III. SUPPLEMENTAL SPECIFICATIONS

TABLE OF CONTENTS

2013 COUNTY SPECIFICATIONS MODIFIED:

COUNTY SPECIFICATIONS ADDED:

02804	WETLAND PLANTING
02805	GOOSE EXCLUSION FENCING
02806	BIODEGRADEABLE TREE SHELTERS
02900	PAVEMENT MARKINGS
03101	WEIR BOX MODIFICATION
05501	STEEL GRATING
05502	CABLE RAILING
06250	COMPOSITE WOOD TIMBERS
06251	WOOD CAP FOR RAILING
13140	TRASH RACK WITH PEAK ROOF
13142	STOP GATE
13143	WATERGOAT
13144	BEAVER POND LEVELER
13145	TURTLE BASKING STATION
13146	IPE TIMBER
13148	ARTICULATING CONCRETE BLOCK (ACB) SYSTEM
13180	MAINTENANCE AND CONTROL OF TRAFFIC
101400	PARK SIGNS
101423	PANEL SIGNAGE
311300	TREE PROTECTION AND ROOT PRUNING
323300	SITE FURNISHINGS
329100	PLANTING PREPARATION
329200	SEEDING AND SODDING
329300	EXTERIOR PLANTS

SECTION 01000 GENERAL PROVISIONS AND REQUIREMENTS

This Section shall conform to the Arlington County Construction Standards and Specifications of Section 01000 except as modified herein.

Add the following to Section 01000:

19. Environmental Protection

The Contractor shall implement measures to prevent releases of pollution to the environment and unauthorized discharges to the County's storm drain system or surface waters. The Contractor shall ensure the pollution prevention measures outlined in Section 01500 Erosion and Sediment Control and Pollution Prevention are implemented throughout the duration of the work.

When the work includes an approved Stormwater Pollution Prevention Plan (SWPPP) required under Chapter 60 of the County Code (land disturbance of at least 2,500 square feet), the Contractor shall strictly abide by this plan which includes: a Pollution Prevention (P2) Plan, an Erosion and Sediment Control (ESC) 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

SECTION 01300 SUBMITTALS

This Section shall conform to the 2013 Arlington County Construction Standards and Specifications of Section 01300 except as modified herein.

Delete specification 01300 in its entirety and replace with:

This section outlines the requirements for submitting and processing the construction schedule, substitutions, shop drawings, samples, and other data which are required for the Engineer's review for conformance with the standards, specifications and contract documents.

PART 1 – GENERAL

1.1. Purpose of Section

This section outlines the requirements for submitting and