determine that it is in its best interest to procure the items or services through such other contract(s). The County does not guarantee that the selected contractor will be the exclusive provider of the goods or services covered by the resulting contract.

10. PREVAILING WAGE CONTRACT FOR CONSTRUCTION SERVICES

This solicitation and the resulting contract are subject to Prevailing Wage provisions covered under Article 4-104 of the Arlington County Purchasing Resolution. All employees of any contractor or any subcontractor working on the contract shall be paid wages, salaries, benefits, and other remuneration at or above the craft or trade category prevailing wage rate indicated by Virginia Commissioner of Labor and Industry (DOLI) and as listed in the contract. The County will request from DOLI a wage determination at bid posting and a final wage determination at contract award. If the final wage determination changes at contract award, the Bidder shall submit their revised bid pricing to comply with the final wage determination from DOLI. By submitting a response to the solicitation, the Bidder certifies that it will comply with this provision and will ensure that its subcontractors, if any, also comply with the prevailing wage provisions. (Refer to draft Contract Terms and Conditions for further Prevailing Wage details specific to this solicitation/contract.)

11. BID FORM SUBMISSION

The submitted Bid Form must be signed and fully executed. The Bid Form must be submitted electronically via Vendor Registry no later than the date and time specified in this solicitation. The Vendor Registry system will not accept bids after the close date and time. The County will not accept emailed or faxed bid.

Bid Submittals shall include:

- **Pages 76 - 83, The Bid Form (Unit Price shall include all labor, material, and equipment)**
- **Bidder's Project Experience List covering:**
 - **Company's qualification and Project criteria**
- **Resumes of the proposed Key Personnel with their Bids**
- **OSHA 10 certification**
- **VDOT Flagger Certification, or American Traffic Safety Services Association Flagger Certification, or any other VDOT approved flagger Certification**

- **VDOT Erosion & Sediment Control Contractor Certification**
- **Attachment B – Pricing Sheet**

Failure to do so may result in the Bid being determined as non-responsive.

The Bidder name on the electronic bid submittal shall be the same as the Contractor/Vendor name as the registration in Vendor Registry for the upload to be considered a valid bid. ONLY ELECTRONIC SUBMISSION IS ALLOWED, NO BID SUBMITTED OTHER THAN A VENDOR REGISTRY ELECTRONIC UPLOAD WILL BE ACCEPTED. **Arlington County is not responsible for late submissions, missed Addendums, or questions not submitted before the end date and time.**

Timely submission is solely the responsibility of the Bidder. The Vendor Registry System will not accept applications after the publicly posted date and time. A bid may be rejected if the Bid Form is not signed in the designated space by a person authorized to legally bind the Bidder.

Modification of or additions to the Bid Form may be cause for rejection of the bid; however, Arlington County reserves the right to decide, in its sole discretion, whether to reject such a bid as nonresponsive. As a precondition to bid acceptance, Arlington County may request the bidder to withdraw or modify any such modifications or additions, if it does not affect quality, quantity, price, or delivery.

Bids and all documents uploaded/submitted to Arlington County by an Bidder become the property of the County upon receipt.

12. BIDDER CERTIFICATION

Submission of a signed Bid Form is certification by the respective bidder that it is registered with the Virginia State Corporation Commission (SCC), if applicable, it is the legal entity authorized to enter into an agreement with the County, and that it will accept any award made to it as a result of the submission. Entry of a Bidder's SCC number may be required at Vendor Registration.

13. ERRORS IN EXTENSION

If the unit price and the extension price differ, the unit price will prevail.

14. EXCEPTIONS

Conditional or qualified bids containing exceptions, unless specifically allowed in the solicitation, are subject to rejection in whole or in part as nonresponsive.

15. NONCONFORMING TERMS AND CONDITIONS

If a bid contains alternate terms and conditions that do not conform to the terms and conditions in this solicitation, the bid will be subject to rejection for nonresponsiveness. The County reserves the right to permit a bidder to withdraw nonconforming terms and conditions from its bid prior to the County's determination of nonresponsiveness.

16. BIDDERS' RESPONSIBILITY TO INVESTIGATE

Before submitting a bid, each bidder must make all investigations necessary to ascertain all conditions and requirements affecting the full performance of the contract and to verify any representations made by the County upon which the bidder will rely. No pleas of ignorance of such conditions and requirements will relieve the successful bidder from its obligation to comply in every detail with all provisions and

requirements of the contract or will be accepted as a basis for any claim for any monetary consideration on the part of the successful bidder.

17. SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK

Each bidder is responsible for ascertaining the nature and locations of the Work of the solicitation, and for investigating the general and local conditions and factors which can affect the work or its cost, including but not limited to:

- a. conditions bearing upon transportation, disposal, handling, and storage of materials;
- b. the availability of labor, water, electric power, and roads;
- c. uncertainties of weather, river stage, tides, or similar physical conditions at the site;
- d. the conformation and conditions of the ground; and
- e. the character of equipment and facilities needed before and during work performance.

Each bidder is responsible for investigating the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work publicly or otherwise available, as well as from the drawings and specifications made a part of this solicitation.

The locations of existing utilities, including underground utilities, which may affect the work are indicated on the drawings or in the specifications insofar as their existence and location were known at the time of preparation of the drawings. However, nothing in these drawings or specifications shall be construed as a guarantee that such utilities are in the location indicated or that they actually exist, or that other utilities are not within the area of operations. The bidder shall make all necessary investigations to determine the existence and locations of such utilities.

The County assumes no responsibility for any conclusions or interpretations made by the bidder based on the information made available by the County. The County assumes no responsibility for any understanding reached or representation made concerning conditions which could affect the work by any of its officers or agents before the execution of the contract, unless that understanding, or representation is expressly stated in the Contract.

18. INCOMPLETE DOCUMENTS

Each bidder is responsible for having determined the accuracy and/or completeness of the solicitation documents upon which it relied in making its bid, and has an affirmative obligation to notify the Arlington County Purchasing Agent immediately upon discovery of an apparent or suspected inaccuracy, error in, or omission of any pages, drawings, sections, or addenda whose omission from the documents was apparent from a reference or page numbering or other indication in the solicitation documents.

If a bidder downloads an electronic version of the solicitation documents, that potential bidder is responsible for determining the accuracy and/or completeness of the electronic documents and ensuring that the electronic documents used in preparing the bid are the most current version of solicitation documents issued by the County.

If the successful bidder proceeds with any activity that may be affected by an inaccuracy, error in, or omission in the solicitation documents of which it is aware but has not notified the Arlington County Purchasing Agent, the bidder hereby agrees to perform any activity described in the missing or incomplete documents at bidder's sole expense and at no additional cost to Arlington County.

19. ERRONEOUS OR INFEASIBLE REQUIREMENTS

Each bidder is responsible for having determined the feasibility of the work required and shall notify the County Purchasing Agent immediately upon discovery of any apparent erroneous, contradictory, incomplete, or infeasible requirements or directions contained in the Solicitation Documents. If a bidder fails to notify the County of such conditions immediately upon discovery, the bidder assumes all responsibility for any and all work required to satisfy the contract requirements at no additional cost to the County and within the Time for Completion.

20. QUALIFICATION OF BIDDERS

In order to be considered responsible and responsive Bidders shall have the experience described below, and provide the supporting documentation as instructed. Bidders shall have three (3) continuous years of construction contract experience conducting public works infrastructure and street improvement projects in an urban environment. The experience shall be work of similar size and scope, construction, reconstruction, and maintenance. The Bidder's obtained project experience shall consist of the following:

- State and County streets
- Curbs and gutters
- Sidewalks and walkways
- Driveway aprons
- Storm sewer pipes and inlets
- Wet Utilities
- Pavement markings and signage
- Electrical conduits
- Traffic signals and Street lighting
- Streetscapes and related site work

Project Experience: Bidders shall provide a list of three (3) similar projects completed within the last five (5) years involving the same size, and scope. The County will randomly contact the references provided. For each project, Bidders shall list the following information:

- Project Name
- Project description and scope of work
- Owner Project manager's name, telephone number and email address
- Work start date, scheduled completion, and actual completion date
- Initial contract cost and final contract cost

Staffing Qualifications: All key personnel proposed for this contract must have experience as designated key personnel in similar size and type of projects. The following are considered key personnel:

- Site Supervisor shall have at least five (5) years of experience in overseeing projects of similar type and size.
- Safety Project Officer:
 - At least one (1) VDOT Basic Work Zone Traffic Control certified employee on-site at all times (a certified flagger in accordance with the VDOT Flagger Certification Program, the American Traffic Safety Services Association Flagger Certification Program or any other VDOT approved flagger program).
 - At least one (1) OSHA 10 certified employee on-site at all times who has served as a Project Safety Officer on at least three (3) prior projects. If the contractor has multiple

employees with these requirements, the Contractor shall clearly identify which employee shall serve as the Project Safety Officer.

- Environmental Project Officer:
 - At least one (1) employee that has successfully completed the VDOT Erosion & Sediment Control Contractor Certification training. The Environmental Project Officer shall be on-site during all land disturbance activities.

The experience of the contractor owner(s) may be imputed to a newly formed company/Contractor provided the Contractor owner(s) has/have at least five (5) years of demonstrated experience of reliability and meets the criteria set forth herein.

In addition, the Purchasing Agent may require a bidder to demonstrate that it has the necessary facilities, ability, and financial resources to comply with the contract and furnish the service, material or goods specified herein in a satisfactory manner before the award of any contract. A bidder may also be required to provide past history and references. Failure to qualify according to the foregoing requirements will result in bid rejection.

21. DETERMINATION OF RESPONSIBILITY

If Bidder is not prequalified by the Virginia Department of Transportation, in determining “a responsible Bidder”, in addition to price and other considerations, the Purchasing Agent shall consider: History or good faith assurances of (i) completion by the Bidder and any potential subcontractors of specified safety training programs established by the U.S. Department of Labor, Occupational Safety and Health Administration; (ii) participation by the bidder and any potential subcontractors in apprenticeship training programs approved by state agencies or the U.S. Department of Labor; or (iii) maintenance by the Bidder and any potential subcontractors of records of compliance with applicable local, state, and federal laws.

22. INFORMALITIES

The County reserves the right to waive minor defects or variations from the exact requirements of the solicitation in a bid insofar as those defects or variations do not affect the price, quality, quantity, or delivery schedule of the services being procured. If insufficient information is submitted for Arlington County to properly evaluate a bid or a bidder; the County may request such additional information after bid opening, provided that the information requested does not change the price, quality, quantity, or delivery schedule for the services being procured.

23. NEW MATERIAL

Unless otherwise provided for in this solicitation, all goods, materials, supplies, or components offered to the County under this bid solicitation must be new, not used or reconditioned, and are not of such age or so deteriorated as to impair their usefulness or safety and that the goods, materials, supplies, or components offered are current production models of the respective manufacturer. If a bidder believes that furnishing used or reconditioned goods, materials, supplies or components will be in the County's interest, the bidder shall notify the County Purchasing Agent in writing no later than fifteen (15) calendar days prior to the date set for opening of bids. The notice shall include the reasons for the request and any benefits which may accrue to the County if the Purchasing Agent authorizes the bidding of used or reconditioned goods, materials, supplies or components.

24. BID WITHDRAWAL PRIOR TO BID OPENING

The Bidder may withdraw a bid from Vendor Registry before the opening date and time. It is the sole responsibility of the Bidder to remove and/or resubmit a bid before the bid deadline.

25. WITHDRAWAL OF BID FROM CONSIDERATION AFTER BID OPENING

After the opening of a bid, a bidder may withdraw its bid from consideration if the price of the bid is substantially lower than other bids due solely to a mistake therein, provided the bid is submitted in good faith, the mistake is a clerical mistake as opposed to a judgment mistake, and is actually due to an unintentional arithmetic error or an unintentional omission of a quantity of work, labor or material made directly in the compilation of the bid, which unintentional error or unintentional omission can be clearly shown by objective evidence drawn from inspection of original work papers, documents and materials used in the preparation of the bid sought to be withdrawn. No partial withdrawals of bids will be permitted after the time and date set for the bid opening. The bidder must give an electronic written notice to the Arlington County Purchasing Agent of a claim of right to withdraw a bid and provide all work papers, documents and other materials used in the preparation of the bid sought to be withdrawn, within two (2) business days after the date of bid opening. A bid may also be withdrawn if the County fails to award or issue a notice of intent to award the bid within ninety (90) days after the date fixed for opening bids.

26. METHOD OF AWARD

The County will award to the lowest responsive and responsible bidder. The lowest bidder will be determined by the Grand Total as indicated on the Bid Form.

The "Traffic Signal Work" section of Attachment B – Pricing Sheet contains energy-efficient light emitting diode (LED) lighting. Per section 4-101(12) of the Arlington County Purchasing Resolution, If the County receives two or more bids for products that are Energy Star certified, meet Federal Energy Management Program (FEMP) designated efficiency requirements, or appear on FEMP's Low Standby Power Product List, the County may only select among those bids unless, before selecting a different bid, the local public body provides a written statement that demonstrates the cost of the products that are Energy Star certified, meet FEMP-designated efficiency requirements, or appear on FEMP's Low Standby Power Product List was unreasonable.

27. NOTICE OF DECISION TO AWARD

When the County has made a decision to award a contract(s), the County will post a Notice of Award or Intent to Award to [Vendor Registry](#).

28. INSURANCE REQUIREMENTS

Each bidder must be able to demonstrate proof of the specific coverage requirements and limits applicable to this solicitation. If the bidder is not able to do so, it may propose alternate insurance coverage for consideration by the County. Written requests for consideration of alternate coverage must be received by the County Purchasing Agent at least 10 working days prior to bid due date. If the County permits alternate coverage, an amendment to the Insurance Checklist will be issued prior to the time and date set for receipt of bids.

29. SURETY REQUIRED

Companies who wish to implement digital signatures during the COVID-19 public health emergency may do so, along with a SURETY BOND SEAL ADDENDUM which contains an electronic corporate seal and states the following:

"Due to logistical issues associated with the use of traditional seals during this COVID-19 pandemic, [Surety Company] has authorized its Attorney-in-Fact to affix [Surety Company's] corporate seal to any bond executed on behalf of [Surety Company] by any such Attorney-in-Fact by attaching this Addendum to said bond.

To the extent this Addendum is attached to a bond that is executed on behalf of [Surety Company] by its Attorney-in-Facts, [Surety Company] hereby agrees that the seal below shall be deemed affixed to said bond to the same extent as if its raised corporate seal was physically affixed to the face of the bond.”

A. BID SURETY:

A fully completed and properly executed original Bid Bond, cashier's check, certified check, money order, or cash escrow in the amount of 5% of the amount of the bid made payable to the Treasurer of Arlington County shall accompany each bid. The Bid Surety will be retained until after the award to the successful bidder. The Bid Surety of the successful bidder will be retained until completion of the Contract or the posting of a Performance Bond, whichever occurs sooner. A bid submitted without a proper bid surety will be rejected.

B. FAILURE TO EXECUTE:

The failure of a bidder to accept an award and file acceptable Performance and Payment Bonds within ten (10) days after award notice will cause cancellation of the award and the forfeiture of the Bid Surety to the County.

C. PERFORMANCE SURETY:

A fully completed and properly executed original Performance Bond in the amount of 100% of the amount of the bid will be required of the successful bidder to ensure satisfactory completion of the work. The bond shall be a corporate surety bond issued by a surety company authorized to do business in the Commonwealth of Virginia and acceptable to the County. Where applicable, the Performance Bond shall be renewable annually in the original amount through the completion of the Contract, including all warranty and guarantee periods.

D. PAYMENT BOND:

A fully completed and properly executed original Payment Bond in the amount of 100% of the amount of the bid, will be required of the successful bidder to ensure payment of all persons who have and fulfill contracts for the Contractor for performing labor, providing equipment, or providing material in the performance of the work provided for in the Contract. The Bond shall be a corporate surety bond issued by a surety company authorized to do business in the Commonwealth of Virginia and acceptable to the County. Where applicable, the Payment Bond shall be renewable annually in the original amount for the duration of the Contract.

30. EXECUTION OF CONTRACT

Within three days after the Contract is presented to the successful Bidder for signature, the Contractor must submit to the County Purchasing Agent the original of the executed Agreement. Within ten days the Contractor must submit executed performance and payment bonds and required certificate of insurance. Failure to do so shall constitute a default, and the County may award the Contract to the next lowest responsive and responsible bidder or solicit new bids. The County may then charge against the Contractor the difference between the amount of the Contract award and the amount for which a Contract is subsequently executed, up to the total amount of the Contractor's bid security.

31. EXPENSES INCURRED IN PREPARING BID

All expenses related to a bid are the sole responsibility of the bidder.

32. OPTIONAL ESCROW AGREEMENT

If the successful bidder so elects, the bidder may utilize an escrow account for utilization of the retainage funds pursuant to § 2.2-4334 of the Code of Virginia. The bidder must indicate on the Bid Form whether or not it elects the escrow account procedure.

33. NEGOTIATIONS WITH LOWEST RESPONSIVE AND RESPONSIBLE BIDDER

If the bid by the lowest responsive and responsible bidder exceeds available funds, the County reserves the right to negotiate with the apparent low bidder to obtain an acceptable price. Negotiations with the apparent low bidder may involve discussions of reduction of quantity, quality, or other cost saving mechanisms. The final negotiated contract shall be subject to final approval of the County, in its sole discretion.

34. ELECTRONIC SIGNATURE

If awarded, the Bidder may be required to accept an agreement and sign electronically through the County's e-signature solution, DocuSign.

FOLLOWING THIS PAGE IS THE AGREEMENT THAT WILL BE ENTERED INTO BETWEEN THE COUNTY AND THE CONTRACTOR. THE AGREEMENT IS PART OF THIS SOLICITATION. THIS AGREEMENT IS SUBJECT TO REVIEW BY THE COUNTY ATTORNEY PRIOR TO BEING SUBMITTED FOR CONTRACTOR'S SIGNATURE.

II. AGREEMENT AND CONTRACT TERMS AND CONDITIONS



**ARLINGTON COUNTY, VIRGINIA
OFFICE OF THE PURCHASING AGENT
SUITE 500, 2100 CLARENDON BOULEVARD
ARLINGTON, VA 22201**

AGREEMENT NO. 22-DES-ITBPW-693

THIS AGREEMENT is made, on _____, between Contractor's name,
Contractor's address ("Contractor") a name of state type of entity
authorized to do business in the Commonwealth of Virginia, and the County Board of Arlington County,
Virginia ("County"). The County and the Contractor, for the consideration hereinafter specified, agree as
follows:

1. CONTRACT DOCUMENTS

The Contract Documents consist of:

- Agreement No. 22-DES-ITBPW-693 and all modifications properly incorporated into the Agreement
- Exhibit A – DES General Conditions, Special Conditions, and Supplementary Specifications
- Exhibit B – Specifications, Drawings and Construction Notes
- Exhibit C – Virginia Department Of Labor And Industry Wage Determination Decision
- Exhibit D – Price Bid of Contractor
- Exhibit E – Current VDOT Standard Details
- Exhibit F – Material Testing Requirement
- Exhibit G – VDOT Lane Closure Guidelines
- Exhibit H – County RFI Form
- Exhibit I – List of State and Federal Roads
- Arlington County Invitation to Bid No. 22-DES-ITBPW-693 is incorporated by reference.

Where the terms and provisions of this Agreement vary from the terms and provisions of the other Contract Documents, the terms and provisions of this Agreement will prevail over the other Contract Documents, and the remaining Contract Documents will be complementary to each other. If there are any conflicts, the most stringent terms or provisions will prevail.

The Contract Documents set forth the entire agreement between the County and the Contractor. The County and the Contractor agree that no representative or agent of either party has made any representation or promise with respect to the parties' agreement that is not contained in the Contract Documents. The Contract Documents may be referred to below as the "Contract" or the "Agreement".

2. SCOPE OF WORK

The Contractor will furnish all labor, materials, and equipment for the construction services of two (2) Traffic Signal Upgrade projects, one at the intersection of Arlington Boulevard at N. Montague St. (TE08) and another at the intersection of Fairfax Drive and N. Monroe St. (T45S) (the "Project") and all other work shown, described, and required by the Contract Documents (hereinafter "the Work"). Both projects will upgrade the traffic signal at the intersection while TE08 will incorporate streetscape improvements. The streetscape improvements include sidewalk connections, ADA ramps, enhanced pedestrian crossings, bus stops, street trees, landscaping, asphalt pavement, and all other related incidental work described and required in the contract documents.

The Work shall be performed according to the standards established by the Contract Documents read together as a single specification. It shall be the Contractor's responsibility, at solely the Contractor's cost, to provide sufficient services to fulfill the purposes of the Work. Nothing in the Contract Documents shall be construed to limit the Contractor's responsibility to manage the details and execution of its Work.

3. PROJECT OFFICER

The performance of the Contractor is subject to the review and approval of the County Project Officer identified in Section 53, Notices, unless the Contractor is otherwise notified in writing.

4. TIME FOR COMPLETION

Work under this Agreement shall achieve Substantial Completion no later than two hundred seventy (270) consecutive calendar days after the commencement date given in a Notice to Proceed provided by the County to the Contractor, subject to any modifications made as provided for in the Contract Documents. This two hundred seventy (270) day period shall be the Period of Performance for Substantial Completion. No Work shall be deemed Substantially Complete until it meets the requirements of Substantial Completion set forth in the General Conditions. Final Completion of the Work shall be completed no later than forty-five (45) calendar days after the date of acceptance of Substantial Completion by the County Project Officer. Work will not reach Final Completion until it meets the requirements set forth in the General Conditions. Unless otherwise provided, no claims for early completion are allowed.

5. CONTRACT AMOUNT

The County will pay the Contractor in accordance with the terms of the Progress Payments and Retainage and Payment Terms sections below and at the prices shown in Exhibit D, but not more than \$_____ for the Contractor's completion of the Work as required by the Contract Documents provided the Work is performed to the satisfaction of and is accepted by the Project Officer. The Contractor will complete the Work for the total amount specified in this section ("Contract Amount") unless such amount is modified as provided in this Agreement. The Contract Amount includes all of the Contractor's costs and fees (profit) and is inclusive of all anticipated or known site conditions, anticipated or known materials, labor, and equipment costs, or any other costs which should reasonably have been expected by the Contractor.

6. PROGRESS PAYMENTS AND RETAINAGE

The County will make monthly progress payments to the Contractor upon written application by the Contractor, on the basis of a written estimate of the work performed during the preceding calendar month as approved by the Project Officer. However, 5% of each progress payment will be retained by the County until Final Completion and acceptance of all Work covered by the Agreement.

All material and work covered by partial payments will become the property solely of the County at the time the partial payment is made. However, the Contractor will have the sole responsibility, care and custody for all materials and work upon which payments have been made until Substantial Completion. When calculating payment for materials on-site, the County shall not pay for materials which are not scheduled for incorporation into the Work within sixty (60) days from the date of application for payment.

7. PAYMENT TERMS

The Contractor must submit invoices to the County's Project Officer, who will either approve the invoice or require corrections. The County will pay the Contractor 45 days after approval of an invoice for completed work which is reasonable and allocable to the Contract. The number of the County Purchase Order pursuant to work has been performed must appear on all invoices.

8. PAYMENT OF SUBCONTRACTORS

The Contractor is obligated to take one of the two following actions within seven days after receipt of payment by the County for work performed by any subcontractor under this Contract:

- a. Pay the subcontractor for the proportionate share of the total payment received from the County attributable to the work performed by the subcontractor under this Contract; or
- b. Notify the County and the subcontractor, in writing, of the Contractor's intention to withhold all or a part of the subcontractor's payment with the reason for nonpayment.

The Contractor is obligated to pay interest to the subcontractor on all amounts owed by the Contractor to the subcontractor that remain unpaid after seven days following receipt by the Contractor of payment from the County for work performed by the subcontractor under this Contract, except for amounts withheld as allowed in subsection b., above. Unless otherwise provided under the terms of this Contract, interest will accrue at the rate of 1% per month.

The Contractor must include in each of its subcontracts, if any are permitted, a provision requiring each subcontractor to include or otherwise be subject to the same payment and interest requirements with respect to each lower-tier subcontractor.

The Contractor's obligation to pay an interest charge to a subcontractor pursuant to this section may not be construed to be an obligation of the County. A Contract modification may not be made for the purpose of providing reimbursement for such interest charge. A cost reimbursement claim may not include any amount for reimbursement for such interest charge.

9. PREVAILING WAGE CONTRACT REQUIREMENTS

- A. Section 4-104 of the Arlington County Purchasing Resolution (regarding "Prevailing Wage") applies to this Contract. All employees of the Contractor and any subcontractors shall be paid wages, salaries, benefits, and other remuneration at or above the craft or trade category prevailing wage rate indicated by Virginia Commissioner of Labor and Industry (DOLI) and as listed in the contract.

In addition to applying the prevailing wage rates to its own employees, the Contractor shall include the provisions of this Article 4-104 in every subcontract so that such provisions will be binding upon each subcontractor. The Contractor agrees to assume the obligation that the wage

requirements will be observed in fulfilling the requirements of the Contract. The appropriate enforcement sanctions will be invoked against the Contractor and any such subcontractor in the event of such subcontractor's failure to comply with any of the provisions of this Article 4-104.

All wage rates to be used are listed in this Contract in Exhibit C. While DOLI maintains a list of wage determinations online for reference purposes, only the wage determinations made in an official Wage Determination Decision, sent by DOLI to Arlington County, can be used to ascertain the exact rates to be paid for this Contract.

All rates are determined by DOLI and any appeals of specific classification may be made through the Wage Determination Appeal form available at <http://www.doli.virginia.gov/wp-content/uploads/2021/04/Appeal-for-Wage-Determination-Clarification.pdf>.

- B. Upon award of the Contract, the Contractor shall certify, under oath, to the Virginia Commissioner of Labor and Industry and to the County Prevailing Wage Compliance Manager, the pay scale for each craft and trade to be employed for, or to provide labor for, in the Work by the Contractor and any subcontractors. The Contractor's certification shall include all information required by the Code of Virginia § 2.2-4321.3G.
- C. The Contractor shall ensure that each individual providing labor as a mechanic, laborer, worker or equivalent shall be accurately classified in confirmation with the Wage Determination.
- D. The Contractor shall post the prevailing wage rate for each craft and classification involved as determined by DOLI, including the effective date, in a prominent and easily accessible place at the work site during the time work is being performed. The posting must be in English and any other language that is primarily spoken by the individuals at the work site. Within 10 days of such posting the Contractor shall certify to the County Prevailing Wage Compliance Manager and DOLI its compliance with this subsection at https://www.doli.virginia.gov/wp-content/uploads/2021/04/PW_Posting_Compliance_Form.pdf;
- E. The Contractor must fully cooperate with the County Prevailing Wage Compliance Manager to ensure contract compliance requirements, including but not limited to site visits, wage rate signage, contractor employee interviews, and the submission of certified payroll records.
- F. The Contractor must submit to the County Prevailing Wage Compliance Manager and DOLI, within five (5) working days of the end of each month, certification for each craft or trade employed on the project, specifying the total hourly amount paid to employees, including wages and applicable fringe benefits using the Pay Scale Certification Form at <https://www.doli.virginia.gov/wp-content/uploads/2021/04/DOLI-Pay-Scale-Certification-for-Public-Works-Projects.pdf>. The certification must itemize the amount paid in wages and each applicable benefit and list the names and addresses of any third-party fund, plan or program to which benefit payments will be made on behalf of employees.

- G. The Contractor shall indemnify and hold harmless the County from any fines, demands, claims, suits, and damages, including attorney's fees, resulting from the Contractor's or any subcontractor's failure to pay the Prevailing Wage.
- H. The Contractor and its subcontractors shall keep, maintain, and preserve (i) records relating to the wages paid to and hours worked by each individual performing the work of any mechanic, laborer, or worker; and (ii) a schedule of the occupation or work classification at which each individual performing the work of any mechanic, laborer, or worker on the construction project is employed each workday and week. The Contractor and its subcontractors shall make such records available to the Prevailing Wage Compliance Manager within 10 days of a request or per a regular schedule established in the Contract and shall certify that records reflect the actual hours worked and the amount paid to its workers for whatever time period is requested. The Contractor and its subcontractors must preserve these records for a period of six (6) years after the expiration or earlier termination of the applicable contract.
- I. Any Contractor or subcontractor who pays any mechanic, laborer, or worker for services under this Contract less than the Prevailing Wage shall be liable to such individuals for the payment of all wages due, plus interest at an annual rate of eight percent (8%) from the dates wages were due; and shall be disqualified from bidding on public contracts with any public body until the Contractor or subcontractor has made full restitution. A willful violation of Article 4-104 is a Class I misdemeanor.
- J. For questions regarding Prevailing Wage, please email prevailingwage@arlingtonva.us.

10. RELEASE AND REQUEST FOR FINAL PAYMENT

In order to receive final payment upon Final Completion of the Project and before Final Acceptance, the Contractor must submit to the Project Officer a signed original notarized copy of the Arlington County Release and Request for Final Payment form per the General Conditions.

11. LIQUIDATED DAMAGES

Time is of the essence under this Contract. The Work must be completed within the Time for Completion. The County and the Contractor agree that damages for failure to achieve Substantial Completion of the Work by the date specified under Time for Completion are not susceptible to exact determination but that \$1,113 per calendar day is in proportion to the actual loss that the County would suffer from such delay. Therefore, the Contractor will pay the County as liquidated damages \$1,113 per day for each and every day beyond the time for Substantial Completion that the County determines Substantial Completion has not achieved. The County and the Contractor also agree that damages for failure to achieve Final Completion of the Work by the date specified under Time for Completion are not susceptible to exact determination but that \$1,113 per calendar day is in proportion to the actual loss the County would suffer from such delay. Therefore, the Contractor will pay the County as liquidated damages \$1,113 per day for each and every day beyond the time for Final Completion until Final Completion is achieved.

The County will be entitled to deduct liquidated damages against any sums owed by the County to the Contractor under this Contract. The Contractor hereby waives any defense as to the validity of any

liquidated damages on grounds that such liquidated damages are void as penalties or are not reasonably related to actual damages.

12. PERFORMANCE OF WORK BY THE CONTRACTOR

The Contractor shall perform on site, and with its own organization, at least fifty percent (50%) of the total direct labor and at least fifty percent (50%) of the total work in place to be performed under the Contract.

The self-performance percentage may be reduced by an Amendment to the Contract, if during performance of the Work, the Contractor requests a reduction, and the Project Officer determines that the reduction would be to the advantage of the County.

13. NON-APPROPRIATION

All payments by the County to the Contractor pursuant to this Contract are subject to the availability of an annual appropriation for this purpose by the County Board of Arlington County, Virginia ("Board"). In the event that the Board does not appropriate funds for the goods or services provided under this Contract, the County will terminate the Contract, without termination charge or other liability to the County, on the last day of the fiscal year or when the previous appropriation has been spent, whichever occurs first.

14. ESTIMATED QUANTITIES/NON-EXCLUSIVITY OF CONTRACTOR

This Contract does not obligate the County to purchase a specific quantity of items or services during Contract Term. Any quantities that are included in the Contract Documents are the present expectations of the County for the period of the Contract; and the County is under no obligation to buy that or any amount as a result of having provided this estimate or of having had any normal or otherwise measurable requirement in the past. The County may require more goods and/or services than the estimated annual quantities, and any such additional quantities will not give rise to any claim for compensation other than at the unit prices and/or rates in the Contract.

The County does not guarantee that the Contractor will be the exclusive provider of the goods or services covered by this Contract. The items or services covered by this Contract may be or become available under other County contract(s), and the County may determine that it is in its best interest to procure the items or services through those contract(s).

15. COUNTY PURCHASE ORDER REQUIREMENT

County purchases are authorized only if the County issues a Purchase Order in advance of the transaction, indicating that the ordering County agency has sufficient funds available to pay for the purchase. If the Contractor provides goods or services without a signed County Purchase Order, it does so at its own risk and expense. The County will not be liable for payment for any purchases made by its employees that are not authorized by the County Purchasing Agent.

16. LIEN

It is expressly agreed that after any payment has been made by the County either to the Contractor for work done, or labor or material supplied under the Contract, the County will have a lien upon all material delivered to the site either by the Contractor, or for the Contractor, which is to be used in the performance of the Contract.

17. EMPLOYMENT DISCRIMINATION BY CONTRACTOR PROHIBITED

During the performance of its work pursuant to this Contract:

- A. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, sexual orientation, gender identity, national origin, age, disability or on any other basis prohibited by state law. 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. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation will be deemed sufficient for meeting the requirements of this section.
- C. The Contractor will state in all solicitations or advertisements for employees that it places or causes to be placed that such Contractor is an Equal Opportunity Employer.
- D. The Contractor will comply with the provisions of the Americans with Disabilities Act of 1990 ("ADA"), which prohibits discrimination against individuals with disabilities in employment and mandates that disabled individuals be provided access to publicly and privately provided services and activities.
- E. The Contractor must include the provisions of the foregoing paragraphs in every subcontract or purchase order of more than \$10,000.00 relating to this Contract so that the provisions will be binding upon each subcontractor or vendor.

18. EMPLOYMENT OF UNAUTHORIZED ALIENS PROHIBITED

In accordance with §2.2-4311.1 of the Code of Virginia, as amended, the Contractor must not during the performance of this Contract knowingly employ an unauthorized alien, as that term is defined in the federal Immigration Reform and Control Act of 1986.

19. DRUG-FREE WORKPLACE TO BE MAINTAINED BY CONTRACTOR

During the performance of this Contract, the Contractor must: (i) provide a drug-free workplace for its 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 violating 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 more than \$10,000.00 relating to this Contract so that the provisions will be binding upon each subcontractor or vendor.

For the purposes of this section, "workplace" means the site(s) for the performance of the work required by this Contract.

20. *SEXUAL HARASSMENT POLICY

If the Contractor employs more than five employees, the Contractor shall (i) provide annual training on the Contractor's sexual harassment policy to all supervisors and employees providing services in the Commonwealth, except such supervisors or employees that are required to complete sexual harassment training provided by the Department of Human Resource Management, and (ii) post the Contractor's sexual harassment policy in (a) a conspicuous public place in each building located in the Commonwealth that the Contractor owns or leases for business purposes and (b) the Contractor's employee handbook.

21. COVID-19 VACCINATION POLICY FOR CONTRACTORS

Due to the ongoing COVID-19 pandemic, the County has taken various steps to protect the welfare, health, safety, and comfort of the workforce and public at large. As part of these steps, the County has implemented various requirements with respect to health and safety including policies with respect to social distancing, the use of face-coverings and vaccine mandates. To protect the County's workforce and the public at large, all employees and subcontractors of the Contractor who are assigned to this Contract, should be fully vaccinated against COVID-19. Any contractor employee or subcontractor who is not fully vaccinated should be following a weekly testing protocol as established by the Contractor, unless exempt pursuant to a valid reasonable accommodation under state or federal law.

22. PROJECT STAFF

The County has the right to reasonably reject staff or subcontractors whom the Contractor assigns to the Project. The Contractor must then provide replacement staff or subcontractors satisfactory to the County in a timely manner and at no additional cost to the County. The day-to-day supervision and control of the Contractor's employees and its subcontractors is the sole responsibility of the Contractor.

23. FAILURE TO DELIVER

If the Contractor fails to deliver goods or services in accordance with the Contract terms and conditions, the County, after notice to the Contractor, may procure the goods or services from other sources and hold the Contractor responsible for any resulting additional purchase and administrative costs. The County shall be entitled to offset such costs against any sums owed by the County to the Contractor. However, if public necessity requires the use of nonconforming materials or supplies, they may be accepted at a reduction in price to be determined solely by the County.

24. UNSATISFACTORY WORK

If any of the work done, or material, goods, or equipment provided by the Contractor, is unsatisfactory to the County the Contractor must, upon notice from the County, immediately remove at the Contractor's expense such unsatisfactory work, material, goods, or equipment and replace the same with work, material, goods, or equipment satisfactory to the County. If the Contractor fails to do so after fifteen (15) days the County shall have the right to remove or replace the rejected work, material, goods, or equipment at the expense of the Contractor and offset the expense and administrative costs against any sums owed to the Contractor. This provision applies during the Contract term and during any warranty or guarantee period. At the Project Officer's discretion, rather than correction or replacement of the work, an appropriate adjustment to the Contract Amount may be made.

25. TERMINATION

The County may terminate this Contract at any time as follows: (1) for cause, if, as determined by the County, the Contractor is in breach or default or has failed to perform the Work satisfactorily; or (2) for the convenience of the County.

Upon receipt of a notice of termination, the Contractor must not place any further orders or subcontracts for materials, services or facilities; must terminate all vendors and subcontracts, except as are necessary for the completion of any portion of the Work that the County did not terminate; and must immediately deliver all documents related to the terminated Work to the County.

Any purchases that the Contractor makes after the notice of termination will be the sole responsibility of the Contractor, unless the County has approved the purchases in writing as necessary for completion of any portion of the Work that the County did not terminate.

If any court of competent jurisdiction finds a termination for cause by the County to be improper, then the termination will be deemed a termination for convenience.

A. TERMINATION FOR CAUSE, INCLUDING BREACH AND DEFAULT; CURE

1. Termination for Unsatisfactory Performance. If the County determines that the Contractor has failed to perform satisfactorily, then the County will give the Contractor written notice of such failure(s) and the opportunity to cure them within 15 days or any other period specified by the County ("Cure Period"). If the Contractor fails to cure within the Cure Period, the County may terminate the Contract for failure to provide satisfactory performance by providing written notice with a termination date. Upon such termination, the Contractor may apply for compensation for Contract services that the County previously accepted ("Termination Costs"), unless payment is otherwise barred by the Contract. The Contractor must submit any request for Termination Costs, with all supporting documentation, to the County Project Officer within 30 days after the expiration of the Cure Period. The County may accept or reject the request for Termination Costs, in whole or in part, and may notify the Contractor of its decision within a reasonable time.

In the event of termination by the County for failure to perform satisfactorily, the Contractor must continue to provide its services as previously scheduled through the termination date, and the County must continue to pay all fees and charges incurred through the termination date.

2. Termination for Breach or Default. If the County terminates the Contract for default or breach of any Contract provision or condition, then the termination will be immediate after notice of termination to the Contractor (unless the County provides for an opportunity to cure), and the Contractor will not be permitted to seek Termination Costs.

Upon any termination pursuant to this section, the Contractor will be liable to the County for costs that the County must expend to complete the Work, including costs resulting from any related delays and from unsatisfactory or non-compliant work performed by the Contractor or its subcontractors. The County will deduct such costs from any amount due to the Contractor; or if the County does not owe the Contractor, the Contractor must promptly pay the costs within 15 days of a demand by the County. This section does not limit the County's recovery of any other damages to which it is entitled by law.

Except as otherwise directed by the County, the Contractor must stop work on the date of receipt the notice of the termination.

B. TERMINATION FOR THE CONVENIENCE OF THE COUNTY

The County may terminate this Contract in whole or in part whenever the Purchasing Agent determines that termination is in the County's best interest. The County will give the Contractor at least 15 days' notice in writing. The notice must specify the extent to which the Contract is terminated and the effective termination date. The Contractor will be entitled to Termination Costs, as defined above, plus any other reasonable amounts that the parties might negotiate; but no amount will be allowed for anticipatory profits.

Except as otherwise directed by the County, the Contractor must stop work on the date of receipt of the notice of the termination.

26. INDEMNIFICATION

The Contractor covenants for itself, its employees and its subcontractors to save, defend, hold harmless and indemnify the County and all of its elected and appointed officials, officers, current and former employees, agents, departments, agencies, boards and commissions (collectively the "County Indemnitees") from and against any and all claims made by third parties for any and all losses, damages, injuries, fines, penalties, costs (including court costs and attorneys' fees), charges, liability, demands or exposure resulting from, arising out of or in any way connected with the Contractor's acts or omissions, including the acts or omissions of its employees, vendors, delivery drivers and/or subcontractors, in performance or nonperformance of the Contract. This duty to save, defend, hold harmless and indemnify will survive the termination of this Contract. If the Contractor fails or refuses to fulfill its obligations contained in this section, the Contractor must reimburse the County for any and all resulting payments and expenses, including reasonable attorneys' fees. The Contractor must pay such expenses upon demand by the County, and failure to do so may result in the County withholding such amounts from any payments to the Contractor under this Contract.

27. INTELLECTUAL PROPERTY INDEMNIFICATION

The Contractor warrants and guarantees that in providing services under this Contract neither the Contractor nor any subcontractor is infringing on the intellectual property rights (including, but not limited to, copyright, patent, mask and trademark) of third parties.

If the Contractor or any of its employees or subcontractors uses any design, device, work or material that is covered by patent or copyright, it is understood that the Contract Amount includes all royalties, licensing fees, and any other costs arising from such use in connection with the Work under this Contract.

The Contractor covenants for itself, its employees and its subcontractors to save, defend, hold harmless, and indemnify the County Indemnitees, as defined above, from and against any and all claims, losses, damages, injuries, fines, penalties, costs (including court costs and attorneys' fees), charges, liability or exposure for infringement of or on account of any trademark, copyright, patented or unpatented invention, process or article manufactured or used in the performance of this Contract. This duty to save, defend, hold harmless and indemnify will survive the termination of this Contract. If the Contractor fails or refuses to fulfill its obligations contained in this section, the Contractor must reimburse the County for any and all resulting payments and expenses, including reasonable attorneys' fees. The Contractor must pay such expenses upon demand by the County, and failure to do so may result in the County withholding such amounts from any payments to the Contractor under this Contract.

28. COPYRIGHT

By this Contract, the Contractor irrevocably transfers, assigns, sets over and conveys to the County all rights, title and interest, including the sole exclusive and complete copyright interest, in any and all copyrightable works created pursuant to this Contract. The Contractor will execute any documents that the County requests to formalize such transfer or assignment.

The rights granted to the County by this section are irrevocable and may not be rescinded or modified, including in connection with or as a result of the termination of or a dispute concerning this Contract.

The Contractor may not use subcontractors or third parties to develop or provide input into any copyrightable materials produced pursuant to this Contract without the County's advance written approval and unless the Contractor includes this Copyright provision in any contract or agreement with such subcontractors or third parties related to this Contract.

29. OWNERSHIP AND RETURN OF RECORDS

This Contract does not confer on the Contractor any ownership rights or rights to use or disclose the County's data or inputs.

All drawings, specifications, blueprints, data, information, findings, memoranda, correspondence, documents or records of any type, whether written, oral or electronic, and all documents generated by the Contractor or its subcontractors as a result of this Contract (collectively "Records") are the exclusive property of the County and must be provided or returned to the County upon completion, termination, or cancellation of this Contract. The Contractor will not use or willingly cause or allow such materials to be used for any purpose other than performance of this Contract without the written consent of the County.

The Records are confidential, and the Contractor will neither release the Records nor share their contents. The Contractor will refer all inquiries regarding the status of any Record to the Project Officer or to his or her designee. At the County's request, the Contractor will deliver all Records, including hard copies of electronic records, to the Project Officer and will destroy all electronic Records.

The Contractor agrees to include the provisions of this section as part of any contract or agreement related to this Contract into which it enters with subcontractors or other third parties. The provisions of this section will survive any termination or cancellation of this Contract.

30. CONFIDENTIAL INFORMATION

The Contractor and its employees, agents and subcontractors will hold as confidential all County information obtained under this Contract. Confidential information includes, but is not limited to, nonpublic personal information; personal health information (PHI); social security numbers; addresses; dates of birth; other contact information or medical information about a person; and information pertaining to products, operations, systems, customers, prospective customers, techniques, intentions, processes, plans and expertise. The Contractor must take reasonable measures to ensure that all of its employees, agents and subcontractors are informed of and abide by this requirement.

31. ETHICS IN PUBLIC CONTRACTING

This Contract incorporates by reference Article 9 of the Arlington County Purchasing Resolution, as well as all state and federal laws related to ethics, conflicts of interest or bribery, including the State and Local Government Conflict of Interests Act (Code of Virginia § 2.2-3100 et seq.), the Virginia Governmental Frauds Act (Code of Virginia § 18.2-498.1 et seq.) and Articles 2 and 3 of Chapter 10 of Title 18.2 of the Code of Virginia, as amended (§ 18.2-438 et seq.). The Contractor certifies that its bid was made without collusion or fraud; that it has not offered or received any kickbacks or inducements from any other offeror, supplier, manufacturer or subcontractor; and that it has not conferred on any public employee having official responsibility for this procurement 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.

32. COUNTY EMPLOYEES

No Arlington County employee may share in any part of this Contract or receive any benefit from the Contract that is not available to the general public.

33. FORCE MAJEURE

Neither party will be held responsible for failure to perform the duties and responsibilities imposed by this Contract if such failure is due to a fire, riot, rebellion, natural disaster, war, act of terrorism or act of God that is beyond the control of the party and that makes performance impossible or illegal, unless otherwise specified in the Contract, provided that the affected party gives notice to the other party as soon as practicable after the force majeure event, including reasonable detail and the expected duration of the event's effect on the party.

34. AUTHORITY TO TRANSACT BUSINESS

The Contractor must, pursuant to Code of Virginia § 2.2-4311.2, be and remain authorized to transact business in the Commonwealth of Virginia during the entire term of this Contract. Otherwise, the Contract is voidable at the sole option of and with no expense to the County.

35. RELATION TO THE COUNTY

The Contractor is an independent contractor, and neither the Contractor nor its employees or subcontractors will be considered employees, servants or agents of the County. The County will not be responsible for any negligence or other wrongdoing by the Contractor or its employees, servants or agents. The County will not withhold payments to the Contractor for any federal or state unemployment taxes, federal or state income taxes or Social Security tax or for any other benefits. The County will not provide to the Contractor any insurance coverage or other benefits, including workers' compensation.

36. ANTITRUST

The Contractor conveys, sells, assigns and transfers to the County all rights, title and interest in and to all causes of action under state or federal antitrust laws that the Contractor may have relating to this Contract.

37. REPORT STANDARDS

The Contractor must submit all written reports required by this Contract for advance review in a format approved by the Project Officer. Reports must be accurate and grammatically correct and should not contain spelling errors. The Contractor will bear the cost of correcting grammatical or spelling errors and inaccurate report data and of other revisions that are required to bring the report(s) into compliance with this section.

38. AUDIT

The Contractor must retain all books, records and other documents related to this Contract for at least five (5) years, unless otherwise specified in the Contract, or such period of time required by the County's funding partner(s), if any, whichever is greater, after the final payment and must allow the County or its authorized agents to examine the documents during this period and during the Contract Term. The Contractor must provide any requested documents to the County for examination within 15 days of the request, at the Contractor's expense. Should the County's examination reveal any overcharging by the Contractor, the Contractor must, within 30 days of County's request, reimburse the County for the overcharges and for the reasonable costs of the County's examination, including, but not limited to, the services of external audit firm and attorney's fees; or the County may deduct the overcharges and examination costs from any amount that the County owes to the Contractor. If the Contractor wishes to

destroy or dispose of any records related to this Contract (including confidential records to which the County does not have ready access) within five (5) years after the final payment, unless otherwise specified in the Contract, or such period of time required by the County's funding partner(s), if any, whichever is greater, the Contractor must give the County at least 30 days' notice and must not dispose of the documents if the County objects.

The Purchasing Agent may require the Contractor to demonstrate that it has the necessary facilities, ability, and financial resources to comply with the Contract and furnish the service, material or goods specified herein in a satisfactory manner at any time during the term of this Contract.

39. ASSIGNMENT

The Contractor may not assign, transfer, convey or otherwise dispose of any award or any of its rights, obligations or interests under this Contract without the prior written consent of the County.

40. AMENDMENTS

This Contract may not be modified except by written amendment executed by persons duly authorized to bind the Contractor and the County.

41. ARLINGTON COUNTY PURCHASING RESOLUTION AND COUNTY POLICIES

Nothing in this Contract waives any provision of the Arlington County Purchasing Resolution, which is incorporated herein by reference, or any applicable County policy.

42. DISPUTE RESOLUTION

All disputes arising under this Agreement or concerning its interpretation, whether involving law or fact and including but not limited to claims for additional work, compensation or time, and all claims for alleged breach of contract must be submitted in writing to the Project Officer as soon as the basis for the claim arises. In accordance with the Arlington County Purchasing Resolution, claims denied by the Project Officer may be submitted to the County Manager in writing no later than 60 days after the final payment. The time limit for a final written decision by the County Manager is 30 days. Procedures concerning contractual claims, disputes, administrative appeals and protests are contained in the Arlington County Purchasing Resolution. The Contractor must continue to work as scheduled pending a decision of the Project Officer, County Manager, County Board or a court of law.

43. APPLICABLE LAW, FORUM, VENUE, AND JURISDICTION

This Contract is governed in all respects by the laws of the Commonwealth of Virginia; and the jurisdiction, forum and venue for any litigation concerning the Contract or the Work is in the Circuit Court for Arlington County, Virginia, and in no other court.

44. ARBITRATION

No claim arising under or related to this Contract may be subject to arbitration.

45. NONEXCLUSIVITY OF REMEDIES

All remedies available to the County under this Contract are cumulative, and no remedy will be exclusive of any other at law or in equity.

46. NO WAIVER

The failure to exercise a right provided for in this Contract will not be a subsequent waiver of the same right or of any other right.

47. SEVERABILITY

The sections, paragraphs, clauses, sentences, and phrases of this Contract are severable; and if any section, paragraph, clause, sentence or phrase of this Contract is declared invalid by a court of competent jurisdiction, the rest of the Contract will remain in effect.

48. ATTORNEY’S FEES

In the event that the County prevails in any legal action or proceeding brought by the County to enforce any provision of this Contract, the Contractor will pay the County’s reasonable attorney’s fees and expenses.

49. SURVIVAL OF TERMS

In addition to any statement that a specific term or paragraph survives the expiration or termination of this Contract, the following sections also survive: INDEMNIFICATION; INTELLECTUAL PROPERTY INDEMNIFICATION; RELATION TO COUNTY; OWNERSHIP AND RETURN OF RECORDS; AUDIT; COPYRIGHT; DISPUTE RESOLUTION; APPLICABLE LAW AND JURISDICTION; ATTORNEY’S FEES, AND CONFIDENTIAL INFORMATION.

50. HEADINGS

The section headings in this Contract are inserted only for convenience and do not affect the substance of the Contract or limit the sections’ scope.

51. AMBIGUITIES

The parties and their counsel have participated fully in the drafting of this Agreement; and any rule that ambiguities are to be resolved against the drafting party does not apply. The language in this Agreement is to be interpreted as to its plain meaning and not strictly for or against any party.

52. NOTICES

Unless otherwise provided in writing, all legal notices and other formal communications required by this Contract are deemed to have been given when either (a) delivered in person; (b) delivered by an agent, such as a delivery service; or (c) deposited in the United States mail, postage prepaid, certified or registered and addressed as follows:

TO THE CONTRACTOR:

Phone:

Email:

TO THE COUNTY:

_____, Project Officer

Phone:

Email:

AND

Dr. Sharon T. Lewis, LL.M, MPS, VCO, CPPB
Purchasing Agent
Arlington County, Virginia
2100 Clarendon Boulevard, Suite 500
Arlington, Virginia 22201
Phone: (703) 228-3294
Email: slewis1@arlingtonva.us

TO COUNTY MANAGER'S OFFICE (FOR PROJECT CLAIMS):

Mark Schwartz, County Manager
Arlington County, Virginia
2100 Clarendon Boulevard, Suite 318
Arlington, Virginia 22201

53. NON-DISCRIMINATION NOTICE

Arlington County does not discriminate against faith-based organizations.

54. INSURANCE, PAYMENT AND PERFORMANCE BONDS

The Contractor shall maintain the required insurance coverage and payment and performance bonds as set forth in the Invitation to Bid through completion of the Contract, including all warranty and guarantee periods.

55. MATERIAL CHANGES

The Contractor shall notify Purchasing Agent within seven days of any material changes in its operation that relate to any matter attested regarding certifications on its bid form.

WITNESS these signatures:

THE COUNTY BOARD OF ARLINGTON
COUNTY, VIRGINIA

CONTRACTOR

AUTHORIZED
SIGNATURE: _____

AUTHORIZED
SIGNATURE: _____

NAME: _____

NAME: _____

TITLE: _____

TITLE: _____

DATE: _____

DATE: _____

III. ARLINGTON COUNTY CONSTRUCTION GENERAL CONDITIONS
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A. INTRODUCTION TO TERMS

- 1) The term "Agreement" means the completed and signed Form of Contract Agreement.
- 2) The term "Award Date" means the date of execution of the Agreement by the Purchasing Agent.
- 3) The term "Business Day" shall refer to any day that the County is open for general business.
- 4) The term "Calendar Day" means any day of twenty-four hours measured from midnight to the next midnight. Included are weekends and holidays. When the term "Day" is used it shall be assumed to refer to a Calendar Day unless otherwise specified.
- 5) The term "Change Order" means a written order to the Contractor, signed by the Project Officer and the Contractor, which authorizes a change in the Work, and/or adjustment to the Contract Amount and/or an adjustment to the Time for Completion. A Change Order once signed by all the parties is incorporated into and becomes part of the Contract.
- 6) The term "Commencement Date" means the date on which the Time for Completion will commence for the Contractor to begin to perform his obligations under the Contract Documents as provided in the Notice to Proceed.
- 7) The term "Construction Change Directive" means a written order issued by the County directing a change in the Work prior to agreement on adjustment, if any, in the Contract Amount or Contract Time, or both.
- 8) The term "Contract Documents" means the Agreement and all the documents and Exhibits and/or Attachments identified therein which shall include the Drawings and the Specifications, and all modifications including amendments and subsequent Change Orders thereto properly incorporated in the Contract.
- 9) The terms "County" and "Contractor" shall mean the respective parties to the Contract. They shall be treated throughout the Contract Documents as though each were of the singular number and masculine gender. Only one Contractor is recognized as a party to this Contract.
- 10) The term "Critical Path Method or CPM" means a step-by-step project management technique for process planning that defines critical and non-critical tasks with the goal of preventing time-frame problems and process bottlenecks. An activity on the critical path cannot be started until its predecessor activity has been completed. is delayed then the entire project is delayed.
- 11) The term "Delay" means an event or condition that results in a work activity starting or being completed later than originally planned.
- 12) The term "Drawings" means all drawings pertaining to the Contract, including the Contract Drawings and Construction Notes which show and describe the locations, character, dimensions, and details of the Work to be performed under the contract.
- 13) The term "Field Order" is a written order to the Contractor, authorized by the Project Officer, which acknowledges a change in the Work that does not adjust the Contract Amount and does not adjust the Time for Completion.

- 14) The term "Final Acceptance" shall mean the date on which the County issues the final payment for the Work.
- 15) The term "Final Completion" shall mean the condition when the County agrees that all the Work has been fully completed in accordance with the Contract Documents and is acceptable. The date of the Final Completion of the Work under the Contract is the date on which Final Completion is accomplished.
- 16) The term "Float" shall represent the amount of time that a task in a project network or sequence can be delayed without causing a delay to: subsequent tasks ("free Float") or project completion date ("total Float"). Float shall belong to the County and shall be used for the successful completion of the Project within the Time for Completion.
- 17) The term "Limits of Disturbance (LOD)" shall represent the area within which land disturbing activities take place. Land disturbing activities include all actions that expose bare soil during construction.
- 18) The term "Limits of Work (LOW)" shall represent the area within which construction activities take place, including but not limited to the Limits of Disturbance area.
- 19) The term "Notice to Proceed" shall mean a written notice issued by the County to the Contractor stating the Commencement Date. The Notice to Proceed will specify the Time for Completion of the Contract.
- 20) The term "Project" means the entire proposed construction to be executed as stipulated in the Contract Documents
- 21) The term "Project Officer" means the County Project Officer assigned by the Director of the County Department responsible for the project, or the Director's designee. When a designee to act on behalf of the Project Officer is used by the County, the name of the designee and the duties and authority of such designee will be identified in the Contract Documents or in a written notice to the Contractor from the Project Officer responsible for the project. The designee may be a professional architect or engineer or other person employed by the County to perform construction services administration, design services, or project oversight.
- 22) The term "Punch List" means unfinished items of the construction of the Project, which unfinished items of construction are minor or insubstantial details of construction, mechanical adjustment or decoration remaining to be performed, the non-completion of which would not materially affect use of the Project, and which are capable of being completed within the time specified for Final Completion after Substantial Completion has been achieved.
- 23) The term "Request for Information" (RFI) means a request originated by the Contractor requesting clarification or additional information from the Project Officer and/or Architect/Engineer concerning information in the construction documents where the Contractor believes there is insufficient information or a conflict in the documents. RFI's shall be submitted by the Contractor sufficiently in advance of the Work to provide time for assessment and response without delay of the Work. Responses to RFI's shall not be construed as authorization for a Change Order.

- 24) The term "Schedule of Values" means a listing of the Contractor's total contract value by Construction Specifications Institute (CSI) divisions, including Division 1, Contractor's General Conditions.
- 25) The term "Site" refers to that portion of the property on which the Work is to be performed or which has otherwise been set aside for use by the Contractor.
- 26) The terms "Special Conditions" mean the written statements modifying or supplementing the Technical Specifications or General Conditions for requirements or conditions peculiar to the Contract.
- 27) The term "Specifications" means and shall include the Technical Specifications, the Special Conditions and all written agreements and instructions pertaining to the performance of the Work.
- 28) When used, the term "Stipulated Price Item" means and includes an item of Work, unanticipated or of unknown quantity at the time of issuance of the solicitation for a Bid and determined to be executed, based on the actual field conditions during the progress of Work under the Contract. The Unit Price for the "Stipulated Price Item", as identified in the "Stipulated Price Items" section of the Bid Form, is predetermined by the County as the current reasonably workable rate for the Item inclusive of all necessary labor, equipment, materials, overheads (provision and installation), and the contractor's profit.
- 29) The term "Subcontractor", shall include only those having a direct contract with the Contractor, and it shall include those who furnish material worked to a special design according to the plans and specifications for this Work but shall not include those who merely furnish material not so worked.
- 30) The term "Substantial Completion" shall mean the condition when the County agrees that the Work, or a specific portion thereof, is sufficiently complete, in accordance with the Contract Documents, so that it can be utilized by the County for the purposes for which it was intended. The date of Substantial Completion of the Work under the Contract is the milestone date on which Substantial Completion condition is accomplished.
- 31) The term "Technical Specifications" means that part of the Contract Documents that describe the quality of materials, method of installation, standard of workmanship, and the administrative and procedural requirements for the performance of the Work under the contract.
- 32) The term "Time for Completion" shall mean the time period set forth in the Agreement.
- 33) The term "Work" shall mean the services performed under this Contract including, but not limited to, furnishing labor, and furnishing and installing materials and equipment required to complete the Project specified in the Contract Documents.

B. DRAWINGS, SPECIFICATIONS, RELATED DATA AND RECORDS KEEPING

1. INTENT OF THE DRAWINGS AND SPECIFICATIONS

- a. It is understood that, except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, water haulage, light power, transportation, superintendence, temporary construction of all kinds, and other services and facilities of every nature whatsoever that are necessary to execute and deliver the

Work, complete and usable within the scope of the Contract with all parts in working order, and all connections properly made.

- b. The general character and scope of the Work are illustrated by the Drawings and listed in the Specifications. Any additional drawings and or other instructions deemed necessary by the Project Officer or designee will be furnished to the Contractor when required for the Work and shall be incorporated into the Contract Documents.
 - c. Where "as shown", "as indicated", "as detailed", or words of similar import are used, it shall be understood that direction, requirements, permission, or review of Project Officer or designee is intended unless stated otherwise. As used herein, "provide" shall be understood to mean "provide complete in place", that is, "furnish and install."
 - d. Unless otherwise specifically noted, the word "similar" where it occurs in the Drawings, shall be interpreted in its general sense and not as meaning identical, and all details shall be worked out in relation to their locations and their connection with other parts of the Work.
 - e. Materials or work described in words which, so applied, have a well-known technical, construction industry, or trade meaning, shall be held to refer to the recognized technical or trade meaning.
 - f. The Contract Documents are complementary, and what is called for by any one document shall be as binding as if called for by all documents. In case of conflicting variance between the Contract Documents, the Order of Precedence stated in the Agreement shall govern. Figured dimensions on the plans shall be used; drawings shall not be scaled.
 - g. Unless otherwise specifically noted, construction tolerances shall be to the numerical precision presented in the Contract Drawings.
2. DISCREPANCIES AND ERRORS
- If the Contractor discovers any discrepancies between the Drawings and Specifications and the site conditions or any errors or omissions in the Drawings or Specifications, the Contractor shall at once, but in no event later than three calendar days after discovery of the discrepancy or error, report them in writing to the Project Officer or designee. If the Contractor proceeds with any work that may be affected by such discrepancies, errors, or omissions, after their discovery, but before a clarification is provided, such work shall be at the Contractor's risk and expense. Issues affecting critical path activities shall be made known to the Project Officer or designee within one business day after discovery.

3. DIFFERING SITE CONDITIONS

The Contractor shall immediately, and before the conditions are further disturbed, give notice to the Project Officer of subsurface or latent physical conditions at the site which differ materially from those indicated in this Contract, or previously unknown physical conditions discovered at the site of an unusual nature, and which differ materially from those ordinarily expected to be encountered at the site. Such notice shall be followed by a written notice provided within 48 hours of discovery.

The Project Officer will investigate the site conditions promptly after receiving the notice. If the conditions do materially differ to the extent that an increase or decrease would result in the Contractor's cost of the Work, or the time required for performing any part of the Work under the

contract, an equitable adjustment may be made under this clause and the Contract modified in writing accordingly.

No request by the Contractor for an adjustment to the Contract under this clause shall be allowed, unless the Contractor has given the written notice required. If the Contractor proceeds with any work that may be affected by such differing site conditions before giving notice to the Project Officer as set forth herein, such work shall be at the Contractor's sole risk and expense.

No request by the Contractor for an adjustment to the contract for differing site conditions shall be allowed if made after Final Payment under the Contract.

4. COPIES FURNISHED

Except as provided for otherwise, copies of the Drawings and Specifications reasonably necessary for the execution of the Work will be furnished to the Contractor. One electronic copy of the Contract Drawings and Specifications will be provided by the Project Officer or designee to the Contractor.

5. USE OF CADD FILES

The Contractor may request Electronic CADD files related to the Work or the Project. The CADD files will be provided by the County only if the Contractor completes the Arlington County Electronic CADD Drawing Release Form, which form is then incorporated by reference into this Contract. Use of CADD files are at the Contractor's own risk and in no way alleviates Contractor's responsibility for the Work to conform to the Plans and Specifications.

6. DOCUMENTS ON THE JOBSITE

The Contractor shall keep on the site of the Project a copy of the Drawings and Specifications updated to include all authorized revisions and RFI responses and shall at all times give the County and its authorized representatives access thereto. The Contractor shall mark up the Drawings on a daily basis in red. The As-Built Drawings shall be submitted to the County at Substantial Completion as the Final As-Built Drawings.

7. OWNERSHIP OF DRAWINGS AND SPECIFICATIONS

All Drawings and Specifications and copies thereof furnished by the County are the property of the County and shall not be used on other projects. All copies of the Drawings and Specifications except the signed Contract sets shall be returned to the Project Officer or designee at Final Completion.

8. SUBMITTALS

a. The term "submittals", as used herein, shall include fabrications, erection and setting drawings, manufacturers' standard drawings, schedules, descriptive literature, catalogs, brochures, performance and test data, wiring and control diagrams, and other descriptive data pertaining to the materials and equipment as required to demonstrate compliance with the Contract requirements.

b. Unless other specified in the Specifications the Contractor shall submit for the review of the Project Officer or designee a listing of all submittals required by the Specifications or requested by the Project Officer or designee within fifteen (15) calendar days after receipt of the Notice to Proceed. This listing shall include due dates for each required submittal, coordinated with the project schedule such that adequate time is allotted for review and potential resubmittals,

fabrication and delivery without causing delay. The Contractor bears all risk for delay associated with submittals not received in a timely manner.

- c. Submittals shall be submitted in such number of copies as established in the Specifications. Each submission shall be accompanied by a letter of transmittal, listing the contents of the submission and identifying each item by reference to specification section or drawing. All submittals shall be clearly labeled with the name of the project and such information as may be necessary to enable their complete review by the Project Officer or designee. Catalog plates and other similar material that cannot be so labeled conveniently shall be bound in suitable covers bearing the identifying data.
- d. Submittals shall be accompanied by all required certifications and other such supporting material and shall be submitted in sequence or groups that all related items can be checked together. When submittals cannot be checked because a submission is not complete, or because submittals on related items have not been received by the Project Officer or designee, then such submittals will be returned without action or will be held, not checked, until the missing material is received. Incomplete or defective submittals shall not be considered to have been submitted. Failure to deliver submittals within the specified time will not be grounds for additional time or compensation.
- e. Submittals shall have been reviewed by the Contractor and coordinated with all other related or affected work before they are submitted for review and acceptance and shall bear the Contractor's certification that the Contractor has checked and approved them as complying with all relevant information in the Contract Documents. Submittals submitted without such certification and coordination will be returned to the Contractor without action and will not be considered as a formal submission.
- f. If shop drawings show variations from the Drawings and Specifications because of standard shop practice or other reasons, the Contractor shall make specific mention of such variation in the Contractor's letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment; otherwise, the Contractor will not be relieved of the responsibility for executing the work in accordance with the Drawings and Specifications even though shop drawings have been accepted.
- g. The Project Officer or designee shall review the shop drawings with reasonable promptness. Review and/or acceptance of shop drawings will be general for conformance with the design concept of the Project and compliance with the information given in the Contract Documents, and will not include quantities, detailed dimensions, nor adjustments of dimensions to actual field conditions. Acceptance shall not be construed as permitting any departure from Contract requirements, as authorization of any increase in price nor as relieving the Contractor of the responsibility for any error in details, dimensions or otherwise that may exist. Review is not intended to relieve the contractor of full responsibility for the accuracy and completeness of the plans and calculations, or for the complete compliance with the contract documents. Contractor is solely responsible for the means and methods of the construction, including temporary items proposed for use.

9. SAMPLES

The Contractor shall submit to the Project Officer or designee, all samples required by the Specifications or requested by the Project Officer or designee. Samples shall be submitted in single units only, unless the Contractor desires additional units for the Contractor's own use. Each sample shall bear a label indicating what the material represented, the name of the producer and the title of the Project. Acceptance of a sample shall be only for conformance with the design concept of the Project and compliance with the information given in the Contract Documents, and only for the characteristics or use named in such acceptance. Such acceptance shall not be construed to change or modify any Contract requirements or the Contract Price. Materials and equipment incorporated in the Work shall match the accepted samples. The Contractor shall be responsible for researching the availability of the specified product in the dimensions and colors specified at no additional cost to the County. Failure of the Contractor to identify specified products that are not commercially produced within the time required for submittal transmittal in order to meet the project schedule shall not be entitled to additional time or compensation.

10. TESTS

Any specified tests of materials and finished articles shall be made by bureaus, laboratories or agencies approved by the Project Officer or designee and the certified reports of such tests shall be submitted to the Project Officer or designee. All tests shall be in compliance with the Specifications. All costs in connection with the testing and test failures shall be borne by the Contractor. Failure of any material to pass the specified tests or any test performed by the Project Officer or designee, will be sufficient cause for refusal to consider, under this Contract, any further materials of the same brand or make of that material. Samples of various materials delivered on the site or in place may be taken by the Project Officer or designee for testing. Samples failing to meet the Contract requirements will automatically void previous acceptance of the items tested. The Contractor will not be compensated for additional time and/or cost incurred in finding an acceptable replacement or the removal and replacement of the defective item.

11. MATERIALS AND EQUIPMENT LIST

- a. Unless otherwise specified in the Specifications, within thirty (30) days of the Commencement Date the Contractor shall submit to the Project Officer or designee a complete list of materials and equipment proposed for use in connection with the Project. Partial lists submitted from time to time will not be considered unless specifically approved by the Project Officer or designee.
- b. After any material or piece of equipment has been approved through submittal process, no change in brand or make will be permitted unless satisfactory written evidence is presented to prove that the manufacturer cannot make scheduled delivery of the accepted material, or that material delivered has been rejected and the substitution of a suitable material is an urgent necessity, or that other conditions have become apparent which indicate that acceptance of such other material is in the best interest of the County. The Contractor is solely responsible for the cost and time required to obtain and install a suitable replacement.

12. STANDARDS, SUBSTITUTIONS

- a. Any material specified by reference to the number, symbol or title of a specific standard, such as a Commercial Standard, a Federal Specification, a Trade Association Standard, or other similar standard, shall comply with the requirements in the latest revision of the standards or specification and any amendment or supplement, except as limited to type, class or grade, or as

modified in such reference. The standard referred to, except as modified in the Specifications, shall have full force and effect as though printed in the Specifications.

- b. Reference in the Specifications or on the Drawings to any article, device, product, material, fixture, form or type of construction by name, make or catalog number shall be interpreted as establishing a standard of quality and shall not be construed as eliminating from competition other products of equal or better quality by other approved manufacturers. Otherwise, applications for acceptance of substitutions for the specified items will be considered only upon request of the Contractor, not of individuals, trades or suppliers, and only for a specific purpose; no blanket acceptance will be granted. No acceptance of a substitution shall be valid unless it is in written form and signed by the Project Officer or designee.
- c. If any proposed substitution will affect a correlated function, adjacent construction or the work of other contractors, then the necessary changes and modifications to the affected work shall be considered as an essential part of the proposed substitution, to be accomplished by the Contractor without additional expense to the County or an extension of the contract time, if and when accepted. Detail drawings and other information necessary to show and explain the proposed modifications shall be submitted with the request for acceptance of the substitution.

13. SURVEYS AND CONTROLS

Unless otherwise specified, the Contractor shall establish all baselines for the location of the principal component parts of the Work, establish a suitable number of benchmarks adjacent to the Work, and develop all detail surveys necessary for construction by a professional land surveyor licensed in the Commonwealth of Virginia. The Contractor shall carefully preserve benchmarks, reference points and stakes, and in the case of destruction thereof by the Contractor or due to the Contractor's negligence or the negligence of any subcontractor or supplier, the Contractor shall be responsible for expense and damage resulting therefrom and shall be responsible for any mistakes that may be caused by the loss or disturbance of such benchmarks, reference points and stakes. The Contractor shall within 30 days of NTP perform a full site survey to verify all control points shown on the drawings against existing conditions within the site limits. Any discrepancies found during this effort shall be made known immediately to the Project Officer. Failure to perform this survey and provide proof and acceptance of Project datum, control points, and existing benchmarks will not give rise to any extensions to contract time or amount. The cost of all necessary surveying services shall be considered incidental to the work and, unless otherwise specified, shall be included in the cost of the Work.

14. AS-BUILT DRAWINGS

As-Built Drawings shall be the responsibility of the Contractor. The Contractor shall maintain and mark up one set of prints of the applicable Contract Drawings to portray as-built construction. The prints shall be neatly and clearly marked in red to show all variations between the Work actually provided and that indicated on the Contract Drawings, and all utilities encountered in the Work. All drafting shall conform to good drafting practice and shall include such supplementary notes, legends and details as may be necessary for legibility and clear portrayal of the as-built construction. These drawings shall be marked promptly upon any approved change to the Work or discovery of any undocumented utility or obstruction and shall be submitted to the Project Officer or designee in sufficient time to be approved no later than thirty (30) calendar days after the Substantial Completion Date. The final As-Built Drawings approved by the Project Officer or designee shall be submitted in paper copy and .pdf format electronic files prior to Final Completion. Unless otherwise required under the Contract Documents, incorporation of red-lined changes into CADD format shall be the

responsibility of the Architect and/or Engineer of Record, with the exception being any documents prepared by the Contractor in CADD, the record version of which shall also be provided to the County in CADD format by the Contractor. Final payments will be held until the complete set of red-line drawings are submitted to and approved by the Project Officer.

15. WEB BASED RECORDS DOCUMENTATION

Unless instructed otherwise, the Contractor shall use the web-based construction management tool, e-Builder for, but not limited to, submittals, record keeping and document storage of all construction files including, invoices, pay applications, RFIs, approved shop drawings, change orders, construction progress meeting minutes, warranties, equipment specifications and brochures, record drawings, automated alerts and reminders for all functions, and Operation and Maintenance (O&M) Manuals.

C. COUNTY, COUNTY PROJECT OFFICER, AND CONTRACTOR RELATIONS

1. STATUS OF COUNTY PROJECT OFFICER OR DESIGNEE

The Project Officer or designee shall be the County's representative during the construction period. All Contractor instructions or requests shall be issued from or submitted through the Project Officer or designee. The Project Officer or designee shall have authority to suspend the Work whenever such suspension may be necessary in the responsible opinion of the Project Officer or designee to ensure the proper execution of the Contract. The Project Officer or designee shall also have authority to reject all work and materials that do not conform to the Contract and to decide questions that arise in the execution of the Work. The County Project Officer or designee will, within a reasonable time, make decisions on all matters relating to the execution and progress of the Work.

2. LIMITATION ON COUNTY'S RESPONSIBILITIES

The County shall not supervise, direct, or have control or authority over, nor be responsible for: The Contractor's means, methods, techniques, sequences or procedures of construction; the safety precautions and programs related to safety, or the Contractor's failure to perform or furnish the Work in accordance with the Contract Documents.

3. DISPUTES

- a. All disputes or claims arising under this Contract or its interpretation, whether involving law or fact or both, or extra work, and all claims for alleged breach of Contract shall be submitted in writing to the Project Officer or designee as set forth in these General Conditions. Such claims must set forth in detail the amount of the claim and shall state the facts surrounding it in sufficient detail to identify it together with its character and scope.
- b. Claims denied by the Project Officer shall be processed in accordance with the procedures outlined in Sections 7-107, Contractual Disputes and 7-108, Legal Actions of the Arlington County Purchasing Resolution and the Dispute Resolution paragraph in the Agreement.
- c. The Contractor shall not cause a delay in the work pending a decision of the Project Officer or designee, County Manager, County Board, or court, except by prior written approval of the Project Officer or designee.

4. INSPECTION OF WORK

The Project Officer or designee and representatives of any public authority having jurisdiction shall, at all times, have access to the Work while in progress. The Contractor shall provide suitable facilities for such access and for proper observation of the Work and shall conduct all special tests required by

the Specifications, the Project Officer or designee's instructions, and any laws, ordinances or the regulations of any public authority applicable to the work. Nothing in this section shall abrogate or otherwise limits or relieves the Contractor's independent duty to inspect the Work.

5. INSPECTION OF MATERIALS

All articles, materials, and supplies purchased by the Contractor for the Work are subject to inspection upon delivery to the site and during manufacturing or fabrication. The County reserves the right to return for full credit, at the risk and expense of the Contractor, all or part of the articles, materials, or supplies furnished contrary to Specifications and instructions. Nothing in this section shall abrogate or otherwise limit or relieve the Contractor's independent duty to inspect materials.

6. EXAMINATION OF COMPLETED WORK

If the Project Officer or designee requests it, the Contractor, at any time before acceptance of the Work, shall remove or uncover such portions of the finished work as may be directed. After examination, the Contractor shall restore said portions of the work to the standard required by the Specifications. Should the work thus exposed or examined prove acceptable, then the uncovering or removing, and the replacing of the covering or making good of the parts removed shall be paid for as extra work but should the work so exposed or examined prove unacceptable, then the uncovering, removing and replacing shall be at the Contractor's expense.

7. RIGHT TO SUSPEND WORK

The County shall have the authority to suspend the Work, in whole or in part, for such periods and such reasons as the County may deem necessary or desirable. Any such suspension shall be in writing to the Contractor and the Contractor shall obey such order immediately and not resume the Work until so ordered in writing by the County. No such suspension of the Work shall be the basis for a claim by the Contractor for any increase in the Contract Amount provided that the suspension is for a reasonable time under the circumstances then existing. If the suspension of Work is caused by the County's belief that non-conforming work is being installed, and subsequent investigation proves that the Work was non-conforming, the Contractor shall not be awarded additional time or costs.

8. RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a 10-day period after receipt of written notice from the County or such shorter time as may be reasonable under the circumstances, to commence and continue correction of such default or neglect with diligence and promptness, the County may, without prejudice to other remedies the County may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including the County's expenses, and any additional architect or engineering costs necessary by Contractor's default, neglect or failure. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the County upon demand.

9. CONTRACTOR MANAGEMENT PERSONNEL

The Contractor shall keep a competent superintendent and any necessary assistants on the Site at all times during progress of the Work and such persons shall be satisfactory to the Project Officer or designee. The superintendent or project manager shall not be changed except with the Project Officer or designee's consent. If the Project Officer determines that the superintendent or project manager is no longer satisfactory, then the superintendent or project manager must be replaced within 15 days

of the Project Officer's written notice with a replacement superintendent or project manager with equal or superior qualifications and subject to Project Officer approval.

The superintendent and project manager shall represent the Contractor and all directions given to such persons shall be as binding as if given to the Contractor. The Contractor shall at all times enforce strict discipline and good order among the workers performing under this Contract and shall not employ on the Work any person not reasonably proficient in the Work assigned. Persons permitted to perform Work under Contractor, or any subcontractor, or sub-subcontractor, shall meet all employment eligibility, safety training, security or drug/alcohol testing requirements required by law or by the County. Any person not complying with all such requirements shall be immediately removed from the Site.

The Contractor shall have a qualified and experienced person who can clearly communicate technical matters regarding the subject project. This person shall be available via phone to respond to emergency situations on the project 24 hours a day.

10. DRUG-FREE POLICY

The Contractor is responsible for ensuring that the Site remains a drug-free site. Contractor will require that employees undergo random drug/alcohol screening on a quarterly interval. Any employee who fails the test must be removed from the Site immediately. Random screening shall be performed by a third party licensed to do so in the Commonwealth of Virginia. The Contractor shall provide its random testing policy and schedule to the Project Officer within 30 days of Notice to Proceed. The Contractor will include this provision in every subcontract relating to this Contract. Any infraction by an employee of the Drug-Free policy shall be reported to the Project Officer within 24 hours.

11. LANDS BY COUNTY

The County shall provide access to the lands shown on the Drawings upon which the Work under the Contract is to be performed and to be used for rights of way and for access. In case all the lands, rights-of-way or easements have not been obtained as herein contemplated before construction begins, then the Contractor shall begin its work on such lands and rights-of-way that the County has acquired access to. No additional time or compensation shall be awarded to the Contractor for modifying work location and sequence provided other locations are available for work.

Contractor shall verify the acquisition of all off-site easements and Rights-of-Way prior to the start of off-site construction. Restore all off-site easements to the conditions existing prior to the start of work.

The Contractor shall confine all activities at the site associated with construction activities, to include storage of equipment and or materials, access to the work, formwork, etc. to within the designated Limits of Disturbance (LOD).

12. LANDS BY CONTRACTOR

If the Contractor requires additional land or lands for temporary construction facilities and for storage of materials and equipment other than the areas available on the site or right-of-way, or as otherwise furnished by the County, then the Contractor shall provide such other lands and access thereto entirely at the Contractor's own expense and without liability to the County. The Contractor shall not enter upon private property for any purpose without prior written permission of all of the persons

and entities who own the property. The Contractor shall provide copies of all agreements to the County and shall include language in the agreement indemnifying and holding the County harmless for any damages, repairs, restoration or fees associated with the use of the property. Upon termination of the agreement, the Contractor shall provide to the County a fully executed release from the property owner.

13. PROTECTION OF WORK AND PROPERTY

- a. The Contractor shall continuously maintain and protect all of its Work from damage and shall protect the County's property from damage or loss arising in connection with this Contract until Substantial Completion. After Substantial Completion, the maintenance or protection of any incomplete or remedial Work identified on the punch list that requires maintenance or protection in order to allow for the final completion and acceptance of such Work shall be the responsibility of the Contractor until Final Completion. The Contractor shall make good any such damage or loss, except such as may be caused by agents or employees of the County. Failure to adequately protect the Work shall not be grounds for additional compensation for any maintenance and/or repairs to such Work.
- b. The Contractor shall not place upon the Work, or any part thereof, any loads which are not consistent with the design strength of that portion of the Work.
- c. The Contractor shall be responsible for the preservation of all public and private property, trees, monuments, etc., along and adjacent to the street and/or right-of-way, and shall use every precaution to prevent damage to pipes, conduits and other underground structures, curbs, pavements, etc., except those to be removed or abandoned in place and shall protect carefully from disturbance or damage all monuments and property marks until an authorized agent has witnessed or otherwise referenced their location and shall not remove them until directed. Any damage which occurs by reason of the operations under this Contract, whether shown or not on the approved construction plans, shall be completely repaired or replaced to the County's satisfaction by the Contractor at the Contractor's expense. The Contractor shall be responsible for all damages caused by their construction activities.
- d. Prior to commencing construction activity at the Site, the Contractor shall videotape the Site and an additional fifty (50) feet outside the perimeter of the Site. Contractor shall submit a copy of high-resolution digital recording on a DVD or flash drive to the County. The recording shall be stable, continuous, and contain all items within the limits of Work. Submission of the DVD to the County shall be a condition precedent to any obligation of the County to consider an Application for Payment. The DVD shall be the property of the County, and the County shall be permitted to reproduce such DVD's and use the same for any purpose without limitation or claim of ownership or compensation from any party. Contractor shall incorporate the cost of the preconstruction survey in the bid amount or the unit prices of the bid items, as applicable. No additional payment will be made by the County.
- e. The Contractor shall shore, brace, underpin, secure, and protect, as may be necessary, all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the site that may be affected in any way by excavations or other operations connected with the work required under this Contract. The Contractor shall be responsible for giving any and all required notices to owners or occupants of any adjoining or adjacent property or other relevant parties before commencement of any work. Contractor shall provide all engineering (signed and sealed)

for items listed in this section per the Specifications. The Contractor shall indemnify and hold the County harmless from any damages on account of settlements or loss of all damages for which the County may become liable in consequence of such injury or damage to adjoining and adjacent structures and their premises.

- f. In an emergency affecting the safety of life or of the Work, or of adjoining property, the Contractor, without special instruction or authorization from the Project Officer or designee, or the County, is hereby permitted to act, at the Contractor's discretion, to prevent such threatened loss or injury, and the Contractor shall so act without appeal, if so instructed or authorized.
- g. The Contractor shall contact "Miss Utility" at 811 for marking the locations of existing underground utilities (i.e., Water, sewer, gas, telephone, electric, and cable tv) at least 72 hours prior to any excavation or construction. The Contractor is required to identify and protect all other utility lines found in the work site area belonging to other owners that are not members of "Miss Utility". Private water and/or sewer laterals will not be marked by "Miss Utility" or the County. The Contractor shall locate and protect these services during construction.

14. SEPARATE CONTRACTS

- a. The County reserves the right to let other contracts in connection with this Project. The Contractor shall afford other contractors' reasonable access to the Project including storage of their materials and the execution of their work and shall properly connect and coordinate its work with the work of other such contractors.
- b. If any part of the Contractor's work depends, for proper execution or results, upon the work of any other contractor, the Contractor shall inspect and promptly report to the Project Officer or designee any defects in such work that renders it unsuitable for such proper execution and results. The Contractor's failure to so inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the reception of the Contractor's work, except as to defects which may develop in other contractor's work after its execution.
- c. If the Contractor or any of the Contractor's subcontractors or employees cause loss or damage to any separate contractor on the Work, the Contractor agrees to settle or make every effort to settle or compromise with such separate contractor. If such separate contractor sues the County on account of any loss so sustained, the County shall notify the Contractor, who shall indemnify and save the County harmless against any expense, claim or judgment arising therefrom, including reasonable attorney's fees.
- d. In case of a dispute arising between two or more separate contractors engaged on adjacent work as to the respective rights of each under their respective contracts, the Project Officer shall determine the rights of the parties.

15. SUBCONTRACTS

- a. Unless otherwise specified, the Contractor shall, within fifteen (15) calendar days after the execution of the Contract by the County, provide to the Project Officer or designee, in writing, the names of all subcontractors proposed for the principal parts of the Work and for such others as requested by the Project Officer or designee, and shall not employ any subcontractors that the Project Officer or designee may object to as incompetent or unfit after an appropriate

determination of the subcontractor's ability. No proposed subcontractor will be disapproved except for cause.

- b. The Contractor shall make no substitutions for any subcontractor previously selected/approved unless first submitted to the County for approval.
- c. The Contractor shall be as fully responsible to the County for the acts and omissions of the Contractor's subcontractors as the Contractor is for the acts and omissions of persons directly employed by the Contractor.
- d. The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind subcontractors to the Contractor by the terms of the General Conditions of the Contract, Special Provisions and other Contract Documents comprising the Contract insofar as such documents are applicable to the work of subcontractors.
- e. Nothing contained in the Contract shall be construed to create any contractual relation between any subcontractor and the County, nor shall it establish any obligation on the part of the County to pay to or see to the payment of any sums to any subcontractor. The County will not discuss, negotiate or otherwise engage in any contractual disputes with any subcontractor.
- f. If requested by the County, the Contractor shall replace any subcontractor at no cost to the County within 30 days of the Project Officers written notice or as otherwise specified. No additional time or compensation will be provided in the event a subcontractor is removed due to non-compliance of the requirements outlined within the Contract.

16. ELIMINATED ITEMS

If any item(s) in the Contract are determined to be unnecessary for the proper completion of the Work contracted, the Project Officer or designee may, upon written notice to the Contractor, eliminate such item(s) from the Contract. Payment will not be made for such item(s) so eliminated; except that the Contractor will be compensated for the actual cost of any work performed and the net cost of materials purchased before the item(s) was eliminated from the Contract, including freight and tax costs, as evidenced by invoice. No additional compensation will be made for overhead or anticipated profit. The County will receive the full unit price credit for work eliminated prior to production or installation.

17. COUNTY ORDINANCES

The Contractor shall comply with all applicable County ordinances, including but not limited to: the *Noise Control, Erosion & Sediment Control, Storm Water Management, and Chesapeake Bay Preservation ordinances (Chapters 15, 57, 60, and 61 of the County Code)*.

D. MATERIALS AND WORKMANSHIP

1. MATERIALS FURNISHED BY THE CONTRACTOR

Unless otherwise specified, all materials and equipment incorporated in the Work under the Contract shall be new. All work shall be accomplished by persons qualified in the respective trades.

2. IBC AND VUSBC REQUIREMENTS

The Contractor certifies that all material supplied or used under this Contract meets all current International Building Code (IBC) requirements and the requirements of the Virginia Uniform

Statewide Building Code (VUSBC); and further certifies that, if the material delivered or used in the performance of the work is found to be deficient in any of the applicable state or national code requirements, all costs necessary to bring the material into compliance with the requirements shall be borne by the Contractor. The County shall be entitled to offset such costs against any sums owed by the County to the Contractor under this Contract.

3. ADA COMPLIANCE

The Contractor shall ensure that all Work performed under this Agreement is completed in accordance with the Contract Documents, including Work intended to meet the accessibility requirements of the Americans with Disabilities Act (ADA).

The Contractor is not required to ascertain whether the Contract Documents meet ADA design standards and guidelines. However, should the Contractor discover any non-conformity with such requirements, the Contractor shall immediately inform the County and its design consultant, if applicable, to allow for corrective action.

The Contractor shall defend and hold the County harmless from any expense or liability arising from the Contractor's non-compliance in meeting its obligations herein. The Contractor shall be responsible for all costs related to permitting delays, redesign, corrective Work, and litigation relating to such non-compliance.

4. MANUFACTURER'S DIRECTIONS

Manufactured articles, material, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the manufacturer's directions as accepted by the Project Officer or designee, unless herein specified to the contrary.

5. WARRANTY

All material provided to the County shall be fully guaranteed by the Contractor against manufacturing defects within the period of the manufacturer's standard warranty. Such defects shall be corrected by the Contractor at no expense to the County. The Contractor shall provide all manufacturers' warranties to the Project Officer by the date of Final Completion.

All Work is guaranteed by the Contractor against defects resulting from the use of inferior or faulty materials. The Contractor warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects or inferior or faulty workmanship or work not in accordance with the Contract Documents for one (1) year from the date of Substantial Completion or as set forth in the Specifications of the work by the County in addition to and irrespective of any manufacturer's or supplier's warranty.

No date other than Substantial Completion or as set forth in the Specifications shall govern the effective date of the Warranty, unless that date is agreed upon by the County and the Contractor in advance and in a signed writing.

The Contractor shall promptly correct any defective work or materials after receipt of a written notice from the County to do so. If the Contractor fails to proceed promptly or use its best efforts and due diligence to complete such compliance as quickly as possible, the County may have the materials or work corrected and the Contractor and its Sureties shall be liable for all expenses and costs incurred by the County.

Nothing contained in this section shall be construed to establish a period of limitations with respect to other obligations the Contractor may have under this Contract.

6. INSPECTION AND ACCEPTANCE OF MATERIALS

Inspection and acceptance by the County will be at the work site in Arlington County, Virginia and within ten (10) calendar days of delivery unless otherwise provided for in the Contract Documents. The County will not inspect, accept, or pay for any materials stored or delivered off-site by the Contractor, except as provided by the Payment for Stored Materials clause of these General Conditions and other requirements of the Contract Documents. The County's right of inspection shall not be deemed to relieve the Contractor of its obligation to ensure that all articles, materials and supplies are consistent with Specifications and instructions and are fit for their intended use. The County reserves the right to conduct any tests or inspections it may deem appropriate before acceptance. The Contractor shall be responsible for maintaining all materials and supplies in the condition in which they were accepted until they are used in the work.

The Contractor is to coordinate its work and request inspections in such a manner as to minimize the cost to the County without impacting the overall schedule of the Project within reason. All costs associated with re-inspection shall be borne by the Contractor.

7. CONTRACTOR'S TITLE TO MATERIALS

No materials or supplies for the work shall be purchased by the Contractor or any subcontractor subject to any chattel mortgage or under a conditional sale or other agreement by which an interest is retained by the seller. The Contractor warrants that it has good title to, and that it will require all subcontractors to warrant that they have good title to, all materials and supplies for which the Contractor invoices for payment. The County may request proof of title or payment prior to acceptance of the Contractor's invoice.

8. TITLE TO MATERIALS AND WORK COVERED BY PARTIAL PAYMENTS

All material and work covered by partial payments made by the County will become the property solely of the County at the time the partial payment is made. However, risk of loss or damage to all items shall be the responsibility of the Contractor until Final Acceptance by the County. This provision will not be construed as relieving the Contractor from having sole responsibility for all materials and work upon which payments have been made and for the restoration of any damaged work or replacement or repair at the County's option of any damaged materials. This provision will not be construed as a waiver of the County's right to require fulfillment of all terms of the Agreement, including full rights under the terms of the Warranty provisions of the Agreement, nor shall payment indicate acceptance of the materials or work.

9. CONNECTING WORK

The Contractor shall do all cutting, patching, or digging of the Contractor's work that may be required to make its several parts come together properly and fit it to receive or be received by work of other contractors as shown upon or reasonably implied by the Drawings and Specifications for the completed Project and shall make good after them as the Project Officer or designee may direct. This work will be performed in a workmanlike manner utilizing proper care and equipment to achieve proper line and grade. The Contractor shall not endanger any work by cutting, patching, or digging, or otherwise, and shall not cut or alter the work of any other contract except with the prior written consent of the Project Officer or designee.

10. REJECTED WORK AND MATERIALS

- a. Any of the Work or materials, goods, or equipment which do not conform to the requirements of the Contract Documents or are not equal to samples accepted by the Project Officer or designee or are in any way unsatisfactory or unsuited to the purpose for which they are intended, shall be rejected, and replaced immediately so as not to cause delay to the Project or work by others. Any defective work, whether the result of poor workmanship, use of defective materials, damage through carelessness or any other cause, shall be removed and the work shall be re-executed by the Contractor at the Contractor's expense. The fact that the Project Officer or designee may have previously overlooked such defective work shall not constitute acceptance of any part of it.
- b. If the Contractor fails to proceed at once with the replacement of rejected material and/or the correction of defective workmanship when notified to do so by the Project Officer or designee, the County may, by contract or otherwise, replace such material or correct such workmanship and charge the cost to the Contractor. This clause applies during the Contract and during any warranty or guarantee period.
- c. The Contractor shall be responsible for managing, addressing within a timely manner, and formally closing out all notices of non-compliance issued by the inspector of record, Arlington County Inspection Services, or the Design Team. The Contractor shall be solely liable for any costs or time associated with the corrective action to address any notices of non-compliance. The Contractor must work directly with the entity issuing the notice of non-compliance.
- d. If the Project Officer or designee deems it expedient not to require correction of work which has been damaged or not done in accordance with the Contract, an appropriate adjustment to the Contract Price may be made.

11. PROHIBITION AGAINST ASBESTOS CONTAINING MATERIALS

No goods or equipment provided to the County or construction material installed shall contain asbestos. If a Contractor or supplier provides or installs any goods, equipment, supplies, or materials that contain asbestos in violation of this prohibition, the Contractor shall be responsible for all costs related to the immediate removal and legal disposal of the goods, equipment or materials containing asbestos and replacement with County-approved alternate. The Contractor shall be responsible for all goods, equipment, supplies or materials installed or provided by any of its employees, agents or subcontractors in connection with the work under this contract. The Contractor shall also reimburse to the County all costs of such goods, equipment, supplies or materials installed if not corrected by the Contractor.

E. LEGAL RESPONSIBILITY AND PUBLIC SAFETY

1. SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK

The Contractor acknowledges that it has taken steps reasonably necessary to ascertain the nature and locations of the work of the Contract, and that it has investigated and satisfied itself as to the general and local conditions and factors which can affect the Work or its cost, including but not limited to:

- a. conditions bearing upon transportation, disposal, handling, and storage of materials;
- b. the availability of labor, water, electric power, and roads;
- c. uncertainties of weather, river stages, tides, or similar physical conditions at the site;
- d. the information and conditions of the ground; and
- e. the character of equipment and facilities needed before and during work performance.

The Contractor, by executing the Contract, represents that it has reviewed and understands the Contract Documents and has notified the County of and obtained clarification of any discrepancies which have become apparent during the bidding period. During the Contract, the Contractor must promptly notify the County in writing of any apparent errors, inconsistencies, omissions, ambiguities, construction impracticalities or code violations discovered as a result of the Contractor's review of the Contract Documents including any differences between actual and indicated dimensions, locations and descriptions, and must give the County timely notice in writing of same and of any corrections, clarifications, additional Drawings or Specifications, or other information required to define the Work in greater detail or to permit the proper progress of the Work. The Contractor must provide similar notice with respect to any variance between its review of the Site and physical data and Site conditions observed. If the Contractor performs any Work involving an apparent error, inconsistency, ambiguity, construction impracticality, omission or code violation in the Contract Documents of which the Contractor is aware, or which could reasonably have been discovered, without prompt written notice to the County and request for correction, clarification or additional information, as appropriate, the Contractor does so at its own risk and expense and all related claims are specifically waived.

The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the County, as well as from the Drawings and Specifications made a part of this Contract. Unless otherwise specified, all existing structures, materials and obstructions that interfere with the new construction shall be removed and disposed of as part of this Contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the Work without additional expense to the County.

The locations of existing utilities, including underground utilities, which may affect the Work, are indicated on the Drawings or in the Specifications insofar as their existence and location were known at the time of preparation of the drawings. However, nothing in these Drawings or Specifications shall be construed as a guarantee that such utilities are in the location indicated or that they actually exist, or that other utilities are not within the area of the operations. The Contractor shall make all necessary investigations to determine the existence and locations of such utilities. Should uncharted or incorrectly charted utilities be encountered during performance of the Work, notify the Project Officer or designee immediately for instructions. The Contractor will be held responsible for any damage to and maintenance and protection of existing utilities and structures, of both public and private ownership. However, if it is determined that such existing utility lines or structures require relocation or reconstruction or any other work beyond normal protection, then such additional work will be ordered under the terms of the clause entitled "Changes in Work." At all times, cooperate with the County and utility companies to keep utility services and facilities in operation.

The County assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available by the County. The County assumes no responsibility for any understanding reached or representation made concerning conditions which can affect the Work by any of its officers or agents before the execution of this Contract, unless that understanding, or representation is expressly stated in this Contract.

2. PUBLIC CONVENIENCE

The Contractor shall at all times so conduct its Work as to ensure the least possible obstruction to traffic (vehicular, bicycle and pedestrian) and inconvenience to the general public, County employees, and the residents in the vicinity of the Work. Traffic shall be maintained in accordance with the approved Maintenance of Traffic (MOT) plan. No road, street or sidewalk shall be closed to the public except with the permission of the Project Officer or designee and or proper governmental authority. Fire hydrants on or adjacent to the Work shall be kept accessible to firefighting equipment at all times. Temporary provisions shall be made by the Contractor and included in the cost of the Work to ensure the use of sidewalks, trails, and transit facilities compliant with all applicable ADA and other regulations, as well as the proper functioning of all gutters, drainage inlets, drainage ditches, and irrigation ditches, which shall not be obstructed except as approved by the Project Officer or designee.

The Contractor is responsible for securing its work area for safety and security. The Contractor shall confine its construction and presence to the Limits of Work, unless otherwise approved by the County Project Officer.

3. SAFETY AND ACCIDENT PREVENTION

The Contractor shall comply with, and ensure that the Contractor's employees and subcontractors comply with, all current applicable local, state and federal policies, regulations and standards relating to safety and health, including, by way of illustration and not limitation, the U.S. Department of Labor's Occupational Safety and Hazard Administration (OSHA) Construction Industry Regulations, the standards of the Virginia Occupational Safety and Health program of the Department of Labor and Industry for General Industry and for the Construction Industry, the Federal Environmental Protection Agency Standards and the applicable standards of the Virginia Department of Environmental Quality.

The Contractor shall provide, or cause to be provided, all technical expertise, qualified personnel, equipment, tools and material to safely accomplish the Work specified to be performed by the Contractor and subcontractor(s).

The Contractor shall identify to the County Project Officer at least one on-site person who is the Contractor's competent, qualified, and authorized safety officer on the worksite and who is, by training or experience, familiar with and trained in policies, regulations and standards applicable to the work being performed. The competent, qualified and authorized person must be capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees, shall be capable of ensuring that applicable safety regulations are complied with, and shall have the authority and responsibility to take prompt corrective measures, which may include removal of the Contractor's personnel from the work site.

The Contractor shall provide to the County, within 7 days of issuance of the Notice to Proceed, a copy of the Contractor's written safety policies and safety procedures applicable to the scope of work. Failure to provide this information within may result in cancellation of the Contract.

The Contractor shall exercise proper precaution at all times for the protection of persons and property and shall be responsible for all injury to persons and damage to property either on or off the site, which occur as a result of the Contractor's prosecution of the Work.

The Contractor shall take or cause to be taken such additional safety and health measures as the County may determine to be reasonably necessary. Machinery, equipment, and all hazards shall be

guarded in accordance with the safety provisions of the current version of "Manual of Accident Prevention" published by the Associated General Contractors of America, Inc., to the extent that such provisions are not in conflict with applicable local laws. The Contractor is directed to the "Rules and Regulations Governing Construction, Demolition and All Excavation" and adopted by the Safety Codes Commission of Virginia, 1966, or latest edition, covering requirements for shoring, bracing, and sheet piling of trench excavations.

4. HAZARDOUS MATERIALS

Arlington County is subject to the Hazard Communication Standard, 29 CFR §1910.1200 (Standard). The Contractor agrees that it will provide or cause to be provided Safety Data Sheets (SDS) required under the Standard for all hazardous materials supplied to the County or used in the performance of the work. Such SDS shall be delivered to the County no later than the time of actual delivery of any hazardous materials to the County or use of such material in the performance of work under the Contract by the Contractor or its subcontractors, whichever occurs first. Container labeling meeting the requirements of the Standard shall be appropriately affixed to the shipping or internal containers. The County reserves the right to refuse shipments of hazardous materials not appropriately labeled, or when SDS have not been received prior to or at the time of receipt of the shipment for use by the County or for use by the Contractor in the performance of the Contract, or whenever the material is delivered in a manner inconsistent with any applicable law or regulation. Any expenses incurred due to the refusal or rejection of SDS are the responsibility of the Contractor. The Contractor shall comply with all federal, state, and local laws governing the storage, transportation, and use of toxic and hazardous materials. The Contractor shall maintain onsite an up to date SDS binder for all material used and delivered to the Project. The County Project Officer or his designee shall be allowed access to the SDS book at all times.

5. HAZARDOUS WASTE

Hazardous Waste Generator/Hazardous Waste Disposal: The County Board of Arlington County, Virginia and the Contractor shall be listed as Co-generators. The Contractor shall assume all the duties pertaining to the Waste Generator, including signing the Waste Shipment Record ("WSR") and manifest. The Contractor shall supply the County Project Officer with the executed original Owner's Copy of the WSR, as required by applicable regulatory agencies within 35 days from the time the waste was accepted by the initial waste transporter, and prior to request for final payment. A separate WSR shall be submitted for each shipment to the disposal site.

Delayed Waste Shipment Records: The Contractor shall report in writing to the EPA Region III office within 45 days if an executed copy of the WSR is not received from the operator of the disposal site. The report to the EPA regional office shall include a copy of the original WSR and a cover letter signed by the Contractor stating the efforts taken to locate the hazardous waste shipment and the results of those efforts.

Temporary Hazardous Waste Storage Prohibited: The Contractor shall not temporarily store hazardous waste unless pre-approved by the County in writing. If so approved, hazardous waste stored off-site in a temporary facility shall be monitored and records shall be kept on the number of containers, size, and weight. The Contractor shall inform the County when the hazardous waste is to be transported to the final disposal site. The County has the right to inspect the temporary site at any time. The Contractor shall submit copies of all relevant manifests, Waste Shipment Record(s), and landfill receipts to the County Project Officer prior to the request for final payment. All paperwork shall be signed by the Contractor and disposal site operator as required.

6. ASBESTOS

Whenever and wherever during the course of performing any work under this Contract the Contractor discovers the presence of asbestos or suspects that asbestos is present, the Contractor shall stop work immediately, secure the area, notify the County Project Officer immediately and await positive identification of the suspect material. During the downtime in such a case, the Contractor shall not disturb any surrounding surfaces but shall protect the area with suitable dust covers. Work shall not proceed without an Asbestos-Related Work Authorization executed by the County Asbestos Program Manager.

7. CROSSING UTILITIES

When construction crosses highways, railroads, streets, waterways, or utilities under the jurisdiction of State, County, City, or other public agency, public utility, or private entity, the Contractor shall secure written permission where necessary from the proper authority before executing such new construction. A copy of such written permission must be filed with the County before any work is started. The Contractor shall be required to furnish a release from the proper authority before Final Acceptance of the Work.

8. OVERHEAD HIGH VOLTAGE LINES SAFETY ACT

If any work required herein will be performed within ten feet of an overhead high voltage line, the provisions of Virginia Statute 59.1-406, et. seq., "Overhead High Voltage Line Safety Act" (Act) shall apply. The "person or contractor responsible for the work to be done", as that term is used in the Act, will be interpreted to mean the Contractor. The Contractor shall notify the owner or operator of the high voltage line in the manner prescribed in Section 59.1-411 of the Act in sufficient time prior to the time work is to be commenced to avoid any delays in the work. The County will not pay for lost time, profits, or permit any extension of the work for any delays caused by the failure of the Contractor to make such arrangements in a timely manner. All costs for the work shall be paid by the Contractor. The County shall reimburse the Contractor for the actual reasonable cost paid to the owner or operator of the high voltage line by the Contractor on presentation to the County by the Contractor of original invoices from the owner or operator of the high voltage line in the same manner as for other Contractor invoices submitted for work performed. Retention, if applicable to the Contract, shall not be withheld from the payment to the Contractor by the County for this work. No processing, administrative, or other charges above the actual amount charged by the owner or operator of the high voltage line shall be paid to the Contractor by the County.

9. SANITARY PROVISIONS

The Contractor shall provide and maintain such sanitary accommodations for the use of the Contractor's employees and those of its subcontractors as may be necessary to comply with the requirements and regulations of OSHA and of the local and State departments of health.

10. SITE CLEAN-UP AND WASTE DISPOSAL

The Contractor shall frequently remove and properly dispose of all refuse, rubbish, scrap materials, and debris from the site resulting from the Contractor's operations during the performance of this contract. The Contractor shall ensure the work site presents a neat and orderly appearance at all times. The Contractor shall isolate any and all dumpsters, trash cans and recycling bins provided for the Project from public use until Final Acceptance.

Unless otherwise stated, the Contract Amount and any unit prices shall include all costs and fees for removal and disposal of all waste and debris, whether disposed of at a County site or at any other location.

The Contractor shall remove all surplus material, false work, temporary structures including foundations thereof, and debris resulting from the Contractor's operations at work completion and before Final Acceptance. The County shall reserve the right to remove the surplus material, false work, temporary structures including foundations and debris. The County will restore the site to a neat, orderly condition if the Contractor fails to do so. The County shall be entitled to offset such cost against any sums owed by the County to the Contractor under this Contract.

11. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

When the Project includes an approved SWPPP, the Contractor shall strictly abide by this plan which includes: a Pollution Prevention (P2) Plan, an Erosion and Sediment Control (E&S) Plan, and a Stormwater Management Plan. If the Contractor proposes to deviate from this approved plan, it shall be the Contractor's responsibility to coordinate and obtain approval from the County Project Officer prior to implementing any changes.

No separate payment shall be made by the County for SWPPP implementation, with the exception of E&S items as specified on the E&S plans or listed as pay items. The Contractor shall not be entitled to any additional payment for changes to the SWPPP which are the result of the Contractor's work schedule or resource allocation, weather delays, or other factors not controlled by the County.

F. PROGRESS AND COMPLETION OF THE WORK

1. NOTICE TO PROCEED

The Contractor shall be given written Notice to Proceed with the Work. Such Notice to Proceed shall state the date on which the Work is to be commenced, and every calendar day thereafter shall be counted in computing the actual Time for Completion.

2. TIME FOR COMPLETION

It is hereby understood and mutually agreed by and between the Contractor and the County that the Commencement Date, the rate of progress, and the Time for Completion of the Work to be done hereunder are essential conditions of the Contract. The Contractor agrees that the Work shall be started promptly upon receipt of a written Notice to Proceed in accordance with the accepted schedule. The Work shall be prosecuted regularly, diligently, and uninterruptedly at a rate of progress that will ensure full completion of the Project within the Time for Completion specified in the Contract Documents.

3. SCHEDULE OF COMPLETION

Unless otherwise specified, the Contractor shall within 10 business days after the Award Date, or prior to the pre-construction meeting, whichever occurs first, submit schedules which show the order in which the Contractor proposes to carry on the Work, with dates for starting and completing the various activities of the Work. The Contractor shall submit an updated schedule monthly with the request for partial payment. Review and acceptance by the County of the Contractor's schedule of completion shall in no way relieve the Contractor of its responsibility to complete the Work within the contract time. If the Work falls behind the schedule, the County may require the Contractor to prepare and submit, at no extra cost to the County, a recovery schedule indicating by what means the

Contractor intends to regain compliance with the schedule. The recovery schedule must be submitted to the County for review by the date indicated in the County's written demand.

4. CONDITIONS FOR COMPLETION

a. **SUBSTANTIAL COMPLETION:** The Work will be considered Substantially Complete when all of the following conditions have been met and accepted by the Project Officer, and a Certificate of Substantial Completion has been issued:

1. The Contractor has provided formal notice that the Work is substantially complete, and the Project Officer has agreed that the condition of the Work warrants a Substantial Completion inspection;
2. The Contractor has provided a Punch List and that list has been reviewed and approved by the Project Officer. Failure to include an item on the Punch List does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents;
3. Final test reports as required by the Contract and certificates of inspection and approval required for use and occupancy;
4. Fire Marshal's report, if applicable;
5. Approval forms and transfer documents for all utilities;
6. All life safety systems, including fire alarms, visual and audios alarms, fire detectors and fire alarm annunciator system, sprinkler systems, and all mechanical and electrical systems are complete and working in an automatic mode, and the County has been adequately trained in the operation of the systems;
7. The HVAC system Testing and Balancing Report and build air quality test results as required for LEED certification have been accepted by the Project Officer;
8. Operation and Maintenance Manuals have been submitted for review;
9. All documents and verification of training required in accordance with any Commissioning Plan;
10. Mark-ups of construction drawings showing the As-Built or "Record" condition have been submitted for review and approval by the Project Officer;
12. Entrances and egress pathways have been constructed and can remain clear of construction activities;
13. A Certificate of Occupancy has been issued for the space by the County's Inspection Services Division;
14. All Commissioning has performed and completed to the satisfaction of the Project Officer; and

15. Schedule to complete the Punch List and value of Work not yet complete.

b. Upon the Contractor providing notice that the Work is substantially complete, the Project Officer or designee will invite all relevant parties to perform an inspection of the Work, and any noted deficiencies or incomplete items not indicated on the Contractor's punch list will be added. All punch list items, whether generated by the Contractor or any other party on behalf of the County, shall be completed within thirty (30) days of the date of Substantial Completion, unless otherwise agreed to by the County due to seasonal or other extenuating circumstances.

c. FINAL COMPLETION: The Work will be considered Finally Complete when all of the following conditions have been met and accepted and a Final Completion Notice has been issued by the Project Officer:

1. The Contractor has provided formal notice that the Work is complete, and the Project Officer has agreed that the condition of the Work warrants a Final Completion inspection;

2. All construction deficiencies and punch list items have been closed and all construction deficiencies corrected and accepted by the Project Officer;

3. All spare parts and attic stock have been delivered, stored in an orderly manner in a space designated by the Project Officer and a complete inventory list has been verified and accepted by the Project Officer;

4. All warranties and manufacturer certificates and contact information for parties providing warranties have been delivered and accepted by the Project Officer;

5. All final Operating and Maintenance manuals have been delivered and approved and accepted by the Project Officer;

6. All final As-Built Drawings in .pdf format on a CD delivered and accepted by the Project Officer;

7. All commissioning has been completed and any open construction items in the commissioning agent's report have be closed and accepted by the Project Officer; and

8. All LEED documents and submittals, if applicable, to be provided by the Contractor or sub-contractors have been submitted and accepted by the Project Officer.

5. USE OF COMPLETED PORTIONS

The County shall have the right to take possession of and use any completed or partially completed portions of the Work, notwithstanding that the time for completing the entire Work or such portions may not have expired; but taking such possession and use shall not be deemed an acceptance of any work not done in accordance with the Contract Documents. If the Contractor claims that such prior use increases the cost or delays, the completion of remaining work, or causes refinishing of completed work, the Contractor may submit a claim for compensation or extension of time, or both.

G. MEASUREMENT AND PAYMENT

1. PAYMENTS TO CONTRACTOR

The County will make partial payments, less retainage, to the Contractor monthly on the basis of the Contractor's written estimate of the work performed during the preceding calendar month as approved by the Project Officer or designee.

The Contractor's application for payment shall indicate the amount of work completed to date in a format consistent with the accepted bid and as indicated below:

- a. Lump Sum: For lump sum contracts, the Contractor shall provide to the Project Officer a Schedule of Values, and the application for payment will reflect the Schedule of Values and the amount of work completed in those units.

For contracts that include multiple lump sum line items, the application for payment shall reflect the percentage of work completed for each lump sum item. If requested by the Project Officer, the Contractor shall provide a Schedule of Values for each lump sum line item in the contract.

- b. Unit Price: The schedule of unit prices in the accepted bid shall be used as the basis for preparing the estimates, and each partial payment shall represent the total value of all units of work completed, computed at the unit prices stated in the Contract, less the aggregate of previous payments.

At the discretion of the Project Officer, payments may alternatively be based on actual quantities and site measurements taken in the field by County staff using the Contract Unit Prices.

If Stipulated Price Items are included in the contract, Work on such Stipulated Price Items shall be carried out only upon written order by the Project Officer. The payment for a Stipulated Price Item shall be made by the County to the Contractor at the related unit price specified in the 'Stipulated Price Items' section of the Bid Form on the same basis as the payment for any other regular Bid Item.

In addition to the amount of work completed to date, the application for payment shall indicate the aggregate of all previous payments for each line item, the retainage previously withheld, and the total payment requested this period.

The Contractor's application for payment will not be reviewed or processed unless an updated schedule is attached. The pay application shall also contain a certification by the Contractor that due and payable amounts have been paid by the Contractor, including payments to subcontractors, for work which previous payment was received by the Contractor from the County.

2. PAYMENT FOR STORED MATERIALS

When requested in writing by the Contractor, payment allowances may be made for material secured for use on the Project and secured at the project site. Such payments will only be made for materials scheduled for incorporation into the work within sixty (60) days.

Payment for materials stored offsite may be considered at the discretion of the Project Officer. Any such request shall be made in writing, and the Contractor shall provide photographs of materials stored offsite, bills of sale, and proof of insurance on the premises at which off-site materials are

stored with the application for payment. Payment for stored materials may also be subject to additional requirements contained elsewhere in the Contract Documents.

3. PAYMENTS WITHHELD

The Project Officer or designee may withhold or, on account of subsequently discovered evidence, nullify the whole or a part of any certificate for payment to the extent necessary to protect the County from loss on account of defective work not remedied or withhold payment for violation of any contract term or condition not remedied after sufficient notice given to the Contractor.

Any such withholding shall not result in any liability to the Contractor for damages.

4. COUNTY ORDERED CHANGES IN WORK

The County, without invalidating the Contract, may order extra Work or make changes by addition, deletion or revision in the Work, with the total Contract Amount being adjusted accordingly if applicable. All such work shall be executed under the conditions of the original Contract, except that modification of the Time for Completion caused thereby shall be made at the time of approving such change.

- a. Changes in the Work which do not involve extra cost and are not inconsistent with the purpose of the Project can be directed by means of a Field Order. Otherwise, except in an emergency endangering life or property, no extra Work or change shall be made unless in pursuance of a written Construction Change Directive or Change Order and no claim for an addition to the Contract Amount or Contract Time shall be valid unless so ordered.
- b. The Contractor shall review any County requested or directed change and shall respond in writing within 14 days after receipt of the proposed change stating the effect of the proposed change upon Contractor's work, including any increase or decrease in Contract time and price. The Contractor shall furnish the County an itemized breakdown of the quantities and prices used in computing the proposed change. The Contractor shall also furnish any sketches, drawings, and or pictures to properly explain the change or impact to the Project Officer. It is the sole responsibility of the Contractor to provide adequate change order backup to satisfy the Project Officer.
- c. The value of any such extra work or change shall be proposed by the Contractor in one or more of the following ways: (a) by estimate in a lump sum; (b) by cost and fixed fee; (c) by unit price additions or deletions of quantities stated in the unit price contract; or (d) by any other method permitted under the Arlington County Purchasing Resolution. The Project Officer will determine the method appropriate based on the nature of the changes.
- d. If none of the aforementioned methods is agreed upon the Contractor shall proceed with the work without delay under force account, provided the Contractor receives a Construction Change Directive. In such case, the Contractor shall keep and present in such form as the Project Officer or designee may direct, a correct account of the cost, together with vouchers. The Project Officer or designee shall be permitted to verify such records on a daily basis and may require such additional records as are necessary to determine the cost of the change to the Work. The Project Officer or designee shall certify to the amount due to the Contractor, including a reasonable lump sum allowance for overhead and profit. A complete accounting of the extra cost shall be made within 14 days after completion of the work involved in the claim. Refer to Paragraph G.5, *Force*

Account Work, below for a description of allowable costs when work is performed under force account.

- e. A cost proposal for a change in the Work shall provide a complete breakdown itemizing the estimated quantities and costs of labor, materials, and equipment (base cost) required in addition to any markup used. The allowable percentage markups for overhead and profit for a non-force account change to the Work performed by the Contractor's own forces or performed by the Subcontractor shall be negotiated based on the nature, size, and complexity of the Work involved but shall not exceed the percentages for each category listed below.
 - 1) Subcontractor's markup for overhead and profit for the work it performs in a change to the Work shall be a maximum of fifteen (15%).
 - 2) Contractor's markup for overhead and profit on the Subcontractor's base cost in a change to the Work shall be a maximum of ten percent (10%).
 - 3) Contractor's markup for overhead and profit (including bonds and insurance) for work it performs in a change to the Work shall be a maximum of fifteen percent 15%.
 - 4) The markup for overhead and profit of a sub-subcontractor at any tier on a change to the Work it performs shall be a maximum of fifteen percent (15%). The Contractor and all intervening tiers of subcontractors' markup on such sub-subcontractor's base cost in the change to the Work shall not exceed a total of ten percent (10%).
- f. Base Cost is defined as the total of labor, material, and equipment costs, it does not include markup for overhead and profit. The labor costs include only the costs of employees directly constructing or installing the change in the Work and exclude the costs of employees coordinating or managing the work.
- g. The allowable percentage markups for overhead and profit stated above shall compensate the Contractor, subcontractor, and sub-subcontractor for all other costs associated with or relating to the change to the Work including by way of illustration and not limitation, general conditions, supervision, field engineering, coordination, insurance, bond(s), use of small tools, incidental job costs, and all other general and administrative home and field office expenses.
- h. Allowable costs for changes in the Work shall not include home office expenses including payroll costs for the Contractor's officers, executives, administrators, project managers, estimators, clerks' timekeepers, and other administrative personnel employed by the Contractor, whether at the Site or in the Contractor's principal or branch office for general administration of the Work. These costs are deemed overhead included in the percentage markups in Subsection (e) above.
- i. If the change to the Work also changes the Time for Completion by adding days to perform the Work, an itemized accounting of the following Site direct overhead expenses for the change to the time may be considered as allowable costs for compensation in addition to the base cost indicated above:
 - 1) site superintendent's pro-rata salary
 - 2) temporary site office trailer expense

- 3) temporary site utilities including basic telephone service, electricity, heat, water, and sanitary/toilet facilities.

All other direct and indirect overhead expenses are considered covered by and included in Subsection (e) markups above. In no case shall subcontractor extended overhead be submitted or considered. The County does not have a direct contractual relationship with any subcontractor or supplier and therefore will not direct, discuss or negotiate with subcontractors employed by the Contractor.

- j. If Contractor requests an extension to the Time for Completion due to changes in the Work it must provide to the Project Officer adequate documentation substantiating its entitlement for the time extension. The documentation must demonstrate an anticipated actual increase in the time required to complete the Work beyond that allowed by the Contract as adjusted by prior changes to the Work, not just an increase or decrease in the time needed to complete a portion of the total Work. In the event a Critical Path Method (CPM) schedule is required by the Contract, no extension to the Time for Completion shall be granted unless the additional or change to the Work increases the length of the critical path beyond the Time for Completion as demonstrated on the approved CPM schedule or bar chart schedule. Any Float belongs to Arlington County. A written statement in addition to a CPM analysis shall be prepared explaining how no other sequence of work activities could have been performed to decrease the impact or eliminate the impact altogether. If requested by the Project Officer, the Contractor must provide alternate documentation detailing the claim to the County's satisfaction.
- k. Any change that will increase the Contract Amount more than 10% will require notice to sureties and require that Performance and Payment Bonds be increased by the Contractor. The increased Performance and Payment Bonds must be sent to the County's Office of the Purchasing Agent within 15 calendar days of the County's approval of such change.

5. FORCE ACCOUNT WORK

A Force Account may be used at the County's discretion and only when either 1) agreement on the valuation of a change cannot be made using the methods described in the preceding paragraph, *County Ordered Changes in the Work*, or 2) the County cannot firmly establish an applicable and acceptable estimate for the cost of the work because the level of effort necessary to perform and complete the work cannot be reasonably estimated or anticipated but can only be determined by performing the work. Because of the significant burden on the County to monitor and control the work, Force Account work is not a preferred method, and it shall be the responsibility of the Contractor to provide all necessary documentation and justification of costs. The rates for labor, equipment and materials to be used in cases of work performed on a force account basis will be compensated as documented below. No costs other than those explicitly listed below shall be allowed:

- a. Labor: Before any Force Account work begins, the Contractor shall submit for approval to the Project Officer the proposed hourly rates and associated labor costs (benefits and payroll burden) for all laborers and forepersons to be engaged in the work. The number of laborers and forepersons engaged in the work will be subject to regulation by the Project Officer and shall not exceed the number that the Project officer deems most practical and economical for the work. For all labor and forepersons in direct charge of the force account work, excluding general superintendence, compensation will be as follows:

- 1) Certified Pay Rate: The Contractor will receive the actual rate of wage or scale as set forth in his most recent payroll for each classification of laborers, and forepersons who are in direct charge of the specific operation. The time allowed for payment will be the number of hours such workers are actually engaged in the work. If overtime work is authorized by the County, payment will be at the normal overtime rate set forth in the Contractor's most recent payroll.
 - 2) Benefits: The Contractor will be entitled to receive the actual cost for any fringe benefits that are regularly provided to the classes of laborers and forepersons engaged in the work and that are not included in the certified pay rate.
 - 3) Payroll Burden: The Contractor will be entitled to receive the actual cost for all costs associated with required payroll taxes and payroll benefits not covered in 2) above, including:
 - Social Security Tax
 - Medicare Tax
 - Unemployment Tax
 - Worker's Compensation Insurance
 - Contractor's Public Liability Insurance
 - Contractor's Property Damage Liability Insurance
 - 4) If the Contractor is unable to provide the necessary documentation for Benefits and Payroll Burden as identified above, the Contractor will be entitled to an additive of 20% of the Certified Hourly Pay Rate as full and final compensation for Benefits and Payroll Burdens
 - 5) Overhead and Profit: The Contractor will be entitled to an additive of 10% on all properly documented and approved costs established in paragraphs 1), 2), 3), and 4) above for all administrative, overhead, and profit associated with labor costs.
 - 6) Subsistence and lodging allowances may be allowed by the Project Officer at the actual and documented costs for lodging and meals if the following conditions are met and the applicable rates and authorization for such costs are established prior to beginning the work. No additives for overhead, administrative, profit, or any other costs will be permitted for subsistence and lodging.
 - i. The specific Force Account work is outside the scope of the original contract, requires mobilization of a separate crew not intended to be used on the original contract, and the Contractor's base location is more than 50 miles from the work site, or
 - ii. Forces which have been working on the Contract will be used for the Force Account work and have been routinely staying overnight during the life of the Project, and the Force Account Work will warrant an extension of the contract time, and the distance from the Contractor's base location to the work site is more than 50 miles
- b. Materials: The Contractor will receive the actual cost of materials accepted by the Project Officer that are delivered and used for the work including taxes, transportation, and handling charges paid by the Contractor, not including labor and equipment rentals as herein set forth, to which 15 percent (15%) of the cost will be added for administration and profit. The Contractor shall make every reasonable effort to take advantage of trade discounts offered by material suppliers. Any

discount received shall pass through to the County. Salvageable temporary construction materials will be retained by the County, or their appropriate salvage value shall be credited to the County, at the County's discretion.

- c. Equipment: For all equipment other than small tools, the Contractor will be entitled to rental rates as established herein and agreed to in writing before the work is begun. Transportation costs directly attributable to Force Account work will be as stated below. Small tools will be considered any equipment which has a new cost of \$1000 or less and will not be eligible for any compensation. The Contractor shall provide the Project Officer a list of all equipment to be used in the work. For each piece of equipment, the list shall include the serial number; date of manufacture; location from which equipment will be transported; and, for rental equipment, the rental rate and name of the company from which it is rented. The number and types of equipment engaged in the work will be subject to regulation by the Project Officer as deemed to be the most practical and economical for the work. No compensation will be allowed for equipment which is inoperable due to mechanical failure. Compensation for equipment shall be as follows:
- 1) Hourly Base Equipment Rental Rates (Owned Equipment) – For equipment authorized for use in the Force Account work that is owned by the Contractor, the Contractor shall be entitled to an Hourly Base Rental Rate as detailed in the following paragraphs. The Hourly Base Rental Rate for Contractor owned equipment will not exceed 1/176 of the monthly rates of the schedule shown in the *Rental Rate Blue Book* modified in accordance with the *Rental Rate Blue Book* rate adjustment tables that are current at the time the force account is authorized. The rates for equipment not listed in the *Rental Rate Blue Book* schedule shall not exceed the hourly rate being paid for such equipment by the Contractor at the time of the force account authorization. In the absence of such rates, prevailing rates being paid in the area where the authorized work is to be performed shall be used.
 - 2) Hourly Base Equipment Rental Rates (Rented Equipment) – If the Contractor does not possess or have readily available equipment necessary for performing the force account work and such equipment is rented from a source other than a company that is an affiliate of the Contractor, payment will be based on actual invoice rates when the rates are reasonably in line with established rental rates for the equipment in question and are approved by the Project Officer.
 - 3) Hourly Operating Rates – Hourly Operating Rates shall be as established in the Blue Book estimated operating cost per hour. This operating cost will be full compensation for fuel, lubricants, repairs, servicing (greasing, fueling, and oiling), small tools, and any and all incidentals. If rental rates for the equipment being used in the work are not listed in the Blue Book or otherwise readily available, the Hourly Operating Cost will be 15% of the established Hourly Base Rental Rate. If invoices for Rental Equipment include the furnishing of fuel, lubricants, repair, and servicing, then the Contractor will not be entitled to any Hourly Operating costs for that equipment.
 - 4) Equipment Usage - Equipment usage will be measured by time in hours of actual time engaged in the performance of the work. The Contractor shall be entitled to the applicable Hourly Base Equipment Rental Rate and Hourly Operating Rate for all approved Equipment Usage.

- 5) Equipment Standby – Standby time is defined as the period of time equipment authorized for Force Account work by the Project Officer is available on-site for the work but is idle for reasons not the fault of the Contractor or normally associated with the efficient and necessary use of that equipment in the overall operation of the work at hand. Hourly rates for Contractor owned equipment on standby, will be at 50 percent (50%) of the rate paid for equipment performing work. Operating costs will not be allowed for equipment on Standby. When equipment is performing work less than 40 hours for any given week and is on standby, payment for standby time will be allowed for up to 40 hours, minus hours performing work. Payment for Standby will be allowed only for working days. Payment for Standby will not be made for the time that equipment is on the Project in excess of 24 hours prior to its actual performance in the force account work.
- 6) Transporting Costs – When it is necessary to obtain equipment exclusively for Force Account work from sources beyond the Project limits and the Project Officer authorizes the transporting of such equipment to the Project site, the cost of transporting the equipment will be allowed as an expense. Where the transport requires the use for a hauling unit, the allowable expense will consist only of the actual cost incurred for the use of the hauling equipment, or the applicable Blue Book cost, whichever is less. When equipment is transferred under its own power, the allowable Transporting cost shall be 50% of the Hourly Base Equipment Rental Rate.
- 7) Overhead and Profit – The Contractor shall be entitled to an additive of 10% on all appropriate and approved Equipment Rental, Operating, and Transporting costs as defined above.
- d. Subcontracting: The Contractor shall receive the cost of work performed by a subcontractor as determined in (a), (b), and (c) above. In addition, the Contractor will be allowed an allowance per the schedule below for administrative costs and profit.

Total Cost of Subcontract Work: Rate Schedule

\$0 - \$10,000	10%
> \$10,000	\$1,000 + 5 % above \$10,000

- e. Other Costs: The Contractor shall not be entitled to any costs associated with Force Account Work other than those specifically identified in this section.
- f. Statements: Payments will not be made for work performed on a force account basis until the Contractor has furnished the Project Officer duplicate itemized statements of all costs of such work detailed as follows:
 - 1. Payroll indicating name, classification, date, daily hours, total hours, rate, and extension of each laborer, foreperson
 - 2. Designation, dates, daily hours, total hours, rental rate, and extension for each unit of equipment
 - 3. Quantities of materials, prices, and extensions
 - 4. Transportation of materials
 - 5. Statements shall be accompanied and supported by invoices for all materials used and transportation charges. However, if materials used on the Force Account work are not specifically purchased for such work but are taken from the Contractor’s stock, then in lieu of

the invoices, the Contractor shall furnish an affidavit certifying that such materials were taken from his stock; that the quantity claimed was actually used; and that the price, transportation, and handling claimed represented his actual cost.

6. CLAIMS FOR EXTRA COST

If the Contractor claims that any event will give rise to a claim for an increase in the Contract Amount or that any instructions from the Project Officer, by drawings or otherwise, will incur him extra cost under the Contract, then, except in emergencies endangering life or property, it shall give the Project Officer written notice thereof no later than three (3) days of the event or instruction. The Contractor thereafter must provide to the Project Officer a full cost proposal within 14 days detailing the amount of additional compensation claimed, together with the basis therefore and documentation supporting the claimed amount. No such claims shall be valid unless so made. If the Project Officer agrees that such event or instructions involve extra cost to the Contractor, any additional compensation will be determined by one of the methods provided in the Changes in Work paragraph of these General Conditions as selected by the Project Officer. All pricing and supporting documentation requirements of the Changes in the Work clause shall apply to claims for extra cost deemed valid under this paragraph.

7. DAMAGES FOR DELAY; EXTENSION OF TIME OTHER THAN FOR WEATHER

- a. Excusable Non-Compensable Delays: If and to the extent that the Contractor is delayed at any time in the progress of the Work by a Force Majeure event or other causes outside of the County's control or the Contractor's control and which the Contractor could not have reasonably foreseen, the Contractor may request an extension of the Time for Completion. To be considered for an extension of the Time for Completion, the Contractor shall give the Project Officer timely written notice at the inception of the delay. The Contractor thereafter must provide to the Project Officer a full claim within 14 calendar days of the cessation of the delay and demonstrate that the delay affected the critical path of the accepted schedule, and any Float has been consumed. If the Project Officer agrees with the existence and impact of the delays, the Project Officer shall extend the Time for Completion for the length of time that the Time for Completion was actually delayed thereby. The Contractor shall not be due compensation or damages of any kind as a result of such delay. Delays caused by weather are addressed in Section G.8.
- b. Excusable Compensable Delays: If and to the extent that the Contractor is unreasonably delayed at any time in the progress of the Work by any act or omission of the County, its agents or employees, due to causes within the County's control, the Contractor may request an extension of the Time for Completion and/or additional compensation. The Contractor shall give notice to the Project Officer immediately at the time of the occurrence giving rise to the delay and shall give written notice no later than five (5) calendar days after the inception of the delay. The Contractor's written notice shall specify the nature of the delay claimed, the cause of the delay, and the impact of the delay on the Contractor's schedule. Thereafter the Contractor shall provide to the Project Officer a full claim within 14 calendar days of the cessation of the delay. The claim must detail the amount of additional contract time or compensation claimed, together with the basis therefor along with itemized documentation supporting the claim. The itemized documentation must demonstrate that the claimed delay directly affected the critical path of the accepted schedule, and any Float has been consumed and the time and/or costs incurred by the Contractor are directly attributable to the delay in the work claimed. The Contractor shall be entitled to additional compensation only if the delay was caused solely by acts or omission of the County, its agents or employees, or due to causes within their control.

If the Contractor is entitled to compensation, an itemized accounting of the following direct site overhead expenses will be considered as allowable costs to be used in determining the compensation due the Contractor: the site superintendent(s) (as identified at the inception of the work) pro rata salary, temporary site facilities, temporary site office expense, and temporary site utilities including basic telephone service, electricity, heat, water, and sanitary/toilets. A fifteen percent (15%) markup of these expenses will be allowed to compensate the Contractor for home office and other direct or indirect overhead.

Furthermore, compensation for the delay shall be calculated from the contractual Time for Completion, as adjusted by Change Order, and shall not be calculated based on any early completion planned or scheduled by the Contractor

- c. Non-Excusable Non-Compensable Delays: The Contractor shall not be entitled to an extension of the Time for Completion or to any additional compensation for delays if and to the extent they are caused by acts, omissions, fault, or negligence of the Contractor or its subcontractors, agents, or employees or due to foreseeable causes within their control, including, but not limited to, delays resulting from defective work, including workmanship and/or materials, from rejected work which must be corrected before dependent work can proceed, from defective work or rejected work for which corrective action must be determined before like work can proceed, from incomplete, incorrect, or unacceptable Submittals or samples, or from the failure to furnish enough properly skilled workers, proper materials or necessary equipment to diligently perform the work in a timely manner in accordance with the Project schedule.
- d. No extension of time or additional compensation shall be given for a delay if the Contractor failed to give notice in the manner and within the time prescribed herein. Furthermore, no extension of time or additional compensation shall be given for any delay unless a full claim is made to the Project Offer within 14 days of the end of the delay. Failure to give written notice or failure to present a timely claim shall constitute a waiver of any claim for extension or additional compensation based upon that cause.
- e. If the Contractor submits a claim for damages pursuant to this Section, the Contractor shall be liable to the County for a percentage of all costs incurred by the County in investigating, analyzing, negotiating and litigating the claim, which percentage shall be equal to the percentage of the Contractor's total delay claim that is determined through litigation to be false or to have no basis in law or fact (Virginia Code §2.2-4335).
- f. Any change in the Time for Completion or additional compensation shall be accomplished only by the issuance of a Change Order.

8. TIME EXTENSIONS FOR WEATHER

The Contractor's sole relief on any claims for delay which is caused by abnormal weather shall be an extension of the Time for Completion provided the Contractor gave the Project Officer written notice no later than five (5) calendar days after the onset of such delay and provided the weather affected the Critical Path. A fully documented claim for a time extension under this Section must be submitted no later than thirty (30) calendar days after the cessation of the delay. It shall be the Contractor's responsibility to provide the necessary documentation to satisfy the Project Officer that the weather conditions claimed were encountered, which may include daily reports by the Contractor, copies of notification of weather days to the Project Officer, NOAA backup, and pictures from each day claimed.

The Time for Completion will not be extended due to inclement weather conditions which are normal, as defined below, for Arlington County. The Time for Completion includes an allowance for workdays (based on five (5) day workweek) which according to historical data may not be suitable for construction work. The Contractor may request extension to the Time for Completion if it can demonstrate unusual and disruptive weather conditions per the requirements below:

- a. That one or more of the Weather Conditions listed below was encountered; and,
- b. The occurrence of the Weather Condition(s) resulted in an inability to prosecute work which would have otherwise been performed on the day(s) the Weather Condition(s) occurred; and,
- c. The work which was not able to be completed was on the Critical Path and could not be completed **only** due to the Weather Condition(s) claimed.

The Project Officer will determine the Contractor’s entitlement to an extension of the Time for Completion. A time extension of no more than one (1) day will be granted for one (1) day of lost work which satisfies the requirements above, regardless of the number of Weather Conditions encountered. The Contractor’s sole relief shall be an extension of the Time for Completion and no claim for an increase in Contract Amount will be allowed.

The Weather Conditions listed below will be the only basis for consideration by the County, based upon the requirements listed above, as an extension of the Time for Completion due to inclement weather or weather-related site conditions.

Weather Condition #1: Unusually Heavy Precipitation - Figure 1 illustrates the anticipated monthly inclement weather due to precipitation (Rain Days). If the number of days with precipitation in excess of 0.10”, as recorded at Washington Reagan National Airport, exceeds the anticipated Rain Days, the Contractor will be entitled to an extension of one (1) day on the Time for Completion for every day in excess of the Rain Days illustrated in Figure 1. The anticipated value of Rain Days for partial months at the beginning and end of the Contract shall be evaluated on a pro-rated basis.

FIGURE 1
Average days with precipitation of 0.1” or more

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
7	6	7	6	8	6	7	6	6	5	6	6

Weather days are not exclusive to the individual months that they represent in Figure 1. If weather days are not used in a previous month(s) they can be used to offset weather delays in subsequent months. This will be reviewed on a case-by-case basis and is subject to reconciliation at the end of the Project.

Condition #2: Temperature – The Contractor may be entitled to an additional day for every day that the recorded high temperature at Washington Reagan National Airport is 32 degrees Fahrenheit or less, that has not already been incurred under Weather Condition #1 above. This condition does not apply to vertical construction as defined by the Arlington County Vertical Construction Standards.

9. RELEASE OF LIENS

The County, before making final payment, shall require the Contractor to furnish a complete release of all liens arising out of this Contract. The Contractor may, if any subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the County, to indemnify him against any lien. If any lien remains unsatisfied after all payments have been made, the Contractor shall refund to the County all

money that the latter may be compelled to pay in discharging such lien. However, the County may make payments in part or in full to the Contractor without requiring the releases or receipts, and the payments so made shall not impair the obligations of any Surety or Sureties on any bond or bonds furnished under this Contract.

10. FINAL PAYMENT

After the Contractor has completed all work and corrections to the satisfaction of the Project Officer or designee and delivered all maintenance and operating instructions, schedules, quantities, bonds, certificates of inspection, maintenance records, As-Built Drawings, and other items required as final payment submittal documents, the Contractor may make application for final payment following the procedure for progress payments. The Final Application for Payment shall be accompanied by all documents required in the Contract, including a complete and signed and notarized copy of the Final Payment Release Form as follows:

RELEASE AND REQUEST FOR FINAL PAYMENT

CONTRACT NUMBER: _____ CONTRACTOR NAME: _____

FINAL PAYMENT AMOUNT: _____

The Contractor hereby requests final payment in the amount indicated on the above referenced Contract. The Contractor agrees that its acceptance of final payment releases and forever discharges Arlington County and its officers, employees, servants, and agents from any and all actions, claims, demands and liability of whatever nature now existing or which may hereafter arise as a result of or in connection with the above referenced Contract.

The Contractor certifies that all of the debts for labor, materials, and equipment incurred in connection with the above referenced Contract have been fully paid.

AUTHORIZED SIGNATURE DATE: _____

The date of Final Acceptance is the date on which the County issues the final payment for the work performed.

COMMONWEALTH OF VIRGINIA

COUNTY OF ARLINGTON

On this the ____ day of _____, 20__, before me, personally appeared _____, who acknowledged himself/herself to be _____ in the above instrument, and that he/she, as such _____, being authorized so to do, executed the foregoing instrument for the purposes therein contained, by signing his/her name by himself/herself as _____.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Notary Public

My Commission Expires: _____

VI. INSURANCE REQUIREMENTS

Review this section carefully with your insurance agent or broker prior to submitting a bid or proposal. See the Insurance Checklist (part of the Bid or Proposal Forms) for specific coverages applicable to this Contract. The term "Contract," as used in this section, shall mean the fully executed Agreement covering the work entered into between the County and the Contractor.

1. General

- 1.1 The Contractor shall provide insurance as specified in the Insurance Checklist found on the last page of the bid or proposal form.
- 1.2 The Contract with the Contractor will not be executed by the County until the Contractor has obtained, at its own expense, all of the insurance called for hereunder and such insurance has been approved by the County; additionally, the Contractor shall not allow any subcontractor to start work on any subcontract until all insurance required of the subcontractor has been so obtained and approved by the Contractor. The Contractor shall submit to the County Purchasing Agent copies of all required endorsements and documentation of coverage consistent with the requirements herein or, alternately, at the County's request, certified copies of the required insurance policies in compliance with the insurance requirements. All endorsements and documentation shall state this Contract's number and title.
- 1.3 The Contractor shall require all subcontractors to maintain during the term of this Agreement, Commercial General Liability insurance, Business Automobile Liability insurance, and Workers' Compensation, Employers' Liability insurance, or any other insurance required by the Contract in the same manner and form as specified for the Contractor. The Contractor shall furnish subcontractors' evidence of insurance and copies of endorsements to the County Purchasing Agent immediately upon request by the County and/or prior to the subcontractor's performance of work related to this Contract.
- 1.4 If there is a material change or reduction in coverage, nonrenewal of any insurance coverage or cancellation of any insurance coverage required by this contract, the Contractor shall notify the Purchasing Agent immediately. It is the Contractor's responsibility to notify the County upon receipt of a notice indicating that the policy will not be renewed or will be materially changed. Any policy on which the Contractor has received notification from an insurer that the policy has or will be cancelled or materially changed or reduced must be immediately replaced with another policy consistent with the terms of this Contract and in such a manner that there is no lapse in coverage, and the County immediately notified of the replacement. Not having the required insurance throughout the Contract is considered a material breach of this Contract and grounds for termination. The Contractor shall also obtain an endorsement providing to the County thirty (30) days advance notice of cancellation or nonrenewal (ten days for nonpayment of premium. A copy of that endorsement shall be provided to the County Purchasing Agent prior to the execution of this Contract or any Contract extension thereafter.
- 1.5 No acceptance and/or approval of any insurance by the County shall be construed as relieving or excusing the Contractor, any surety, or any bond, from any liability or obligation imposed under this Agreement.

- 1.6 Arlington County, and its officers, elected and appointed officials, employees, and agents are to be listed as additional insureds under all coverages except Workers' Compensation, Professional Liability, and Automobile Liability, and the endorsement must clearly identify the County as an additional insured permitted to enjoy all the benefits under the applicable policy of insurance. The certified policy, if requested, must so state coverage afforded under this paragraph shall be primary as respects the County, its officers, elected and appointed officials, agents and employees. The following definition of the term "County" applies to all policies issued under the Contract and to all applicable endorsements:

"The County Board of Arlington County and any affiliated or subsidiary Board, Authority, Committee, or Independent Agency (including those newly constituted), provided that such affiliated or subsidiary Board, Authority, Committee, or Independent Agency is either a Body Politic created by the County Board of Arlington County, Virginia, or one in which controlling interest is vested in Arlington County; and Arlington County Constitutional Officers."

- 1.7 The Contractor shall be responsible for the work performed under the Contract Documents and every part thereof, and for all materials, tools, equipment, appliances, and property of any description used in connection with the work. The Contractor assumes all risks for direct and indirect damage or injury to the property or persons used or employed on or in connection with the Work contracted for, and of all damage or injury to any person or property wherever located, resulting from any action, omission, commission, or operation under the Contract, or in connection in any way whatsoever with the contracted work.
- 1.8 The insurance coverage required shall remain in force throughout the Contract or as otherwise stated in the Contract Documents or these Insurance Requirements. If the Contractor fails to provide acceptable evidence of current insurance within seven (7) days of written notice at any time during the Contract, the County shall have the absolute right to terminate the Contract without any further obligation to the Contractor.
- 1.9 Contractual and other liability insurance provided under this Contract shall not contain a supervision, inspection or engineering services exclusion that would preclude the County from supervising or inspecting the work as to the end result. The Contractor shall assume all on-the-job responsibilities as to the control of persons directly employed by it and of the subcontractors and any persons employed by the subcontractor and/or carriers delivering and receiving materials from the Project.
- 1.10 If any policy contains a warranty stating that coverage is null and void (or words to that effect) if the Contractor does not comply with the most stringent regulations governing the work, such policy shall be modified so that coverage shall be afforded in all cases except for the Contractor's willful or intentional noncompliance with applicable government regulations.
- 1.11 All policies shall include the following language: "The insolvency or bankruptcy of the insured or of the insured's estate will not relieve the insurance company of its obligations under this policy."
- 1.12 All policy forms must "Pay on behalf of" rather than "Indemnify" the insured.

- 1.13 Nothing contained in these Insurance Requirements, or the Contract Documents shall be construed as creating any contractual relationship between any subcontractor and the County. The Contractor shall be as fully responsible to the County for the acts and omissions of its subcontractors and of persons employed by them as it is for acts and omissions of persons directly employed by it.
- 1.14 Precaution shall be exercised by the Contractor at all times for the protection of persons, (including employees) and property. All existing structures, utilities, roads, services, trees and shrubbery shall be protected against damage or interruption of service at all times by the Contractor and its subcontractors during the term of the Contract, and the Contractor shall be held responsible for any damage to property occurring by reason of its work under the Contract whether identified on the Contract Documents or not.
- 1.15 For any claims related to this work, The Contractor's insurance shall be deemed primary and non-contributory to all other applicable coverage and in particular with respect to Arlington County, its representatives, officials, employees, and agents. Any insurance or self-insurance maintained by Arlington County shall be excess and noncontributory of the Contractor's insurance. The Contractor shall waive its right of subrogation for all insurance claims.
- 1.16 If the Contractor does not meet the insurance requirements set forth by the Contract Documents, alternate insurance coverage or self-insurance, satisfactory to the Purchasing Agent, may be considered. Written requests for consideration of alternate coverages including the Contractor's most recent actuarial report and a copy of its self-insurance resolution to determine the adequacy of the insurance funding must be received by the County Purchasing Agent at least ten (10) working days prior to the date set for receipt of bids or proposals. If the County denies the request for alternate coverages, the specified coverages will be required to be submitted. If the County permits alternate coverage, an Addendum to the Insurance Requirements will be prepared and distributed prior to the time and date set for receipt of bids or proposals.
- 1.17 All required insurance coverages must be acquired from insurers authorized to do business in the Commonwealth of Virginia and acceptable to the County. The insurers must also have a policyholders' with a rating of "A-VII" in the latest edition of the A.M. Best Co.'s Insurance Reports, unless the County grants specific approval for an exception, in the same manner as described in 1.16 above.
- 1.18 The Contractor shall be responsible for payment of any deductibles applicable to the coverages.
- 1.19 The Contractor must disclose the amount of any deductible or self-insurance component applicable to the General Liability, Automobile Liability, Professional Liability, Intellectual Property or any other policies, if any. The County reserves the right to request additional information to determine if the Contractor has the financial capacity to meet its obligations under a deductible. Thereafter, at its option, the County may require a lower deductible, funds equal to the deductible be placed in escrow, a certificate of self-insurance, collateral, or other mechanism in the amount of the deductible to ensure additional protection for the County.
2. Contractor's Insurance:
 - 2.1 The Contractor shall purchase the following insurance coverages, including the terms, provisions and limits shown in the Insurance Checklist.

2.1.1 Commercial General Liability - Such Commercial General Liability policy shall include any or all of the following as indicated on the Checklist:

- i. General aggregate limit is to apply per project;
- ii. Premises/Operations;
- iii. Actions of Independent Contractors;
- iv. Products/Completed Operations to be maintained for five (5) years after completion of the Work;
- v. Contractual Liability, including protection for the Contractor from claims arising out of liability assumed under this Contract;
- vi. Personal Injury Liability including, including but not limited to, coverage for offenses related to employment and copyright infringement;
- vii. Explosion, Collapse, or Underground (XCU) hazards.

2.1.2 Business Automobile Liability, including coverage for any owned, hired, or non-owned motor vehicles, Uninsured Motorists coverage, and automobile contractual liability.

2.1.3 Workers' Compensation - statutory benefits as required by Virginia law or the U.S. Longshoremen's and Harbor Workers' Compensation Act, or other laws as required by labor union agreements, including standard Other States coverage: Employers' Liability coverage. The policy shall not contain any provision or definition which would serve to eliminate third party action over claims, including exclusion for bodily injury to an employee of the insured, employees of the premises owner, or employees of the general contractor to which the insured is subcontracted; or employees of the insured's subcontractor.

2.1.4 General Environmental Remediation Projects

In addition to the Insurance Requirements specified in the general provision or elsewhere in the Contract Documents, the Contractor shall not commence work under this Contract until all insurance as required hereafter has been obtained, and certified copies, naming the County as an additional insured, of such insurance have been submitted and accepted by the Purchasing Agent.

- i. An environmental remediation contractor or subcontractor shall be responsible for purchasing and maintaining Business Automobile Liability insurance and Workers' Compensation insurance as described in 2.1.2 and 2.1.3.
- ii. Acceptance by Arlington County of insurance submitted by the Contractor does not relieve or decrease in any manner the liability of the Contractor for performance of environmental remediation Work under the Contract.
- iii. The Contractor is responsible for any losses, claims, and costs of any kind, which exceed the Contractor's limits of liability, or which may be outside the coverage scope of the policies. The limits and coverage requirements may be revised at the option of the Arlington County Risk Manager. The requirements outlined shall in no way be construed to limit or eliminate the liability of the Contractor, which arises from performance of work under the Contract.

2.1.5 Contractors Pollution Liability (CPL) Policy

- i. Minimum liability limits required shall be \$1,000,000 Per Loss and \$2,000,000 Total All Losses, including, but not limited to, property damage, bodily injury, loss of use, and clean-up costs.
- ii. Limits must be dedicated to work performed under this Contract only, unless prior approval by the Arlington County Risk Manager has been obtained. The policy of insurance shall contain or be endorsed to include the following:
 - a. Pollution coverage as respects asbestos, lead, VOC and PCB's.
 - b. "Covered Operations" designated by the CPL policy must specifically include all work performed under this contract. (This would include and not be limited to excavation, off-site incineration of soils, demolition, asbestos abatement, drum removal and disposal, in-situ vapor extraction, etc.) and exclusions or limitations affecting work performed under this contract must be deleted. (i.e., lead, asbestos, pollution, testing, underground storage tanks, radioactive matter, etc.)
 - c. Contractor must comply with all applicable DOT and EPA requirements.
 - d. Premises/Operations.
 - e. Broad form property damage.
 - f. Products/Completed Operations coverage for a minimum of five (5) years after Final Payment.
 - g. Contractual liability coverage in accordance with ISO policy form CG 00 01 11 85. Modifications to the standard provision will not be acceptable if they serve to reduce coverage.
 - h. Cross liability/severability of interest.
 - i. The scope of work and all related activities under this Contract shall be scheduled as "Covered Operations" under this policy.
 - j. Coverage is included on behalf of the insured for covered claims arising out of the actions of independent contractors. If insured is utilizing subcontractors, the CPL policy must use "By or On behalf of" language with regards to coverage.
 - k. Loading and unloading exclusions must be amended so as to include coverage for mobile equipment and automobiles.

2.1.6 Asbestos and Lead Based Paint Abatement Projects

- i. Minimum Liability Limits shall be \$1,000,000 Per Occurrence and \$2,000,000 Aggregate. Limits must be dedicated to work performed under this Contract only, unless otherwise approved by the Arlington County Risk Manager. The policy shall be written with a minimum annual aggregate combined single limit for Bodily Injury and Property Damage as shown on the Insurance Checklist. This limit can be inclusive of defense costs.
- ii. The policy of insurance shall contain or be endorsed to include the following:
 - a. Coverage for Asbestos/Lead-Based Paint Abatement operations as described in the contract. Specific lead endorsement evidencing this project must be provided, if applicable.

- b. Pollution coverage as respects Asbestos/Lead-Based Paint for all phases of the abatement process.
- c. Transportation coverage for the hauling of ACM/Lead-Based Paint from the project site to the final disposal location, as evidenced by the contractor or applicable waste hauler. Contractor must comply with all applicable D.O.T. regulations.
- d. Premises/Operations.
- e. Broad Form Property Damage.
- f. Products/Completed Operations coverage for a minimum of five (5) years after project completion.
- g. Contractual Liability coverage in accordance with ISO policy form CG 00 01 11 85. Modifications to the standard provision will not be acceptable if they serve to reduce coverage.
- h. Cross Liability. Any "Insured vs. Insured" – type language must be deleted or amended to "Named Insured vs. Named Insured."
- i. The policy shall not exclude Asbestos/Lead Based Paint bodily injury to employees of Arlington County so long as their designated job duties do not require them to be in the regulated asbestos/lead-based paint abatement area.
- j. If the policy or any endorsement contains a provision which limits or eliminates bodily injury or property damage coverage based on final air fiber clearance levels, the policy shall be modified so that it is consistent with the clearing level (FCC) and the appropriate analytical testing protocol contained in the project specifications.
- k. Personal Injury.
- l. Independent Contractors.
- m. Hostile fire coverage is to be provided.

2.1.7 Environmental Impairment Liability, including coverage of insureds' on-site clean up, with the following minimum limits of liability:

Bodily Injury and Property	2,000,000 each occurrence
Damage Liability	4,000,000 annual aggregate

The County Board of Arlington County, Virginia, is to be named in Additional Name Insured or a Broad Form Contractual Endorsement may be added to the policy as respects any liability that may arise out of or result from the handling of Work on this Project including specifically but without limitation thereto, the indemnity provisions in the Agreement. Such policies will be endorsed to provide that they are primary to an insurance carried by the County Board of Arlington County, Virginia.

2.1.8 Should any of the Work hereunder involve the cleanup, remediation and/or removal of bio-solids, bio-hazards waste, or any hazardous or toxic materials, trash, debris, refuse, or waste, the Contractor shall provide, or shall require its subcontractor performing the work to provide, the following coverage in addition to the above requirements:

- a) Environmental Liability and Cleanup Coverage – with limits of not less than \$2,000,000 per occurrence.

- b) Business Automobile Liability – for transportation or regulated and/or hazardous waste, products, or materials with limits of not less than \$1,000,000, per occurrence. Said coverage shall include County as an additional insured and shall include both the MCS-90 and CA 9948 (or equivalent) endorsements, which shall be specifically referenced on the certificate of insurance.
- 2.2 The Contractor shall take reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to, its employees on the job, and others. The Contractor shall comply with all applicable provisions of federal, state and municipal safety laws, insurance requirement's, standard industry practices, the requirements of the operations and this contract, the Contractor, directly through its subcontractors, shall effect and properly maintain at all times, as required by the conditions and progress of the work, necessary safeguards for safety and protection of the public, including securing areas, posting danger signs, placarding, labeling or posting other forms of warning against hazards.
- 3. Commercial General or other Liability Insurance - Claims-made Basis:
- 3.1 If Commercial General or other liability insurance purchased by the Contractor has been issued on a claims-made basis, the Contractor must comply with the following additional conditions. The limits of liability and the extensions to be included as described in the Insurance Checklist remain the same. The Contractor must either:
 - i. Agree to provide insurance, copies of the endorsement and certified documentation evidencing the above coverages and naming the County as an additional insured for a period of five (5) years after final payment under the Contract. Such documentation shall evidence a retroactive date, no later than the beginning of the Contractors or subcontractors' work under this Contract, or
 - ii. Purchase an extended (minimum five [5] years) reporting period endorsement for the policy or policies in force during the term of this Contract and evidence the purchase of this extended reporting period endorsement by means of a copy of the endorsement itself. The extended reporting period will begin upon final payment under the Contract.
- 4. Builder's Risk Insurance
- 4.1 The Contractor shall purchase and maintain builders risk insurance with a limit equal to the initial Contract Amount and any amendments to the Contract which affect the project cost on a replacement cost basis. Builder's risk insurance shall be maintained until Final Payment under the Contract has been made or until no person or entity other than the County has an insurable interest in the covered property, whichever is earlier. The builders risk insurance shall include the County as defined in Section 1.6, Contractor, subcontractors and sub-subcontractors as named insureds.
- 4.2 Insurance shall be on an all-risks policy form including the perils of fire, theft, vandalism, malicious mischief, lightning, wind, force majeure, collapse, and earthquake. Coverage is to apply for demolition occasioned by enforcement of any applicable legal requirements, and Architect's fees. Coverage for the peril of flood shall not be required unless otherwise required in the Contract Documents.
- 4.3 Unless otherwise provided in the Contract Documents, the builders risk insurance shall also cover materials to be incorporated into the project which are stored off the site.

- 4.4 The Contractor shall purchase and maintain Boiler and Machinery insurance, if required by the contract documents or by law, with a limit satisfactory to the County. The Boiler and Machinery insurance shall cover objects during installation and until Final Acceptance by the County. The County shall be included as a named insured.
- 4.5 Any loss under builder's risk insurance shall be payable to the County as fiduciary for the insureds, as their interests may appear, subject to any mortgagee clause. The Contractor shall pay subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require subcontractors to make payments to their sub-subcontractors in similar manner. The County, as fiduciary, shall have the right to adjust and settle a loss with insurers.
- 4.6 The insurance company providing the builders risk coverage shall grant permission for the County to partially occupy or use the premises under construction prior to final acceptance without removing or affecting the coverage.

EXHIBIT F

Arlington County, VA Materials Testing Specification Reference (September 2020)

MATERIAL AND TEST (REF. - VDOT TEST METHODS MANUAL)	VDOT ROAD AND BRIDGE SPECIFICATION 2002 (Or Latest Version)	MINIMUM RATE OF SAMPLING (REF. - VDOT MANUAL OF INSTRUCTIONS)	LOCATION OF SAMPLING	REMARKS
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SOILS AND AGGREGATES				
1. Embankments				
(a) Density, Any Method	303.04(h)	One (1) test per 2500 yd ³ or less plus: (a) for fills less than 500 ft. length one (1) test on every other 6-in. layer bottom to top of fill starting with the second lift; (b) for fills from 500-2000 ft. length, two (2) tests per 6-in. layer within top five (5) ft. of fill; (c) for fills greater than 2000 ft length, break into equal segments not to exceed 2000 ft. and use same frequency for each section as for fills 500 to 2000 ft. in length.	Roadway	When tests are not run due to gravel, muck, rock, etc. give station and depth on report in lieu of test, with reason. For nuclear test, use Direct Transmission Method, VTM-10. See Notes 1 and 2.
2. Finished Sub-grade (Both Cut and Fill Sections)				
(a) Density, Any Method	305.03	One (1) test per 2000 continuous linear ft. of roadway and one test minimum per intersection per construction location	Roadway (24 ft.)	For nuclear test, use Direct Transmission Method, VTM-10. See Notes 1 and 2.

Arlington County, VA Materials Testing Specification Reference (September 2020)

MATERIAL AND TEST (REF. - VDOT TEST METHODS MANUAL)	VDOT ROAD AND BRIDGE SPECIFICATION 2002 (Or Latest Version)	MINIMUM RATE OF SAMPLING (REF. - VDOT MANUAL OF INSTRUCTIONS)	LOCATION OF SAMPLING	REMARKS
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(b) Density, Any Method	305.03	One (1) test per continuous section/block/or intersection	Curb, Comb. Curb and Gutter	For nuclear test, use Direct Transmission Method, VTM-10. See Notes 1 and 2.
(c) Density, Any Method	305.03	One (1) test per continuous section/block/or intersection	Sidewalk	For nuclear test, use Direct Transmission Method, VTM-10. See Notes 1 and 2.
3. Central Mix Aggregate (Treated or Untreated) Base, Subbase, and Select Material				
(a) Density, Any Method	305.03, 308.03, & 309.05,	One (1) test per 1/2 mile or less per continuous lane application width per layer. If testing by nuclear method, each test shall consist of average of five (5) readings.	Roadway. Location of five (5) nuclear readings at randomly selected sites.	For nuclear tests, use Backscatter, Control Strip Method, VTM-10. With nuclear method, set up roller pattern and control strip for each layer or lift placed. See Notes 1 and 2.
(b) Density, Any Method	305.03, 308.03, & 309.05,	One (1) test per continuous section/block/or intersection	Curb, Comb. Curb and Gutter	For nuclear test, use Direct Transmission Method, VTM-10. See Notes 1 and 2.
(c) Density, Any Method	305.03, 308.03, & 309.05,	One (1) test per continuous section/block/or intersection	Sidewalk	For nuclear test, use Direct Transmission Method, VTM-10. See Notes 1 and 2.

Arlington County, VA Materials Testing Specification Reference (September 2020)

MATERIAL AND TEST (REF. - VDOT TEST METHODS MANUAL)	VDOT ROAD AND BRIDGE SPECIFICATION 2002 (Or Latest Version)	MINIMUM RATE OF SAMPLING (REF. - VDOT MANUAL OF INSTRUCTIONS)	LOCATION OF SAMPLING	REMARKS
4. Backfill for Pipes and Box Culverts	302.03, 303.04(g), 401.03(i)	Minimum one test per lift on alternating sides of pipe for each 300 feet of pipe or portion thereof. Test pattern is to begin after first 4" compacted layer above the structures bedding and continue to 1' above top of pipe or box culvert structure. For rate of testing greater than 1' above top of pipe refer to contract documents and Rate of Sampling for embankments.	Alternating sides of structure	For nuclear test, use Direct Transmission Methods, VTM-10. See Notes 1 and 2. Backfill lifts shall be compacted in horizontal layers not more than 6 inches in thickness, loose measurement. (Or as Specified by the Contract Documents)
5. Backfill for Drop Inlets	302.03, 303.04(g)	Minimum one test every other lift around the perimeter beginning after the first 4" compacted layer above the bedding and continue to top of the structure. Stagger tests to ensure consistent compaction effort has been achieved.	Perimeter of structure	To include drop inlets, junction boxes, etc. For nuclear test, use Direct Transmission Methods, VTM-10. See Notes 1 and 2. Backfill lifts shall be compacted in horizontal layers not more than 6 inches in thickness, loose measurement. (Or as Specified by the Contract Documents)
6. Backfill for Manholes	302.03, 303.04(g)		Perimeter of structure	For nuclear test, use Direct Transmission Methods, VTM-10. See Notes 1 and 2. Backfill lifts shall be compacted in horizontal layers not more than 6 inches in thickness, loose measurement. (Or as Specified by the Contract Documents)

Arlington County, VA Materials Testing Specification Reference (September 2020)

MATERIAL AND TEST <i>(REF. - VDOT TEST METHODS MANUAL)</i>	VDOT ROAD AND BRIDGE SPECIFICATION <i>2002 (Or Latest Version)</i>	MINIMUM RATE OF SAMPLING <i>(REF. - VDOT MANUAL OF INSTRUCTIONS)</i>	LOCATION OF SAMPLING	REMARKS
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HYDRAULIC CEMENT CONCRETE				
1. Sidewalk, Curb, Comb. Curb and Gutter				
(a) Temperature Measurements	217	One test per batch (truck), and when making compressive specimens.	At job site, and prior to placing concrete in forms.	If test on any batch fails, recheck batch immediately before rejecting. Enter results of tests in project records.
(b) Air Content	217	One test per batch (truck), and when making compressive specimens	At job site, and prior to placing concrete in forms	Any of 3 approved methods may be used for this test. However, with any test method used, with readings indicating concrete to be outside of specification must be confirmed first with test by Pressure Method before rejection of concrete. Enter results in project records.
(c) Consistency (Slump Test).	217	One test per batch (truck), and when making compressive specimens.	At job site, and prior to placing concrete in forms.	If test on any batch fails, recheck batch immediately before rejecting. Enter results in project records.

Arlington County, VA Materials Testing Specification Reference (September 2020)

MATERIAL AND TEST (REF. - VDOT TEST METHODS MANUAL)	VDOT ROAD AND BRIDGE SPECIFICATION 2002 (Or Latest Version)	MINIMUM RATE OF SAMPLING (REF. - VDOT MANUAL OF INSTRUCTIONS)	LOCATION OF SAMPLING	REMARKS
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(d) Compressive Strength...	217	<p>For <u>miscellaneous concrete</u>, one set of 3 cylinders shall be made for each 250 cubic yards, with a minimum of one set of 3 per day. Any one set to be made from same batch.</p> <p>For <u>structural concrete</u>, one set of 3 cylinders shall be made for each 100 cubic yards of concrete placed, with a minimum of 2 sets of 3 cylinders each per structure per class of concrete. Any one set to be made from same batch.</p>	At job site.	<p><u>Molding and Curing</u> Molds shall be placed on a rigid horizontal surface free from vibration and other disturbances during the first 24 hours, all test specimens shall be stored under conditions that maintain the temperature immediately adjacent to the specimens in the range of 60°F to 80°F, and prevent loss of moisture.</p> <p><u>Testing</u> Except when high-early strength concrete is specified, compressive strength testing will be performed at 28 days.</p>
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Arlington County, VA Materials Testing Specification Reference (September 2020)

MATERIAL AND TEST (REF. - VDOT TEST METHODS MANUAL)	VDOT ROAD AND BRIDGE SPECIFICATION 2002 (Or Latest Version)	MINIMUM RATE OF SAMPLING (REF. - VDOT MANUAL OF INSTRUCTIONS)	LOCATION OF SAMPLING	REMARKS
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ASPHALT PAVEMENT				
(a) In-Place Pavement Density by Nuclear Method (Roller Pattern)/ (Control Strip) (Asphalt Pavement)	Roads and Bridges Section 315.05 VTM-76 AASHTO T-166	Establish Roller pattern and Control Strip according to VTM-76. Ten (10) stratified random sample to establish target density. Verify minimum density achieved with cores per VTM-76. QC technician shall be certified and pass State proficiency	Field	Contractor/Asphalt Producer shall provide Certified Asphalt Paving Technician for density testing
(b) In-place Pavement Density by Nuclear Method and/or VDOT cores Test Section) (Asphalt Pavement)	Roads and Bridges Section 315.05 VTM-76 AASHTO T-166	Test Section- Lot Size: 5000 ft. per Lane width. Ten (10) stratified random samples per lot for nuclear gauge and/or five(5) stratified random plug/cores per lot QC technician shall be certified and pass State proficiency	Field	Contractor/Asphalt Producer shall provide Certified Asphalt Paving Technician for density testing
(c) Temperature Measurements	Roads and Bridges 211.08	One temperature measurement initially on first and fifth loads, each type mix each production day, and thereafter minimum of one per hour of production time for each mix type, by Producer's Certified Asphalt	QC - Processing or mixing plant from back of truck QA – Field	The Contractor should take and record temperature measurements of the asphalt concrete at the beginning of paving operations and thereafter at a rate of not less than one measurement every hour. The

Arlington County, VA Materials Testing Specification Reference (September 2020)

MATERIAL AND TEST (REF. - VDOT TEST METHODS MANUAL)	VDOT ROAD AND BRIDGE SPECIFICATION 2002 (Or Latest Version)	MINIMUM RATE OF SAMPLING (REF. - VDOT MANUAL OF INSTRUCTIONS)	LOCATION OF SAMPLING	REMARKS
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		Concrete Technician. If any test outside of tolerance, minimum of 3 additional tests made in different points of the load, and 4 tests averaged and average used as temperature of load or batch.		Project Officer may increase the frequency of temperature measurements at any time. The temperature should be checked using an appropriate heat-sensing device (i.e. probe thermometer, infrared thermometer, etc.).
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Note 1. Density tests are reported on Forms TL-53, TL-54, TL-55, TL-124, TL-125 (Sand Cone Method), and TL-125A (One-Point Proctor Method).

Note 2. If there is a breakdown in the nuclear testing equipment, then density testing shall continue using other approved methods.



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION


4975 Alliance Drive
Fairfax, VA 22030

CHARLES A. KILPATRICK, P.E.
COMMISSIONER

September 29, 2016

MEMORANDUM

TO: NOVA District Staff

FROM: Hari Sripathi, P.E.
Regional Operations Director 

SUBJECT: Lane Closures in Nova District

As a follow up to the Lane Closures in Nova District memorandum dated April 27, 2012, enclosed are the updated guidelines for lane closures.

These updated guidelines will be effective immediately. All existing and previously approved projects are encouraged to review their respective contract documents and make adjustments if possible.

Lane Closure Guidelines

-For Northern Virginia-



**Virginia Department of Transportation
Northern Region Operations**

September 21, 2016

Instruction

The purpose of this memorandum is to present guidelines for lane closure hours for construction, maintenance, permits, and special events in Northern Virginia.

The first version of the lane closure guidelines was issued in April 2012. In the past four years, there have been completed and on-going roadway construction projects in the NoVA District, such as I-495 and I-95 express lanes and the I-66 spot improvements. As these guidelines are applied and implemented, modifications and updates to these guidelines have become necessary. Same as the previous version, the modifications were made based on traffic volume; roadway characteristics; comments from staff; and considering the public tolerance for the lane closure during certain time periods of the day.

It should be noted that these guidelines must be used as a starting point for discussion at the project level. On large scale projects with robust community outreach and a Traffic Management Plan, these hours could be extended. If project staff would like to modify these hours for interstate or major arterials, they must work with NRO Traffic Operations staff for recommendations and obtain final approval from their functional Assistant District Administrator (ADA).

Please review the existing contracts and discuss the deviations from these hours with your functional ADA.

Restriction of Operations:

In addition to the allowable lane closure hours specified in the tables, the restrictions listed below shall be followed.

1. Peak Hours Lane Closures

Any lane reductions (temporary or permanent) during the peak periods (Monday to Friday, 6:00AM to 9:00AM and 3:30PM to 6:30PM) on roads with an AADT above or equal to 10,000 vehicles requires consultation with the Regional Operations Director (ROD) and Public Affairs Manager.

2. Complete Roadway Closures

If there are complete road closures on any road for construction or maintenance work, the ROD and Public Affairs Manager must be consulted.

Complete Roadway Closures shall be limited to 20 to 30 minutes intermittent stoppage for some specific work activities.

If the closure duration is above 30 minutes, it shall be approved separately with full Maintenance of Traffic and Traffic Management Plans.

3. Construction in Residential Subdivisions

Road work within residential subdivisions and/or cul-de-sac streets should be conducted during daytime hours to avoid night time noise issues.

4. Express Lanes (I-95 & I-495)

All I-95 and I-495 Express Lane closures shall be coordinated with the Express Lanes Operations Center at least 5 business days in advance using their Authorization to Work form (available from the Express Lanes Operations Center at (571) 419-6046. Complete road closures on the I-95 Express Lanes and I-495 Express Lanes will be limited to 30 minutes or less

5. Holiday

In addition to the Sunday or Holiday work limitations, mobile, short duration, short-term stationary or intermediate-term stationary temporary traffic control zone lane closures on mainline lanes, shoulders or ramps shall not be performed during the following Holiday time periods without the written permission of the Engineer. Additionally, long-term stationary temporary traffic control zones shall not be initially put in place, adjusted, or removed during the following Holiday time periods without the written permission of the Engineer (VDOT 2016 Standard Specifications, updated 7/2016):

- **January 1:** From Noon on the preceding day until Noon on the following day, except as indicated below.
- **Martin Luther King, Jr. Day and Lee Jackson Day*:** From Noon on the preceding Thursday to Noon on the following Tuesday.
- **Presidents Day*:** As indicated below.
- **Easter*:** As indicated below.
- **Memorial Day:** As indicated below.
- **July 4:** From Noon on the preceding day until Noon on the following day, except as indicated below.
- **Labor Day:** As indicated below.
- **Columbus Day*:** As indicated below.
- **Veterans Day*:** From Noon on the preceding day until Noon on the following day, except as indicated below.
- **Thanksgiving Day:** From Noon on the Wednesday preceding Thanksgiving Day until Noon on the Monday following Thanksgiving Day.
- **Christmas Day:** From Noon on the preceding day until Noon on the following day, except as indicated below.

If the Holiday occurs on a Friday or Saturday: From Noon on the preceding Thursday to Noon on the following Monday.

If the Holiday occurs on a Sunday or Monday: From Noon on the preceding Friday to Noon on the following Tuesday.

***Note:**

For low volume roadways (minor arterial), lane closures will not be allowed during the holidays; however, there will be no restriction to the preceding day and the following day.

INTERSTATE 395 & INTERSTATE 95					
WEEKDAY		Northbound			
		Single-Lane Closures or Shoulder	Two-Lane Closures	Multiple-Lane Closures	Complete Road Closure
Segment 1	14th St. Bridge to Springfield Interchange	10:00AM to 3:00PM	10:00PM to 5:00AM	11:00PM to 5:00AM	12:00AM to 4:00AM
		9:00PM to 5:00AM			
Segment 2	Springfield Interchange to Rt.123	9:30AM to 3:30PM	10:00PM to 5:00AM	11:00PM to 5:00AM	12:00AM to 4:00AM
		9:00PM to 5:00AM			
Segment 3	Rt.123 to Prince William / Stafford County line	9:30AM to 3:30PM	10:00PM to 4:30AM	11:00PM to 4:00AM	12:00AM to 4:00AM
		9:00PM to 5:00AM			
Segment 4	Prince William / Stafford County line to Rt.3 Exit 130	9:30AM to 3:30PM	10:00PM to 4:30AM	n/a	12:00AM to 4:00AM
		9:00PM to 4:30AM			
Segment 5	Rt.3 Exit 130 to Caroline / Hanover County line	9:00AM to 3:30PM	10:00PM to 4:30AM	n/a	12:00AM to 4:00AM
		9:00PM to 5:30AM			
All lanes open at 12:00 noon on Friday					
WEEKDAY		Southbound			
		Single-Lane Closures or Shoulder	Two-Lane Closures	Multiple-Lane Closures	Complete Road Closure
Segment 1	14th St. Bridge to Springfield Interchange	10:00AM to 2:30PM	10:00PM to 5:00AM	11:00PM to 5:00AM	12:00AM to 4:00AM
		9:30PM to 5:00AM			
Segment 2	Springfield Interchange to Rt.123	9:00AM to 2:00PM	10:00PM to 5:00AM	11:00PM to 5:00AM	12:00AM to 4:00AM
		9:30PM to 5:00AM			
Segment 3	Rt.123 to Prince William / Stafford County line	9:00AM to 2:00PM	10:00PM to 5:00AM	11:00PM to 5:00AM	12:00AM to 4:00AM
		9:30PM to 6:00AM			
Segment 4	Prince William / Stafford County line to Rt.3 Exit 130	9:00AM to 2:00PM	10:00PM to 5:30AM	n/a	12:00AM to 4:00AM
		9:30PM to 6:00AM			
Segment 5	Rt.3 Exit 130 to Caroline / Hanover County line	9:00AM to 3:00PM	10:00PM to 5:30AM	n/a	12:00AM to 4:00AM
		9:30PM to 6:00AM			
All lanes open at 11:00am on Friday					

INTERSTATE 395 & INTERSTATE 95			
WEEKEND	Northbound/Southbound*		
	Single-Lane Closures or Shoulder	Multiple-Lane Closures	Complete Road Closure
Friday to Saturday	10:00PM to 7:00AM	11:00PM to 6:00AM	12:00AM to 5:00AM
Saturday to Sunday	10:00PM to 7:00AM	11:00PM to 6:00AM	12:00AM to 5:00AM
Sunday to Monday	10:00PM to 5:00AM	11:00PM to 4:00AM	12:00AM to 4:00AM

* For special operations, depending on time of year, additional hours may be allowed with proper ADA/ROD approval.

	REVERSIBLE LANES (HOV & EXPRESS LANES)*	
	Single-Lane Closures or Shoulder	Complete Road Closure**
WEEKDAY	9:30PM (Sunday to Thursday) to 4:00AM (Monday to Friday)	11:00PM to 4:00AM
WEEKEND	11:00PM (Friday to Saturday) to 9:00AM (Saturday to Sunday)	11:00PM to 4:00AM

* Direction of traffic control for all lane closures in reversible lanes will need to be adjusted as necessary to face direction of traffic.
 ** Complete Road Closure on Express Lanes limited to 30 minutes or less.

INTERSTATE 495 (BELTWAY)					
WEEKDAY		Inner Loop			
		Single-Lane Closures or Shoulder	Two-Lane Closures	Multiple-Lane Closures	Complete Road Closure
Segment 1	A. L. Bridge to Springfield Interchange	10:00AM to 3:00PM	10:00PM to 5:00AM	11:00PM to 5:00AM	12:00AM to 5:00AM
		9:30PM to 5:00AM			
Segment 2	Springfield Interchange to W.W. Bridge	10:00AM to 3:00PM	10:00PM to 5:00AM	11:00PM to 5:00AM	12:00AM to 5:00AM
		9:30PM to 5:00AM			
All lanes open at 12:00 noon on Friday					
WEEKDAY		Outer Loop			
		Single-Lane Closures or Shoulder	Two-Lane Closures	Multiple-Lane Closures	Complete Road Closure
Segment 1	A. L. Bridge to Springfield Interchange	9:30AM to 2:30PM	10:00PM to 5:00AM	11:00PM to 5:00AM	12:00AM to 5:00AM
		9:30PM to 5:00AM			
Segment 2	Springfield Interchange to W.W. Bridge	10:00AM to 3:00PM	10:00PM to 5:00AM	11:00PM to 5:00AM	12:00AM to 5:00AM
		9:30PM to 5:00AM			
All lanes open at 12:00 noon on Friday					
WEEKEND		Inner/Outer Loop			Complete Road Closure
		Single-Lane Closures or Shoulder	Multiple-Lane Closures		
Friday to Saturday		10:00PM to 8:00AM	11:00PM to 7:00AM		12:00AM to 5:00AM
Saturday to Sunday		10:00PM to 9:00AM	11:00PM to 8:00AM		12:00AM to 5:00AM
Sunday to Monday		9:30PM to 5:00AM	11:00PM to 5:00AM		12:00AM to 5:00AM
EXPRESS LANES					
		Single-Lane Closures or Shoulder	Complete Road Closure**		
WEEKDAY	9:30PM (Sunday to Thursday) to 4:00AM (Monday to Friday)		11:00PM to 4:00AM		
WEEKEND	11:00PM (Friday to Saturday) to 9:00AM (Saturday to Sunday)		11:00PM to 4:00AM		
** Complete Road Closure on Express Lanes limited to 30 minutes or less.					

INTERSTATE 66					
WEEKDAY		Eastbound			
		Single-Lane Closures or Shoulder	Two-Lane Closures	Multiple-Lane Closures	Complete Road Closure
Segment 1	Prince William County line to Route 286	10:00AM to 3:30PM	9:00PM to 5:00AM	10:00PM to 5:00AM	12:00AM to 4:00AM
		8:00PM to 5:00AM			
Segment 2	Route 286 to Beltway	11:00AM to 3:30PM	10:00PM to 5:00AM**	11:00PM to 5:00AM**	12:00AM to 4:00AM
		9:00PM to 5:00AM			
Segment 3	Beltway to TR Bridge (Inside Beltway)	9:30PM to 5:00AM	n/a	n/a	12:00AM to 4:00AM
All lanes open at 12:00 noon on Friday					
WEEKDAY		Westbound			
		Single-Lane Closures or Shoulder	Two-Lane Closures	Multiple-Lane Closures	Complete Road Closure
Segment 1	Prince William County line to Route 286	9:00AM to 2:30PM	9:30PM to 6:00AM	10:30PM to 5:00AM	12:00AM to 4:00AM
		9:00PM to 6:00AM			
Segment 2	Route 286 to Beltway	9:00AM to 2:00PM*	10:00PM to 5:00AM**	11:00PM to 5:00AM**	12:00AM to 4:00AM
		9:30PM to 5:00AM			
Segment 3	Beltway to TR Bridge (Inside Beltway)	9:30AM to 2:00PM*	10:00PM to 5:00AM**	n/a	12:00AM to 4:00AM
		10:00PM to 5:00AM			
All lanes open at 12:00 noon on Friday					
* Only be considered for three lane segment.					
** Consider opening shoulder lane, where Applicable.					

WEEKEND		Eastbound/Westbound		
Outside Beltway		Single-Lane Closures or Shoulder	Multiple-Lane Closures	Complete Road Closure
Friday to Saturday		9:00PM to 9:00AM	10:00PM to 6:00AM	12:00AM to 5:00AM
Saturday to Sunday		9:00PM to 9:00AM	10:00PM to 6:00AM	12:00AM to 5:00AM
Sunday to Monday		8:00PM to 5:00AM	9:00PM to 5:00AM	12:00AM to 4:00AM
Inside Beltway		Single-Lane Closures or Shoulder	Multiple-Lane Closures	Complete Road Closure
Friday to Saturday		10:00PM to 6:00AM	n/a	12:00AM to 5:00AM
Saturday to Sunday		10:00PM to 6:00AM	n/a	12:00AM to 5:00AM
Sunday to Monday		9:30PM to 5:00AM	n/a	12:00AM to 4:00AM

ROUTE 267 CONNECTOR				
WEEKDAY	Eastbound		Westbound	
	Single-Lane Closures or Shoulder	Complete Road Closure	Single-Lane Closures or Shoulder	Complete Road Closure
Monday to Friday	11:00AM to 3:00PM	12:00AM to 4:00AM	9:30AM to 3:00PM	12:00AM to 4:00AM
	9:30PM to 5:00AM		9:00PM to 5:00AM	
All lanes open at 12:00 noon on Friday				

WEEKEND	Eastbound/Westbound	
	Single-Lane Closures or Shoulder	Complete Road Closure
Friday to Saturday	10:00PM to 8:00AM	12:00AM to 5:00AM
Saturday to Sunday	11:00PM to 8:00AM	12:00AM to 5:00AM
Sunday to Monday	9:00PM to 5:00AM	12:00AM to 4:00AM

Single-Lane Closures* or Shoulder					
ARTERIAL	WEEKDAY		WEEKEND		
	Monday to Thursday	Friday	Friday to Saturday	Saturday to Sunday	Sunday to Monday
Major Arterials**	9:30AM to 3:00PM	9:30AM to 2:00 PM	10:00PM to 9:00AM	10:00PM to 8:00AM	10:00PM to 5:00AM
	10:00PM to 5:00AM				
All Other Roadways	9:00AM to 3:30PM	9:00AM to 2:00 PM	10:00PM to 9:00AM	9:00PM to 9:00AM	10:00PM to 5:00AM
	9:00PM to 5:00AM				

Multiple-Lane Closures					
ARTERIAL	WEEKDAY		WEEKEND		
	Monday to Thursday	Friday	Friday to Saturday	Saturday to Sunday	Sunday to Monday
Major Arterials**	10:00PM to 5:00AM	Not allowed until 11:00PM	11:00PM to 5:00AM	11:00PM to 6:00AM	11:00PM to 5:00AM
All Other Roadways	9:00PM to 5:00AM	Not allowed until 10:00PM	10:00PM to 6:00AM	10:00PM to 6:00AM	10:00PM to 5:00AM

*Single-lane closures only permitted for multiple-lane roadways.

**Major Arterials defined as Primary Roads, high volume Secondary Roads, and all other routes that connect directly to Interstates.

EXHIBIT I

State & Federal Roads in Arlington County, VA

State Routes

- Interstate 66: Custis Memorial Parkway
- Interstate 395: Henry G. Shirley Memorial Highway
- U.S. Route 1: Jefferson Davis Highway
- State Route 27: Washington Boulevard (Memorial Bridge to U.S. Route 50)
- U.S. Route 29: Lee Highway
- U.S. Route 50: Arlington Boulevard
- State Route 110: Jefferson Davis Highway (Rosslyn to Crystal City)
- State Route 120: Glebe Road
- State Route 123: Chain Bridge Road
- State Route 124: Spout Run Parkway (Lee Highway to Lorcom Lane)
- State Route 233: Airport Viaduct
- State Route 237: Washington Boulevard (North Glebe Road to Lee Highway)
- State Route 237: Fairfax Drive (Kirkwood Road to North Glebe Road)
- State Route 237: 10th Street North (U.S. Route 50 to Kirkwood Road)
- State Route 309: Old Dominion Drive

Federal Routes

- Arlington Hall Street
- Boundary Channel Drive
- George Washington Memorial Parkway
- Fort Myer streets, including Arlington National Cemetery
- Marshall Drive (North Meade Street to U.S. Route 110)
- Memorial Avenue
- Pentagon Street
- Spout Run Parkway (Lorcom Lane to George Washington Memorial Parkway)

VII. ATTACHMENTS AND FORMS

ARLINGTON COUNTY, VIRGINIA
OFFICE OF THE PURCHASING AGENT

INVITATION TO BID NO. 22-DES-ITBPW-693

B I D F O R M

ELECTRONIC BIDS WILL BE RECEIVED BY THE COUNTY VIA VENDOR REGISTRY NOT LATER THAN 1:00 P.M., MAY 19, 2022.

FOR PROVIDING TWO (2) TRAFFIC SIGNAL UPGRADES IDENTIFIED HEREIN IN ACCORDANCE WITH THE DRAWINGS, SPECIFICATIONS, TERMS AND CONDITIONS OF THIS SOLICITATION

BIDDERS SHALL FURNISH ALL NECESSARY LABOR, EQUIPMENT, MATERIALS, AND ALL INCIDENTALS NECESSARY TO PERFORM THE WORK AS SET FORTH IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. ALL PRICES INCLUDE PROVISION AND INSTALLATION.

Bidders shall enter the Unit Prices on Attachment B-Pricing sheet and enter the Grand Total from Attachment B below:

Grand Total from Attachment B: \$ _____

THE FULL LEGAL NAME OF THE ENTITY SUBMITTING THIS BID MUST BE WRITTEN IN THE SPACE BELOW. THIS BID FORM AND ALL OTHER DOCUMENTS THAT REQUIRE A SIGNATURE MUST BE FULLY AND ACCURATELY COMPLETED AND SIGNED BY A PERSON WHO IS AUTHORIZED TO BIND THE BIDDER, OR THE BID MAY BE REJECTED.

SUBMITTED BY:

(Legal name of entity)

AUTHORIZED SIGNATURE:

PRINT NAME AND TITLE:

ADDRESS:

CITY/STATE/ZIP:

TELEPHONE NO.:

E-MAIL ADDRESS:

THIS ENTITY IS INCORPORATED

IN:

THIS ENTITY IS A:

(check the applicable option)

CORPORATION

LIMITED PARTNERSHIP

GENERAL PARTNERSHIP

UNINCORPORATED ASSOCIATION

LIMITED LIABILITY COMPANY

SOLE PROPRIETORSHIP

IS BIDDER AUTHORIZED TO TRANSACT BUSINESS IN THE COMMONWEALTH YES NO

IDENTIFICATION NO. ISSUED TO THE ENTITY BY THE SCC:

Any Bidder exempt from Virginia State Corporation Commission (SCC) authorization requirement must include a statement with its bid explaining why it is not required to be so authorized.

VIRGINIA CONTRACTOR'S LICENSE NUMBER:

ENTITY'S DUN & BRADSTREET D-U-N-S NUMBER: (if available):

HAS YOUR FIRM OR ANY OF ITS PRINCIPALS BEEN DEBARRED FROM SUBMITTING BIDS TO ARLINGTON COUNTY, VIRGINIA, OR ANY OTHER STATE OR POLITICAL SUBDIVISION WITHIN THE PAST THREE YEARS? YES NO

HAS YOUR FIRM DEFAULTED ON ANY PROJECT IN THE LAST THREE YEARS? YES NO

HAS YOUR FIRM HAD ANY TYPE OF BUSINESS, CONTRACTING OR TRADE LICENSE, REGISTRATION OR CERTIFICATION REVOKED OR SUSPENDED IN THE PAST THREE YEARS? YES NO

HAS YOUR FIRM AND ITS PRINCIPALS/OWNERS BEEN CONVICTED OF ANY CRIME RELATING TO ITS CONTRACTING BUSINESS IN THE PAST TEN YEARS? YES NO

HAS YOUR FIRM BEEN FOUND IN VIOLATION OF ANY LAW APPLICABLE TO ITS CONTRACTING BUSINESS (LICENSING LAWS, TAX LAWS, WAGE AND HOUR LAWS, PREVAILING WAGE LAWS, ENVIRONMENTAL) WHERE THE RESULT OF SUCH VIOLATION WAS THE PAYMENT OF A FINE, BACK PAY DAMAGES, OR ANY OTHER PENALTY IN THE AMOUNT OF \$5000 OR MORE? YES NO

IS YOUR FIRM PREQUALIFIED BY THE VIRGINIA DEPT. OF TRANSPORTATION? YES NO

IF YOUR FIRM IS NOT PREQUALIFIED BY THE VIRGINIA DEPT. OF TRANSPORTATION, YOUR FIRM ENSURES THAT ALL CRAFT LABOR IT EMPLOYS UNDER THE PROJECT WILL HAVE COMPLETED, PRIOR TO WORKING ON THE PROJECT, THE OSHA 10-HOUR TRAINING COURSE FOR SAFETY ESTABLISHED BY THE U.S. DEPARTMENT OF LABOR. YES NO

BIDDER STATUS: MINORITY OWNED: WOMAN OWNED: NEITHER:

The undersigned certifies that (Bidder Name) is currently registered with the Virginia State Board of Contractors as required by the Code of Virginia. Certificate Number for a Class License was issued on the day of , 20 . The undersigned further certifies that the registration fee and all renewal fees required under law have been paid.

TIME LIMIT FOR PROJECT:

SUBSTANTIAL COMPLETION – **270 CALENDAR DAYS**
FINAL COMPLETION – **45 CALENDAR DAYS** FROM
SUBSTANTIAL COMPLETION

LIQUIDATED DAMAGES:

SUBSTANTIAL COMPLETION - **\$1,113.00** PER DAY
FINAL COMPLETION - **\$1,113.00** PER DAY

MINIMUM BIDDER QUALIFICATIONS:

In a separate attachment, Bidders shall provide the following documentation:

Company Qualifications: Proof of three (3) continuous years of construction contract experience conducting public works infrastructure and street improvement projects in an urban environment. The experience shall be work of similar size and scope, construction, re-construction, and maintenance.

Project Experience: Bidders shall provide a list of three (3) similar projects completed within the last five (5) years involving the same size, and scope. The County will randomly contact at least five (5) of the references provided. For each project, Bidders shall list the following information to show compliance with the experience criteria:

- Project Name
- Project description and scope of work
- Owner Project manager’s name, telephone number and email address
- Work start date, scheduled completion, and actual completion date
- Initial contract cost and final contract cost

Staffing Qualifications:

Resumes of the proposed Site Supervisor, Safety Project Officer and Environmental Project Officer assigned to this work, who have the requirements as described in the scope of work.	YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
--	-----	--------------------------	----	--------------------------

(ATTACH TO YOUR BID SUBMISSION)

OSHA 10 Certification	YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
------------------------------	-----	--------------------------	----	--------------------------

(ATTACH TO YOUR BID SUBMISSION)

VDOT Flagger Certification, or American Traffic Safety Services Association Flagger Certification, or any other VDOT approved flagger Certification	YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
--	-----	--------------------------	----	--------------------------

(ATTACH TO YOUR BID SUBMISSION)

VDOT Erosion & Sediment Control Contractor Certification	YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
---	-----	--------------------------	----	--------------------------

(ATTACH TO YOUR BID SUBMISSION)

COMPLETE THE PRICING SHEET PROVIDED WITH THE BID DOCUMENTS AS ATTACHMENT B TO ITB NO. 22-DES-ITBPW-639 AND SUBMIT IN MICROSOFT EXCEL FORM IT WITH YOUR BID.

FAILURE TO SUBMIT THE PRICING SHEET WITH THE BID WILL DEEM THE BIDDER NONRESPONSIVE.

The undersigned acknowledges receipt of the following Addenda:

ADDENDUM NO. 1 DATE: _____ INITIAL: _____
ADDENDUM NO. 2 DATE: _____ INITIAL: _____
ADDENDUM NO. 3 DATE: _____ INITIAL: _____

STIPULATED PRICE ITEMS

The Contractor agrees to perform related work for the following items at the stipulated prices shown:

#	ITEM DESCRIPTION	UNIT	PRICE
1	CONCRETE PIER, CRADLE, OR ENCASEMENT	CY	\$200.00
2	ROCK EXCAVATION	CY	\$150.00
3	CRUSHER RUN VDOT #25 OR APPROVED EQUAL	CY	\$100.00
4	OVER EXCAVATION	CY	\$65.00
5	TEST PITS	EA	\$550.00
6	SELECT BORROW	CY	\$70.00

THE UNDERSIGNED UNDERSTANDS AND ACKNOWLEDGES THE FOLLOWING:

THE OFFICIAL COPY OF THE SOLICITATION DOCUMENTS, WHICH INCLUDES ANY ADDENDA, IS THE ELECTRONIC COPY THAT IS AVAILABLE FROM THE [VENDOR REGISTRY WEBSITE](#).

VENDORS ARE REQUIRED TO REGISTER ON [VENDOR REGISTRY](#) IN ORDER TO SUBMIT A RESPONSE TO THIS INVITATION TO BID. **NO RESPONSES WILL BE ACCEPTED AFTER THE BID DUE DATE AND TIME.**

POTENTIAL BIDDERS ARE RESPONSIBLE FOR DETERMINING THE ACCURACY AND COMPLETENESS OF ALL SOLICITATION DOCUMENTS THEY RECEIVE FROM ANY SOURCE, INCLUDING THE COUNTY.

TRADE SECRETS OR PROPRIETARY INFORMATION:

Trade secrets or proprietary information submitted by a Bidder in connection with a procurement transaction will not be subject to public disclosure under the Virginia Freedom of Information Act. Pursuant to Section 4-111 of the Arlington County Purchasing Resolution, however, a Bidder seeking to protect submitted data or materials from disclosure must, before or upon submission of the data or materials, identify the data or materials to be protected and state the reasons why protection is necessary.

Please mark one:

- No, the bid that I have submitted does not contain any trade secrets and/or proprietary information.

- Yes, the bid that I have submitted does contain trade secrets and/or proprietary information.

If Yes, you must clearly identify below the exact data or materials to be protected and list all applicable page numbers, sections, and paragraphs of the bid that contain such data or materials:

State the specific reason(s) why protection is necessary and why the identified information constitutes a trade secret or is proprietary:

If you fail above to identify the data or materials to be protected or to state the reason(s) why protection is necessary, you will not have invoked the protection of Section 4-111 of the Purchasing Resolution. Accordingly, upon the award of a contract, the bid will be open for public inspection consistent with applicable law.

CERTIFICATION OF NON-COLLUSION: The undersigned certifies that this bid is not the result of or affected by (1) any act of collusion with another person engaged in the same line of business or commerce (as defined in Virginia Code §§ 59.1-68.6 *et seq.*) or (2) any act of fraud punishable under the Virginia Governmental Frauds Act (Virginia Code §§ 18.2-498.1 *et seq.*).

CONTACT PERSON AND MAILING ADDRESS FOR DELIVERY OF NOTICES

Provide the name and address of the person who is designated to receive notices and other communications regarding this solicitation. Refer to the "Notices" section in the draft Contract Terms and Conditions for information regarding delivery of notices.

NAME: _____

ADDRESS: _____

E-MAIL: _____

ACKNOWLEDGEMENT OF COUNTY COVID-19 VACCINATION POLICY

I, _____(hereinafter referred to as “Bidder”), certify that I will comply with the COVID-19 Vaccination Policy as a condition of contract award which may require that all contractor employees or subcontractors who will be working on the contract are fully vaccinated against COVID-19, or being tested on a weekly basis, or are exempt pursuant to a valid reasonable accommodation under state or federal law.

Signed: _____ **Date:** _____

Name of Bidder: _____

Energy-Efficient Lighting Certification

I, _____ (hereinafter referred to as “Bidder”), by checking “Yes” in the table below, certify the LED lighting used for the “Traffic Signal Work” portion of this project is Energy Star Certified and meet the Federal Energy Management Program (FEMP) efficiency requirements. By checking “No” in the table below, I certify the LED lighting used for the “Traffic Signal Work” portion of this project is not Energy Star Certified or meet the FEMP efficiency requirements.

Bid Item Number	Description	Energy Star Certified and meet FEMP Efficiency Requirements.	
13160-C8-03000	Traffic Signal Upgrade at Arlington Blvd. & N. Montague St. (As outlined in the construction plan set).	YES <input type="checkbox"/>	NO <input type="checkbox"/>
13160-C8-03000	Traffic Signal Upgrade at Fairfax Drive & N. Monroe St. (As outlined in the construction plan set). Note: All restoration work at Fairfax Dr. & N. Monroe St. is incidental to Traffic Signal Upgrade work.	YES <input type="checkbox"/>	NO <input type="checkbox"/>

Signed: _____ Date: _____

Name of Bidder: _____

INSURANCE CHECKLIST

CERTIFICATE OF INSURANCE MUST SHOW ALL COVERAGE AND ENDORSEMENTS MARKED "X".

COVERAGES REQUIRED

COVERAGE MINIMUM(S)

COVERAGES REQUIRED

LIMITS (FIGURES DENOTE MINIMUMS)

- 1. Workers' Compensation..... Statutory limits of Virginia
- 2. Employer's Liability.....\$500,000/accident, \$500,000/disease, \$500,000/disease policy limit
- 3. Commercial General Liability.....\$1,000,000 CSL BI/PD each occurrence, \$1 Million annual aggregate
- 4. Premises/Operations..... \$500,000 CSL BI/PD each occurrence, \$ 1 Million annual aggregate
- 5. Automobile Liability.....\$1 Million BI/PD each accident, Uninsured Motorist
- 6. Owned/Hired/Non-Owned Vehicles.....\$1 Million BI/PD each accident, Uninsured Motorist
- 7. Independent Contractors.....\$1 Million CSL BI/PD each occurrence, \$1 Million annual aggregate
- 8. Products Liability.....\$1 Million CSL BI/PD each occurrence, \$1 Million annual aggregate
- 9. Completed Operations.....\$1 Million CSL BI/PD each occurrence, \$1 Million annual aggregate
- 10. Contractual Liability (Must be shown on Certificate).....\$1 Million CSL BI/PD each occurrence, \$ 1 Million annual aggregate
- 11. Personal and Advertising Injury Liability.....\$1 Million each offense, \$1 Million annual aggregate
- 12. Umbrella\Excess Liability.....\$1 Million Bodily Injury, Property Damage and Personal Injury
- 13. Per Project Aggregate
- 14. Professional Liability
 - a. Architects and Engineers..... \$1 Million per occurrence/claim
 - b. Asbestos Removal Liability\$2 Million per occurrence/claim
 - c. Medical Malpractice.....\$1 Million per occurrence/claim
 - d. Medical Professional Liability.....\$1 Million per occurrence/claim
- 15. Miscellaneous E&O/ Professional Liability\$1 Million per occurrence/claim
- 16. Motor Carrier Act End. (MCS-90) \$1 Million BI/PD each accident, Uninsured Motorist
- 17. Motor Cargo Insurance
- 18. Garage Liability.....\$1 Million Bodily Injury, Property Damage per occurrence
- 19. Garagekeepers Liability.....\$500,000 Comprehensive, \$500,000 Collision
- 20. Inland Marine-Bailee's Insurance..... \$ _____
- 21. Moving and Rigging Floater..... Endorsement to CGL
- 22. Dishonesty Bond.....\$ _____
- 23. Builder's Risk..... Provide Coverage in the full amount of contract
- 24. XCU Coverage..... Endorsement to CGL
- 25. USL&H..... Federal Statutory Limits
- 26. Carrier Rating shall be Best's Rating of A-VII or better or its equivalent
- 27. Notice of Cancellation, nonrenewal or material change in coverage shall be provided to County at least thirty (30) days prior to action.
- 28. The County shall be named Additional Insured on all policies except Workers Compensation, Errors and Omissions/Professional Liability and Auto.
- 29. Certificate of Insurance shall show Bid Number and Bid Title.
- 30. Environmental Impairment Liability, including coverage of on-site clean up.....BI/PD \$3 Million per occurrence/\$6 Million Aggregate
 - a. In addition to environmental impairment liability, if work requires clean up, remediation, and/or removal of bio-solids, bio-hazards waste, and any hazardous or toxic material via transportation request:
 - Business Auto Liability.....\$2 Million per occurrence with MCS-90 and CA9948 (or equivalent endorsements specifically referenced in the certificate of insurance
- 31. Cyber insurance.....\$2 Million per occurrence/Aggregate
- 32. OTHER INSURANCE REQUIRED: _____

INSURANCE AGENT'S STATEMENT: I have reviewed the above requirements with the bidder named below and have advised the bidder of required coverages not provided through this agency.

AGENCY NAME: _____ AUTH. SIGNATURE: _____

BIDDER'S STATEMENT: If awarded the Contract, I will comply with all Contract insurance requirements.

BIDDER NAME: _____ AUTH. SIGNATURE: _____

ESCROW AGREEMENT

The following pages contain the escrow agreement authorized by 2.2-4334 of the Code of Virginia. Its use is at the Contractor's option. If the Contractor elects to use the escrow procedures, indicate by completing the applicable section of the Bid Form. If the Contractor indicates that it elects to use the escrow procedures, the Contractor must submit the completed escrow agreement to the County, signed by all parties except the County, no later than fifteen (15) days after the date of the notice of award or intent to award issued by the County Purchasing Agent. Escrow agreements received after that time will not be considered.

ESCROW AGREEMENT

THIS AGREEMENT, made and entered into on the date of execution of this agreement by the County by, between and among the County Board of Arlington, Virginia (County), _____ (Contractor), _____ and _____ (Name of Bank), _____ (Address of Bank), a trust company, bank, or savings and loan institution with its principal office located in the Commonwealth of Virginia (hereinafter referred to collectively as Bank) and (Surety) provides:

- I. The County and the Contractor have entered into a Contract with respect to _____ (Contract). This Agreement is pursuant to, but in no way amends or modifies, the Contract. Payments made hereunder or the release of funds from escrow shall not be deemed approval or acceptance of performance by the Contractor.
- II. In order to assure full and satisfactory performance by the Contractor of its obligations under the Contract, the County is required thereby to retain certain amounts otherwise due the Contractor. The Contractor has, with the approval of the County, elected to have these retained amounts held in escrow by the Bank. This agreement sets forth the terms of the escrow. The Bank shall not be deemed a party to, bound by, or required to inquire into the terms of, the Contract or any other instrument or agreement between the County and the Contractor.
- III. The County shall from time to time pursuant to its Contract pay to the Bank amounts retained by it under the Contract. Except as to amounts actually withdrawn from escrow by the County, the Contractor shall look solely to the Bank for the payment of funds retained under the Contract and paid by the County to the Bank.

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

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

- IV. Upon receipt of checks or warrants drawn by the County and made payable to it as escrow agent, the Bank shall promptly notify the Contractor, negotiate the same and deposit or invest and reinvest the proceeds in approved securities in accordance with the written instructions of the Contractor. In no event shall the Bank invest the escrowed funds in any security not approved.
- V. The following securities, and none other, are approved securities for all purposes of this Agreement:
 - (1) United States Treasury Bonds, United States Treasury Notes, United States Treasury Certificates of Indebtedness or United States Treasury Bills,
 - (2) Bonds, notes and other evidence of indebtedness unconditionally guaranteed as to the payment of principal and interest by the United States,

- (3) Bonds or notes of the Commonwealth of Virginia,
- (4) Bonds of any political subdivision of the Commonwealth of Virginia, if such bonds carried, at the time of purchase by the Bank or deposit by the Contractor, a Standard and Poor's or Moody's Investors Service rating of at least "A", and
- (5) Certificates of deposit issued by commercial Banks located within the Commonwealth, including, but not limited to, those insured by the Bank and its affiliates.
- (6) Any bonds, notes, or other evidence of indebtedness listed in Sections (1) through (3) may be purchased pursuant to a repurchase agreement with a bank, within or without the Commonwealth of Virginia having a combined capital, surplus and undivided profit of not less than \$25,000,000, provided the obligation of the Bank to repurchase is within the time limitations established for investments as set forth herein. The repurchase agreement shall be considered a purchase of such securities even if title, and/or possession of such securities is not transferred to the Escrow Agent, so long as the repurchase obligation of the Bank is collateralized by the securities themselves, and the securities have on the date of the repurchase agreement a fair market value equal to at least 100% of the amount of the repurchase obligation of the Bank, and the securities are held by a third party, and segregated from other securities owned by the Bank.

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

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

Upon receipt of a direction signed by the County Comptroller, the Bank shall pay the principal of the fund, or any specified amount thereof, to the Treasurer of Arlington County, Virginia for the account of the County. Such payment shall be made in cash as soon as is practicable after receipt of the direction.

Upon receipt of a direction signed by the County Comptroller, the Bank shall pay and deliver the principal of the fund, or any specified amount thereof, to the Contractor, in cash or in kind, as may be specified by the Contractor. Such payment and delivery shall be made as soon as is practicable after receipt of the direction.

- VII. For its services hereunder, the Bank shall be entitled to a reasonable fee in accordance with its published schedule of fees or as may be agreed upon by the Bank and the Contractor. Such fee and any other costs of administration of this Agreement shall be paid from the income earned upon the escrowed fund and, if such income is not sufficient to pay the same, by the Contractor.
- VIII. The net income earned and received upon the principal of the escrowed fund shall be paid over to the Contractor in quarterly or more frequent installments. Until so paid or applied to pay the

Bank's fee or any other costs of administration, such income shall be deemed a part of the principal of the fund.

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

WITNESS the following:

_____, CONTRACTOR

By: _____ (Officer/Partner/Owner)

Date: _____

Bank Attest: _____ (Bank Officer)

Bank: _____

By: _____ (Vice President)

Date: _____

Surety Attest: _____ (Surety Company)

By: _____ (Resident Virginia Agent)

(Address)

Date: _____

By: _____ (Attorney in fact)

Date: _____

THE COUNTY BOARD OF ARLINGTON COUNTY, VIRGINIA

By: _____ (Purchasing Agent)

Date: _____

**ARLINGTON COUNTY DES ENGINEERING
SPECIAL CONDITIONS**

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PROJECT SUMMARY

The Contractor shall provide all resources to successfully perform the terms of this contract in accordance with project plans, and in compliance with Arlington County and VDOT Standards and Specifications. The Contractor shall perform the work complete, in place, tested, and ready for continuous service.

All work within the VDOT Right-Of-Way shall be performed in accordance with the VDOT Standards and Specifications, unless otherwise noted. All work within the County Right-Of-Way shall be in accordance with the Arlington County Standards and Specifications, unless otherwise noted.

SUPPLEMENTS TO THE GENERAL CONDITIONS

These Conditions modify the Arlington County Construction General Conditions. All provisions that are not modified or deleted by these Supplemental Conditions shall remain in full force and effect. The address system used in these Supplemental Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

ARTICLE B – DRAWINGS, SPECIFICATIONS AND RELATED DATA

SC-B.10 TESTS

Add the following new language to Paragraph B.10:

All materials testing shall be in compliance with the Arlington County Materials Testing Specification Reference. This document specifies the method and frequency of testing for Arlington County projects. A copy of this document is included in the bid documents. This shall be incidental to the work and no separate payment will be made.

The Contractor shall engage the services of a geotechnical company, acceptable to both the County and VDOT, to conduct all materials testing per the County and VDOT Specifications.

If it is observed that samples for testing are being improperly taken or that samples are being taken from an area that is not fully representative of all project conditions, then Contractor shall take and test additional samples at the County Project Officer's request from areas designated by the County Project Officer and at the Contractor's expense.

In addition, the Contractor shall provide the County with unfettered site access as needed for VDOT/County personnel or VDOT/County consultants to enter the site, inspect, and perform any additional testing for any and all materials (including soil, concrete, asphalt, etc.).

Compaction results must meet VDOT Specifications and be certified by a Geotechnical Engineer licensed in Virginia. This work shall be at no cost to the County.

ARTICLE C – COUNTY, COUNTY PROJECT OFFICER, AND CONTRACTOR RELATIONS

SC-C.1 STATUS OF COUNTY PROJECT OFFICER OR DESIGNEE

Add the following new language to Paragraph C.1:

The County Project Officer will coordinate and consult with the VDOT Field Inspector as appropriate when working within the VDOT Right-Of-Way.

SC-C.4 INSPECTION OF WORK

Add the following new language to Paragraph C.4:

Contractor shall notify the Project Officer at least 3 working days prior to disturbing any existing, or installing any new, traffic signs, signals, or other traffic control devices. The Contractor shall allow 3 working days for the inspection and approval of the premarkings prior to placing the permanent markings.

SC-C.9 CONTRACTOR MANAGEMENT PERSONNEL

Add the following new language to Paragraph C.9:

Site Supervisor:

The Contractor shall have a qualified and experienced site supervisor who can clearly communicate technical matters on-site at all times when construction activity is occurring or when the site is not in a secure state.

Safety Project Officer:

The Contractor shall have at least one (1) employee certified by VDOT in Basic Work Zone Traffic Control on-site at all times that work is occurring and be responsible for the following:

- Placement, maintenance, and removal of work zone traffic control devices,
- Compliance with permit requirements and conditions, approved plans and specifications, the Virginia Work Area Protection Manual, and the Manual of Uniform Traffic Control Devices.

The flagger shall be certified in accordance with the VDOT Flagger Certification Program, the American Traffic Safety Services Association Flagger Certification Program or any other VDOT approved flagger program. The flagger shall have his/her certification card with them at all times while performing flagging activities.

The Contractor shall have at least one (1) employee certified in OSHA 10 on-site at all times that work is occurring. The employee shall have served as a Project Safety Officer on at least three (3) prior projects. If the contractor has multiple employees with these requirements, the Contractor shall clearly identify which employee shall serve as the Project Safety Officer.

Environmental Project Officer:

For each task order, the Contractor shall have at least one (1) employee that has successfully completed the VDOT Erosion & Sediment Control Contractor Certification training. The contractor employee shall be on-site during all land disturbance activities. The Contractor shall be responsible for ensuring compliance with all applicable local, State, and Federal erosion and sediment control regulations and permits during land disturbance activities.

If the Contractor proposes to deviate from the approved Erosion and Sediment Control Plan, it shall be the Contractor's responsibility to coordinate and obtain approval from the County Project Officer prior to implementing any changes.

SC-C.13 PROTECTION OF WORK AND PROPERTY

Add the following new language to Subparagraph C.13.c:

The Contractor shall be responsible for all damages caused by their construction activities. The Contractor shall perform or provide repairs, replacements, and restoration to all property that has been damaged resulting from construction operations performed by the Contractor, and shall meet the following requirements:

1. Restore all areas to conditions that existed prior to construction. Remove and Replace damaged items with items equal to or better than the damaged items.

ARTICLE E – LEGAL RESPONSIBILITY AND PUBLIC SAFETY

SC-E.1 SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK

Add the following new language at the end of E.1:

When construction activity reaches in proximity to existing utilities, the trench(es) shall be opened a sufficient distance ahead of the work or test pits shall be made to verify the exact location and inverts of the utility to allow for possible changes in the line or grade as directed by the Project Officer. This shall be incidental to the work and no separate payment shall be made.

SC-E.2 PUBLIC CONVENIENCE

Add the following new language to Paragraph E.2:

The Contractor shall set up controls at the beginning of each workday and take down controls at the end of each workday for the duration of the project. At all times the Contractor shall maintain safe two-way vehicular traffic, and safe accessible pedestrian traffic in conformance with County and VDOT standards. At all times the Contractor shall use the personnel and traffic control signs and devices necessary to comply with the Virginia Work Area Protection Manual and Part VI of the "National Manual on Uniform Traffic Control Devices." The Contractor has sole responsibility for ensuring that its operations are conducted in a safe manner and notwithstanding any other provision to the contrary, shall fully indemnify Arlington County, its officers, agents and employees for any damage or injury related to traffic operations which is caused by negligent or otherwise improper or deficient performance under the Contract or nonperformance of the terms of the Contract. All personnel, signs, barricades and any other items necessary for the maintenance of traffic and safety shall be provided by the Contractor.

When conditions warrant due to traffic volumes, patterns, or special events, the County may suspend or otherwise direct the Contractor's activities to protect the public and or the County's transportation network.

When the project includes a VDOT and/or County approved MOT Plan (or Plans), the Contractor shall strictly abide by this plan. If the Contractor proposes to deviate from the approved MOT Plan for a County Road, it shall be the Contractor's responsibility to coordinate and obtain approval from the County Project Officer prior to implementing any changes. If the Contractor proposes to deviate from the approved MOT

Plan for a VDOT road, it shall be the Contractor's responsibility to coordinate and obtain approval directly from VDOT prior to implementing any changes.

Prior to any lane closures within the VDOT Right-of-Way, the County Project Officer and VDOT Field Inspector must be notified in advance of such lane closure in accordance with VDOT requirements.

The Contractor shall not be entitled to any additional payment for changes to MOT which are the result of the Contractor's work schedule or resource allocation, weather delays, or other factors not controlled by the County.

Failure of the Contractor to correct any MOT deficiency immediately upon notification may result in the project being shut down until the deficiency is corrected, and a reduction from the amount of payment due in the amount of \$1,000.00 per violation. Repeated violations of this provision may result in contract termination.

The Contractor shall install project information signs (size - 36"x48") at least two (2) different locations for each site. Signs will be supplied by the County. Signposts and incidentals necessary for a complete installation of the signs shall be furnished by the Contractor. Signs shall be installed at least two (2) weeks prior to the start of the construction. The Contractor shall coordinate the location of the signs with the Project Officer. After the project has been completed the Contractor shall remove and return the signs to the County Project Officer. The cost for this work shall be considered incidental to other items within the Contract and no separate payment will be made.

At the close of each workday, the area of work shall be confined to the smallest area possible, but in no event larger than the area designated in the Construction Documents, so that the maximum use of the street and sidewalk shall be restored and the hazard to traffic reduced to the minimum.

The Contractor shall preserve all bus stops, including maintaining adequate accessibility through and adjacent to the construction for buses and their passengers. The Contractor shall not close, relocate, or otherwise modify a bus stop without prior request of the Project Officer. Any relocation or closure of a bus stop will require at least four weeks advance notice for coordination with the county's bus stop coordinator.

SC-E.10 SITE CLEAN-UP AND WASTE DISPOSAL

Add the following new language to Paragraph E.10:

The County's Earth Products Recycling Yard (located at 4300 29th Street South, Arlington, VA) shall **not** be used on an as-needed basis for unspecified quantities of waste (due in part to the limited size of the Yard). Although atypical, the Yard **may** be considered, on a case-by-case basis, for disposal of specific types/quantities of waste from County construction projects. In such cases disposal arrangements must be approved by the County Project Officer, be made in advance, depend on available space and the type/quantity of waste, and comply with certain requirements (for example, concrete shall be broken into pieces no longer than 24" in any dimension, contain less than 20% soil content, and be free of rebar).

SC-E.11 STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

Delete Paragraph 2.

ARTICLE F – PROGRESS AND COMPLETION OF THE WORK

SC-F.2 TIME FOR COMPLETION

Delete Paragraph F.2 and replace with the following language:

It is hereby understood and mutually agreed by and between the Contractor and the County that the Commencement Date, the rate of progress, and the Time for Completion of the Work to be done hereunder are essential conditions of the Contract. The Contractor agrees that the Work shall be started promptly upon receipt of a written Notice to Proceed in accordance with the accepted schedule. Additional time shall not be allowed for holidays or weather delays except as allowed in the contract.

ARTICLE G– MEASUREMENT AND PAYMENT

SC-G.1 PAYMENTS TO CONTRACTOR

Add the following new language to Section G.1:

Payments will be based on actual quantities and site measurements of the approved work taken in the field by the County Project Officer using the Contract Unit Prices. Any Work that is not shown on the approved plans that has not been previously authorized in writing by the Project Officer shall be at the Contractor's expense, and at no cost to the County.

SPECIAL CONDITIONS

These Special Conditions include any project-specific requirements in addition to the General Condition, Supplementary Specifications, and the County Standards Referenced herein.

1. CONSTRUCTION STANDARDS

All work shall conform to project plans and specifications along with the current edition of following County and VDOT construction standards and specifications:

- **The Arlington County Department of Environmental Services (DES) Bike Parking Standards**, a copy of which may be downloaded at no charge from the internet at: <https://info.arlingtontransportationpartners.com/arlington-county-bike-parking-standards>
- **The Arlington County Department of Environmental Services (DES) Construction Standards and Specifications**, a copy of which may be downloaded at no charge from the internet at: <http://topics.arlingtonva.us/building/construction-standards-specifications/>
- **The Arlington County Department of Environmental Services (DES) Traffic Signal Specifications**, a copy of which may be downloaded at no charge from the internet at: <https://transportation.arlingtonva.us/traffic-signal-specification-updates/>
- **The Arlington County Department of Environmental Services (DES) Streetlight Specifications**, a copy of which may be downloaded at no charge from the internet at: <https://transportation.arlingtonva.us/streets/street-lights/lighting-standards-specifications-updates/>
- **The Arlington County Department of Environmental Services (DES) Pavement Marking Specifications**, a copy of which may be downloaded at no charge from the internet at: <http://transportation.arlingtonva.us/streets/traffic-signals/>
- **The Arlington County Department of Parks and Recreation (DPR) Specifications**, a copy of which may be downloaded at no charge from the internet at: <https://www.arlingtonva.us/Government/Departments/Parks-Recreation/About/Design-Standards>
- **The Virginia Department of Transportation (VDOT) Road and Bridge Standards and Specifications**, a copy of which may be downloaded at no charge from the internet at: <http://www.virginiadot.org/business/const/spec-default.asp>
- **The Virginia Work Area Protection Manual (WAPM)**, a copy of which may be downloaded at no charge from the internet at: <https://www.virginiadot.org/business/trafficeng-WZS.asp>
- **Manual on Uniform Traffic Control Devices (MUTCD)**, a copy of which may be downloaded at no charge from the internet at: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/pdf_index.htm
- **The Arlington County Department of Environmental Services (DES) Dechlorination and Disposal Procedures**, a copy of which may be downloaded at no charge from the internet at: <https://www.arlingtonva.us/Government/Programs/Water-Utilities/Discharging-Chlorinated-Water>
- **Washington Metropolitan Area Transit Authority (WMATA) Adjacent Construction Project Manual, Current Edition**, a copy of which may be downloaded at no charge from the internet at: <https://www.wmata.com/business/adjacent-construction/upload/ACPM-Rev-5a-09-21-15.pdf>
- **The Supplementary Specifications listed within the Contract.**

In case of a discrepancy, the following order of priority will apply, with the highest governing item appearing first and the least governing item appearing last:

The Contract Bid Items
Special Conditions

Contract Drawings
Supplemental Specifications
Arlington County Construction Standards and Specifications
External Agency Specifications

2. *PERMITS*

Permits required for the project include, but are not limited to:

- **County Land Disturbing Activities (LDA) permit**
- **County Public Right-Of-Way (PROW) permit**
- **County Transportation Right-Of-Way (TROW) permits**
- **VDOT Land Use permit**

All fees for County permits will be waived by Arlington County, and fees for non-County permits will be paid by Arlington County.

The County will obtain the County LDA permit, the County RPA permit, VDOT Land Use permit, VDOT Open Cut permit, VSMP Permit and then NVRPA permits prior to the start of work. The Contractor shall transfer the County LDA permit, VDOT Land Use Permit, VDOT Open Cut permit and the VSMP Permit in the Contractor's name as the permittee and/or responsible party prior to the start of Work. The Contractor shall complete and sign the VDOT forms and submit to the County Project Officer for submission to VDOT two weeks prior to the start of Work within VDOT ROW.

The Contractor shall provide a Responsible Land Disturber (RLD) that meets all the required qualifications of the permits. The Contractor shall complete and sign the RLD certificate and submit to the County Project Officer prior to the start of Work.

The Contractor shall obtain the County PROW permit, the County TROW permits and the County Water Meter and Fire Hydrant permits. The Contractor is responsible for investigating and satisfying all permit requirements for the above-mentioned permits.

3. *SPECIAL CONTRACTOR/SUBCONTRACTOR QUALIFICATIONS*

The Contractor shall have three (3) continuous years of on-call services construction contract experience conducting public works infrastructure and street improvement projects in an urban environment. The experience shall be work of similar size and scope, construction, re-construction, and maintenance. The Contractor's obtained project experience shall consist of the following:

- **State and County streets**
- **Curbs and gutters**
- **Sidewalks and walkways**
- **Driveway aprons**
- **Storm sewer pipes and inlets**
- **Wet Utilities**
- **Pavement markings and signage**
- **Electrical conduits**
- **Traffic signals and Street lighting**
- **Streetscapes and related site work**
- **Low Impact Development including Biofilters and Bioretention**

The Contractor shall provide a complete list of projects completed within the last five (5) years with reference contact information for each project for Bidder qualification verification. Failure to qualify according to the foregoing requirements will result in bid rejection by the Arlington County Purchasing Office. The County will randomly contact at least five (5) of the references provided.

4. STAKEOUT AND CUT-SHEETS

The Contractor shall be responsible for laying out the work and shall retain a professional land surveyor licensed in the Commonwealth of Virginia to provide all necessary construction layouts and establish all control lines, grades, and elevation during construction. The Contractor shall submit a copy of all cut-sheets for review, per the Arlington County Specifications. All cut-sheets for layout and construction shall be provided as submittals at least seven (7) calendar days prior to construction of the work included on that cut-sheet. The cost of all necessary surveying services shall be considered incidental to the work and no separate payment shall be made.

5. SCHEDULE, DURATION, AND PHASING REQUIREMENTS

The Contractor shall provide a schedule for all work listed on plans including any additional work not specifically mentioned on plans but was agreed upon with the County prior to work commencing.

Work Duration per task order shall be calculated in accordance with Supplements to the General Condition "SC-F.2 TIME FOR COMPLETION". The Time for completion shall be used as the basis for the project schedule.

Contractor shall make sure that the submittals/shop drawings are reviewed and accepted, and materials ordered and delivered on site as no additional time will be granted for this.

6. WORK HOURS

The Contractor shall comply with **normal daytime working hours** as defined in the County Noise Control Ordinance unless otherwise defined by the project plans and specifications or approved by the Project Officer.

The Contractor shall comply with **restricted working hours** of 9:00 am to 3:00 pm when working in Arlington County arterial streets unless otherwise indicated on the Maintenance of Traffic Plans for each project.

The Contractor shall comply with **restricted working hours** as defined by VDOT and as noted on the approved VDOT permit when working within the VDOT Right-Of-Way. For restricted work hours in VDOT ROW, see attached "Lane Closure Guidelines in NOVA District". The Contractor is responsible for satisfying all VDOT Permit requirements found at: <http://www.virginiadot.org/business/fairfax-permits-main.asp>. In addition, the County reserves the right to restrict working days and hours to accommodate special site conditions as required.

7. GENERAL SITE SECURITY AND CONTROLS

The Contractor is responsible for securing its work area for safety and security. The Contractor shall confine its construction and presence to the Limits of Work, unless otherwise approved by the County Project Officer.

The Contractor shall provide, erect, and maintain barricades, fences, and/or signage as required to protect the general public, workers, and adjoining properties at no additional cost to the County. Before leaving the site at the end of each day, the Contractor shall replace any and all sections of the security fence or barricade moved or removed during work hours.

The Contractor shall maintain clear vehicular access to existing driveways and entrances at all times unless such access is otherwise addressed on County-approved project plans, precluding concrete pouring and curing of such access points, unless otherwise directed by the County Project Officer.

Homeowners shall be notified by the Contractor a minimum of fourteen (14) calendar days in advance of any driveway closure, and driveways can only be closed for a maximum of five (5) calendar days. The Contractor shall monitor parking of construction personnel's private vehicles and

8. TRAFFIC SIGNALS AND STREETLIGHTS

Materials and construction of the communications conduit, streetlights, and traffic signals shall abide by the latest versions of the 'Arlington County Traffic Signal Specifications and Standards' and 'Arlington County Lighting Specifications and Standards. All materials for these areas shall be approved by Arlington County Transportation Engineering and Operations Bureau. The County Project Officer will facilitate the material specification submissions for review by the Transportation Engineering and Operations Bureau. Prior to removal of the existing signal equipment and materials, the Contractor shall meet with the Project Officer to verify which equipment will be returned to the County, when and where the returned equipment will be delivered, and which equipment will be disposed. All costs associated with this shall be incidental to other items in the Contract.

Installation of the proposed traffic signal equipment and intersection lighting will be measured and paid as a lump sum item. The "Traffic Signal Upgrade" lump sum item shall include all labor, materials, and equipment necessary to furnish and install the traffic signal infrastructure as shown in the associated Traffic Signal Plans and as identified in the Traffic Signal Standards and Specifications.

For Traffic Signal Upgrade work at the intersection of Fairfax Drive & N. Monroe Street, vacuum drilling to obtain clearance to WMATA tunnel, WMATA coordination and approval, foundation designs based on obtained clearance to WMATA tunnel and WMATA approved analysis of proposed traffic signal poles and foundations, and associated restoration work is considered incidental to Traffic Signal Upgrade work and therefore no separate payment will be made. Installation of electrical service for temporary services such as signals, streetlights, signal cabinets, construction trailers, or for equipment use are incidental to the contract. Intercepting existing streetlight conduits and splicing into existing cables are incidental to the contract. References to a CCTV camera shall mean to both furnish and install the CCTV camera, unless specifically excluded.

As part of the luminaire installation, Contractor shall install house-side shields in each fixture. These shields will be provided by the County. If requested, the County will demonstrate how to install the shields. The Contractor shall contact the Streetlights Operations Team Manager at (703) 228-6531 to obtain the shields prior to ordering any streetlight materials to ensure they will be available at the time of construction, and to request a demonstration on how to install the shields. Failure to do so will be at the Contractor's expense for time if construction is stopped because the shields are not available. The installation of the shields is considered incidental to the contract and no additional payments shall be made for this work.

SUPPLEMENTS TO THE DES CONSTRUCTION STANDARDS AND SPECIFICATIONS

SECTION 01500 – TEMPORARY EROSION AND SEDIMENT CONTROL

PART 3 - EXECUTION

PARAGRAPH 3.1 Installation and Maintenance of Erosion and Sediment Controls

Delete

3.5.C The Contractor shall conduct dewatering operations in a manner to prevent sediment or other pollutants from discharging to the County's storm drain system, which includes the curb and gutter, or any surface water. Dewatering operations shall not create any erosion or flooding. Dewatering discharges that contain chemicals, hydrocarbons, or sewage shall not be discharged to the storm drain system. Any discharge from dewatering operations shall be properly filtered prior to being discharged. A dewatering plan with sufficient detail to ensure the proposed dewatering shall comply with applicable regulations must be included as part of the erosion and sediment control plan.

Add

3.5.C The Contractor shall conduct dewatering operations in a manner to prevent sediment or other pollutants from discharging to the County's storm drain system, which includes the curb and gutter, or any surface water. Dewatering operations shall not create any erosion or flooding. Dewatering discharges that contain chemicals, hydrocarbons, or sewage shall not be discharged to the storm drain system. Any discharge from dewatering operations shall be properly filtered prior to being discharged. A dewatering plan with sufficient detail to ensure the proposed dewatering shall comply with applicable regulations shall be prepared by the Contractor.

SECTION 02200 – EARTHWORK

PART 3 - EXECUTION

PARAGRAPH 3.5 Dewatering

Delete

3.5.C The Contractor shall conduct dewatering operations in a manner to prevent sediment or other pollutants from discharging to the County's storm drain system, which includes the curb and gutter, or any surface water. Dewatering operations shall not create any erosion or flooding. Dewatering discharges that contain chemicals, hydrocarbons, or sewage shall not be discharged to the storm drain system. A dewatering plan with sufficient detail to ensure the proposed dewatering shall comply with applicable regulations must be included as part of the erosion and sediment control plan.

Add

3.5.C The Contractor shall conduct dewatering operations in a manner to prevent sediment or other pollutants from discharging to the County's storm drain system, which includes the curb and gutter, or any surface water. Dewatering operations shall not create any erosion or flooding. Dewatering discharges that contain chemicals, hydrocarbons, or sewage shall not be discharged to the storm drain system. Any discharge from dewatering operations shall be properly filtered prior to being discharged. A dewatering plan with sufficient detail to ensure the proposed dewatering shall comply with applicable regulations shall be prepared by the Contractor.

SECTION 02500 – GRAVITY SEWERS AND APPURTENANCES

PART 4 – MEASUREMENT AND PAYMENT

PARAGRAPH 4.1 Sewer

Delete

4.1.A Sewer pipe for the various materials, classes, and sizes shown on the plans shall be measured in linear feet along the center line of the pipe and shall be measured from inside wall of structure to inside wall of structures. Payment shall include the furnishing of all pipe and fittings, all necessary tests, excavation, removal and disposal of existing pipes, removal and disposal of unsuitable or surplus material, placement of bedding and backfill as shown in Standard M-3.0, restoration of roadways as shown in Standard M-6.1, all other restoration, and all other work required to providing a complete sewer installation in compliance with the Construction Documents.

Add

4.1.A Sewer pipe for the various materials, classes, and sizes shown on the plans shall be measured in linear feet along the center line of the pipe and shall be measured from inside wall of structure to inside wall of structures. Payment shall include the furnishing of all pipe and fittings, all necessary tests, excavation, abandonment and/or removal and disposal of existing pipes, removal and disposal of unsuitable or surplus material, placement of bedding and backfill as shown in Standard M-3.0, restoration of roadways as shown in Standard M-6.1, all other restoration, and all other work required to providing a complete sewer installation in compliance with the Construction Documents.

SECTION 02600 - BITUMINOUS ROADWAY PAVEMENTS

PART 4 – MEASUREMENT AND PAYMENT

Delete

4.2 Subbase shall be measured to the width and depths shown on the approved plans as verified in the field by the Project Officer or his designee. Payment shall be in cubic yards of material.

Add

4.2 Subbase shall be measured to the width and depths shown on the approved plans as verified in the field by the Project Officer or his designee. Payment shall be in cubic yards of material and shall include demolition, excavation, and the necessary preparation of the sub grade surface.

SECTION 02900 - PAVEMENT MARKINGS

PART 3 - EXECUTION

PARAGRAPH 3.2 Provision for Temporary Markings

Add

B. All Type D pavement markings shall conform to the latest VDOT requirements.

PART 4 - MEASUREMENT AND PAYMENT

PARAGRAPH 4.4 Removal/Eradication of Existing Pavement Markings

Delete

A. Payment for pavement line markings (type, class, width) removal and/or eradication shall be paid by actual work performed as listed in the contract and shall include all labor, materials, tools, equipment, transportation, supplies, and incidentals required to remove and/or eradicate the line markings as specified.

Add

A. Payment for pavement line markings (type, class, width) removal and/or eradication shall be incidental to the work and no separate payment shall be made.

Add

PARAGRAPH 4.5 Pavement Message Marking

A. Measurement of pavement message markings (type, class, size) shall be in units of each furnished and installed.

B. Payment for pavement message markings (type, class, size) shall be in units of each and shall include all labor, materials, tools, equipment, transportation, supplies, and incidentals required to furnish and install the message markings as specified.

SECTION 329100 - PLANTING PREPARATION

PART 4 - MEASUREMENT AND PAYMENT

Add

4.10 The measurement of CONTINUOUS SOIL PANEL to be paid for shall be per CUBIC YARD of the amended soil in accordance with the plans, specifications and to the satisfaction of the Project Officer.

4.11 The unit price for CONTINUOUS SOIL PANEL shall include the cost of furnishing all labor, materials, equipment and incidental expenses, including but not limited to imported topsoil, vapor barrier, 4" UD-4 underdrain (per VDOT specification), bedding material per Continuous Soil Panel and Tree Pit Drainage Details, and connection to storm sewer system.

ATTACHMENT A



COMMONWEALTH of VIRGINIA DEPARTMENT OF LABOR AND INDUSTRY

Gary G. Pan
COMMISSIONER

Main Street Centre
600 East Main Street, Suite 207
Richmond, Virginia 23219
PHONE (804) 371-2327
FAX (804) 371-6524

Virginia Department of Labor and Industry Wage Determination Decision

Project Name	Two Traffic Signal Upgrade Projects
County Project Code	22-DES-ITB-693
DOLI Project Number	ARLC-22-0006
County or Independent City	Arlington County
Publication Date	04/18/2022
Construction Type	Highway

Wage Determinations	Wage	Fringe
Carpenter, Includes Form Work	\$20.97	
Cement Mason/Concrete Finisher	\$20.70	\$8.03
Electrician, Includes Traffic Signalization	\$28.35	15.95% + \$7.00
Fence Erector	\$15.28	
Ironworker, Reinforcing	\$34.18	
Ironworker, Structural	\$34.18	
Laborer: Asphalt, Includes Raker, Shoveler, Spreader and Distributor	\$19.06	\$1.75
Laborer: Common or General	\$20.90	\$7.90
Laborer: Grade Checker	\$14.88	
Laborer: Pipelayer	\$20.48	
Laborer: Power Tool Operator	\$15.69	
Operator: Asphalt Spreader and Distributor	\$20.58	\$2.31

Wage Determinations	Wage	Fringe
Laborer: Common or General	\$20.90	\$7.90
Laborer: Grade Checker	\$14.88	
Laborer: Pipelayer	\$20.48	
Laborer: Power Tool Operator	\$15.69	
Operator: Asphalt Spreader and Distributor	\$20.58	\$2.31
Operator: Backhoe/Excavator/Trackhoe	\$23.93	
Operator: Bobcat/Skid Steer/Skid Loader	\$19.00	\$3.49
Operator: Broom/Sweeper	\$17.40	\$2.01
Operator: Bulldozer, Including Utility	\$20.64	
Operator: Crane	\$29.46	
Operator: Drill	\$24.89	
Operator: Gradall	\$19.26	
Operator: Grader/Blade	\$23.21	
Operator: Hydroseeder	\$16.64	
Operator: Loader	\$18.92	
Operator: Mechanic	\$22.84	
Operator: Milling Machine	\$23.19	\$2.94
Operator: Pavement Planer	\$21.14	
Operator: Pavement Planer Groundsmen	\$19.75	
Operator: Paver (Asphalt, Aggregate, and Concrete)	\$20.33	\$2.81
Operator: Piledriver	\$21.83	\$4.08
Operator: Roller	\$18.92	
Operator: Roller (Finishing)	\$18.73	\$3.23
Operator: Screed	\$22.13	\$4.89
Pavement Marking Operator	\$22.16	
Pavement Marking Truck Driver	\$18.78	
Traffic Control: Flagger	\$13.64	
Truck Driver: 1/Single Axle Truck	\$19.35	
Truck Driver: Fuel and Lubricant Service	\$18.25	
Truck Driver: Heavy 7CY & Under	\$15.53	
Truck Driver: Heavy Over 7CY	\$18.05	
Truck Driver: Multi Axle	\$20.34	\$2.89

Additional Notes

All wage rates to be used on a contract will be set at the time the contract is awarded. While DOLI maintains a list of wage determinations online for reference purposes, only the wage determinations made in an official Wage Determination Decision, sent by DOLI

to the contracting agency, can be used to ascertain the exact rates to be paid for a specific contract.

All rates are determined by DOLI and any appeals of specific classifications may be made through the Wage Determination Appeal form available at <http://www.doli.virginia.gov/wp-content/uploads/2021/04/Appeal-for-Wage-Determination-Clarification.pdf>

Any additional classifications may be requested through the Additional Wage Classification form available at <http://www.doli.virginia.gov/wp-content/uploads/2021/04/Request-for-Additional-Wage-Classification.pdf>
Understand your duties as a contractor under Virginia law by referencing our Contractor Responsibilities information sheet available at <http://www.doli.virginia.gov/wp-content/uploads/2021/04/PREVAILING-WAGE-CONTRACTOR-RESPONSIBILITIES.pdf>

Your employees have specific rights, which can be found on our List of Employee Rights information sheet available at <http://www.doli.virginia.gov/wp-content/uploads/2021/04/PREVAILING-WAGE-EMPLOYEE-RIGHTS.pdf>
Any further questions should be directed to PrevailingWage@doli.virginia.gov



MEMORANDUM

To: Andy Anton
Arlington County DES-TE&O

From: Andy Smith, P.E.
Jerry Pertzsch, P.E.
Kimley-Horn and Associates, Inc.

Date: May 1, 2019

Subject: **Analysis of Proposed Traffic Signal Poles and WMATA Station at:
Fairfax Drive and N. Monroe Street**

Andy Anton,

Kimley-Horn is pleased to submit this memo describing the loading of the signals below.

The purpose of the analysis is to determine if the modified foundation is adequate for use per WMATA Adjacent Construction Project Manual, and VDOT IIM-TE-382.1, IIM-S&B-90.2. The key element for determining adequacy of the foundation is the increase in load when compared to the current state at the level of the WMATA tunnel below. Based on our analysis we have determined the load increase to be:

Signal Location	Load Increase	Area of Load at Tunnel
Signal with 45' arm in SE Quadrant	14%	39 ft ²
Signal with 30' arm in SW Quadrant	10%	53 ft ²

This load increase is only on the small area of the station beneath the signal. The area of the increase per signal is approximately 0.1% of the Virginia Square Station area (formerly called the Ballston Station, as shown in the associated as-built station plans) of over 50,000 ft². Based on this, we seek an exception to WMATA Adjacent Construction Project Manual that may be expressly permitted by WMATA per article 3.14.

It should be noted that the analysis provided herein is a preliminary analysis, and that the final analysis will be provided by the traffic signal construction contractor.

1) INTRODUCTION

The SE traffic signal is composed of 1 mast arm that is 45 feet in length. The signal pole is an Arlington County standard pole.

The SW traffic signal is composed of 1 mast arm that is 30 feet in length. The signal pole is an Arlington County standard pole.

The analysis conservatively looks at the SE traffic signal with the longer arm for both locations. The remainder of the document will use the load from the SE signal.

The signal is designed to the maximum load per Arlington County design standards, which is significantly more than the proposed loading for the signal. A comparison of the proposed loading on the signal and the design loading is shown in Tables 1 and 2 below. The signal is designed for an additional 2 signals and 31 ft² of sign area. This equates to the signal being designed for 3 times the proposed sign and signal area. The wind load is increased to 50 psf per WMATA article 3.19. This increased wind load makes the mast arm elements over designed. The increased loads are conservatively carried to the foundation.

2) ANALYSIS CRITERIA

WMATA Adjacent Construction Project Manual

VDOT IIM-TE-382.1, IIM-S&B-90.2

Wind Speed: 80 mph, load increased to 50 psf per WMATA Art. 3.19

Loading: WMATA Plate A-4, A-5A, A-7A, Arlington County Traffic Signal Specifications

Soil Properties: WMATA Table 15.2 (Table V-2 Soil Properties for Design) for loading and Arlington County Mast Arm Pole Standard Foundation Notes, Drawing 66-05 for foundation design.

Table 1 - SE Fairfax & Monroe Signal Proposed Conditions

Mast Arm	Mounting Height (ft)	Arm Length (ft)	Number of Signals	Sign Area (ft ²)	Number of add'l attachments
1	20	45	2	7.5	4

Table 2 – SE Fairfax & Monroe Signal Designed Conditions

Mast Arm	Mounting Height (ft)	Arm Length (ft)	Number of Signals	Sign Area (ft ²)	Number of add'l attachments
1	20	45	4	38.5	4

3.1) Analysis method

The FDOT Structures Design Mast Arm program was used for analysis of the signals specified in this memo. The foundation was analyzed using LPILE and FDOT Structures Design Drilled Shaft program.

3.2) Assumptions

- 1) Soil meets or exceeds the design values
- 2) Vertical load conservatively transfers to the bottom of the drilled shaft before distributing according to WMATA Plate A-4.
- 3) Live load surcharge conservatively considered uniform even in pole location
- 4) Signal can carry 50 psf wind load to foundation

4) ANALYSIS RESULTS

Calculations are available separately. Factored calculation summaries are provided below.

Table 3 - SE Fairfax and Monroe Analysis Summary

Section	Component Type	Size	Existing Load (PSF)	Proposed Load (PSF)	Increase in Load (PSF)
Foundation	Drilled Shaft	5' Diameter	2236	2557	321

Table 4 - SW Fairfax and Monroe Analysis Summary

Section	Component Type	Size	Existing Load (PSF)	Proposed Load (PSF)	Increase in Load (PSF)
Foundation	Drilled Shaft	5' Diameter	2417	2650	233

5) Conclusion

The increase in loading from the proposed signals is minor, even with the conservative assumptions used. The factored increase in load due to the signals is less than the factored live load considered in the tunnel design. The 300 psf live load multiplied by a 1.75 factor is 525 psf, whereas the maximum factored loading increase shown above is 321 psf. Additionally, the increase in loading impacts less than 0.1% of the Virginia Square Station area.

Further mitigation of the loading would require extraordinary efforts for these small structures. Therefore, we seek an exception from WMATA per WMATA Adjacent Construction Project Manual article 3.14.

The analysis provided in this memorandum is a preliminary analysis, and the final analysis will be provided by the traffic signal construction contractor.

Attachments:

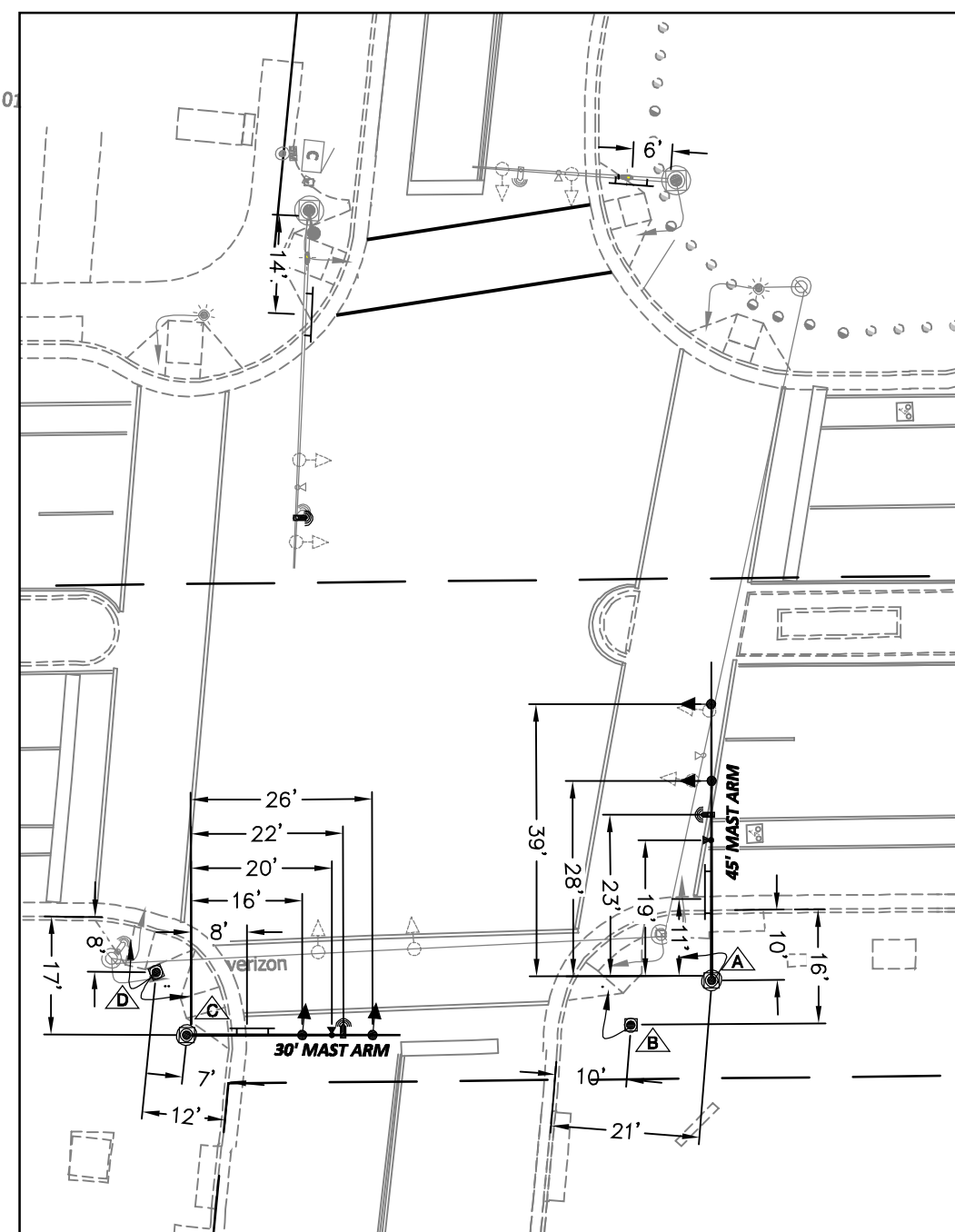
1. WMATA Submittal Package

Draft Plans

CONDUIT & CABLE RUNS

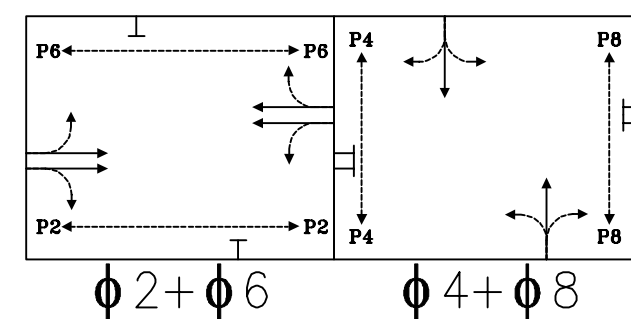
- A** 1-3" CONDUIT (TRENCHED)
2-14/7c SIGNAL HEADS 21,22 (1 SPARE)
1-14/7c PEDESTRIAN SIGNAL P22
1-12/2c CABLE FOR LUMINAIRE SL6
1-14/3c PEDESTRIAN PUSH BUTTON PB22
1-THERMAL DETECTION LEAD-IN CABLE VD2
1-#8 BARE COPPER GROUNDING WIRE
- B** 1-2" CONDUIT (TRENCHED)
1-OPTICOM CABLE PE2
1-#8 BARE COPPER GROUNDING WIRE
- C** 1-2" CONDUIT (TRENCHED)
1-14/7c PEDESTRIAN SIGNAL P82
1-14/3c PEDESTRIAN PUSH BUTTON PB82
1-#8 BARE COPPER GROUNDING WIRE
- D** 1-4" CONDUIT (BORED)
2-14/7c SIGNAL HEADS 21,22 (1 SPARE)
2-14/7c PEDESTRIAN SIGNALS P22,P82
1-12/2c CABLE FOR LUMINAIRE SL6
2-14/3c PEDESTRIAN PUSH BUTTONS PB22,PB82
1-THERMAL DETECTION LEAD-IN CABLE VD2
1-#8 BARE COPPER GROUNDING WIRE
- E** 1-2" CONDUIT (BORED)
1-OPTICOM CABLE PE2
1-#8 BARE COPPER GROUNDING WIRE
- F** 1-2" CONDUIT (TRENCHED)
2-14/7c PEDESTRIAN SIGNALS P21,P42
1-14/3c PEDESTRIAN PUSH BUTTON PB42
1-#8 BARE COPPER GROUNDING WIRE
- G** 1-4" CONDUIT (BORED)
4-14/7c SIGNAL HEADS 21,22,41,42 (2 SPARE)
4-14/7c PEDESTRIAN SIGNALS P21,P22,P42,P82
2-12/2c CABLE FOR LUMINAIRES SL5,SL6
4-14/3c PEDESTRIAN PUSH BUTTONS PB21,PB22,PB42,PB82
2-THERMAL DETECTION LEAD-IN CABLES VD2,VD4
1-#8 BARE COPPER GROUNDING WIRE
- H** 1-2" CONDUIT (BORED)
2-OPTICOM CABLES PE2,PE4
1-#8 BARE COPPER GROUNDING WIRE
- I** 2-EXISTING CONDUITS
1-14/7c PEDESTRIAN SIGNAL P41
1-14/3c PEDESTRIAN PUSH BUTTON PB21
1-12/2c CABLE FOR LUMINAIRE SL2
2-#8 BARE COPPER GROUNDING WIRES
- J** 2-EXISTING CONDUITS
1-14/7c SIGNAL HEADS 81,82
1-14/7c PEDESTRIAN SIGNAL P62
1-14/3c PEDESTRIAN PUSH BUTTON PB62
1-12/2c CABLE FOR LUMINAIRE SL3
1-THERMAL DETECTION LEAD-IN CABLE VD8
1-OPTICOM CABLE PE8
2-#8 BARE COPPER GROUNDING WIRES
- K** 2-EXISTING CONDUITS
1-14/7c SIGNAL HEADS 81,82
2-14/7c PEDESTRIAN SIGNALS P62,P81
2-14/3c PEDESTRIAN PUSH BUTTONS PB62,PB81
2-12/2c CABLES FOR LUMINAIRE SL3,SL4
1-THERMAL DETECTION LEAD-IN CABLE VD8
1-OPTICOM CABLE PE8
2-#8 BARE COPPER GROUNDING WIRES
- L** 2-EXISTING CONDUITS
1-14/7c SIGNAL HEADS 21,22,41,42 (TO BE REMOVED)
4-14/7c PEDESTRIAN SIGNALS P21,P22,P42,P82 (TO BE REMOVED)
4-14/3c PEDESTRIAN PUSH BUTTONS PB21,PB22,PB42,PB82 (TO BE REMOVED)
- M** 4-EXISTING CONDUITS
2-14/7c SIGNAL HEADS 61,62,81,82
4-14/7c PEDESTRIAN SIGNALS P41,P61,P62,P81
4-14/3c PEDESTRIAN PUSH BUTTONS PB41,P61,P62,P81
2-THERMAL DETECTION LEAD-IN CABLES VD6,VD8
2-OPTICOM CABLES PE6,PE8
1-CCTV LEAD-IN CABLE
4-#8 BARE COPPER GROUNDING WIRES
- N** 1-EXISTING CONDUIT
1-12 FIBER CABLE
- O** 1-EXISTING CONDUIT
1-6/3c SERVICE CABLE

POLE LOCATION DETAIL
(SCALE: 1"=25')



PHASE	1	2	3	4	5	6	7	8
MOVEMENT		EB THRU		SB THRU		WB THRU		NB THRU
PHASE ON		X		X		X		X
PHASE OFF	X		X		X		X	
PHASE TIMINGS								
MIN GR		5.0		5.0		5.0		5.0
PASSAGE		0.0		4.0		0.0		4.0
YELLOW		3.4		3.0		3.4		3.0
RED		2.4		3.3		2.4		3.3
MAX 1		45.0		45.0		30.0		30.0
MAX 2		0.0		0.0		0.0		0.0
MIN GAP		0.0		0.0		0.0		0.0
TIME BEFORE REDUCTION		0.0		0.0		0.0		0.0
TIME TO REDUCE		0.0		0.0		0.0		0.0
PED WALK		7.0		7.0		7.0		7.0
PED CLEARANCE		16.0		23.0		12.0		25.0
MODE		MIN RECALL		NON-LOCK		MIN RECALL		NON-LOCK

EXISTING/PROPOSED PHASING DIAGRAM

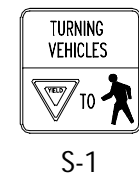


No.	DESIGN NUMBER	SIG. M.A.	FOUNDATION TYPE
A	50700-B1991-Y3	45'	SPECIAL DESIGN
B	-	-	66-04
C	50700-B1991-Y1	30'	SPECIAL DESIGN
D	-	-	66-04

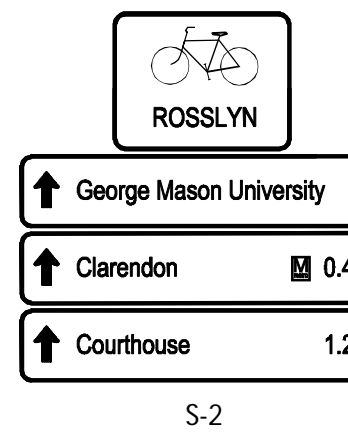
POLE SIGNAL MOUNTING

No.	STANDARD			POLE SIGNAL MOUNTING				STREET NAME SIGN	
	TYPE	SIG. M.A.	LUM. M.A.	VEHICLE & PED. HEADS	PED. PUSH BUTTONS	SIGNS	VIDEO DETECTOR PREEMPTION & CCTV		
A	MAST ARM POLE	45'	6'	145W	21, 22, P22	PB22	S-5	VD2,PE2	S-4
B	PEDESTAL POLE 12'	-	-	-	P82	PB82	S-6	-	-
C	MAST ARM POLE	30'	6'	145W	41, 42	PB21	S-5	VD4,PE4	S-3
D	PEDESTAL POLE 12'	-	-	-	P21, P42	PB42	S-5	-	-

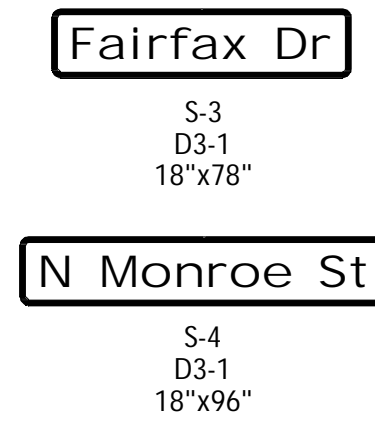
EXISTING SIGNS



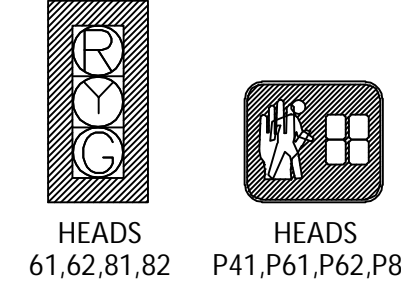
EXISTING SIGNS TO BE RELOCATED



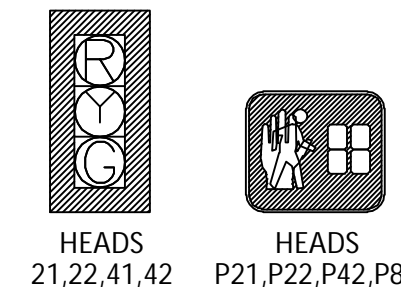
PROPOSED SIGNS



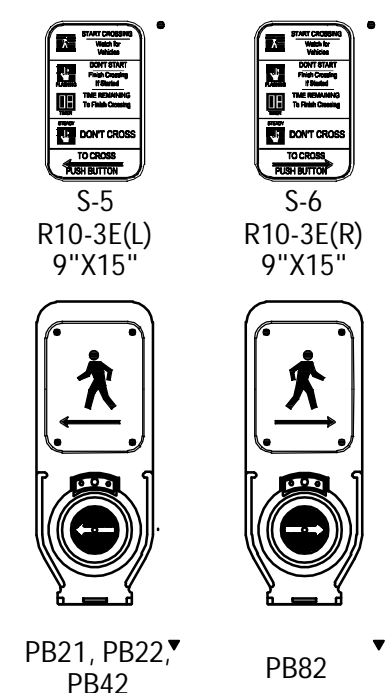
EXISTING SIGNALS



PROPOSED SIGNALS



PROPOSED ACCESSIBLE PEDESTRIAN PUSHBUTTONS



PUSHBUTTON	WALK MESSAGE
PB42, PB82	*FAIRFAX DRIVE, WALK SIGN IS ON TO CROSS FAIRFAX DRIVE*
PB21, PB22	*NORTH MONROE STREET, WALK SIGN IS ON TO CROSS NORTH MONROE STREET*

*PEDESTRIAN PUSHBUTTON SIGN SHALL BE MOUNTED ABOVE PEDESTRIAN PUSHBUTTON.
ACCESSIBLE PUSHBUTTON SYSTEM SHALL BE POLARA SYSTEM CONFORMING TO ARLINGTON COUNTY SPECIFICATION AND SHALL INCLUDE A POLARA CENTRAL CONTROL UNIT.

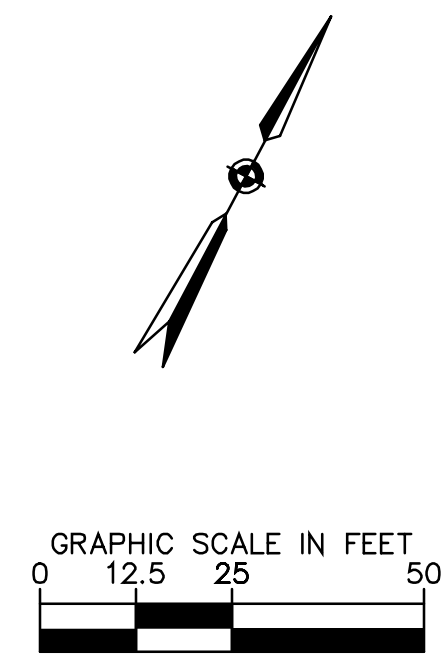
CONSTRUCTION NOTES

- INSTALL PROPOSED S-6 SIGN (SIGN ONLY) ABOVE EXISTING ACCESSIBLE PEDESTRIAN PUSHBUTTON.
- ROTATE EXISTING DETECTION CAMERA TO ESTABLISH VEHICLE DETECTION ZONES FOR PHASE 6 APPROACH.
- INSTALL NON-ORNAMENTAL MAST ARM SIGNAL POLE WITH LUMINAIRE, PEDESTRIAN AND VEHICULAR SIGNAL HEADS, ACCESSIBLE PEDESTRIAN PUSHBUTTON, AND SIGNS.
- INSTALL PEDESTAL POLE WITH PEDESTRIAN SIGNAL(S), ACCESSIBLE PEDESTRIAN PUSHBUTTON, AND SIGNS.
- REMOVE EXISTING STRAIN POLE, SIGNAL HEADS, PEDESTRIAN SIGNAL HEADS, ACCESSIBLE PEDESTRIAN PUSHBUTTONS, AND DETECTION CAMERAS. SIGNAL HEADS AND PUSHBUTTONS TO BE SALVAGED AND RETURNED TO ARLINGTON COUNTY.
- NON-STANDARD PUSHBUTTON SIGNS AND PUSHBUTTONS SHALL NOT BE SALVAGED.
- EXISTING SIGN ASSEMBLY S-2 TO BE RELOCATED TO NEW GROUND-MOUNTED POST.
- INSTALL NON-ORNAMENTAL MAST ARM SIGNAL POLE WITH LUMINAIRE, VEHICULAR SIGNAL HEADS, ACCESSIBLE PEDESTRIAN PUSHBUTTON, AND SIGNS.
- RETAIN EXISTING JUNCTION BOX AND REENTER WITH NEW CONDUIT.
- INSTALL 6" TYPE B CLASS I WHITE CROSSWALK MARKINGS WITH MIN. 4' DISTANCE FROM EXISTING STOP BAR.

SEE SHEET 4 FOR SECTIONS A-A AND B-B.

PHASE	2	4	6	8	2+6	4+8	FLASH
SIGNAL	R/W	R/W	R/W	R/W	R/W	R/W	
21, 22	G				G		Y
41, 42		G				G	R
61, 62			G		G		Y
81, 82				G		G	R
P21, P22	W*				W*		DARK
P41, P42		W*				W*	DARK
P61, P62			W*			W*	DARK
P81, P82				W*		W*	DARK

NOTE: BLANK SPACES IN THIS CHART REPRESENT A "RED" SIGNAL INDICATION.
*WALK INDICATION IS DISPLAYED WHEN PEDESTRIAN CALL IS SERVICED; WALK INDICATION IS DISPLAYED UNTIL IT IS TIMED OUT. OTHERWISE "DON'T WALK" INDICATION IS DISPLAYED.



LEGEND

	EXISTING	PROPOSED
Controller Cabinet	⊠	⊠
Signal Junction Box (61-02)	⊠	⊠
Signal Junction Box (61-04)	⊠	⊠
Comm. Junction Box	⊠	⊠
Service Junction Box	⊠	⊠
Mast Arm Pole & Foundation	⊠	⊠
Pedestrian Pedestal Pole & Foundation	⊠	⊠
Carlyle Lighting Pole & Foundation	⊠	⊠
Service Meter	⊠	⊠
Battery Backup (UPS)	⊠	⊠
Vehicle Signal Head (LED)	⊠	⊠
Pedestrian Push Button	⊠	⊠
FLIR Video Detection	⊠	⊠
Emergency Vehicle Preemption	⊠	⊠
CCTV Vehicle Camera	⊠	⊠
Overhead Light (LED)	⊠	⊠
Conduit Run	⊠	⊠

ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

TRAFFIC SIGNAL MODIFICATION PLANS
FAIRFAX DRIVE AND N. MONROE STREET TRAFFIC SIGNAL MODIFICATION

90% DESIGN PLANS

NOT FOR CONSTRUCTION



DEPARTMENT OF ENVIRONMENTAL SERVICES

Signal Systems and ITS
Traffic Engineering and Operations Bureau
2100 Clarendon Boulevard, Suite 900
Arlington, VA 22201
Phone: 703.228.3629
Fax: 703.228.3606

Kimley-Horn and Associates, Inc.
1400 Commerce Park Drive, Suite 400
Reston, Virginia 20191
Phone: 703-674-1300
Fax: 703-674-1300

Seal

Seal

Revisions Date

Designed: AS
Drawn: JW
Checked: AS
Miss Utility Transmittal #:

Filename: 3 TRAFFIC SIGNAL MODIFICATION
Path: K:\NVA_TPTO\110010106 - Fairfax and Monroe Signal\CAD\PlanSheets
Plotted: May 11, 2020
Plotted by: andy.smith

STANDARD FOUNDATION DATA					
FOUNDATION DESIGN NUMBER	SHAFT DIAMETER (FT)	DEPTH BELOW GRADE (FT)	APPROX. CONC. VOLUME (CY)	VERTICAL REBAR	CLOSED HOOPS
#1	5.0	9.5	7	18-#11	10-#4

POLE ARM LENGTH	ROUND DESIGNS (UMC DRG. 50700-B1991)			SELECTED FOUNDATION DESIGN NUMBER
	ANCHOR BOLT DATA (ALL 6 BOLT PATTERNS)			
	BOLT DIA. (IN)	BOLT CIRCLE (IN)	PROJ. "P" (IN)	
SINGLE 45'	1.50	20	9.00	#1

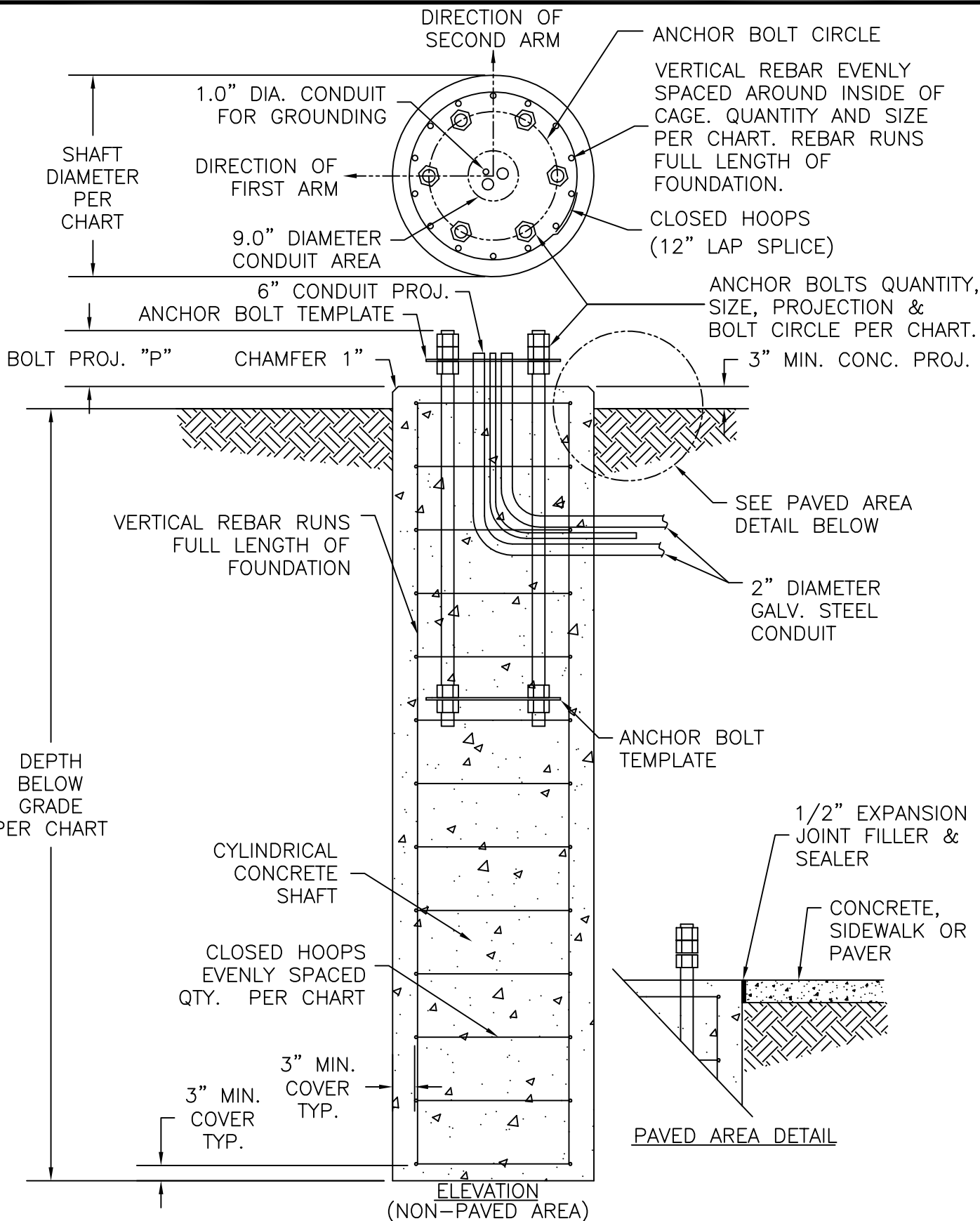
MAST ARM POLE FOUNDATION TYPES (MOD.)

REVISION & DATE	



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
66-06 (MOD.)
FORMERLY TS7-1.10



MAST ARM POLE STANDARD FOUNDATION

REVISION & DATE	



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
66-07
FORMERLY TS7-1.10

WMATA Tunnel Clearance

JBL 5/15/16

Questions concerning the VERTCON process may be mailed to [NGS](#)

Latitude: 38 53

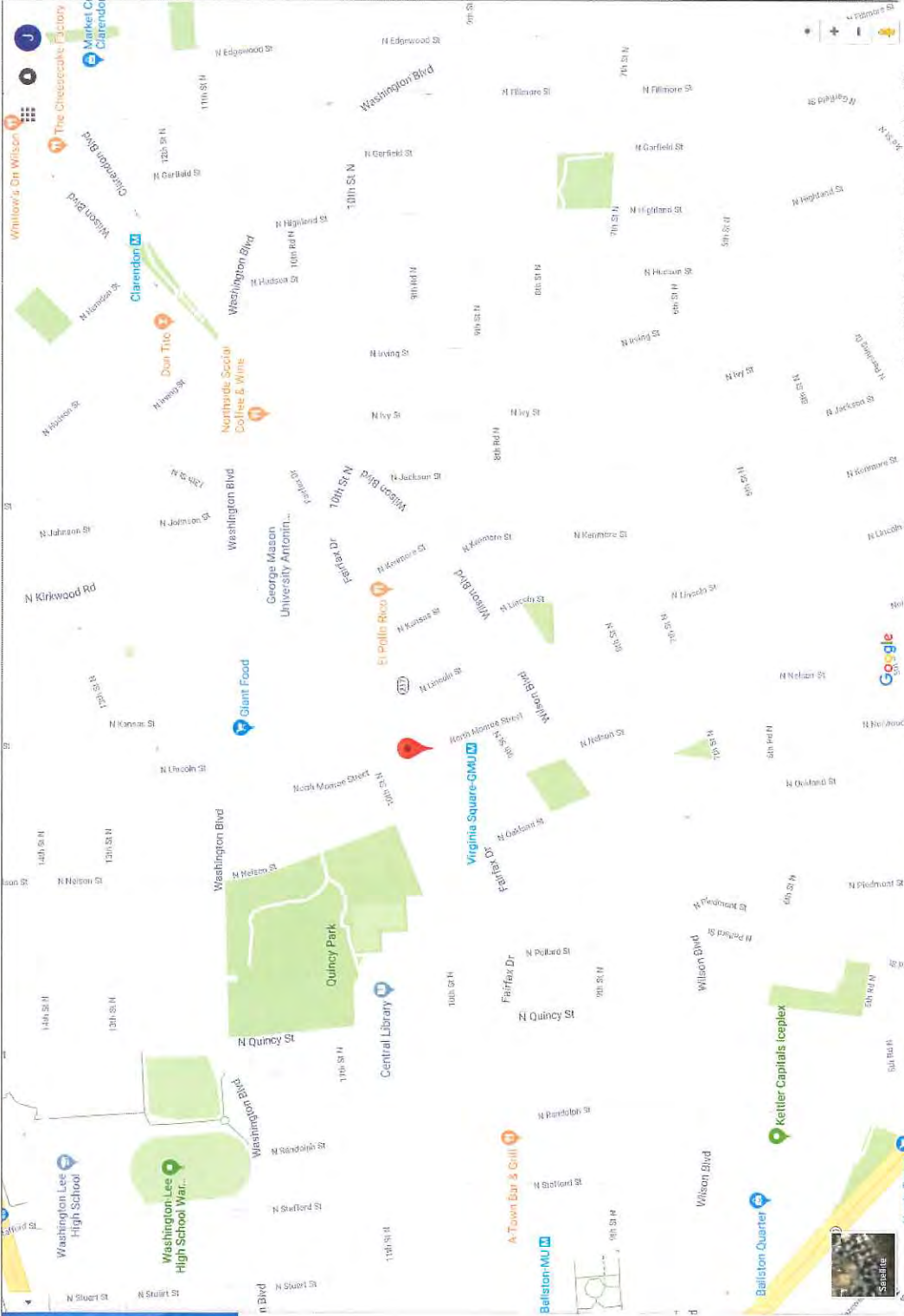
Longitude: 077 06 12

NGVD 29 height: 240.00 FT

Datum shift (NAVD 88 minus NGVD 29): -0.778 feet

Converted to NAVD 88 height: 239.222 feet

JBWS115/116



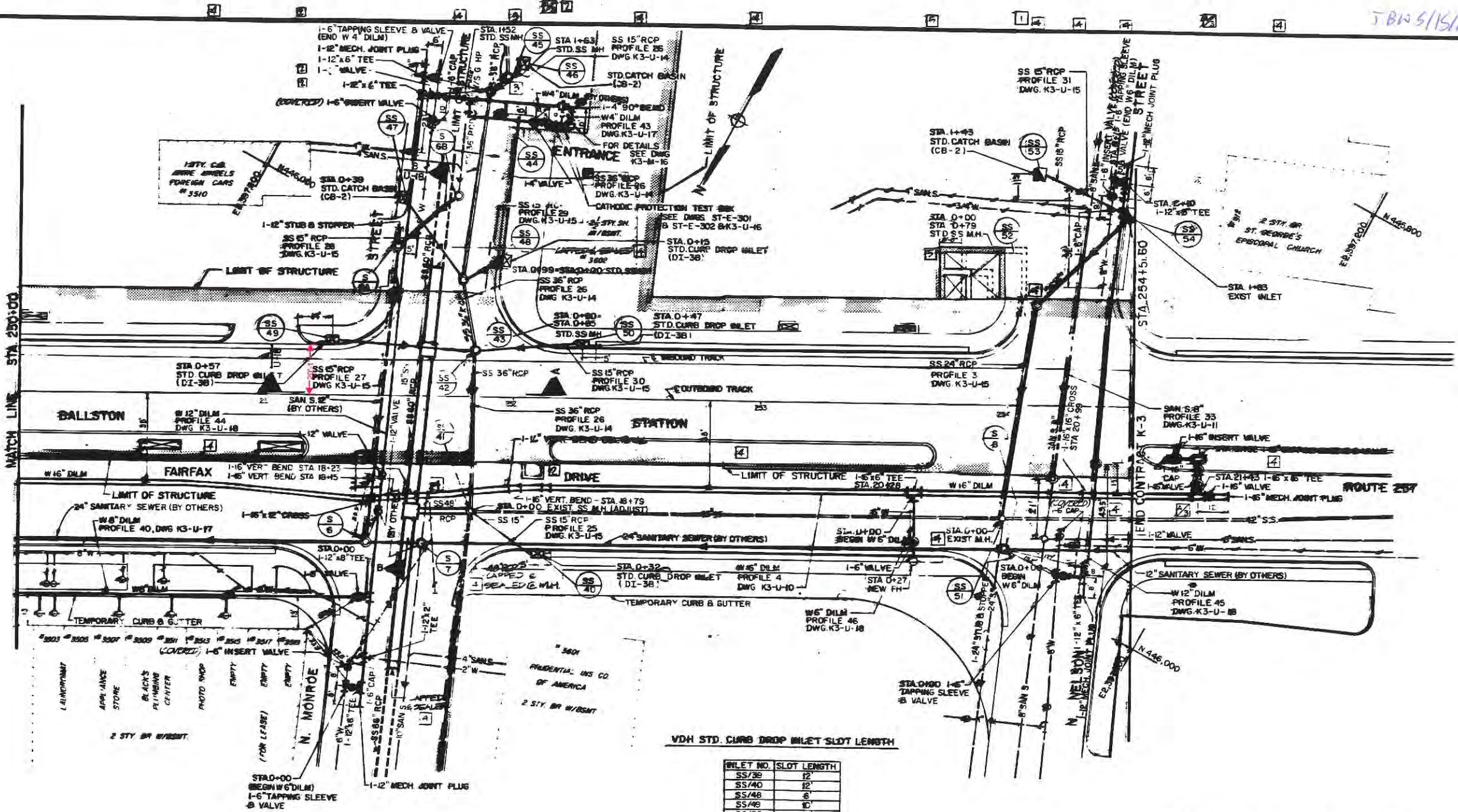
38.883340, -77.103322
 38°53'00.0\"/>

Directions
 SAVE NEARBY SEND TO YOUR PHONE SHARE
 Add a missing place
 Add a label

Map data ©2018 Google, United States, Send feedback, 200 ft, 3:13 PM, 5/11/2018

DESIGN	COMMENTS/REFERENCES	
<ul style="list-style-type: none"> ● CLEARANCE FOR 30' MAST ARM <ul style="list-style-type: none"> ○ PROPOSED ELEVATION FOR BASE OF MAST ARM (FT) 253.67 ○ EXISTING TOP OF TUNNEL ELEVATION (FT) 241.70 ○ DATUM SHIFT (NGVD 29 TO NAVD 88) ADJUSTED ELEVATION (FT) 240.93 ○ CLEARANCE BETWEEN MAST ARM AND TUNNEL (FT) 12.74 		
<ul style="list-style-type: none"> ○ PROPOSED ELEVATION FOR BASE OF MAST ARM (FT) 253.67 ○ EXISTING TOP OF TUNNEL ELEVATION (FT) 241.70 ○ DATUM SHIFT (NGVD 29 TO NAVD 88) ADJUSTED ELEVATION (FT) 240.93 ○ CLEARANCE BETWEEN MAST ARM AND TUNNEL (FT) 12.74 		OBTAINED FROM AS-BUILTS = 241.70 - 0.77 = 253.67 - 240.93
<ul style="list-style-type: none"> ● CLEARANCE FOR 45' MAST ARM <ul style="list-style-type: none"> ○ PROPOSED ELEVATION FOR BASE OF MAST ARM (FT) 252.45 ○ EXISTING TOP OF TUNNEL ELEVATION (FT) 241.70 ○ DATUM SHIFT (NGVD 29 TO NAVD 88) ADJUSTED ELEVATION (FT) 240.93 ○ CLEARANCE BETWEEN MAST ARM AND TUNNEL (FT) 11.52 		OBTAINED FROM AS-BUILTS = 241.70 - 0.77 = 252.45 - 240.93
<ul style="list-style-type: none"> ○ PROPOSED ELEVATION FOR BASE OF MAST ARM (FT) 252.45 ○ EXISTING TOP OF TUNNEL ELEVATION (FT) 241.70 ○ DATUM SHIFT (NGVD 29 TO NAVD 88) ADJUSTED ELEVATION (FT) 240.93 ○ CLEARANCE BETWEEN MAST ARM AND TUNNEL (FT) 11.52 		OBTAINED FROM AS-BUILTS = 241.70 - 0.77 = 252.45 - 240.93
<ul style="list-style-type: none"> ● CONCLUSION <ul style="list-style-type: none"> ○ MAX DEPTH OF CONSTRUCTION, INCLUDING SHORING (FT) 10 		CONSERVATIVE
<ul style="list-style-type: none"> ○ MAX DEPTH OF CONSTRUCTION, INCLUDING SHORING (FT) 10 		CONSERVATIVE

JBW 5/15/78



INLET NO.	SLOT LENGTH
SS/39	12"
SS/40	12"
SS/48	8"
SS/49	8"
SS/50	12"

- NOTE:
- FOR ABBREVIATIONS, SYMBOLS AND GENERAL NOTES, SEE DRAWING NUMBER ST-U-14.
 - FOR 24" SANITARY SEWER AND 12" SANITARY SEWER LATERALS PROFILES BY ARLINGTON COUNTY, VA (BY OTHERS) SEE DWGS K3-U-19 AND K3-U-20.
 - FOR CORROSION CONTROL OF 4" WATER PIPING DETAIL SEE DRAWING NO. K3-U-16.

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

AS-BUILT CONDITION

FEB 08 1978

DESIGNED	DATE	BY	DESCRIPTION
S. SAEDA	2/75		
S. SAEDA	4/75		
S. SAEDA	7/75		
S. SAEDA	1/76		
F. H. BUSH	2/76		

NUMBER	DESCRIPTION	DATE	BY
1-26-78	REV PER PCD-72, AS-BUILT		
1-16-77	REV PER FIELD COND AS-BUILT		
1-16-77	REV PER PCD-60, AS-BUILT		
1/14/78	REVISE VALVE & TEE SIZE		
	SHOW ELEV PER PCD NO 21		

NUMBER	DESCRIPTION	DATE	BY
1-4	ABBREVIATIONS, SYMBOLS & GENERAL NOTES	4/30/74	L.S.S.
U-10	UTILITIES-COMPOSITE PLAN		
U-10	UTILITIES-16" WATER MAIN PROFILES	1/13/74	L.S.S.
U-10	UTILITIES-8" WATER MAIN PROFILES		
U-17	UTILITIES-WATER MAIN PROFILES	9/10/74	L.S.S.
U-22	UTILITIES-COMPOSITE SECTIONS		



WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

SANDERS & THOMAS, INC.
CONSULTING ENGINEERS

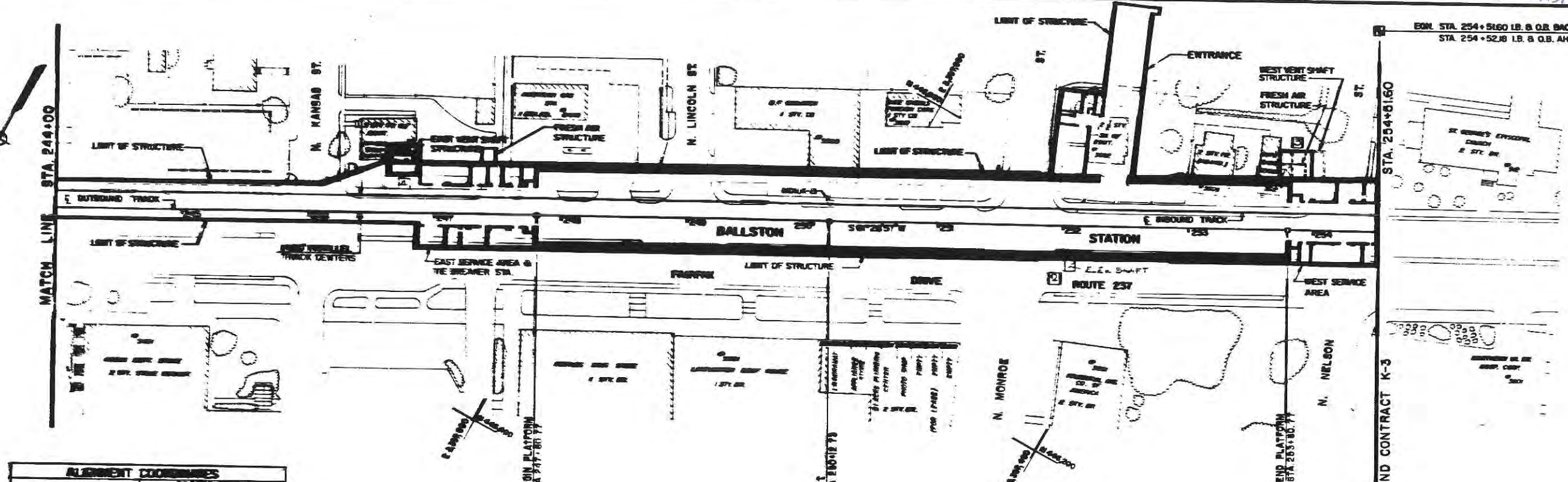
DE LEUW, CATHAR & COMPANY
GENERAL ENGINEERING CONSULTANT

VIENNA ROUTE

UTILITIES-WATER MAINS & SEWERS
STA 250+00 TO STA 254+580

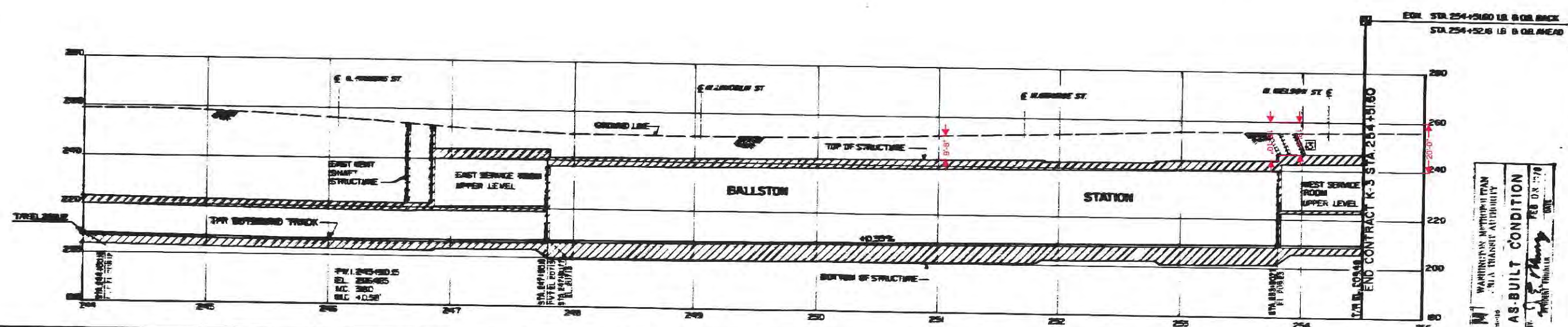
SCALE: 1" = 20'
DRAWING NO. K3-U-8
M135-39

TBW 5/13/14



ALIGNMENT COORDINATES			
STATION	POINT	COORDINATES NORTH	COORDINATES EAST
STA 250+12.75	P.O.T.	496,822.975	2,397,652.882
STA 254+51.80	END	445,804.467	2,397,296.485
STA 254+51.80	1st	445,804.463	2,397,293.828

NOTES:
 1. ALL COORDINATE VALUES SHOWN ARE VIRGINIA STATE PLANE COORDINATES
 2. ELEVATIONS ARE BASED ON THE M.S.C. B.G.S. MEAN SEA LEVEL DATUM 1929 GENERAL ADJUSTMENT.



REVISION	DATE	BY	DESCRIPTION
1	5/13/14	SA	ISSUED FOR PERMITS
2	5/13/14	SA	ISSUED FOR PERMITS
3	5/13/14	SA	ISSUED FOR PERMITS
4	5/13/14	SA	ISSUED FOR PERMITS
5	5/13/14	SA	ISSUED FOR PERMITS

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

SANDERS & THOMAS, INC.
CONSULTING ENGINEERS

DE LEUN, CATHER & COMPANY
GENERAL ENGINEERING CONSULTANT

HENRY BRESSE & ASSOCIATES
GENERAL ARCHITECTURAL CONSULTANT

SUBMITTED: *David S. King*

APPROVED: *J.H. Greenwood*

VIENNA ROUTE
PLAN AND PROFILE
STA 244+00 TO STA 254+51.80

SCALE: HORIZ. 1" = 40' VERT. 1" = 10'

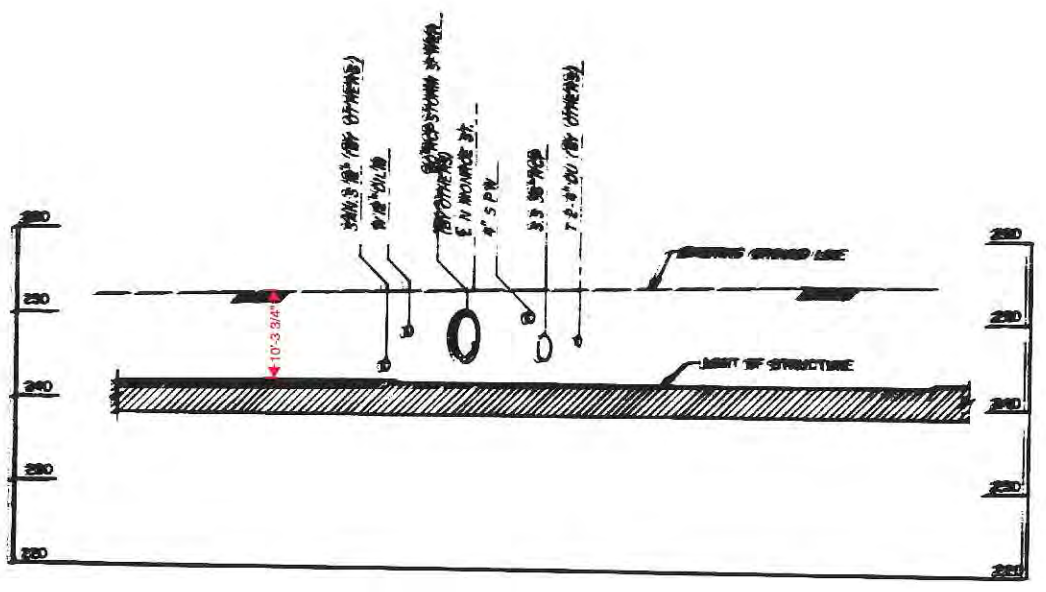
DATE: 5/13/14

PROJECT NO: K3-PP-2

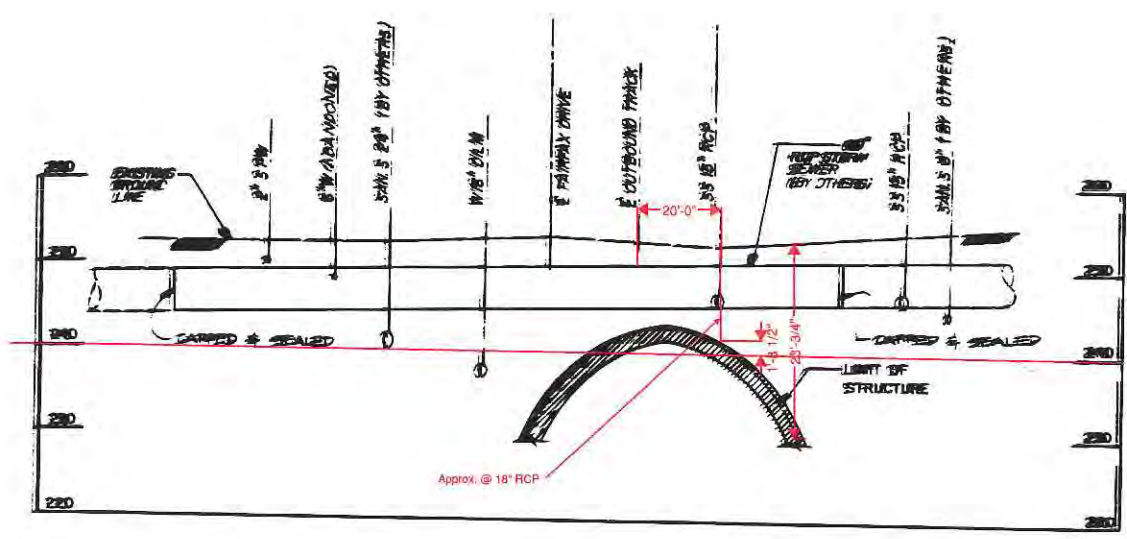
DWG NO: M35-30

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
 AS-BUILT CONDITION
 DATE: 5/13/14

JBNS115118



SECTION A-A
SEE DWG K3-U-4



SECTION B-B
SEE DWG K3-U-4

WASHINGTON METROPOLITAN
AREA TRANSIT AUTHORITY
AS-BUILT CONDITION
BY *D. P. Murray* FEB DE 1978

DESIGNED	J. S. BARRETT	1/14/78
DRAWN	D. GIBBONS	1/14/78
CHECKED	J. S. BARRETT	1/14/78
APPROVED	D. P. MURRAY	2/14/78

REFERENCE DRAWINGS		REVISIONS	
NUMBER	DESCRIPTION	DATE	BY
1	UTILITIES-COMPOSITE PLAN	1-17-78	SM
2	UTILITIES-ELECTRIC PLAN		
3	UTILITIES-ELECTRIC-230 KV CABLE DETAIL		



WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

SANDERS & THOMAS, INC.
CONSULTING ENGINEERS

DE LEUN CATHER, JIMMY
GENERAL ENGINEERING CONSULTANT

MURPHY MESSER & ASSOCIATES
GENERAL ARCHITECTURAL CONSULTANT

SUBMITTED *Donald J. Wis*

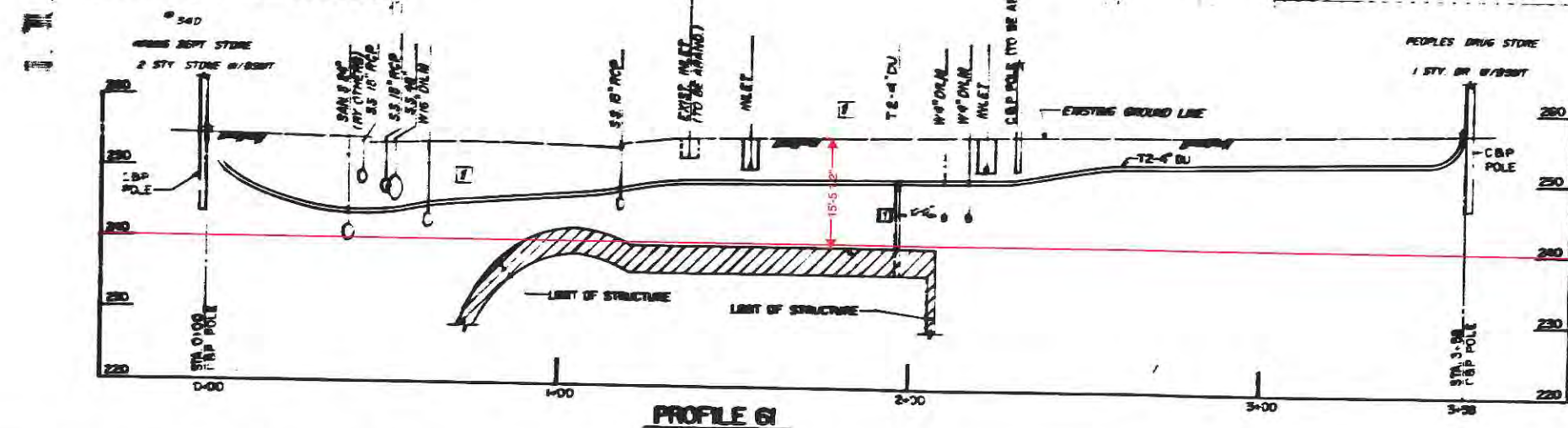
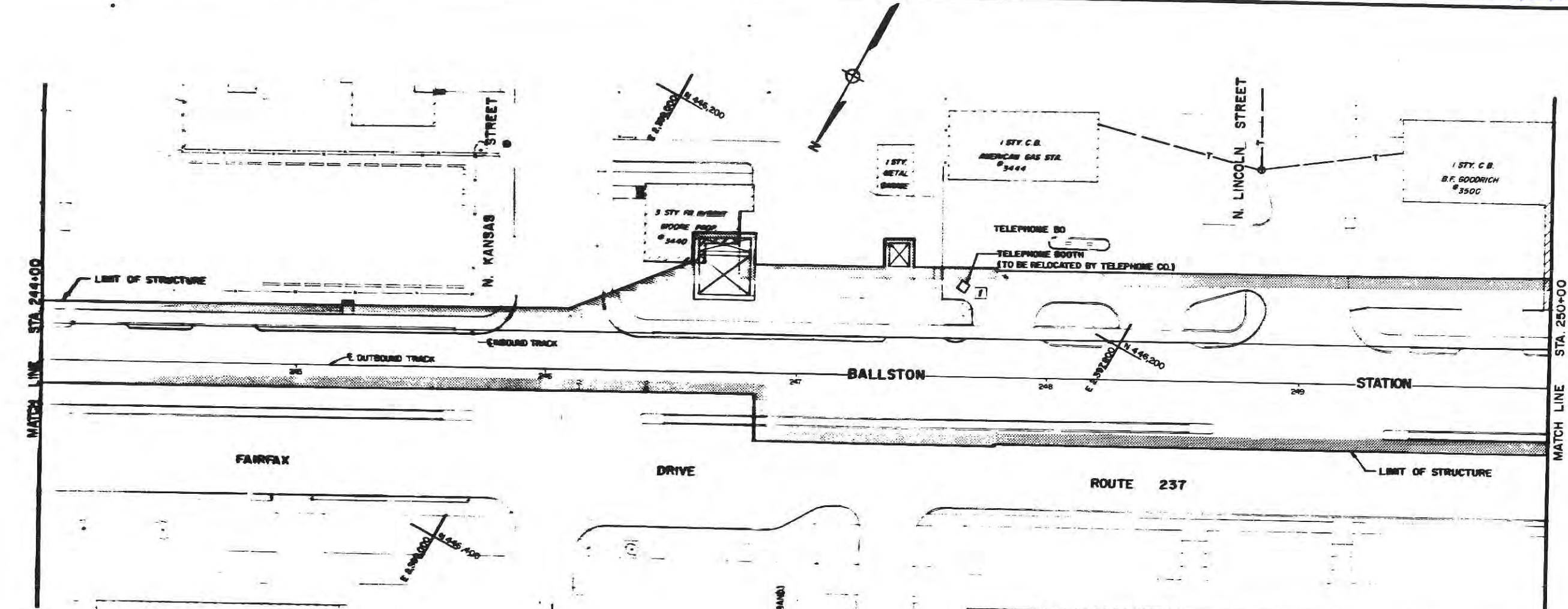
VIENNA ROUTE
UTILITIES
COMPOSITE SECTIONS

SCALE: HORIZ 1"=20'
VERT 1"=4'

DRAWING NO: **K3-U-22**

M135-53

JBNS/IS/16



NOTES
 1 FOR ABBREVIATIONS, SYMBOLS AND GENERAL NOTES, SEE DRAWING NUMBER ST-U-14

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
 AS-BUILT CONDITION
 FEB 08 1970

NO.	DESCRIPTION	DATE	BY	REVISION
1	ABBREVIATIONS, SYMBOLS AND GENERAL NOTES	4-30-74	J.S.C.	REVISE NOTE 1
2	UTILITIES - COMPOSITE PLAN	5-22-74	ADH	DELETED NOTE 2
3	UTILITIES - ELECTRIC PLAN	6-10-74	J.S.C.	REV FOR P.S. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100
4	UTILITIES - TELEPHONE PLAN			

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

SAMBERS & THOMAS, INC.
 CONSULTING ENGINEERS

DE LEIN, CATHY & COMPANY
 GENERAL ENGINEERING CONSULTANT

HARRY WEEZE & ASSOCIATES
 GENERAL ARCHITECTURAL CONSULTANT

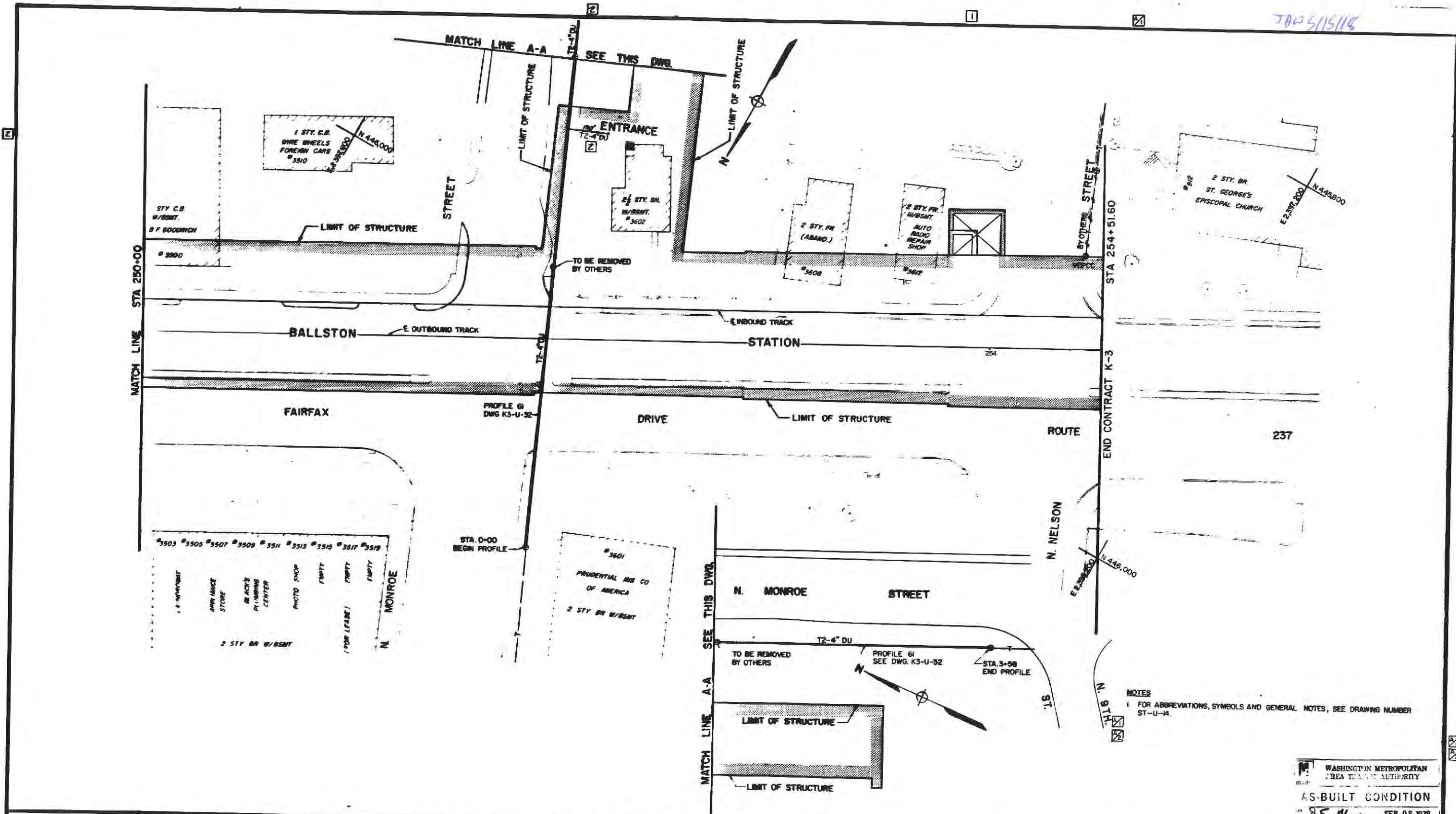
SUBMITTED *Handwritten Signature*

VIENNA ROUTE
UTILITIES-TELEPHONE PLAN
 STA. 244+00 TO STA. 250+00

SCALE
 HORIZ. 1" = 20'
 VERT. 1" = 10'

DRAWING NO. **K3-U-32**
 PROJECT NO. **M135-63**

7803/15/118



NOTES
 1 FOR ABBREVIATIONS, SYMBOLS AND GENERAL NOTES, SEE DRAWING NUMBER ST-U-14.

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
 AS-BUILT CONDITION
 FEB 08 1978
 RESIDENT ENGINEER

DESIGNED	J. S. BAKER	1-78
DRAWN	J. BOGARD	1-78
CHECKED	J. S. BAKER	1-78
APPROVED	L. F. HILBURN	1-78

NUMBER	DESCRIPTION	DATE	BY	REVISIONS
U-4	ABBREVIATIONS, SYMBOLS AND GENERAL NOTES	4/30/78	L.S.S.	REVISE 1.1.1
U-6	UTILITIES-COMPOSITE PLAN	5/22/74	ADR	
U-7	UTILITIES-ELECTRIC PLAN	5/10/74	L.S.S.	RELOCATED WEST VENT SHAFT PER P.O. 523
U-32	UTILITIES-TELEPHONE PLAN	1-78	PHU	ADDED PER FIELD COND. AS-BUILT

NUMBER	DESCRIPTION	DATE	BY	REVISIONS
U-4	ABBREVIATIONS, SYMBOLS AND GENERAL NOTES	4/30/78	L.S.S.	REVISE 1.1.1
U-6	UTILITIES-COMPOSITE PLAN	5/22/74	ADR	
U-7	UTILITIES-ELECTRIC PLAN	5/10/74	L.S.S.	RELOCATED WEST VENT SHAFT PER P.O. 523
U-32	UTILITIES-TELEPHONE PLAN	1-78	PHU	ADDED PER FIELD COND. AS-BUILT

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

SANDERS & THOMAS, INC.
 CONSULTING ENGINEERS

DE LEUW, CATHAR & COMPANY
 GENERAL ENGINEERING CONSULTANT

HARRY WEESE & ASSOCIATES
 GENERAL ARCHITECTURAL CONSULTANT

SUBMITTED: *Richard J. ...*

APPROVED: *John ...*

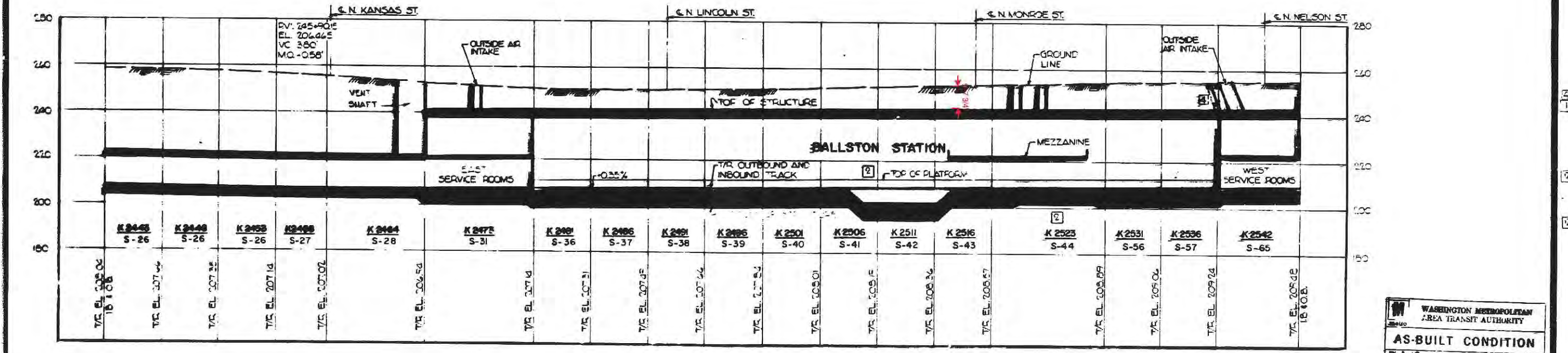
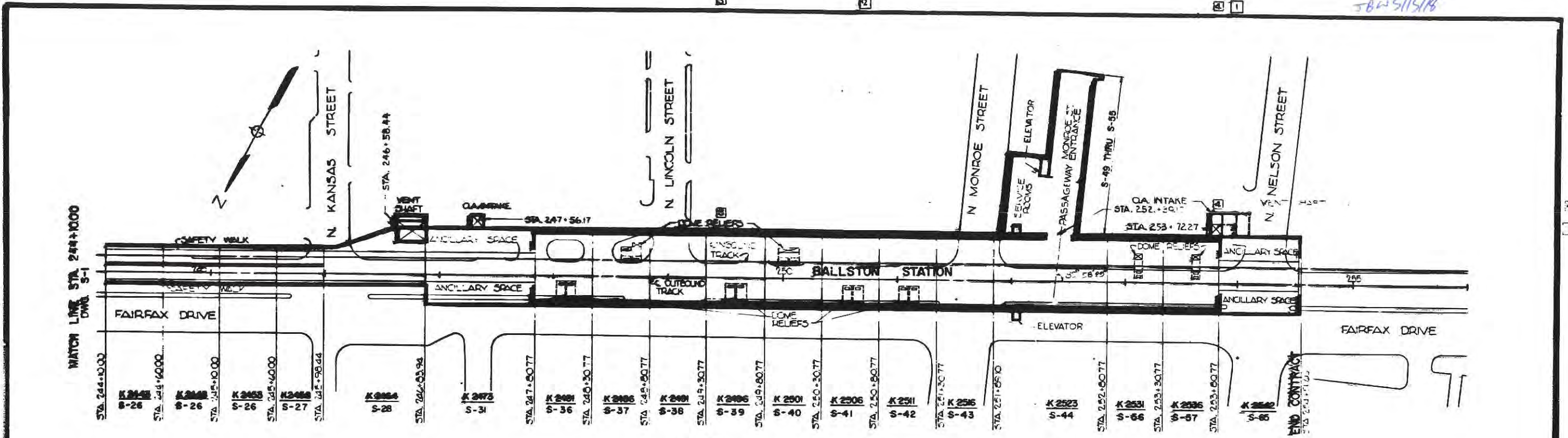
VIENNA ROUTE
 UTILITIES-TELEPHONE PLAN
 STA. 250+00 TO STA. 254+51.60

SCALE: 1" = 20'

DRAWING NO. K3-U-33

MI35-64

JRW 5/15/78



WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
AS-BUILT CONDITION
 BY: *D.E. Murray* FEB 08 1978
 REGISTERED ENGINEER

DESIGNED	J. CLARK	5/18/78
DRAWN	J. WILLIAMS	6/2/78
CHECKED	J. HERRICK	6/22/78
APPROVED	D. F. HILBUSH	6/24/78

NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION
L-1	ARCHITECTURAL KEY PLAN	9/10/74	L.W.	1 RELOCATED WEST VENT SHAFT PER POD NO. 3
M-2	DRAINAGE KEY PLAN	4/1/75	LB	2 REVISE
N-3	VENTILATION KEY PLAN			PER REV. NO. 41
E-2	ELECTRICAL KEY PLAN	1/27/77	BAB	3 REV. PER PD-49, AS BUILT
		2/7/77	BAB	3 REV. PER PD-72, AS BUILT

--	--

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

SANDERS & THOMAS, INC.
CONSULTING ENGINEERS

DE LEUW, CATHAR & COMPANY
GENERAL ENGINEERING CONSULTANT

HARRY WEEBE & ASSOCIATES
GENERAL ARCHITECTURAL CONSULTANT

SUBMITTED: *Donald J. Wee*

APPROVED: *J. H. Curwood*

VIENNA ROUTE

STRUCTURAL KEY PLAN
STA. 244+10.00 TO STA. 254+51.60

SCALE: HORIZ. 1" = 40', VERT. 1" = 20'

DRAWING NO. **K3-S-2**

M135-07

Signal Analysis

Signal Loading

- (1) Attachment loading data are shown in Table 3-1.

Table 62-1: Design Attachment Loading (Dead Loads)

Attachment	Surface Area (SF)	Dead Load (lbs)
Aluminum three-section head	6	63
Aluminum four-section head	8	84
8-foot x 2-foot street name sign	16	48
10-foot x 2-foot street name sign	20	60
30-inch x 36-inch regulatory sign	7.5	22.5
CCTV camera	1	22
Video detection camera	1	22
Opticom device	1	22
Luminaire	2	40
SF = square feet; lbs = pounds; CCTV = closed-circuit television		

- (2) 0- to 40-foot mast arm lengths
- (i) Three aluminum three-section heads spaced every 10 feet
 - (ii) One aluminum four-section head at the end of the arm (1 foot in from the end)
 - (iii) One 8-foot by 2-foot street name sign mounted between the inside two signals
 - (iv) Two 30-inch by 36-inch regulatory signs (next to the last two signal heads)
 - (v) One closed-circuit television (CCTV) camera halfway on the arm
 - (vi) One video detection camera over the outside lane
 - (vii) One Opticom device located 2 feet in from the end of the arm
- (3) 42- to 50-foot mast arm lengths
- (i) Four aluminum three-section heads spaced every 10 feet
 - (ii) One aluminum four-section head at the end of the arm (1 foot in from the end)
 - (iii) One 8-foot by 2-foot street name sign mounted between the inside two signals
 - (iv) Three 30-inch by 36-inch regulatory signs (next to the last two signal heads)

- (v) One CCTV camera halfway on the arm
 - (vi) One video detection camera over the outside lane
 - (vii) One Opticom device located 2 feet in from the end of the arm
- (4) 52- to 60-foot mast arm lengths:
- (i) Four aluminum three-section heads spaced every 10 feet
 - (ii) Two aluminum four-section head at the end of the arm (1 foot in from the end)
 - (iii) One 8-foot by 2-foot street name sign mounted between the inside two signals
 - (iv) Four 30-inch by 36-inch regulatory signs (next to the last two signal heads)
 - (v) One CCTV camera halfway on the arm
 - (vi) Two video detection cameras (over the outside lane, and over the middle of the remaining length)
 - (vii) One Opticom device located 2 feet in from the end of the arm
- (5) 62- to 66-foot mast arm lengths
- (i) Five aluminum three-section heads spaced every 10 feet
 - (ii) Two aluminum four-section head at the end of the arm (1 foot in from the end)
 - (iii) One 10-foot by 2-foot street name sign mounted between the inside two signals
 - (iv) Five 30-inch by 36-inch regulatory signs (next to the last two signal heads)
 - (v) One CCTV camera halfway on the arm
 - (vi) Two video detection cameras (over the outside lane and over the middle of the remaining length)
 - (vii) One Opticom device located 2 feet in from the end of the arm
- (6) All poles shall also be designed for one 12-foot luminaire arm and one luminaire at the end of the luminaire arm. This allows longer luminaire arms to be installed in the future.
- (c) Wind loading
- The entire assembly shall be designed to meet the wind loading requirements of VDOT IIM-S&B-90.2.
- (d) Fatigue loading

FDOT Mast Arm Analysis Program

Custom File Name (optional)

DataFile := "45' Non-Ornamental W/Out Fatigue"

[No Data File used. Overridden for typical mathcad input]

Program modified to analyze Arlington County standard mast arms.



Reference



Changes

This program works in conjunction with Mastarm Design Standards 17743 and 17745.

References:

AASHTO Standard Specifications for Signs, Luminaires and Traffic Signals, 6th Edition (LTS).

FDOT Structures Manual Vol. 3 (SM V3).

Arlington County Traffic Signal Standards. VDOT 11M-S&B-90.2

WMATA Adjacent Construction Project Manual Revision 5a (ACPM).

For more information see Reference.xmcd and Changes.xmcd.

Read In Data

General Information DataFile = "45' Non-Ornamental W/Out Fatigue"

Current Values

Subject = "45' Non-Ornamental W/Out Fatigue"

ProjectNo = "110010106"

PoleLocation = "SE Corner of Fairfax and Monroe"

Date = "5/10/2018"

DesignedBy = "DJC"

CheckedBy = "JBW"

Wind Speed DataFile = "45' Non-Ornamental W/Out Fatigue"

Current Value

WindSpeed = 80 mph

VDOT 11M-S&B-90.2

5/10/18

Arm 1 Analysis

DataFile = "45' Non-Ornamental W/Out Fatigue"

WindSpeed = 80-mph

Arm 1 Loads

SignalNumber	DistanceToSignal(ft)	NumberOfSignalHeads	BackPlate		
1	44	4	"yes"	Use max load allowable from specs.	
2	34	3	"yes"		
3	24	3	"yes"		
4	14	3	"yes"		
5	22	1	"yes"		- 1 CCTV Camera
6	44	1	"yes"		- 1 Video Detection Camera
7	43	1	"yes"		- 1 Opticom Device
8	0	0	"yes"		
9	0	0	"yes"		
10	0	0	"yes"		

PanelNumber	DistanceToPanelCentroid(ft)	PanelArea(sf)	
1	39	22.5	[3 - 30"x36" Regulatory Signs input as one]
2	19	16	
3	0	0	
4	0	0	
5	0	0	

Arm 1 Loads

Arm 1 Properties

Current Values

$L_{total.arm1} = 45 \text{ ft}$

feet, 40 ft. max. for 1 piece arms

$Diameter_{base.arm1} = 11.75 \text{ in}$

inches, measured flat to flat (FG)

$Dist_{splice.from.base.arm1} = 17 \text{ ft}$

feet, splice distance, for 2 piece arms, length of piece closest to pole, use X to zero out (FE)

set $Dist_{splice.from.base.arm1} = 0 \text{ ft}$ for NO SPLICE

$t_{wall.arm1} = \begin{pmatrix} 0.1793 \\ 0.25 \end{pmatrix} \text{ in}$

inches, this value is used for one piece arms (FD)

inches, for 2 piece arms, wall thickness of piece closest to the pole, use X to zero out (FH)

TBW 5/10/18

$G := 1.3$ gust factor

$I_r := 1.0$ importance factor

LTS 3.8

SM V3 3.8

$$\text{Pressure} := (0.00256 \cdot \text{psf}) \cdot \left(G \cdot \frac{\text{WindSpeed}}{\text{mph}} \right)^2 \cdot I_r$$

[Changed wind pressure calc to LTS Appendix C calculation]

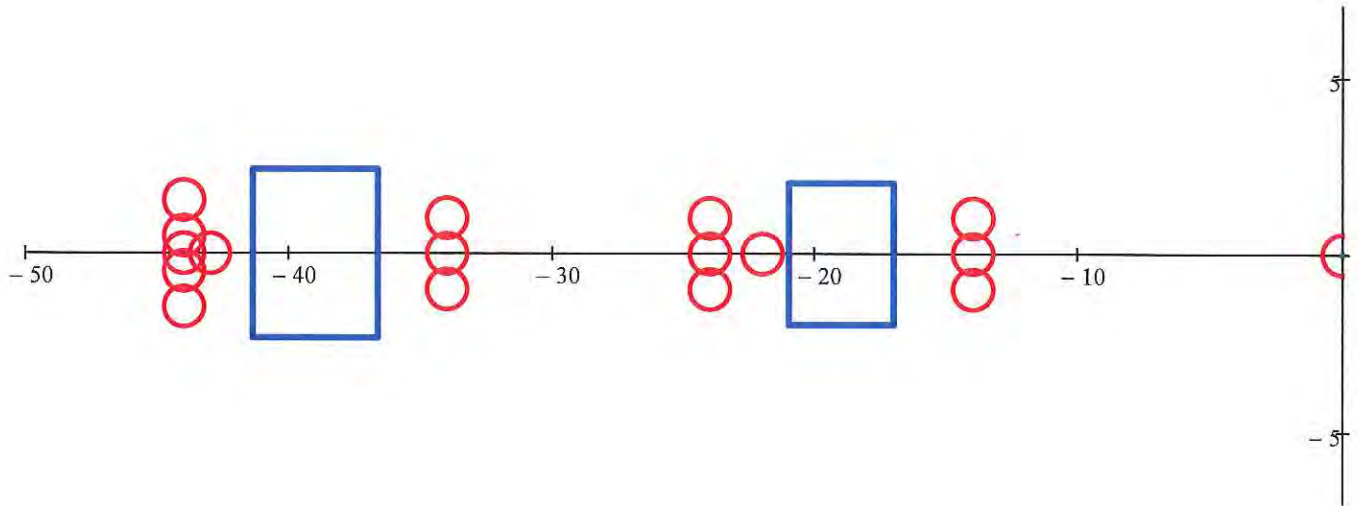
Pressure = 27.7 psf

$\text{Pressure} := 50 \text{ psf}$

[Changed wind pressure per ACPM Section 3.19]

Pressure = 50.00 psf

Summary - Arm 1 Geometry and Loading



Location of Signs and Signals

WindSpeed = 80 mph $L_{\text{total.arm1}} = 45.00 \text{ ft}$

$$\text{Diameter}_{\text{tip.arm1}} = \begin{pmatrix} 5.83 \\ 9.39 \end{pmatrix} \cdot \text{in} \quad \text{Diameter}_{\text{base.arm1}} = \begin{pmatrix} 10.00 \\ 11.75 \end{pmatrix} \cdot \text{in} \quad L_{\text{arm1}} = \begin{pmatrix} 29.75 \\ 17.00 \end{pmatrix} \text{ ft} \quad t_{\text{wall.arm1}} = \begin{pmatrix} 0.1793 \\ 0.25 \end{pmatrix} \cdot \text{in}$$

$X_{\text{signal.arm1}_{i1}} =$

44	ft
34	
24	
14	
22	
44	
43	

$\text{Sections}_{\text{signal.arm1}_{i1}} =$

4
3
3
3
1
1
1

$X_{\text{panel.arm1}_{j1}} =$

39	ft
19	

$\text{Area}_{\text{panel.arm1}_{j1}} =$

22.5	ft ²
16	

Arm 1 Combined Stress Ratio and Deflection

$\max(\text{CSR}_{\text{arm1}}) = 1.508$

$\max(\Delta_{\text{arm1}}) = 10.042 \cdot \text{in}$

$$3 \cdot \text{deg} \cdot \sum (L_{\text{arm1}} - L_{\text{splice.provided}}) = 27.17 \cdot \text{in}$$

**Luminaire Arm Analysis**

DataFile = "45' Non-Ornamental W/Out Fatigue"

WindSpeed = 80-mph

Luminaire Properties*See Design Standards 17743 and 17745 for input values.***Current Values***set $Y_{luminaire} = 0ft$ for NO LUMINAIRE*

$$Y_{luminaire} = 31.75 \text{ ft}$$

feet, use X to zero out (Standard LA = 40 feet) [height @ luminaire fixture]

$$X_{luminaire} = 6 \text{ ft}$$

feet, use X to zero out (Standard LB = 10 feet)

$$\text{Diameter}_{base.lumarm} = 2.375 \text{ in}$$

inches, use X to zero out (Standard LC = 3 inches)

$$t_{wall.lumarm} = 0.143 \text{ in}$$

inches, use X to zero out (Standard LD = 0.125 inches)

$$\text{Slope}_{lumarm} = 0.375$$

rise/run, use X to zero out (Standard LE = 0.5)

$$r_{lumarm} = 1 \text{ ft}$$

feet, use X to zero out (Standard LF = 8 feet)

$$d_{bolt.lum} = 0.5 \text{ in}$$

inches, use X to zero out (Standard LG = 0.5 inches)

$$t_{baseplate.lum} = 0.75 \text{ in}$$

inches, use X to zero out (Standard LH = 0.75 inches)

Luminaire Properties

Analyze Luminaire**Summary - Luminaire Arm Geometry**

$$Y_{luminaire} = 31.75 \text{ ft}$$

$$X_{luminaire} = 6 \text{ ft}$$

$$\text{Diameter}_{base.lumarm} = 2.375 \text{ in}$$

$$t_{wall.lumarm} = 0.143 \text{ in}$$

$$\text{Slope}_{lumarm} = 0.375$$

$$r_{lumarm} = 1 \text{ ft}$$

$$d_{bolt.lum} = 0.5 \text{ in}$$

$$t_{baseplate.lum} = 0.75 \text{ in}$$

Luminaire Arm Ratios

$$\text{CSR}_{base.lumarm} = 0.436$$

$$\text{PR}_{bolt.lum} = 0.228$$

JBW 5/10/18

Upright Analysis DataFile = "45' Non-Ornamental W/Out Fatigue" WindSpeed = 80 mph

Pole Properties

Current Values

$Y_{pole} = 30 \text{ ft}$	<i>feet (UA)</i>	<i>Common wall thicknesses: 0.1793 in. 0.2391 in. 0.25 in. 0.313 in. 0.375 in. 0.5 in.</i>
$Y_{arm.conn} = 20 \text{ ft}$	<i>feet (UB)</i>	
$Diameter_{base.pole} = 15 \cdot \text{in}$	<i>inches, measured flat to flat (UD)</i>	
$t_{wall.pole} = 0.25 \cdot \text{in}$	<i>inches (UE)</i>	
$Gap = \begin{pmatrix} 3.5 \\ 3.5 \end{pmatrix} \cdot \text{in}$	<i>inches, clear distance between connection plate and upright inches, use X to zero out</i>	

Pole Properties

Summary - Upright Geometry

Analyze Pole

$Y_{pole} = 30 \text{ ft}$	$Y_{arm.conn} = 20 \text{ ft}$	$\alpha = 0 \cdot \text{deg}$	$Gap = \begin{pmatrix} 3.5 \\ 3.5 \end{pmatrix} \cdot \text{in}$
$Diameter_{base.pole} = 15 \cdot \text{in}$	$t_{wall.pole} = 0.25 \cdot \text{in}$		

Upright Combined Stress Ratio and Deflections

$\max(CSR_{pole}) = 2.415$	$\max(\Delta_{x,d1}) = 1.46 \cdot \text{in}$	$\max(\Delta_{z,d1}) = 0 \cdot \text{in}$
----------------------------	--	---

Mast Arm Connection(s) Analysis DataFile = "45' Non-Ornamental W/Out Fatigue"

WindSpeed = 80 mph

Connection Properties

Current Values

$h_{conn.plate} = 22 \cdot \text{in}$	<i>inches, for two arm Mast Arms both connection plate heights must be equal (HT)</i>
$t_{vertical.plate} = \begin{pmatrix} 1.5 \\ 1.5 \end{pmatrix} \cdot \text{in}$	<i>inches (FL) inches, use X to zero out (SL)</i>
$d_{bolt.conn} = \begin{pmatrix} 1.5 \\ 1.5 \end{pmatrix} \cdot \text{in}$	<i>inches (FP) inches, use X to zero out (SP)</i>
$t_{baseplate.arm} = \begin{pmatrix} 2 \\ 2 \end{pmatrix} \cdot \text{in}$	<i>inches (FK) inches, use X to zero out (SK)</i>

Connection Properties



Applied Loads (from Upright Design)

$$M_{x,polebase} = \begin{pmatrix} 0.0 \\ 118.2 \\ 118.2 \end{pmatrix} \cdot \text{kip} \cdot \text{ft} \quad M_{y,polebase} = \begin{pmatrix} 156.4 \\ 0.0 \\ 156.4 \end{pmatrix} \cdot \text{kip} \cdot \text{ft} \quad M_{z,polebase} = \begin{pmatrix} 0.0 \\ 35.2 \\ 35.2 \end{pmatrix} \cdot \text{kip} \cdot \text{ft}$$

maximum torsion (Mx & Mz not used)
maximum overturning (My not used)
maximum CSR

$$V_{x,polebase} = \begin{pmatrix} 0.0 \\ 0.3 \\ 0.3 \end{pmatrix} \cdot \text{kip} \quad \text{AxialForce}_{polebase} = \begin{pmatrix} 2.5 \\ 2.5 \\ 2.5 \end{pmatrix} \cdot \text{kip} \quad V_{z,polebase} = \begin{pmatrix} 0.0 \\ 5.8 \\ 5.8 \end{pmatrix} \cdot \text{kip}$$

Diameter_{base.pole} = 15.00·in
 t_{pole} = 0.2500·in
 C_{a.pole} = 0.99



Foundation Analysis

GENERAL NOTES:

1. MINIMUM 15'-0" CLEARANCE SHALL BE MAINTAINED BETWEEN FINISHED ROADWAY LEVEL AND LOWEST POINT OF SIGNAL HEAD ASSEMBLY WHEN ARM IS FULLY LOADED.
2. CONCRETE STRENGTH (f'c) AT 28 DAYS = 3000 PSI MIN.
3. CONCRETE IS AIR ENTRAINED.
4. ALL EXPOSED CONCRETE SURFACES SHALL BE FINISHED SMOOTH.
5. ALL REINFORCEMENT IS DEFORMED BAR PER ASTM A615 GRADE 60.
6. NO GROUT, MORTAR OR CONCRETE SHALL BE PLACED BETWEEN THE BASE PLATE AND THE TOP OF THE FOUNDATION.
7. MAXIMUM HEIGHT BETWEEN THE BASE PLATE AND THE TOP OF THE FOUNDATION IS ONE ANCHOR BOLT DIAMETER PLUS 1.0 INCH.
8. MAXIMUM VERTICAL MISALIGNMENT OF ANCHOR BOLTS SHALL BE 1H:40V.
9. FOUNDATION TO BE CAST AGAINST UNDISTURBED SOIL.
10. ASSUMED SOIL PROPERTIES USED IN THE DESIGN:
11. 100 PCF DENSITY/27 DEG. FRICTION ANGLE/400 PSF COHESION
12. WATER TABLE BELOW BOTTOM OF FOUNDATION
13. IF ACTUAL SUBSURFACE CONDITIONS ENCOUNTERED ARE WORSE THAN THOSE DEFINED ABOVE THEN THE FOUNDATION DESIGN MUST BE REVIEWED BY THE ENGINEER PRIOR TO CONCRETE PLACEMENT.
14. TABULATED BOLT PROJECTION "P" IS BASED UPON THE MAXIMUM ALLOWED GAP BENEATH BASE PLATE. IF A SPECIFIC PROJECT REQUIRES A DIFFERING CONFIGURATION (SUCH AS NO LEVELING NUTS OR BEARING DIRECTLY ONTO THE TOP OF THE FOUNDATION) THEN THE PROJECTION WILL HAVE TO BE ADJUSTED.
15. POLE AND FOUNDATION CENTERLINES ARE INTENDED TO COINCIDE. WHEN OFFSET IS REQUIRED BY SPECIAL CIRCUMSTANCES THEN REFER TO POLE OFFSET REQUIREMENTS BELOW.

POLE OFFSET REQUIREMENTS:

1. IT IS ALWAYS PREFERRED FOR THE POLE AND FOUNDATION CENTERLINES TO COINCIDE. WHEN THIS IS NOT POSSIBLE THEN THE FOLLOWING REQUIREMENTS ARE APPLICABLE.
2. HOOP REINFORCING MUST STAY CENTERED ON THE FOUNDATION.
3. VERTICAL REINFORCING MUST STILL BE LOCATED AROUND THE INSIDE PERIMETER OF THE HOOPS.
4. NO PORTION OF THE EMBEDDED ANCHOR BOLTS MAY BE PLACED CLOSER THAN 1.0 INCH FROM THE HOOP REINFORCING.
5. IF SHIFTED ANCHOR BOLT(S) ARE WITHIN 1.5" OF A VERTICAL STEEL BAR THEN THE VERTICAL BAR IS TO BE ADJUSTED JUST ENOUGH TO AVOID THIS INTERFERENCE.
6. THE ABILITY OF ANY PARTICULAR FOUNDATION AND POLE COMBINATION TO ACCOMMODATE AN ANCHOR BOLT SHIFT VARIES (SOME COMBINATIONS CAN ONLY ACHIEVE 1.75"). EVEN WHEN PHYSICALLY POSSIBLE, NO CENTERLINE OFFSETS ARE TO EXCEED 9.0".
7. NO PORTION OF A POLE BASE PLATE IS TO EXTEND PAST THE EDGE OF THE CONCRETE FOUNDATION.
8. IF A DECORATIVE BASE IS TO BE INSTALLED, IT MUST ALSO BE CHECKED TO VERIFY THAT THE OFFSET APPEARANCE IS ACCEPTABLE. THE DECORATIVE BASE MAY THEREFORE FURTHER REDUCE THE AMOUNT OF OFFSET THAT CAN BE USED.

MAST ARM POLE STANDARD FOUNDATION NOTES

REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
66-05
FORMERLY TS7-1.10

Drilled Shaft Foundation for Sign & Signal Structures

© Florida Department of Transportation

SUBJECT : Signal Foundation Over WMATA Tunnel

Project # 110010106

DESIGNED BY: CAD

DATE: 3/21/2019

CHECKED BY: _____

DATE: _____

JBW 3/27/19

Input

SoilType :=
Sand
Clay

WaterElevation :=
Below Bottom of Shaft
Above Top of Shaft

$\gamma_{\text{soil.dry}} := 100 \times \text{pcf}$

dry soil density

$\gamma_{\text{water}} := 62.4 \times \text{pcf}$

water density

$\gamma_{\text{soil}} := \gamma_{\text{soil.dry}} - \text{if}(\text{WaterElevation} = \text{"Above Top of Shaft"}, \gamma_{\text{water}}, 0 \times \text{pcf}) = 100 \times \text{pcf}$

$b := 5 \times \text{ft}$

shaft diameter

Offset := 0 ft

groundline to top of foundation

$\phi_{\text{soil}} := 27 \times \text{deg}$

soil friction angle (sand)

$c_{\text{soil}} := 0.4 \times \frac{\text{kip}}{\text{ft}^2}$

soil shear strength (clay)

Applied Loads

$M_x := 118.2 \times \text{kip} \times \text{ft}$

$V_x := 0.3 \times \text{kip}$

Torsion := 156.4 kip ft

$M_z := 35.2 \times \text{kip} \times \text{ft}$

$V_z := 5.8 \times \text{kip}$

Axial := 2.5 kip

Shaft Depth Required to Resist Overturning

$SF_{\text{ot}} := 2.25$

Safety Factor against Overturning

VDOT IIM 90.2

$M_{\text{total}} := (SF_{\text{ot}}) \times \sqrt{M_x^2 + M_z^2} = 277.5 \times \text{kip} \times \text{ft}$

$P_{\text{total}} := (SF_{\text{ot}}) \times \sqrt{V_x^2 + V_z^2} = 13.1 \times \text{kip}$

short free-head pile in cohesionless soil using Broms method

$K_p := \tan\left(45 \times \text{deg} + \frac{\phi_{\text{soil}}}{2}\right)^2 = 2.7$ $e_{\text{sand}} := \text{Offset} = 0$

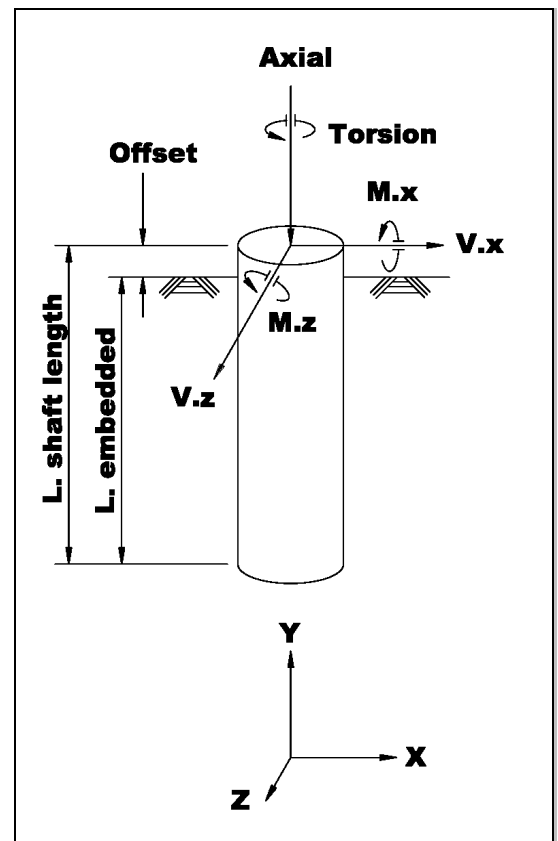
Guess value

$L_{\text{otSand}} := 8 \times \text{ft}$

Given $\frac{\gamma_{\text{soil}} \times b \times L_{\text{otSand}}^3 \times K_p}{2} - P_{\text{total}} \times (e_{\text{sand}} + L_{\text{otSand}}) - M_{\text{total}} = 0 \times \text{kip} \times \text{ft}$

$L_{\text{otSand}} := \text{Find}(L_{\text{otSand}}) = 8.3 \text{ ft}$

$L_{\text{otSand}} := \text{ceil}\left(\frac{L_{\text{otSand}}}{\text{ft}}\right) \times \text{ft} = 9 \text{ ft}$ (*round up to next foot*)



short free-head pile in cohesive soil using Modified Broms method for $L < 3b$ (see reference file for derivation)

$$c_{soil} := \text{if}(c_{soil} = 0 \text{ ksf}, 0.1 \text{ ksf}, c_{soil}) = 0.4 \text{ ksf} \quad \text{Slope} := 8 \times \frac{c_{soil}}{3b} = 0.2 \times \frac{\text{kip}}{\text{ft}^3} \quad e_{clay} := \frac{M_{total}}{P_{total}} + \text{Offset} = 21.2 \text{ ft}$$

$$nforce(M, N) := [\text{Slope} \times (2M + N) + 2c_{soil}] \times N \times \frac{b}{2} \quad mforce(M) := (2c_{soil} + M \times \text{Slope}) \times M \times \frac{b}{2}$$

$$m_arm(M) := e_{clay} + \frac{M}{3} \times \frac{2(M \times \text{Slope} + c_{soil}) + c_{soil}}{M \times \text{Slope} + 2c_{soil}}$$

$$n_arm(M, N) := e_{clay} + M + \frac{N}{3} \times \frac{2(N \times \text{Slope} + M \times \text{Slope} + c_{soil}) + (M \times \text{Slope} + c_{soil})}{\text{Slope} \times (2M + N) + 2c_{soil}}$$

Guess value $M := 4.0 \text{ ft}$ $N := 4.0 \text{ ft}$

Given $P_{total} + nforce(M, N) = mforce(M)$ $mforce(M) \times n_arm(M) = nforce(M, N) \times n_arm(M, N)$

$$\begin{pmatrix} M \\ N \end{pmatrix} := \text{Find}(M, N) \quad L_{ot1Clay} := M + N = 14.1 \text{ ft}$$

$$L_{ot1Clay} := \text{ceil}\left(\frac{L_{ot1Clay}}{\text{ft}}\right) \times \text{ft} = 15 \text{ ft} \quad (\text{round up to next foot})$$

short free-head pile in cohesive soil using Regular Broms method for $L > 3b$

$$f_{clay} := \frac{P_{total}}{9c_{soil}b} = 0.7 \text{ ft} \quad M_{maxtemp} := P_{total}(e_{clay} + 1.5b + 0.5f_{clay}) = 380.2 \text{ kip} \cdot \text{ft} \quad g := \sqrt{\frac{M_{maxtemp}}{2.25c_{soil}b}} = 9.2 \text{ ft}$$

$$L_{ot2Clay} := (1.5b + f_{clay} + g) = 17.4 \text{ ft}$$

$$L_{ot2Clay} := \text{ceil}\left(\frac{L_{ot2Clay}}{\text{ft}}\right) \times \text{ft} = 18 \text{ ft} \quad (\text{round up to next foot})$$

$$L_{otClay} := \text{if}(L_{ot1Clay} < 3b, L_{ot1Clay}, L_{ot2Clay}) = 18 \text{ ft} \quad (\text{If } L_{ot} < 3b, \text{ use Modified Broms method})$$

$$L_{reqdOT} := \text{if}(\text{SoilType} = \text{"Sand"}, L_{otSand}, L_{otClay}) = 9 \text{ ft}$$

Shaft Depth Required to Resist Torsion

NOTE: ω_{fdot} and μ are based upon concrete soil interaction. This torsion methodology is not to be used with permanent casing.

$SF_{tor} := 1.3$ *Safety Factor against Torsion*
 1.0 for Mast Arm signal structures
 1.3 for Overhead Cantilever sign structures

VDOT IIM 90.2

$N_{blows} := 15$ *Number of blows per foot. If $N < 5$, contact the district geotech Engineer*

$\omega_{fdot} := \text{if}(N_{blows} < 5, 0, \text{if}(N_{blows} \geq 15, 1.5, 1.5 \times \frac{N_{blows}}{15})) = 1.5$ *load transfer ratio, If $5 < N < 15$, ω_{fdot} is reduced by a factor of $\frac{N_{blows}}{15}$* SM Vol-9 13.6

$\mu := \tan(\phi_{soil}) = 0.5$ *coefficient of friction between concrete shaft and soil*

$\gamma_{concrete} := \text{if}(\text{WaterElevation} = \text{"Above Top of Shaft"}, 150 \times \text{pcf} - \gamma_{water}, 150 \times \text{pcf}) = 150 \times \text{pcf}$

CohesionFactor := 0.55

$f_{se} := \text{CohesionFactor} \times c_{soil} = 0.2 \times \text{ksf}$

short free-head pile in cohesionless soil

Guess value $L_{torSand} := L_{reqdOT} = 9 \text{ ft}$

Given

$$\text{Torsion} = \frac{\left[\pi \times b \times (L_{torSand}) \times \gamma_{soil} \times \left(\frac{L_{torSand}}{2} \right) \times \frac{b}{2} + \pi \times \left(\frac{b}{2} \right)^2 \times L_{torSand} \times (\gamma_{concrete}) \times \frac{b}{3} \times \mu \right]}{SF_{tor}}$$

$L_{torSand} := \text{Find}(L_{torSand}) = 9.6 \text{ ft}$

Say 9.5 ft is adequate. 9.5 ft is within 3% of 9.6 ft, which is required to resist torsion.

$L_{torSand} := \text{ceil}\left(\frac{L_{torSand}}{\text{ft}}\right) \times \text{ft} = 10 \text{ ft}$ *(round up to next foot)*

$L_{torSand} := 9.5 \text{ ft}$

OK!

short free-head pile in cohesive soil

Guess value $L_{torClay} := L_{reqdOT}$

Given
$$\left[f_{se} \times (\pi \times b) \times (L_{torClay} - 1.5 \times \text{ft}) \times \frac{b}{2} \right] + \left[f_{se} \times \pi \times \left(\frac{b}{2} \right)^2 \times \left(\frac{b}{3} \right) \right] = \text{Torsion} \times SF_{tor}$$

$L_{torClay} := \text{Find}(L_{torClay}) = 24.2 \text{ ft}$

$L_{torClay} := \text{ceil}\left(\frac{L_{torClay}}{\text{ft}}\right) \times \text{ft} = 25 \text{ ft}$ *(round up to next foot)*

$$L_{\text{reqdTor}} := \text{if}(\text{SoilType} = \text{"Sand"}, L_{\text{torSand}}, L_{\text{torClay}}) = 9.5 \text{ ft}$$

$$L_{\text{embedded}} := \text{if}(L_{\text{reqdTor}} > L_{\text{reqdOT}}, L_{\text{reqdTor}}, L_{\text{reqdOT}}) = 9.5 \text{ ft}$$

$$L_{\text{shaft.length}} := L_{\text{embedded}} + \text{Offset} = 9.5 \text{ ft}$$

Unfactored Maximum Moment in Shaft

short free-head pile in cohesionless soil using Broms method

$$f_{\text{sand}} := \sqrt{\frac{\frac{P_{\text{total}}}{2 \times \text{SF}_{\text{ot}}}}{3 \times c_{\text{soil}} \times b \times K_p}} = 1.7 \text{ ft}$$

$$M_{\text{maxSand}} := \frac{P_{\text{total}}}{\text{SF}_{\text{ot}}} \times (e_{\text{sand}} + f_{\text{sand}}) - \frac{\frac{P_{\text{total}}}{\text{SF}_{\text{ot}}} \times f_{\text{sand}}}{3} + \frac{M_{\text{total}}}{\text{SF}_{\text{ot}}} = 129.9 \text{ kip} \cdot \text{ft}$$

short free-head pile in cohesive soil using Modified Broms method for $L < 3b$ (see reference file for derivation)

Guess value $f_{\text{mod}} := 4.0 \text{ ft}$

Given $\frac{P_{\text{total}}}{\text{SF}_{\text{ot}}} = \frac{f_{\text{mod}} \times b}{2} \times (2 \times c_{\text{soil}} + f_{\text{mod}} \times \text{Slope})$

$f_{\text{mod}} := \text{Find}(f_{\text{mod}}) = 1.9 \text{ ft}$

$$M_{\text{modBroms}} := \frac{P_{\text{total}}}{\text{SF}_{\text{ot}}} \times (e_{\text{clay}} + f_{\text{mod}}) - \frac{c_{\text{soil}} \times b \times f_{\text{mod}}^2}{2} - \frac{b \times f_{\text{mod}}^3 \times \text{Slope}}{6} = 129.5 \text{ kip} \cdot \text{ft}$$

short free-head pile in cohesive soil using Regular Broms method for $L > 3b$

$$M_{\text{Broms}} := \frac{P_{\text{total}}}{\text{SF}_{\text{ot}}} \times (e_{\text{clay}} + 1.5 \times b + 0.5 \times f_{\text{clay}}) = 169 \text{ kip} \cdot \text{ft}$$

$$M_{\text{maxClay}} := \text{if}(L_{\text{ot1Clay}} < 3 \times b, M_{\text{modBroms}}, M_{\text{Broms}}) = 169 \text{ kip} \cdot \text{ft} \quad (\text{If } L_{\text{ot}} < 3b, \text{ use Modified Broms method})$$

$$M_{\text{max}} := \text{if}(\text{SoilType} = \text{"Sand"}, M_{\text{maxSand}}, M_{\text{maxClay}}) = 129.9 \text{ kip} \cdot \text{ft} \quad (\text{Service moment})$$

Minimum Reinforcing and Spacing

$F_{y.rebar} := 60 \text{ ksi}$ *reinforcing yield strength*

$f_c := 3.0 \text{ ksi}$ *concrete strength*

$cover := 3 \text{ in}$ *cover*

$A_{bar} := 1.56 \text{ in}^2$ *longitudinal bar area*

$d_{bar} := 1.41 \text{ in}$ *longitudinal bar diameter*

$A_{v.bar} := 0.2 \text{ in}^2$ *stirrup area*

$d_{v.bar} := .5000 \text{ in}$ *stirrup diameter*

$s_{v1} := 12 \text{ in}$ *stirrup spacing, depth = 0 ft-2 ft*

$s_{v2} := 12 \text{ in}$ *stirrup spacing, depth = 2 ft-depth.stir*

$s_{v3} := 12 \text{ in}$ *stirrup spacing, depth > depth.stir*

$depth_{stir} := 9.5 \text{ ft}$ *stirrup depth, see s.v2 and s.v3 above*

$b = 5 \text{ ft}$ *shaft diameter*

$$Num_{bar_1} := \frac{0.01}{A_{bar}} \times \frac{\pi b^2}{4} = 18.1 \quad \text{LRFD 5.7.4.2}$$

$$Num_{bar_2} := \frac{0.135}{A_{bar} F_{y.rebar}} \left(\frac{\pi b^2}{4} f_c \right) = 12.2$$

$$Num_{bar} := \text{ceil}(\max(Num_{bar_1}, Num_{bar_2})) = 19 \quad \text{number of longitudinal bars}$$

Minimum reinforcement is 0.008Ag. Number of longitudinal bars adjusted. [LRFD 5.12.9.5.2]

$Num_{bar} := 18$

$$ReinfClearSpacing := \left[b - 2 \left(cover + d_{v.bar} + \frac{d_{bar}}{2} \right) \right] \times \frac{\pi}{Num_{bar}} - d_{bar} = 7.59 \text{ in}$$

$CheckReinfClearSpacing := \text{if}(ReinfClearSpacing \geq 6 \text{ in}, "OK", "No Good")$

$CheckReinfClearSpacing = "OK"$

Check Shear and Torsion

$LF_{shr} := 1.3$	Shear Load Factor	1.3 is a reasonable Load Factor for combined WL + DL on sign and signal structures
$LF_{tor} := 1.3$	Torsion Load Factor	
$\phi_{shr} := 0.90$	Shear Resistance Factor	<u>LRFD 5.5.4.2.1</u>
$\phi_{tor} := 0.90$	Torsion Resistance Factor	<u>LRFD 5.5.4.2.1</u>

$$V_u := LF_{shr} \times \sqrt{V_x^2 + V_z^2} = 7.6 \text{ kip}$$

$$T_u := LF_{tor} \times \text{Torsion} = 203.3 \text{ kip}\cdot\text{ft}$$

Area and perimeter of concrete cross-section

$$A_{cp} := \pi \times \left(\frac{b}{2}\right)^2 = 2827.4 \text{ in}^2 \qquad p_{cp} := 2 \times \pi \times \left(\frac{b}{2}\right) = 188.5 \text{ in}$$

Diameter, perimeter and area enclosed by the centerline of the outermost closed transverse torsion reinforcement

$$d_{oh} := b - 2 \times \left(\text{cover} + \frac{d_{v,bar}}{2}\right) = 53.5 \text{ in} \qquad p_h := \pi \times d_{oh} = 168.1 \text{ in}$$

$$A_{oh} := \pi \times \left(\frac{d_{oh}}{2}\right)^2 = 2.2 \times 10^3 \text{ in}^2 \qquad A_o := 0.85 \times A_{oh} = 1.9 \times 10^3 \text{ in}^2$$

$$0.8 \times b = 4 \text{ ft}$$

Effective shear depth

$$D_r := b - 2 \times \left(\text{cover} + d_{v,bar} + \frac{d_{bar}}{2}\right) = 4.3 \text{ ft} \qquad d_e := \frac{b}{2} + \frac{D_r}{\pi} = 3.9 \text{ ft}$$

LRFD C5.8.2.1

$$d_v := \max(0.9 \times d_e, 0.72 \times b) = 3.6 \text{ ft}$$

Check Shear Strength

$$V_c := 0.0316 \times (2.0) \times \sqrt{\frac{f_c}{\text{ksi}}} \times \left(\frac{b}{\text{in}}\right) \times \left(\frac{d_v}{\text{in}}\right) \times \text{kip} = 283.7 \text{ kip} \qquad \text{LRFD Eqn 5.8.3.3-3} \qquad \text{LRFD 5.8.3.4.1} \qquad \text{ACI 11.3.3}$$

$$V_s := \frac{A_{v,bar} \times F_{y,rebar} \times d_v}{\max(s_{v1}, s_{v2}, s_{v3})} = 43.2 \text{ kip} \qquad \text{LRFD Eqn 5.8.3.3-4}$$

$$\phi_{shr} = 0.9$$

$$V_u = 7.6 \text{ kip}$$

$$\text{ShearRatio} := \frac{V_u - \phi_{shr} \times V_c}{\phi_{shr} \times V_s} = -6.4$$

$$\text{ShearRatio} := \text{if}(\text{ShearRatio} \leq 0, 0, \text{ShearRatio}) = 0$$

Check Torsion Strength

$$T_{n1} := \frac{2 \times A_o \times A_v \cdot \text{bar} \times F_{y \cdot \text{rebar}}}{S_{v1}} = 318.5 \text{ kip} \cdot \text{ft}$$

LRFD Eqn 5.8.3.6.2-1LRFD 5.8.3.4.1

$$T_{n2} := \frac{2 \times A_o \times A_v \cdot \text{bar} \times F_{y \cdot \text{rebar}}}{S_{v2}} = 318.5 \text{ kip} \cdot \text{ft}$$

$$T_{n3} := \frac{2 \times A_o \times A_v \cdot \text{bar} \times F_{y \cdot \text{rebar}}}{S_{v3}} = 318.5 \text{ kip} \cdot \text{ft}$$

$$\phi_{\text{tor}} = 0.9$$

$$T_u = 203.3 \text{ kip} \cdot \text{ft}$$

$$L_{\text{reqdTor}} = 9.5 \text{ ft}$$

$$\text{Tor2}_{\text{sand}} := T_u - \max \left[\left[\pi \times b \times (2 \times \text{ft} - \text{Offset}) \times \gamma_{\text{soil}} \times \left(\frac{2 \times \text{ft} - \text{Offset}}{2} \right) \times (\omega_{\text{fdot}}) \times \frac{b}{2} \right], 0 \text{ kip} \cdot \text{ft} \right] = 191.5 \text{ kip} \cdot \text{ft}$$

$$\text{Tor3}_{\text{sand}} := T_u - \max \left[\left[\pi \times b \times (\text{depth}_{\text{stir}} - \text{Offset}) \times \gamma_{\text{soil}} \times \left(\frac{\text{depth}_{\text{stir}} - \text{Offset}}{2} \right) \times (\omega_{\text{fdot}}) \times \frac{b}{2} \right], 0 \text{ kip} \cdot \text{ft} \right] = -62.5 \text{ kip} \cdot \text{ft}$$

$$\text{Tor2}_{\text{clay}} := T_u - \max \left[\left[f_{\text{se}} \times (\pi \times b) \times (2.0 \times \text{ft} - \text{Offset} - 1.5 \times \text{ft}) \times \frac{b}{2} \right], 0 \text{ kip} \cdot \text{ft} \right] = 199 \text{ kip} \cdot \text{ft}$$

$$\text{Tor3}_{\text{clay}} := T_u - \max \left[\left[f_{\text{se}} \times (\pi \times b) \times (\text{depth}_{\text{stir}} - \text{Offset} - 1.5 \times \text{ft}) \times \frac{b}{2} \right], 0 \text{ kip} \cdot \text{ft} \right] = 134.2 \text{ kip} \cdot \text{ft}$$

$$\text{Tor2} := \text{if}(\text{SoilType} = \text{"Sand"}, \text{Tor2}_{\text{sand}}, \text{Tor2}_{\text{clay}}) = 191.5 \text{ kip} \cdot \text{ft}$$

$$\text{Tor3} := \text{if}(\text{SoilType} = \text{"Sand"}, \text{Tor3}_{\text{sand}}, \text{Tor3}_{\text{clay}}) = -62.5 \text{ kip} \cdot \text{ft}$$

$$\text{TorsionRatio}_{n1} := \frac{T_u}{\phi_{\text{tor}} \times T_{n1}} = 0.71$$

$$\text{TorsionRatio}_{n2} := \frac{\text{Tor2}}{\phi_{\text{tor}} \times T_{n2}} = 0.67$$

$$\text{TorsionRatio}_{n3} := \frac{\text{Tor3}}{\phi_{\text{tor}} \times T_{n3}} = -0.22$$

$$\text{TorsionRatio} := \max(\text{TorsionRatio}_{n1}, \text{TorsionRatio}_{n2}, \text{TorsionRatio}_{n3}) = 0.71$$

$$T_{\text{cr}} := 0.125 \sqrt{\frac{f_c}{\text{ksi}}} \times \left(\frac{A_{\text{cp}}^2}{P_{\text{cp}} \cdot \text{in}^3} \right)^{\frac{1}{3}} \text{ kip} \cdot \text{in} = 765.2 \text{ kip} \cdot \text{ft}$$

LRFD Eqn 5.8.2.1-4

$$\text{TorsionRatio} := \text{if}(T_u \leq 0.25 \times \phi_{\text{tor}} \times T_{\text{cr}}, 0, \text{TorsionRatio}) = 0.7$$

LRFD Eqn 5.8.2.1-3

$$\text{ShearRatio} = 0$$

$$\text{CheckShearTorsion} := \text{if}(\text{ShearRatio} + \text{TorsionRatio} \leq 1, \text{"OK"}, \text{"No Good"})$$

CheckShearTorsion = "OK"

Check Maximum Spacing Transverse Reinforcement

$$v_u := \frac{V_u}{\phi_{shr} \times b \times (0.8 \times d)} = 0.002913 \text{ ksi} \quad 0.125 \times f_c = 0.4 \text{ ksi}$$

LRFD Eqn 5.8.2.9-1

$$s_{max1} := \text{if}(0.8 \times d_v < 24 \times \text{in}, 0.8 d_v, 24 \times \text{in}) = 24 \times \text{in}$$

LRFD Eqn 5.8.2.7-1

$$s_{max2} := \text{if}(0.4 \times d_v < 12 \times \text{in}, 0.4 d_v, 12 \times \text{in}) = 12 \times \text{in}$$

LRFD Eqn 5.8.2.7-2

$$s_{max} := \text{if}(v_u < 0.125 \times f_c, s_{max1}, s_{max2}) = 24 \times \text{in}$$

$$\max(s_{v1}, s_{v2}, s_{v3}) = 12 \times \text{in}$$

$$\text{CheckMaxSpacingTransvReinf} := \text{if}(\max(s_{v1}, s_{v2}, s_{v3}) \leq s_{max}, \text{"OK"}, \text{"No Good"})$$

CheckMaxSpacingTransvReinf = "OK"

*Check Longitudinal Reinforcement for Combined Shear and Torsion*LRFD Eqn 5.8.3.6.3-1

$$M_u := LF_{tor} \times \sqrt{M_x^2 + M_z^2} = 160.3 \text{ kip-ft}$$

LRFD 5.8.3.4.1

$$V_{temp} := \text{if}\left(\frac{V_u}{\phi_{shr}} - 0.5 \times V_s > 0 \text{ kip}, \frac{V_u}{\phi_{shr}} - 0.5 \times V_s, 0 \text{ kip}\right) = 0 \text{ kip}$$

$$\text{LongReinf}_{shr.tor} := \frac{\frac{M_u}{\phi_{tor} \times (0.8 \times b)} + \sqrt{\left(\frac{V_{temp}}{\text{kip}}\right)^2 + \left(\frac{0.45 \times \rho_h \times T_u}{2 \times A_o \times \phi_{tor} \times \text{kip}}\right)^2}}{F_{y.rebar}} = 1.6 \times \text{in}^2$$

$$\text{Num}_{bar} \times A_{bar} = 28.1 \times \text{in}^2$$

$$\text{CheckLongReinf}_{shr.tor} := \text{if}(\text{Num}_{bar} \times A_{bar} \geq \text{LongReinf}_{shr.tor}, \text{"OK"}, \text{"No Good"})$$

CheckLongReinf_{shr.tor} = "OK"

Anchor Bolt Embedment

Num_{anchor} := 6 *number of anchor bolts*

d_{anchor} := 1.5 in *anchor bolt diameter*

Diameter_{boltcircle.anchor} := 20 in *anchor bolt circle diameter*

F_{t.anchor} := 49.3 kip *anchor bolt tensile load
(see Ft.anchor calc below)*

$$\text{Gap}_{\text{shaft}} := \frac{b - 2 \times \text{cover} - 2 \times d_{v,\text{bar}} - \text{Diameter}_{\text{boltcircle.anchor}} - d_{\text{bar}}}{2} = 15.8 \text{ in}$$

$$\text{Diameter}_{\text{bar.circle}} := b - 2 \times \text{cover} - d_{\text{bar}} - 2 \times d_{v,\text{bar}} = 51.6 \text{ in}$$

Ft.anchor calculation (double click gray line below)

FTanchor

$$M_{\text{anchor}} := \sqrt{M_x^2 + M_z^2} = 123.3 \text{ kip}\cdot\text{ft}$$

*Input appropriate applied loads
M.x and M.y on page 1.*

$$A_{\text{net.anchor}} := \frac{\pi}{4} \left(d_{\text{anchor}} - \frac{0.9743}{\frac{4}{\text{in}}} \right)^2 = 1.24 \text{ in}^2$$

LTS Eqn 5-23

$$I_{\text{anchor}} := \frac{\text{Diameter}_{\text{boltcircle.anchor}}^2}{8} \times A_{\text{net.anchor}} \times \text{Num}_{\text{anchor}} = 371.9 \text{ in}^4$$

$$S_{\text{anchor}} := \frac{I_{\text{anchor}}}{\frac{\text{Diameter}_{\text{boltcircle.anchor}}}{2}} = 37.2 \text{ in}^3$$

$$f_{t,\text{anchor}} := \frac{M_{\text{anchor}}}{S_{\text{anchor}}} = 39.8 \text{ ksi}$$

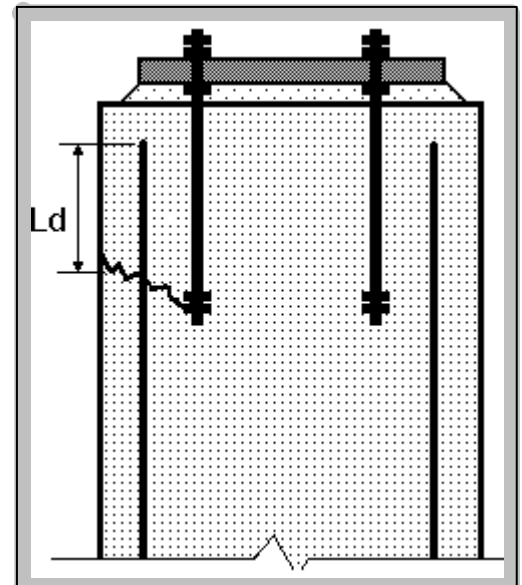
$$F_{t,\text{anchor.calc}} := f_{t,\text{anchor}} \times A_{\text{net.anchor}} = 49.3 \text{ kip}$$

*Copy Ft.anchor.calc result
into Ft.anchor input above.*

FTanchor

$$\text{Num}_{\text{bars.per.anchor}} := \min \left(\left(\frac{\text{Num}_{\text{bar}}}{\text{Num}_{\text{anchor}}} \right), \left(\frac{3}{3} \right) \right) = 3$$

*Use a maximum of three rebar
per anchor bolt (conservative)*



$$\phi := 0.9 \quad \text{Num}_{\text{bars.reqd.per.anchor}} := \frac{F_{t,\text{anchor}}}{A_{\text{bar}}(\phi F_{y,\text{rebar}})} \times \frac{\text{Diameter}_{\text{boltcircle.anchor}}}{\text{Diameter}_{\text{bar.circle}}} = 0.23$$

$$\text{AreaRatio} := \min\left(\frac{\text{Num}_{\text{bars.reqd.per.anchor}}}{\text{Num}_{\text{bars.per.anchor}}}, 1\right) = 0.08$$

$$L_{d,\text{bar}} := \max\left[\frac{1.25(A_{\text{bar}})F_{y,\text{rebar}}}{\sqrt{f_c} \text{ksi} \times \text{in}}, \frac{0.4(d_{\text{bar}})F_{y,\text{rebar}}}{\text{ksi}}\right] = 67.5 \times \text{in} \quad \text{longitudinal bar development length}$$

LRFD 5.11.2.1.1

$$L_{d,\text{bar}} := \text{if}\left(A_{\text{bar}} = 2.25 \times \text{in}^2, \frac{2.70 \times \text{in}^2 F_{y,\text{rebar}}}{\sqrt{f_c} \text{ksi} \times \text{in}}, L_{d,\text{bar}}\right) = 67.5 \times \text{in}$$

$$\text{SpacingFactor} := \max\left(\left(\frac{\text{Num}_{\text{bars.per.anchor}} \times 0.5 - 0.5}{0.5}\right), 1\right) = 1$$

$$L_{\text{embedment.added}} := \sqrt{(\text{ReinfClearSpacing} \times \text{SpacingFactor})^2 + \text{Gap}_{\text{shaft}}^2} = 17.5 \times \text{in}$$

$$L_{\text{embedment.anchor}} := \max\left[\frac{L_{d,\text{bar}}(\text{AreaRatio}) + 12 \times \text{in} + L_{\text{embedment.added}}}{20 \times d_{\text{anchor}}}\right] = 34.6 \times \text{in}$$

$$L_{\text{embedment.anchor}} := \text{Ceil}(L_{\text{embedment.anchor}}, \text{in}) = 35 \times \text{in}$$

Anchor Bolt Shear Break-Out Strength

References:

ACI 318-05 Appendix D.

FDOT/University of Florida Report BD545 RPWO #54,

Anchor Embedment Requirements for Signal/Sign Structures, July 2007.

$$r_b := \frac{\text{Diameter}_{\text{boltcircle.anchor}}}{2} = 10 \times \text{in}$$

$$r := \frac{b}{2} = 30 \times \text{in}$$

$$c_{\text{al}} := \frac{\sqrt{r_b^2 + 3.25(r^2 - r_b^2)} - r_b}{3.25} = 12.9 \times \text{in}$$

adjusted cover

UF Report Eqn 3-2

$$L_e := \min(8 \times d_{\text{anchor}}, L_{\text{embedment.anchor}}) = 12 \times \text{in}$$

load bearing length of anchor for shear

ACI D.6.2.2

$$V_b := 13 \times \left(\frac{L_e}{d_{\text{anchor}}} \right)^{0.2} \times \sqrt{\frac{d_{\text{anchor}}}{\text{in}}} \times \sqrt{\frac{f_c}{\text{psi}}} \left(\frac{c_{a1}}{\text{in}} \right)^{1.5} \times \text{kip} = 61.3 \times \text{kip}$$

shear break-out strength (single anchor)

UF Report Eqn 2-11

$$A := \frac{(360 \times \text{deg})}{\text{Num}_{\text{anchor}}} = 60 \times \text{deg}$$

UF Report Fig 3-7

$$\alpha := 2 \operatorname{asin} \left[\frac{(1.5 \times c_{a1})}{r} \right] = 80.4 \times \text{deg}$$

OverlapTest := if(A ≤ α, "Overlap of Failure Cones", "No Overlap of Failure Cones") = "Overlap of Failure Cones"

$$\text{chord} := 2 \times \sin \left(\frac{A}{2} \right) = 30 \times \text{in}$$

UF Report Fig 3-7

$$A_{V_{co}} := 4.5 \times c_{a1}^2 = 750.2 \times \text{in}^2$$

projected concrete failure area (single anchor)

ACI Eqn D-23

$$A_{V_c} := \text{chord} \times 1.5 \times c_{a1} = 581 \times \text{in}^2$$

projected concrete failure area (group)

ACI D.6.2.1

$$A_{V_{wv}} := \text{if}(A_{V_c} > A_{V_{co}}, A_{V_{co}}, A_{V_c}) = 581 \times \text{in}^2$$

$$\psi_{ecV} := 1.0 \quad \text{eccentric load modifier} \quad \text{ACI D.6.2.5}$$

$$\psi_{edV} := 1.0 \quad \text{edge effect modifier} \quad \text{ACI D.6.2.6}$$

$$\psi_{cV} := 1.2 \quad \text{cracked section modifier} \quad \text{ACI D.6.2.7}$$

$$\psi_{hV} := 1.0 \quad \text{member thickness modifier} \quad \text{ACI D.6.2.8}$$

$$\phi_{\text{breakout}} := 0.75 \quad \text{strength reduction factor} \quad \text{ACI D.4.4.c.i} \quad (\text{shear breakout, condition A})$$

$$V_{cbg} := \text{Num}_{\text{anchor}} \left(\frac{A_{Vc}}{A_{Vco}} \right) (\psi_{ec} \psi_{ed} \psi_{cv} \psi_{hv}) V_b = 342 \text{ kip} \quad \text{concrete breakout strength - shear}$$

ACI Eqn D-22 *Shear force \perp to edge*

$$V_{cbg_parallel} := 2 V_{cbg} = 683.9 \text{ kip} \quad \text{ACI D.6.2.1.c} \quad \text{Shear force } \parallel \text{ to edge}$$

$$T_{n,\text{breakout}} := V_{cbg_parallel} \lambda_b = 569.9 \text{ kip}\cdot\text{ft} \quad \text{concrete breakout strength - torsion}$$

$$\phi_{\text{breakout}} T_{n,\text{breakout}} = 427.5 \text{ kip}\cdot\text{ft}$$

$$T_u = 203.3 \text{ kip}\cdot\text{ft}$$

$$\text{BreakoutTest} := \text{if}(\phi_{\text{breakout}} T_{n,\text{breakout}} \geq T_u, \text{"OK"}, \text{"No Good"}) \quad \text{BreakoutTest} = \text{"OK"}$$

$$\text{OverlapDesign} := \text{if}(A \leq \alpha, \text{"Based on Overlap of Failure Cones"}, \text{"Based on No Overlap of Failure Cones"})$$

OverlapDesign = "Based on Overlap of Failure Cones"

References

LRFD = AASHTO LRFD Bridge Design Specifications

LTS = AASHTO Luminaire, Traffic Signal, and Sign Structure Specifications.

SM = FDOT Structures Manual

SDG = FDOT Structures Design Guidelines

Spec = FDOT Standard Specifications

ACI = ACI 318 Structural Concrete Building Code

UF Report = FDOT/University of Florida Report BD545 RPWO #54

Drilled Shaft Embedment (USCS units).lp9o

LPile for Windows, Version 2016-09.009

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\NVA_TPTO\110010106 - Fairfax and Monroe
Signal\Production\Structural\Design\Foundation Analysis\2019_03_18_CAD\

Name of input data file:

Drilled Shaft Embedment (USCS units).lp9d

Name of output report file:

Drilled Shaft Embedment (USCS units).lp9o

Name of plot output file:

Drilled Shaft Embedment (USCS units).lp9p

Name of runtime message file:

Drilled Shaft Embedment (USCS units).lp9r

Drilled Shaft Embedment (USCS units).lp9o
Date and Time of Analysis

Date: March 26, 2019

Time: 14:11:16

Problem Title

Project Name: Signal Foundation over WMATA

Job Number: 110010106

Client: Arlington County

Engineer: CAD

Description: Drilled shaft embedment.

Program Options and Settings

Computational Options:

- Use unfactored loads in computations (conventional analysis)

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Drilled Shaft Embedment (USCS units).lp9o

Loading Type and Number of Cycles of Loading:

- Static loading specified
- Use of p-y modification factors for p-y curves not selected
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

 Pile Structural Properties and Geometry

Number of pile sections defined = 1
 Total length of pile = 9.500 ft
 Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	60.0000
2	9.500	60.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Drilled Shaft Embedment (USCS units).lp9o

Section 1 is a round drilled shaft, bored pile, or CIDH pile

Length of section	=	9.500000 ft
Shaft Diameter	=	60.000000 in
Shear capacity of section	=	0.0000 lbs

 Ground Slope and Pile Batter Angles

Ground Slope Angle	=	0.000 degrees
	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

 Soil and Rock Layering Information

The soil profile is modelled using 2 layers

Layer 1 is strong rock (vuggy limestone)

Distance from top of pile to top of layer	=	0.0000 ft
Distance from top of pile to bottom of layer	=	0.333333 ft
Effective unit weight at top of layer	=	150.000000 pcf
Effective unit weight at bottom of layer	=	150.000000 pcf
Uniaxial compressive strength at top of layer	=	3000. psi
Uniaxial compressive strength at bottom of layer	=	3000. psi

Layer 2 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	0.333333 ft
Distance from top of pile to bottom of layer	=	15.000000 ft
Effective unit weight at top of layer	=	100.000000 pcf
Effective unit weight at bottom of layer	=	100.000000 pcf
Friction angle at top of layer	=	27.000000 deg.
Friction angle at bottom of layer	=	27.000000 deg.
Subgrade k at top of layer	=	0.0000 pci
Subgrade k at bottom of layer	=	0.0000 pci

NOTE: Default values for subgrade k will be computed for this layer.

Drilled Shaft Embedment (USCS units).lp9o

(Depth of the lowest soil layer extends 5.500 ft below the pile tip)

**** Warning - Possible Input Data Error **** Ok!

Values entered for effective unit weight of rock were outside the limits of 50 pcf to 150 pcf.

The maximum input value, in layer 2, for effective unit weight = 150.00 pcf

This data may be erroneous. Please check your data.

 Summary of Input Soil Properties

Layer	Soil Type	Layer	Effective	Angle of	Uniaxial
Layer kpy Num. pci	Name (p-y Curve Type)	Depth ft	Unit Wt. pcf	Friction deg.	qu psi
1	Strong Rock	0.00	150.0000	--	3000.
--	(Vuggy Limestone)	0.3333	150.0000	--	3000.
2	Sand	0.3333	100.0000	27.0000	--
default	(Reese, et al.)	15.0000	100.0000	27.0000	--
default					

 Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

 Pile-head Loading and Pile-head Fixity Conditions

Drilled Shaft Embedment (USCS units).lp9o

Number of loads specified = 1

Load Compute No.	Load Top y Type vs. Pile Length	Condition 1	Condition 2	Axial Thrust Force, lbs
1	1	V = 5810. lbs	M = 1480000. in-lbs	2500.
	Yes			

V = shear force applied normal to pile axis
M = bending moment applied to pile head
y = lateral deflection normal to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applied to pile head
Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).
Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	9.500000 ft
Shaft Diameter	=	60.000000 in
Concrete Cover Thickness	=	3.250000 in
Number of Reinforcing Bars	=	18 bars
Yield Stress of Reinforcing Bars	=	60000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	2827. sq. in.
Total Area of Reinforcing Steel	=	28.080000 sq. in.
Area Ratio of Steel Reinforcement	=	0.99 percent
Edge-to-Edge Bar Spacing	=	7.635334 in
Maximum Concrete Aggregate Size	=	0.750000 in

Drilled Shaft Embedment (USCS units).lp9o

Ratio of Bar Spacing to Aggregate Size = 10.18
 Offset of Center of Rebar Cage from Center of Pile = 0.0000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$ = 8823.151 kips
 Tensile Load for Cracking of Concrete = -1107.855 kips
 Nominal Axial Tensile Capacity = -1684.800 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.410000	1.560000	26.045000	0.000000
2	1.410000	1.560000	24.474294	8.907915
3	1.410000	1.560000	19.951628	16.741403
4	1.410000	1.560000	13.022500	22.555632
5	1.410000	1.560000	4.522667	25.649318
6	1.410000	1.560000	-4.522667	25.649318
7	1.410000	1.560000	-13.022500	22.555632
8	1.410000	1.560000	-19.951628	16.741403
9	1.410000	1.560000	-24.474294	8.907915
10	1.410000	1.560000	-26.045000	0.000000
11	1.410000	1.560000	-24.474294	-8.907915
12	1.410000	1.560000	-19.951628	-16.741403
13	1.410000	1.560000	-13.022500	-22.555632
14	1.410000	1.560000	-4.522667	-25.649318
15	1.410000	1.560000	4.522667	-25.649318
16	1.410000	1.560000	13.022500	-22.555632
17	1.410000	1.560000	19.951628	-16.741403
18	1.410000	1.560000	24.474294	-8.907915

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 7.635 inches between bars 17 and 18.

Ratio of bar spacing to maximum aggregate size = 10.18

Concrete Properties:

Compressive Strength of Concrete = 3000. psi

Drilled Shaft Embedment (USCS units).lp9o

Modulus of Elasticity of Concrete = 3122019. psi
 Modulus of Rupture of Concrete = -410.791918 psi
 Compression Strain at Peak Stress = 0.001634
 Tensile Strain at Fracture of Concrete = -0.0001160
 Maximum Coarse Aggregate Size = 0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 1

Number	Axial Thrust Force kips
1	2.500

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318, Section 10.3.4.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 2.500 kips

Bending Max Conc Curvature Stress rad/in. ksi	Bending Max Steel Moment Stress in-kip ksi	Bending Run Stiffness Msg kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in
4.16667E-07 0.0461044	1072. 0.3654282	2572160607.	30.5423299	0.00001273	-0.00001227
8.33333E-07 0.0910370	2138. 0.7243227	2566189546.	30.2719727	0.00002523	-0.00002477
0.00000125 0.1356252	3200. 1.0832173	2560216906.	30.1818570	0.00003773	-0.00003727

Drilled Shaft Embedment (USCS units).lp9o					
0.00000167	4257.	2554243872.	30.1368016	0.00005023	-0.00004977
0.1798691	1.4421121				
0.00000208	5309.	2548270679.	30.1097703	0.00006273	-0.00006227
0.2237686	1.8010070				
0.00000250	6356.	2542297407.	30.0917511	0.00007523	-0.00007477
0.2673237	2.1599020				
0.00000292	7398.	2536324090.	30.0788818	0.00008773	-0.00008727
0.3105346	2.5187971				
0.00000333	8435.	2530350744.	30.0692310	0.0001002	-0.00009977
0.3534010	2.8776923				
0.00000375	9466.	2524377380.	30.0617260	0.0001127	-0.0001123
0.3959231	3.2365877				
0.00000417	9466.	2271939642.	15.2468680	0.00006353	-0.0001865
0.2243866	-5.3714201 C				
0.00000458	9466.	2065399675.	15.2323891	0.00006982	-0.0002052
0.2461121	-5.9104866 C				
0.00000500	9466.	1893283035.	15.2211570	0.00007611	-0.0002239
0.2677668	-6.4494322 C				
0.00000542	9466.	1747645879.	15.2124251	0.00008240	-0.0002426
0.2893507	-6.9882566 C				
0.00000583	9466.	1622814030.	15.2056602	0.00008870	-0.0002613
0.3108636	-7.5269592 C				
0.00000625	9466.	1514626428.	15.2004710	0.00009500	-0.0002800
0.3323053	-8.0655396 C				
0.00000667	9466.	1419962276.	15.1965645	0.0001013	-0.0002987
0.3536758	-8.6039975 C				
0.00000708	9466.	1336435084.	15.1937163	0.0001076	-0.0003174
0.3749750	-9.1423324 C				
0.00000750	9466.	1262188690.	15.1917520	0.0001139	-0.0003361
0.3962026	-9.6805439 C				
0.00000792	9466.	1195757707.	15.1905339	0.0001203	-0.0003547
0.4173586	-10.2186316 C				
0.00000833	9466.	1135969821.	15.1899520	0.0001266	-0.0003734
0.4384429	-10.7565949 C				
0.00000875	9466.	1081876020.	15.1899169	0.0001329	-0.0003921
0.4594552	-11.2944335 C				
0.00000917	9466.	1032699837.	15.1903559	0.0001392	-0.0004108
0.4803956	-11.8321470 C				
0.00000958	9466.	987799845.	15.1912087	0.0001456	-0.0004294
0.5012638	-12.3697349 C				
0.00001000	9466.	946641518.	15.1924251	0.0001519	-0.0004481
0.5220598	-12.9071967 C				
0.00001042	9466.	908775857.	15.1939629	0.0001583	-0.0004667
0.5427834	-13.4445320 C				
0.00001083	9466.	873822939.	15.1957866	0.0001646	-0.0004854
0.5634344	-13.9817404 C				
0.00001125	9466.	841459127.	15.1978657	0.0001710	-0.0005040
0.5840128	-14.5188213 C				

Drilled Shaft Embedment (USCS units).lp9o					
0.00001167	9466.	811407015.	15.2001742	0.0001773	-0.0005227
0.6045183	-15.0557744 C				
0.00001208	9466.	783427463.	15.2026897	0.0001837	-0.0005413
0.6249510	-15.5925991 C				
0.00001250	9466.	757313214.	15.2053928	0.0001901	-0.0005599
0.6453105	-16.1292951 C				
0.00001292	9466.	732883756.	15.2082665	0.0001964	-0.0005786
0.6655969	-16.6658618 C				
0.00001333	9466.	709981138.	15.2112962	0.0002028	-0.0005972
0.6858100	-17.2022988 C				
0.00001375	9466.	688466558.	15.2144688	0.0002092	-0.0006158
0.7059495	-17.7386056 C				
0.00001417	9466.	668217542.	15.2177728	0.0002156	-0.0006344
0.7260155	-18.2747817 C				
0.00001458	9466.	649125612.	15.2211981	0.0002220	-0.0006530
0.7460077	-18.8108266 C				
0.00001500	9466.	631094345.	15.2247358	0.0002284	-0.0006716
0.7659260	-19.3467399 C				
0.00001542	9466.	614037741.	15.2283777	0.0002348	-0.0006902
0.7857704	-19.8825211 C				
0.00001583	9466.	597878853.	15.2321168	0.0002412	-0.0007088
0.8055405	-20.4181697 C				
0.00001625	9466.	582548626.	15.2359466	0.0002476	-0.0007274
0.8252363	-20.9536852 C				
0.00001708	9605.	562255627.	15.2438556	0.0002604	-0.0007646
0.8644045	-22.0243149 C				
0.00001792	10067.	561856245.	15.2520652	0.0002733	-0.0008017
0.9032738	-23.0944062 C				
0.00001875	10527.	561464687.	15.2605426	0.0002861	-0.0008389
0.9418430	-24.1639551 C				
0.00001958	10988.	561079782.	15.2692609	0.0002990	-0.0008760
0.9801110	-25.2329574 C				
0.00002042	11448.	560700547.	15.2781977	0.0003119	-0.0009131
1.0180766	-26.3014089 C				
0.00002125	11907.	560326151.	15.2873340	0.0003249	-0.0009501
1.0557385	-27.3693056 C				
0.00002208	12366.	559955888.	15.2966540	0.0003378	-0.0009872
1.0930957	-28.4366430 C				
0.00002292	12824.	559589353.	15.3058862	0.0003508	-0.0010242
1.1301297	-29.5035880 C				
0.00002375	13282.	559225930.	15.3151283	0.0003637	-0.0010613
1.1668453	-30.5700807 C				
0.00002458	13739.	558865130.	15.3245108	0.0003767	-0.0010983
1.2032505	-31.6360261 C				
0.00002542	14195.	558506539.	15.3340257	0.0003897	-0.0011353
1.2393440	-32.7014206 C				
0.00002625	14651.	558149812.	15.3436657	0.0004028	-0.0011722
1.2751247	-33.7662598 C				

	Drilled	Shaft Embedment (USCS units).	lp9o		
0.00002708	15107.	557794643.	15.3534249	0.0004158	-0.0012092
1.3105912	-34.8305396 C				
0.00002792	15562.	557440761.	15.3632978	0.0004289	-0.0012461
1.3457423	-35.8942556 C				
0.00002875	16016.	557087926.	15.3732797	0.0004420	-0.0012830
1.3805768	-36.9574035 C				
0.00002958	16470.	556735920.	15.3833668	0.0004551	-0.0013199
1.4150932	-38.0199788 C				
0.00003042	16923.	556384552.	15.3935553	0.0004682	-0.0013568
1.4492904	-39.0819770 C				
0.00003125	17376.	556033646.	15.4038423	0.0004814	-0.0013936
1.4831671	-40.1433936 C				
0.00003208	17828.	555683045.	15.4142250	0.0004945	-0.0014305
1.5167218	-41.2042238 C				
0.00003292	18280.	555332606.	15.4247011	0.0005077	-0.0014673
1.5499532	-42.2644631 C				
0.00003375	18731.	554982196.	15.4352686	0.0005209	-0.0015041
1.5828600	-43.3241067 C				
0.00003458	19181.	554631697.	15.4459255	0.0005342	-0.0015408
1.6154408	-44.3831497 C				
0.00003542	19631.	554281035.	15.4566705	0.0005474	-0.0015776
1.6476943	-45.4415862 C				
0.00003625	20080.	553930036.	15.4675022	0.0005607	-0.0016143
1.6796189	-46.4994132 C				
0.00003708	20529.	553578642.	15.4784194	0.0005740	-0.0016510
1.7112132	-47.5566247 C				
0.00003792	20977.	553226765.	15.4894211	0.0005873	-0.0016877
1.7424758	-48.6132156 C				
0.00003875	21424.	552874324.	15.5005066	0.0006006	-0.0017244
1.7734053	-49.6691806 C				
0.00003958	21871.	552521244.	15.5116750	0.0006140	-0.0017610
1.8040001	-50.7245146 C				
0.00004042	22317.	552167451.	15.5229260	0.0006274	-0.0017976
1.8342588	-51.7792120 C				
0.00004125	22762.	551812881.	15.5342590	0.0006408	-0.0018342
1.8641798	-52.8332676 C				
0.00004208	23207.	551457469.	15.5456736	0.0006542	-0.0018708
1.8937616	-53.8866757 C				
0.00004292	23651.	551101155.	15.5571697	0.0006677	-0.0019073
1.9230027	-54.9394308 C				
0.00004375	24095.	550743882.	15.5687470	0.0006811	-0.0019439
1.9519014	-55.9915271 C				
0.00004458	24538.	550385596.	15.5804056	0.0006946	-0.0019804
1.9804562	-57.0429588 C				
0.00004542	24980.	550026246.	15.5921453	0.0007081	-0.0020169
2.0086654	-58.0937202 C				
0.00004625	25422.	549665782.	15.6039663	0.0007217	-0.0020533
2.0365274	-59.1438051 C				

Drilled Shaft Embedment (USCS units).lp9o					
0.00004708	25863.	549304155.	15.6158686	0.0007352	-0.0020898
2.0640406	-60.0000000 CY				
0.00004792	26303.	548941320.	15.6278525	0.0007488	-0.0021262
2.0912032	-60.0000000 CY				
0.00004875	26743.	548577233.	15.6399182	0.0007624	-0.0021626
2.1180135	-60.0000000 CY				
0.00004958	27182.	548211850.	15.6520661	0.0007761	-0.0021989
2.1444699	-60.0000000 CY				
0.00005292	28766.	543617994.	15.6695438	0.0008292	-0.0023458
2.2436061	-60.0000000 CY				
0.00005625	29980.	532971220.	15.6237624	0.0008788	-0.0024962
2.3306816	-60.0000000 CY				
0.00005958	30813.	517147432.	15.5169058	0.0009245	-0.0026505
2.4060051	-60.0000000 CY				
0.00006292	31623.	502620811.	15.4216384	0.0009703	-0.0028047
2.4768593	-60.0000000 CY				
0.00006625	32379.	488735097.	15.3295063	0.0010156	-0.0029594
2.5426022	-60.0000000 CY				
0.00006958	32851.	472109686.	15.1886792	0.0010569	-0.0031181
2.5985725	-60.0000000 CY				
0.00007292	33305.	456754094.	15.0588448	0.0010980	-0.0032770
2.6507194	-60.0000000 CY				
0.00007625	33756.	442700491.	14.9428741	0.0011394	-0.0034356
2.6994622	-60.0000000 CY				
0.00007958	34204.	429784458.	14.8390783	0.0011809	-0.0035941
2.7447535	-60.0000000 CY				
0.00008292	34648.	417867280.	14.7460298	0.0012227	-0.0037523
2.7865430	-60.0000000 CY				
0.00008625	35023.	406068323.	14.6446346	0.0012631	-0.0039119
2.8234067	-60.0000000 CY				
0.00008958	35248.	393470479.	14.5157847	0.0013004	-0.0040746
2.8542514	-60.0000000 CY				
0.00009292	35462.	381653287.	14.3956919	0.0013376	-0.0042374
2.8821048	-60.0000000 CY				
0.00009625	35674.	370634318.	14.2856043	0.0013750	-0.0044000
2.9071122	-60.0000000 CY				
0.00009958	35883.	360333002.	14.1845477	0.0014125	-0.0045625
2.9292356	-60.0000000 CY				
0.0001029	36090.	350676456.	14.0910807	0.0014502	-0.0047248
2.9484061	-60.0000000 CY				
0.0001063	36293.	341581153.	13.9994854	0.0014874	-0.0048876
2.9643849	-60.0000000 CY				
0.0001096	36494.	333021152.	13.9150564	0.0015249	-0.0050501
2.9774666	-60.0000000 CY				
0.0001129	36692.	324948663.	13.8371926	0.0015624	-0.0052126
2.9876093	-60.0000000 CY				
0.0001163	36889.	317321362.	13.7653637	0.0016002	-0.0053748
2.9947694	-60.0000000 CY				

Drilled Shaft Embedment (USCS units).lp9o					
0.0001196	37083.	310101632.	13.6991000	0.0016382	-0.0055368
2.9989022	-60.0000000 CY				
0.0001229	37272.	303230112.	13.6371420	0.0016762	-0.0056988
2.9987956	-60.0000000 CY				
0.0001263	37424.	296425361.	13.5701484	0.0017132	-0.0058618
2.9987040	-60.0000000 CY				
0.0001296	37532.	289637604.	13.4958528	0.0017488	-0.0060262
2.9999980	-60.0000000 CY				
0.0001329	37608.	282945427.	13.4129283	0.0017828	-0.0061922
2.9971746	-60.0000000 CY				
0.0001363	37680.	276553358.	13.3342343	0.0018168	-0.0063582
2.9994974	-60.0000000 CY				
0.0001396	37751.	270458256.	13.2603774	0.0018509	-0.0065241
2.9983395	-60.0000000 CY				
0.0001429	37821.	264638196.	13.1911270	0.0018852	-0.0066898
2.9973608	-60.0000000 CY				
0.0001462	37890.	259077536.	13.1258832	0.0019197	-0.0068553
2.9995031	-60.0000000 CY				
0.0001496	37958.	253757858.	13.0644861	0.0019542	-0.0070208
2.9986403	-60.0000000 CY				
0.0001529	38025.	248661930.	13.0068316	0.0019890	-0.0071860
2.9962866	-60.0000000 CY				
0.0001562	38090.	243778745.	12.9523578	0.0020238	-0.0073512
2.9988754	-60.0000000 CY				
0.0001596	38156.	239094885.	12.9008766	0.0020588	-0.0075162
2.9999639	-60.0000000 CY				
0.0001629	38217.	234582648.	12.8480022	0.0020932	-0.0076818
2.9959038	-60.0000000 CY				
0.0001662	38279.	230247077.	12.7978546	0.0021276	-0.0078474
2.9966559	60.0000000 CY				
0.0001696	38339.	226078733.	12.7502628	0.0021622	-0.0080128
2.9989230	60.0000000 CY				
0.0001729	38399.	222067888.	12.7050883	0.0021969	-0.0081781
2.9999407	60.0000000 CY				
0.0001762	38458.	218203462.	12.6624755	0.0022318	-0.0083432
2.9965566	60.0000000 CY				
0.0001796	38517.	214479075.	12.6220533	0.0022667	-0.0085083
2.9949197	60.0000000 CY				
0.0001829	38575.	210888038.	12.5835782	0.0023017	-0.0086733
2.9977045	60.0000000 CY				
0.0002029	38913.	191766735.	12.3893858	0.0025140	-0.0096610
2.9988000	60.0000000 CY				
0.0002229	39225.	175964533.	12.2342474	0.0027272	-0.0106478
2.9979004	60.0000000 CY				
0.0002429	39416.	162263450.	12.0588023	0.0029293	-0.0116457
2.9911151	60.0000000 CY				
0.0002629	39497.	150226069.	11.8771007	0.0031227	-0.0126523
2.9998986	60.0000000 CYT				

Drilled Shaft Embedment (USCS units).lp9o					
0.0002829	39556.	139815769.	11.7410313	0.0033217	-0.0136533
2.9900241	60.0000000	CYT			
0.0003029	39586.	130683458.	11.6376749	0.0035252	-0.0146498
2.9996869	60.0000000	CYT			
0.0003229	39605.	122647257.	11.5523865	0.0037305	-0.0156445
2.9870128	60.0000000	CYT			
0.0003429	39605.	115494076.	11.5553406	0.0039625	-0.0166125
2.9984472	60.0000000	CYT			

 Summary of Results for Nominal (Unfactored) Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain
1	2.500	39445.909	0.00300000

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.70).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, Section 9.3.2.2 or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor for Moment	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
1	0.65	39446.	1.625000	25640.	549487195.
1	0.70	39446.	1.750000	27612.	546965103.
1	0.75	39446.	1.875000	29584.	536439463.

Drilled Shaft Embedment (USCS units).lp9o

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.00	0.00	N.A.	Yes	N.A.	N.A.
2	0.3333	0.3333	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

Computed Values of Pile Loading and Deflection for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 5810.0 lbs
 Applied moment at pile head = 1480000.0 in-lbs
 Axial thrust load on pile head = 2500.0 lbs

Depth Res.	Soil Spr. X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil p
feet	Es*h	inches	in-lbs	lbs	radians	psi*	in-lb^2	
lb/inch	lb/inch	lb/inch	lb/inch					
0.00	0.00896	0.00896	1480000.	5810.	-0.00360	0.00	2.57E+12	
-26866.	1710000.	1710000.	0.00					
0.09500	0.00485	0.00485	1469176.	-17792.	-0.00360	0.00	2.57E+12	
-14540.	3420000.	3420000.	0.00					
0.1900	7.39E-04	7.39E-04	1439456.	-27343.	-0.00360	0.00	2.57E+12	
-2217.	3420000.	3420000.	0.00					
0.2850	-0.00337	-0.00337	1406854.	-22847.	-0.00360	0.00	2.57E+12	

Drilled Shaft Embedment (USCS units).lp9o							
10104.	3420000.	0.00					
	0.3800	-0.00747	1387385.	-17087.	-0.00360	0.00	2.57E+12
0.3398	51.8260	0.00					
	0.4750	-0.01158	1367915.	-17087.	-0.00360	0.00	2.57E+12
0.6581	64.7826	0.00					
	0.5700	-0.01569	1348447.	-17086.	-0.00360	0.00	2.57E+12
1.0696	77.7391	0.00					
	0.6650	-0.01979	1328980.	-17084.	-0.00360	0.00	2.57E+12
1.5744	90.6956	0.00					
	0.7600	-0.02389	1309515.	-17082.	-0.00360	0.00	2.57E+12
2.1724	103.6521	0.00					
	0.8550	-0.02800	1290053.	-17079.	-0.00360	0.00	2.57E+12
2.8637	116.6086	0.00					
	0.9500	-0.03210	1270594.	-17076.	-0.00360	0.00	2.57E+12
3.6481	129.5651	0.00					
	1.0450	-0.03620	1251141.	-17071.	-0.00360	0.00	2.57E+12
4.5257	142.5216	0.00					
	1.1400	-0.04030	1231693.	-17065.	-0.00360	0.00	2.57E+12
5.4964	155.4781	0.00					
	1.2350	-0.04440	1212252.	-17058.	-0.00360	0.00	2.57E+12
6.5603	168.4346	0.00					
	1.3300	-0.04850	1192820.	-17050.	-0.00360	0.00	2.57E+12
7.7173	181.3912	0.00					
	1.4250	-0.05260	1173398.	-17041.	-0.00360	0.00	2.57E+12
8.9674	194.3477	0.00					
	1.5200	-0.05670	1153988.	-17030.	-0.00360	0.00	2.57E+12
10.3105	207.3042	0.00					
	1.6150	-0.06080	1134591.	-17017.	-0.00359	0.00	2.57E+12
11.7467	220.2607	0.00					
	1.7100	-0.06489	1115209.	-17003.	-0.00359	0.00	2.57E+12
13.2759	233.2172	0.00					
	1.8050	-0.06899	1095844.	-16987.	-0.00359	0.00	2.57E+12
14.8982	246.1737	0.00					
	1.9000	-0.07309	1076499.	-16969.	-0.00359	0.00	2.57E+12
16.6134	259.1302	0.00					
	1.9950	-0.07718	1057175.	-16949.	-0.00359	0.00	2.57E+12
18.4216	272.0867	0.00					
	2.0900	-0.08128	1037876.	-16927.	-0.00359	0.00	2.57E+12
20.3228	285.0432	0.00					
	2.1850	-0.08537	1018602.	-16903.	-0.00359	0.00	2.57E+12
22.3170	297.9998	0.00					
	2.2800	-0.08947	999358.	-16876.	-0.00359	0.00	2.57E+12
24.4040	310.9563	0.00					
	2.3750	-0.09356	980146.	-16847.	-0.00359	0.00	2.57E+12
26.5840	323.9128	0.00					
	2.4700	-0.09765	960968.	-16815.	-0.00359	0.00	2.57E+12
28.8569	336.8693	0.00					
	2.5650	-0.1017	941827.	-16781.	-0.00359	0.00	2.57E+12

Drilled Shaft Embedment (USCS units).lp9o

31.2227	349.8258	0.00					
	2.6600	-0.1058	922727.	-16744.	-0.00359	0.00	2.57E+12
33.6814	362.7823	0.00					
	2.7550	-0.1099	903671.	-16704.	-0.00359	0.00	2.57E+12
36.2330	375.7388	0.00					
	2.8500	-0.1140	884662.	-16661.	-0.00359	0.00	2.57E+12
38.8773	388.6953	0.00					
	2.9450	-0.1181	865704.	-16616.	-0.00359	0.00	2.57E+12
41.6146	401.6518	0.00					
	3.0400	-0.1222	846799.	-16566.	-0.00359	0.00	2.57E+12
44.4447	414.6084	0.00					
	3.1350	-0.1263	827953.	-16514.	-0.00359	0.00	2.57E+12
47.3675	427.5649	0.00					
	3.2300	-0.1304	809167.	-16458.	-0.00359	0.00	2.57E+12
50.3832	440.5214	0.00					
	3.3250	-0.1345	790448.	-16399.	-0.00359	0.00	2.57E+12
53.4917	453.4779	0.00					
	3.4200	-0.1386	771798.	-16336.	-0.00359	0.00	2.57E+12
56.6930	466.4344	0.00					
	3.5150	-0.1427	753221.	-16270.	-0.00359	0.00	2.57E+12
59.9871	479.3909	0.00					
	3.6100	-0.1467	734723.	-16200.	-0.00359	0.00	2.57E+12
63.3739	492.3474	0.00					
	3.7050	-0.1508	716307.	-16125.	-0.00359	0.00	2.57E+12
66.8535	505.3039	0.00					
	3.8000	-0.1549	697977.	-16047.	-0.00359	0.00	2.57E+12
70.4258	518.2604	0.00					
	3.8950	-0.1590	679740.	-15965.	-0.00358	0.00	2.57E+12
74.0909	531.2170	0.00					
	3.9900	-0.1631	661598.	-15878.	-0.00358	0.00	2.57E+12
77.8487	544.1735	0.00					
	4.0850	-0.1672	643558.	-15787.	-0.00358	0.00	2.57E+12
81.6992	557.1300	0.00					
	4.1800	-0.1713	625624.	-15692.	-0.00358	0.00	2.57E+12
85.6425	570.0865	0.00					
	4.2750	-0.1753	607801.	-15592.	-0.00358	0.00	2.57E+12
89.6785	583.0430	0.00					
	4.3700	-0.1794	590095.	-15487.	-0.00358	0.00	2.57E+12
93.8071	595.9995	0.00					
	4.4650	-0.1835	572510.	-15378.	-0.00358	0.00	2.57E+12
98.0285	608.9560	0.00					
	4.5600	-0.1876	555053.	-15264.	-0.00358	0.00	2.57E+12
102.3426	621.9125	0.00					
	4.6550	-0.1917	537729.	-15145.	-0.00358	0.00	2.57E+12
106.7494	634.8690	0.00					
	4.7500	-0.1958	520544.	-15020.	-0.00358	0.00	2.57E+12
111.2489	647.8256	0.00					
	4.8450	-0.1999	503504.	-14891.	-0.00358	0.00	2.57E+12

Drilled Shaft Embedment (USCS units).lp9o						
115.8410	660.7821	0.00				
4.9400	-0.2039	486614.	-14756.	-0.00358	0.00	2.57E+12
120.5258	673.7386	0.00				
5.0350	-0.2080	469880.	-14616.	-0.00358	0.00	2.57E+12
125.3033	686.6951	0.00				
5.1300	-0.2121	453310.	-14470.	-0.00358	0.00	2.57E+12
130.1735	699.6516	0.00				
5.2250	-0.2162	436908.	-14319.	-0.00358	0.00	2.57E+12
135.1364	712.6081	0.00				
5.3200	-0.2203	420682.	-14162.	-0.00358	0.00	2.57E+12
140.1919	725.5646	0.00				
5.4150	-0.2244	404639.	-13999.	-0.00358	0.00	2.57E+12
145.3401	738.5211	0.00				
5.5100	-0.2284	388784.	-13831.	-0.00358	0.00	2.57E+12
150.5809	751.4776	0.00				
5.6050	-0.2325	373125.	-13656.	-0.00358	0.00	2.57E+12
155.9144	764.4342	0.00				
5.7000	-0.2366	357668.	-13475.	-0.00358	0.00	2.57E+12
161.3406	777.3907	0.00				
5.7950	-0.2407	342422.	-13288.	-0.00358	0.00	2.57E+12
166.8594	790.3472	0.00				
5.8900	-0.2448	327392.	-13095.	-0.00358	0.00	2.57E+12
172.4709	803.3037	0.00				
5.9850	-0.2488	312586.	-12895.	-0.00358	0.00	2.57E+12
178.1750	816.2602	0.00				
6.0800	-0.2529	298012.	-12688.	-0.00358	0.00	2.57E+12
183.9718	829.2167	0.00				
6.1750	-0.2570	283677.	-12475.	-0.00358	0.00	2.57E+12
189.8613	842.1732	0.00				
6.2700	-0.2611	269588.	-12256.	-0.00358	0.00	2.57E+12
195.8434	855.1297	0.00				
6.3650	-0.2652	255755.	-12029.	-0.00358	0.00	2.57E+12
201.9182	868.0862	0.00				
6.4600	-0.2692	242183.	-11795.	-0.00358	0.00	2.57E+12
208.0857	881.0428	0.00				
6.5550	-0.2733	228882.	-11554.	-0.00358	0.00	2.57E+12
214.3458	893.9993	0.00				
6.6500	-0.2774	215860.	-11306.	-0.00358	0.00	2.57E+12
220.6985	906.9558	0.00				
6.7450	-0.2815	203124.	-11051.	-0.00358	0.00	2.57E+12
227.1439	919.9123	0.00				
6.8400	-0.2856	190684.	-10788.	-0.00358	0.00	2.57E+12
233.6820	932.8688	0.00				
6.9350	-0.2896	178547.	-10518.	-0.00358	0.00	2.57E+12
240.3128	945.8253	0.00				
7.0300	-0.2937	166723.	-10240.	-0.00358	0.00	2.57E+12
247.0362	958.7818	0.00				
7.1250	-0.2978	155219.	-9955.	-0.00358	0.00	2.57E+12

Drilled Shaft Embedment (USCS units).lp9o							
253.8523	971.7383	0.00					
7.2200	-0.3019	144046.	-9662.	-0.00358	0.00	2.57E+12	
260.7611	984.6948	0.00					
7.3150	-0.3060	133211.	-9360.	-0.00358	0.00	2.57E+12	
267.7625	997.6514	0.00					
7.4100	-0.3100	122725.	-9051.	-0.00358	0.00	2.57E+12	
274.8567	1011.	0.00					
7.5050	-0.3141	112595.	-8734.	-0.00358	0.00	2.57E+12	
282.0435	1024.	0.00					
7.6000	-0.3182	102832.	-8408.	-0.00358	0.00	2.57E+12	
289.3229	1037.	0.00					
7.6950	-0.3223	93446.	-8074.	-0.00358	0.00	2.57E+12	
296.6951	1049.	0.00					
7.7900	-0.3264	84444.	-7731.	-0.00358	0.00	2.57E+12	
304.1600	1062.	0.00					
7.8850	-0.3304	75838.	-7380.	-0.00358	0.00	2.57E+12	
311.7175	1075.	0.00					
7.9800	-0.3345	67638.	-7021.	-0.00358	0.00	2.57E+12	
319.3678	1088.	0.00					
8.0750	-0.3386	59852.	-6652.	-0.00358	0.00	2.57E+12	
327.1107	1101.	0.00					
8.1700	-0.3427	52491.	-6275.	-0.00358	0.00	2.57E+12	
334.9463	1114.	0.00					
8.2650	-0.3468	45566.	-5888.	-0.00358	0.00	2.57E+12	
342.8747	1127.	0.00					
8.3600	-0.3508	39086.	-5493.	-0.00358	0.00	2.57E+12	
350.8957	1140.	0.00					
8.4550	-0.3549	33062.	-5088.	-0.00358	0.00	2.57E+12	
359.0095	1153.	0.00					
8.5500	-0.3590	27505.	-4674.	-0.00358	0.00	2.57E+12	
367.2159	1166.	0.00					
8.6450	-0.3631	22425.	-4251.	-0.00358	0.00	2.57E+12	
375.5151	1179.	0.00					
8.7400	-0.3672	17833.	-3818.	-0.00358	0.00	2.57E+12	
383.9070	1192.	0.00					
8.8350	-0.3712	13740.	-3376.	-0.00358	0.00	2.57E+12	
392.3916	1205.	0.00					
8.9300	-0.3753	10157.	-2923.	-0.00358	0.00	2.57E+12	
400.9689	1218.	0.00					
9.0250	-0.3794	7095.	-2461.	-0.00358	0.00	2.57E+12	
409.6389	1231.	0.00					
9.1200	-0.3835	4565.	-1989.	-0.00358	0.00	2.57E+12	
418.4016	1244.	0.00					
9.2150	-0.3876	2579.	-1507.	-0.00358	0.00	2.57E+12	
427.2571	1257.	0.00					
9.3100	-0.3916	1149.	-1015.	-0.00358	0.00	2.57E+12	
436.2053	1270.	0.00					
9.4050	-0.3957	285.0581	-512.7870	-0.00358	0.00	2.57E+12	

Drilled Shaft Embedment (USCS units).lp9o

445.2462 1283. 0.00
 9.5000 -0.3998 0.00 0.00 -0.00358 0.00 2.57E+12
 454.3799 647.8256 0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.00895533 inches
 Computed slope at pile head = -0.00360433 radians
 Maximum bending moment = 1480000. inch-lbs
 Maximum shear force = -27343. lbs
 Depth of maximum bending moment = 0.000000 feet below pile head
 Depth of maximum shear force = 0.19000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 1

 Pile-head Deflection vs. Pile Length for Load Case 1

Boundary Condition Type 1, Shear and Moment

Shear = 5810. lbs
 Moment = 1480000. in-lbs
 Axial Load = 2500. lbs

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
9.50000	0.00895533	1480000.	-27343.
9.02500	0.01027245	1480000.	-29919.
8.55000	0.01188194	1480000.	-32901.
8.07500	0.01608332	1480000.	-50990.
7.60000	0.01900139	1480000.	-56576.
7.12500	0.02270304	1480000.	-63686.
6.65000	0.03133799	1480000.	-97737.
6.17500	0.03975926	1480002.	-105306.

Drilled Shaft Embedment (USCS units).lp9o
 5.70000 0.05214360 1479996. -108232.
 5.22500 0.07665079 1479995. -128372.

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type	Load 1	Load 2	Axial Loading	Pile-head Deflection	Pile-head Rotation	Max in lbs
1	V, lb	5810.	M, in-lb	2500.	0.00896	-0.00360	
		1480000.					
		-27343.					

Maximum pile-head deflection = 0.0089553266 inches
 Maximum pile-head rotation = -0.0036043302 radians = -0.206513 deg.

The analysis ended normally.

WMATA Loading Analysis

ADDITIONAL LOADING ON WMATA TUNNEL JBW 3/27/19

ENGLISH UNITS

REFERENCE:

AASHTO Standard Specifications for Signs, Luminaires and Traffic Signals, 6th Edition
Abbreviation = LTS

AASHTO LRFD Bridge Design Specifications, 8th Edition
Abbreviation = AASHTO

Virginia Department of Transportation Manual of the Structure and Bridge Division
Abbreviation = VDOT

Arlington County Traffic Signal Standards; VDOT IIM-S&B-90.2
Abbreviation = IIM 90.2

WMATA Adjacent Construction Project Manual Revision 5a
Abbreviation = ACPM

WMATA Manual of Design Criteria, Release 9, Revision 2
Abbreviation = MDC

APPLICATION:

This worksheet is to determine the current load on the WMATA tunnel and the proposed loading to the WMATA tunnel.

NOTE: ACPM 3.14 states:

For WMATA cut and cover tunnels and any other underground structures: If new constructions is adjacent to or over existing WMATA cut and cover tunnels, establish earth pressure diagrams based on WMATA's design criteria and soil properties in Table No. 3-3. Establish the short term and long term loading conditions that will result from the adjacent construction. Adjacent construction activities shall not increase stresses and deformations in the existing WMATA tunnels and other underground structures. Any additional loadings must be transferred outside and below the tunnels and other underground structures unless expressly permitted by WMATA.

Water table will be the same for short-term and long-term, so only one case may be checked.

UNITS:	Length: Feet or Inches	ft = 12.00in
	Force: Pound Force or Kip	kip = 1000.00lbf
	Pressure: Pound per length squared	ksf = 1000.00psf
	Kip per length squared	ksi = 1000.00psi
	Unit Weight: Pound per unit cubed	kcf := 1000pcf
	Angles: Degrees ($\pi/180$)	deg = 0.02

Base Units: ft = 1L lb = 1M sec = 1T
K = 1K lbf = force

kip = 1000lbf

ton = 2000lbf

degF := 1K



Job: Signal Foundation over WMATA

Subject: Additional Load on WMATA

Project No.: 110010106

Designed By: CAD

Date: 03/22/2019

Checked By:

Date:

Note: Input parameters are in yellow highlight.

Checks for adequacy are in blue highlight with border

I. Geometry

I.1 Drilled Shaft

$$Dia_{shaft} := 5ft$$

[Diameter of drilled shaft]

$$A_{shaft} := \frac{\pi}{4} Dia_{shaft}^2 = 19.63 \times ft^2$$

[Area of drilled shaft]

$$L_{shaft} := 9.5ft$$

[Length of drilled shaft]

$$V_{shaft} := A_{shaft} \times L_{shaft} = 186.53 \times ft^3$$

[Volume of drilled shaft]

I.2 Vertical Clearance

$$VC_1 := 12.74ft$$

[Clearance between 30 ft mast arm ground elevation to top of tunnel; See clearance calculations]

$$VC_2 := 11.52ft$$

[Clearance between 45 ft mast arm ground elevation to top of tunnel; See clearance calculations]

II. Material Properties

II.1 Concrete

$$\gamma_c := 0.150kcf$$

[Concrete unit weight for cast-in-place concrete]

$$m_{\gamma} := \frac{1}{2}$$

[Distribution slope of load; MDC Plate A-4]

II.2 Soil

$$\gamma_{soil} := 110pcf$$

[Soil unit weight, conservative -- MDC Table V-2]

$$\phi_{soil} := 23deg$$

[Angle of internal friction -- MDC Table V-2]

Horizontal earth pressure is ignored due to equal and opposite.

III.1 Dead Load of Shaft (DC)

Dead Load from Drilled Shaft and Signal

$$DC_{\text{shaft}} := V_{\text{shaft}} \times \gamma_c - V_{\text{shaft}} \times \gamma_{\text{soil}} = 7.46 \text{ kip}$$

[Additional dead load of drilled shaft]

$$DC_{\text{signal}} := 2.5 \text{ kip}$$

[Dead load of mast arm; See Mast Arm calculations]

$$DC := DC_{\text{shaft}} + DC_{\text{signal}} = 9.96 \text{ kip}$$

[Total additional axial load to foundation]

Distribution of Vertical Pressure from Shaft on Tunnel

$$P_1 := \frac{DC}{\frac{\pi}{4} [2 \times m(VC_1 - L_{\text{shaft}}) + Dia_{\text{shaft}}]^2} = 186.80 \text{ psf}$$

[Additional vertical pressure on tunnel from drilled shaft and mast arm]

$$P_2 := \frac{DC}{\frac{\pi}{4} [2 \times m(VC_2 - L_{\text{shaft}}) + Dia_{\text{shaft}}]^2} = 257.37 \text{ psf}$$

[Additional vertical pressure on tunnel from drilled shaft and mast arm]

III.2 Vertical Earth Pressure (EV)

Existing Vertical Soil Pressure on Tunnel

$$EV_1 := VC_1 \times \gamma_{\text{soil}} = 1401.40 \text{ psf}$$

[Vertical pressure on tunnel from soil]

$$EV_2 := VC_2 \times \gamma_{\text{soil}} = 1267.20 \text{ psf}$$

[Vertical pressure on tunnel from soil]

III.3 Live Load Surcharge

Live Load Surcharge

$$LL := 300 \text{ psf}$$

[Live load surcharge for design; VCPM Appendix-3 Plate A-5A]

IV. Loading Summary

JBW 3/27/19

4 of 4

IV.1 LRFD Factored Existing Vertical Pressure on Tunnel

$$VP_{e1} := 1.35EV_1 + 1.75LL = 2416.89 \times \text{psf}$$

[Existing vertical pressure on tunnel]

$$VP_{e2} := 1.35EV_2 + 1.75LL = 2235.72 \times \text{psf}$$

[Existing vertical pressure on tunnel]

IV.2 LRFD Factored Proposed Vertical Pressure on Tunnel

$$VP_{p1} := 1.35EV_1 + 1.75LL + 1.25P_1 = 2650.39 \times \text{psf}$$

[Existing vertical pressure on tunnel]

$$VP_{p2} := 1.35EV_2 + 1.75LL + 1.25P_2 = 2557.43 \times \text{psf}$$

[Existing vertical pressure on tunnel]

IV.3 Vertical Pressure Increase on Tunnel

$$\frac{VP_{p1}}{VP_{e1}} = 1.10$$

[Ratio of the increase of vertical pressure]

$$\frac{VP_{p2}}{VP_{e2}} = 1.14$$

[Ratio of the increase of vertical pressure]

WMATA MANUAL OF DESIGN CRITERIA
FACILITIES, SECTION 15

TABLE V-2 SOIL PROPERTIES FOR DESIGN

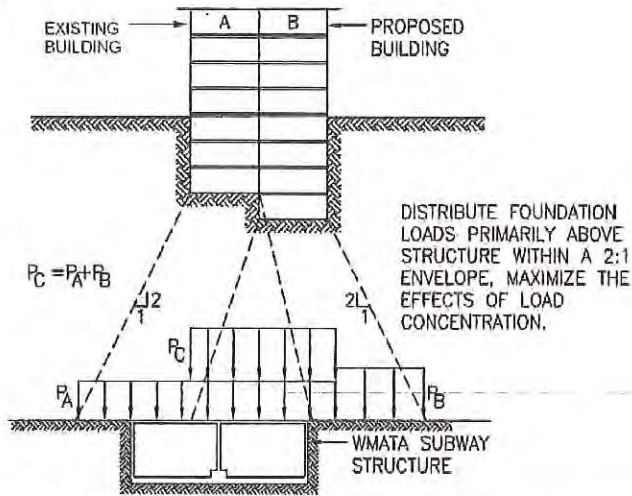
UNIFIED SOIL CLASSIFICATION	SHORT DESCRIPTION	MRV# SYMBOLS	FULL DESCRIPTION/SOURCE	SHEAR STRENGTH AND CONSOLIDATION CONDITION OF A COHESIVE STRATA	MIN. UNIT WEIGHT (PCF)	COEF OF SUBGRADE REACTION (KCF)	UNDRAINED SHEAR STRENGTH (KSF)	YOUNG MOD. OF SUBGRADE (KSI)	COEF. OF AT REST PRESS.	MAX. EFFECTIVE ANGLE OF FRICTION (DEGREES)	MAX. ALLOWABLE BEARING CAPACITY (TSF)
PRIMARY	SECONDARY										
ML & SM	SC & CL	F	FILL FILL GENERALLY COMPOSED OF INORGANIC SOIL OBTAINED FROM NEAR BY NATURAL MATERIALS. MAY BE DERIVED FROM TERRACE CRETACEOUS SOIL OR DECOMPOSED ROCK.	PLACED OVER MARSH, MIXED WITH GUNDS. NO CONSOLIDATION	120					28	NONE ORDINARILY
				FROM PLEISTOCENE SOILS	130					30	1.0 TO 1.50
				FROM DECOMPOSED ROCK (NW OF ROCK CREEK)	130					30	1.5 TO 2.0
				FROM CRETACEOUS CLAYS (NEAR UNION STATION). MAX. SHEAR STRENGTH, COHESIVE STRATA: 0.8 KSF	130					25	0.75
				MIXED WITH ORGANIC SOILS (SOUTH OF ROSSLYN)	120					28	
				OTHER LOCATIONS	130					30	1.0 TO 1.50
CL, CH, OH	OL & FT	A1	RIVER ALLUVIUM OF POST GLACIAL TIMES. VERY SOFT TO MEDIUM STIFF DARK GRAY ORGANIC CLAY WITH LENSES OF HIGHLY ORGANIC MATERIAL (WHERE LOCATED UNDER WATER). SOFT TO STIFF MOTTLED GRAY-BROWN SLIGHTLY ORGANIC SILTY OR SANDY CLAY (WHERE LOCATED IN LAND).	BENEATH FILL. OVERCONSOLIDATED 0.7 TO 0.3 TSF. STRENGTH 0.5 TO 0.7 KSF.	120					23	NONE ORDINARILY
				BENEATH WATER OVERCONSOLIDATED AS MUCH AS 0.2 TSF. STRENGTH 0.2 TO 0.3 KSF.	110					23	NONE
				MAX. SHEAR STRENGTH, COHESIVE STRATA: 0.9 KSF	120					23	0.75
SM	SF	A2	LOOSE TO MEDIUM COMPACT GRAY OR DARK BROWN SILTY FINE TO MEDIUM SAND WITH OCCASIONAL POCKETS OR LENSES OF SMALL GRAVEL. MAY BE SLIGHTLY TO MODERATELY ORGANIC.		130					30	2 TO 2.5
					130					30	2

TABLE V-2, page 1 of 5

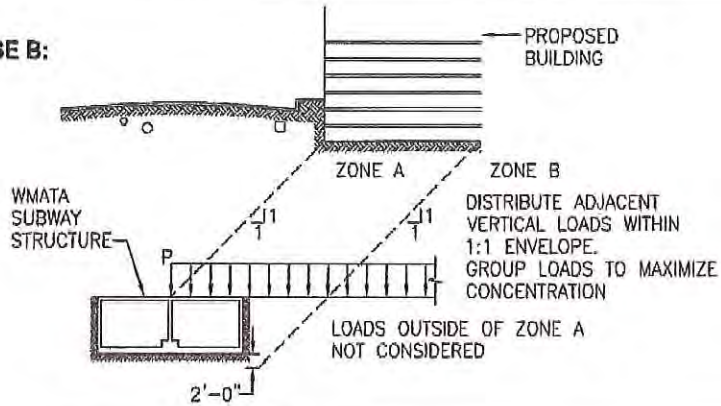
TABLE 15.2 page 1 of 5

PLATE A-4

CASE A:



CASE B:

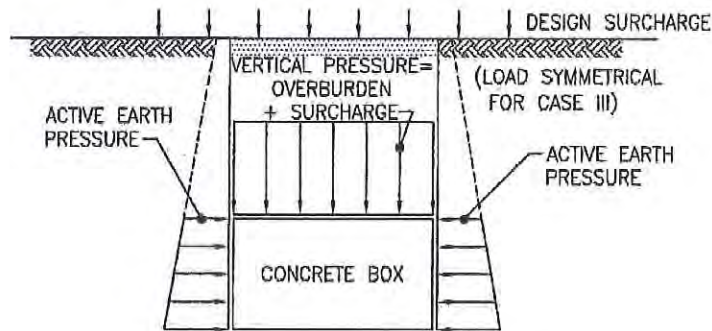
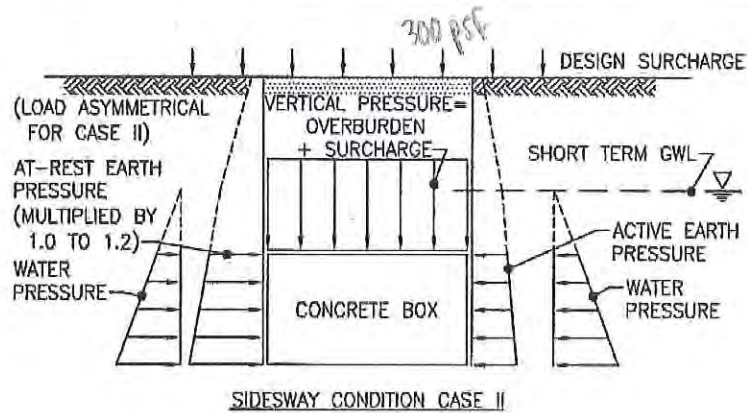


NOTE: EFFECTS OF THE LATERAL LOADS, DUE TO THESE VERTICAL LOADS, SHALL BE CONSIDERED ALONG WITH THE VERTICAL PRESSURES SHOWN HERE ON WMATA STRUCTURES.

DISTRIBUTION OF VERTICAL PRESSURES

WMATA ENGINEERING STANDARDS

PLATE A-5A



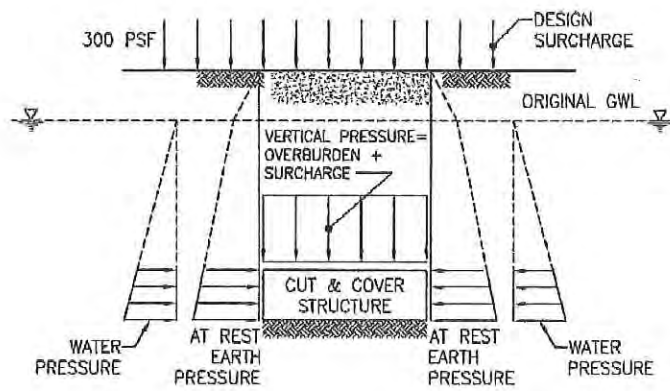
SIDESWAY CONDITION CASE III
 FOR SHORT TERM LOADING, CASE III, USE SYMMETRICAL ACTIVE EARTH PRESSURES ON SIDES, ASSUMING NO WATER PRESSURES.

SHORT TERM LOADING
CONCRETE BOX TUNNEL AND OTHER CUT & COVER STRUCTURES

(SEE DESIGN CRITERIA SECTION V.5.04 FOR DETAILS)

WMATA ENGINEERING STANDARDS

PLATE A-7A



MULTIPLY AT REST EARTH PRESSURE BY FACTOR 1.0 OR 1.2,
(WHICHEVER PRODUCES THE MOST CRITICAL STRESSES)

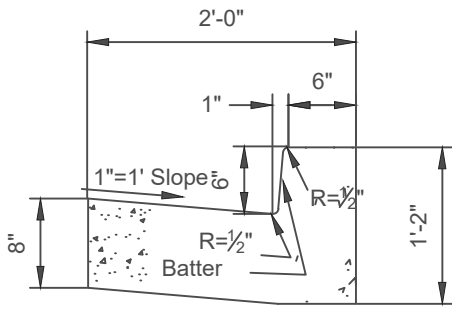
LONG TERM LOADING

CONCRETE BOX TUNNEL AND OTHER CUT & COVER STRUCTURES

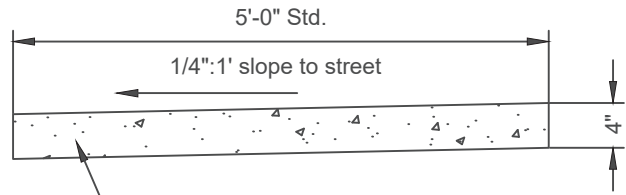
WMATA ENGINEERING STANDARDS

Additional Supporting
Documentation following
9/12/2019 WMATA Comments

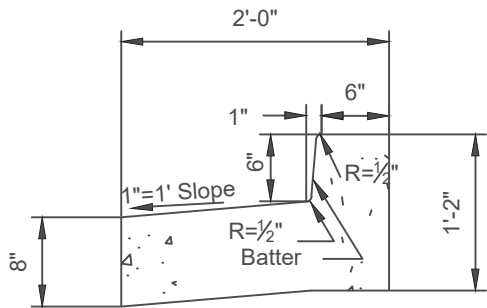
CAD
9/20/2019



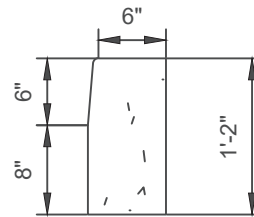
(C-2) STANDARD CURB & GUTTER



STANDARD CONCRETE SIDEWALK



(C-2R) STANDARD REVERSE
PITCH CURB & GUTTER



(C-3) STANDARD HEADER CURB

NOTES:

1. SECTION C-3 IS TO BE USED ONLY WITH RIGID TYPE PAVEMENT UNLESS OTHERWISE DIRECTED IN WRITING OR WHEN SHOWN ON APPROVED PLANS.
2. EXPANSION JOINTS IN HEADER CURB AND STANDARD CURB AND GUTTERS SHALL BE 40' APART OR AT EXPANSION JOINTS IN CONCRETE PAVEMENT.
3. EXPANSION JOINTS MAY BE OMITTED IF 1/8" JOINTS ARE PLACED EVERY 10' OF LESS
4. EXPANSION JOINTS IN THE SIDEWALK SHALL BE 40' APART. IF ADJACENT TO CONCRETE CURB, EXPANSION JOINTS SHALL MATCH JOINT OF CURB. AN EXPANSION JOINT SHALL BE PLACED BETWEEN CURB AND SIDEWALK.
5. SEE DRAWING R-2.2 FOR DETAIL OF SIDEWALK STRESS COLUMN TO BE PLACED UNDER SIDEWALK WHEN PLACED ADJACENT TO BACK OF CURB.
6. SEE ARLINGTON COUNTY SPECIFICATION SECTIONS 02611 AND 03100 FOR MATERIAL SPECS.
7. PROVIDE 6" MINIMUM AGGREGATE BASE HAVING CBR-30 UNDER CURB AND GUTTER.
8. PROVIDE 3" MINIMUM AGGREGATE BASE HAVING CBR-30 UNDER SIDEWALK

CONCRETE CURB & GUTTER AND SIDEWALK

Rev. Sidewalk Dims 07/11/2013

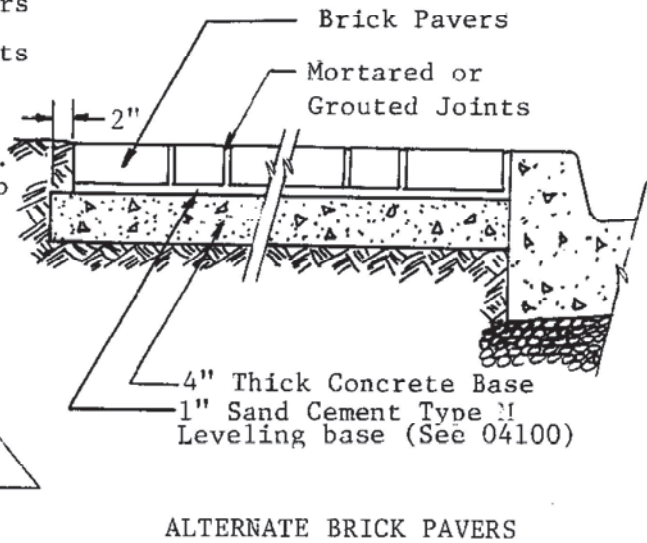
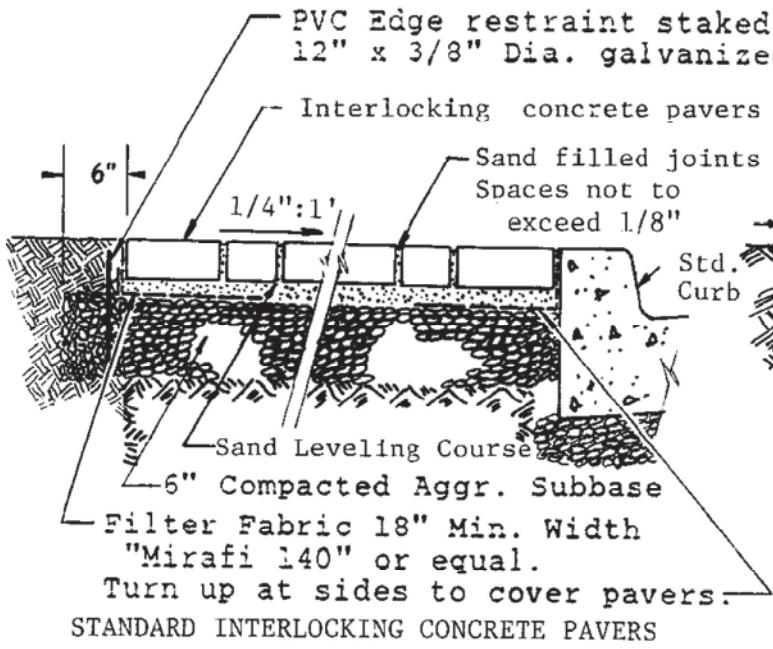
REVISION & DATE



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-2.0

CAD
9/20/2019



NOTES

1. Refer to Section 2611 and Section 2612 for specifications for Interlocking Concrete Pavers and Brick Pavers and other related materials shown on sidewalk applications.
2. All brick shall meet ASTM Specification C-902-78.
3. For driveway application see Drawing R-2.4 and related specs.

**INTERLOCKING CONCRETE AND BRICK PAVERS
FOR SIDEWALK APPLICATION**

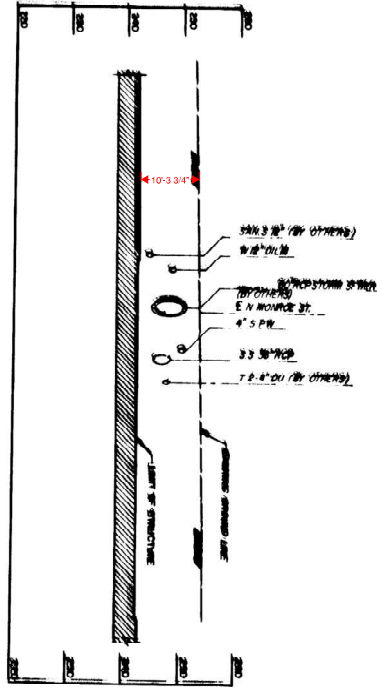
REVISION & DATE



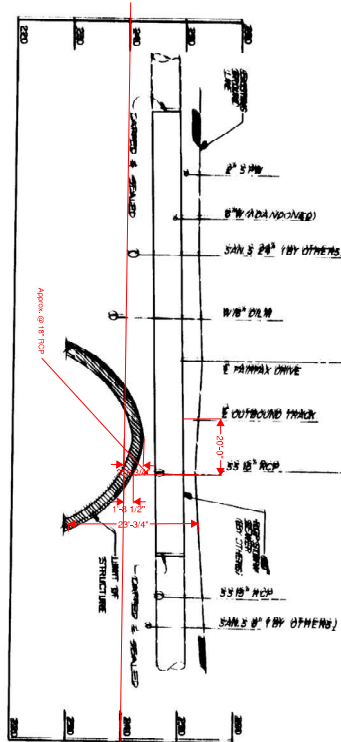
ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF ENVIRONMENTAL SERVICES

DRAWING NO.
R-2.1

CAD
9/20/2019



SECTION A-A
SEE DRAWING K3-U-22



SECTION B-B
SEE DRAWING K3-U-22

EL. Top of Tunnel =
240+3'-6 3/4"=243.56

<table border="1"> <tr><td>DATE</td><td>11/27/2019</td></tr> <tr><td>BY</td><td>W. J. SANDERS</td></tr> <tr><td>CHECKED</td><td>W. J. SANDERS</td></tr> <tr><td>SCALE</td><td>AS SHOWN</td></tr> </table>	DATE	11/27/2019	BY	W. J. SANDERS	CHECKED	W. J. SANDERS	SCALE	AS SHOWN	<table border="1"> <tr><td>NO.</td><td>1</td></tr> <tr><td>DESCRIPTION</td><td>UTILITY'S COMPOSITE SECTION</td></tr> <tr><td>DATE</td><td>11/27/2019</td></tr> <tr><td>BY</td><td>W. J. SANDERS</td></tr> <tr><td>CHECKED</td><td>W. J. SANDERS</td></tr> <tr><td>SCALE</td><td>AS SHOWN</td></tr> </table>	NO.	1	DESCRIPTION	UTILITY'S COMPOSITE SECTION	DATE	11/27/2019	BY	W. J. SANDERS	CHECKED	W. J. SANDERS	SCALE	AS SHOWN	<table border="1"> <tr><td>NO.</td><td>1</td></tr> <tr><td>DESCRIPTION</td><td>UTILITY'S COMPOSITE SECTION</td></tr> <tr><td>DATE</td><td>11/27/2019</td></tr> <tr><td>BY</td><td>W. J. SANDERS</td></tr> <tr><td>CHECKED</td><td>W. J. SANDERS</td></tr> <tr><td>SCALE</td><td>AS SHOWN</td></tr> </table>	NO.	1	DESCRIPTION	UTILITY'S COMPOSITE SECTION	DATE	11/27/2019	BY	W. J. SANDERS	CHECKED	W. J. SANDERS	SCALE	AS SHOWN	<table border="1"> <tr><td>NO.</td><td>1</td></tr> <tr><td>DESCRIPTION</td><td>UTILITY'S COMPOSITE SECTION</td></tr> <tr><td>DATE</td><td>11/27/2019</td></tr> <tr><td>BY</td><td>W. J. SANDERS</td></tr> <tr><td>CHECKED</td><td>W. J. SANDERS</td></tr> <tr><td>SCALE</td><td>AS SHOWN</td></tr> </table>	NO.	1	DESCRIPTION	UTILITY'S COMPOSITE SECTION	DATE	11/27/2019	BY	W. J. SANDERS	CHECKED	W. J. SANDERS	SCALE	AS SHOWN
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<p>WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY</p> <p>SANDERS & THOMAS, INC. CONSULTING ENGINEERS</p> <p>DE LEEM, CANTER GENERAL ENGINEERING CONSULTANTS</p> <p>AMBER DEESE & ASSOCIATES GENERAL CONTRACTORS</p>																																															
<p>VIENNA ROUTE</p> <p>UTILITIES</p> <p>COMPOSITE SECTIONS</p> <p>K3-U-22</p> <p>11/25/19</p>																																															

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
VIENNA ROUTE
UTILITIES
COMPOSITE SECTIONS
K3-U-22
11/25/19

Commonwealth Of Virginia

Department Of Transportation

Land Use Permit



Permit No 947-144096

Status APPROVED

This permit only grants permission to use whatever rights the Commonwealth Transportation Board and the Department of Transportation have in the right of way and no more, and it is the obligation of the permittee to secure any other releases or permission that may be needed in order to perform the work.

Effective Date Jun 24, 2021 Expiration Date Jun 24, 2022 Reinstatement Date

Permittee Information		Your Job# Traffic Singal Upgrade at Arlington Blvd & N Montague Street	Surety & Account Receivable Information	
Owner & Address	County of Arlington 2100 Clarendon Boulevard Suite 900 Arlington VA 22201	Agent	Name Arlington County	Surety Account VAAR00617
Contact	Anup Kafle	Contact	Surety Type Resolution	Amount 10,000,000.00
Phone#	703-228-7050	Phone#	Obligation Amount 1,000.00	Surety Holder CUSTOMER
Fax#		Fax#		
24 Hr#	703-795-9863	24 Hr#		

AUTHORIZATION: In compliance with your application, permission is hereby given insofar as the Commonwealth Transportation Board has the right, power, and authority under sections 33.2 - 210;33.2 - 240;33.2 - 241 of the Code of Virginia as amended, to grant by Special Agreement and/or by Land Use Permit for you to perform the work and or activity(s) described below:

Location

County/City/Town	Arlington County	Highway Route(s)	50 - Arlington Blvd.
From Route Number	NIS	From Route Name	N Manchester Steet
To Route Number	NIS	To Route Name	Kelsey Court

Work Description

Intersection improvements as well as traffic signal upgrade of Arlington Blvd & N Montague Street. All work shall conform to the provisions as listed on the LUP-SPG Special Provisions Form. WORK HOURS: Monday thru Thursday 9:30am-3pm, and Friday 9:30am-2pm. Information Sign Required; see item#7, General Requirements, LUP-SPG. LOCATION INSPECTOR: Mark Kaldmaa (703)259-2777. Lane closure request forms must be submitted to the inspector by COB Wednesday the week before the lane closure is needed and also entered into LCAMS/VA Traffic. All lane closures require the applicant to call VDOT TOC at 703-877-3401 before setup and after removal of MOT.

Payment Reference	Payment Date	Payment Type	Payment Amount
61594842	6/17/2021	Credit Card	\$1,220.00

Applicant has compiled with VA Code Section 56-265.15 Affidavit is attached.

TERMS:Applicable as stated in the VDOT Land Use Permit Regulations (current edition) and/or as per approved plans, and/or regulatory instructions, including but not limited to the LUP-SPG and/or agreement(s) attached hereto.

COMMONWEALTH TRANSPORTATION BOARD

By:

Jun 24, 2021

Robert Burton

- C** Call before you dig
A Allow the required time for marking
R Respect and protect the marks/flags
E Excavate carefully



Call Miss Utility
811

[] When checkbox is marked, by approving this permit, the issuing official certifies that the entrance was designed in accordance with Appendix F of the Road Design Manual

FINAL INSPECTION & SURETY REQUIREMENTS: Upon completion of the work or activity(s) authorized under this Land Use Permit, the permittee shall contact the following office in writing or by electronic communication to request final inspection and release of the surety obligation for this permit.

NOVA District - Fairfax Permits
4975 Alliance Drive Suite 1N
Fairfax, VA VA 22030

Permit No.947-144096

VDOT's Web Site: www.vdot.virginia.gov

Permittee Copy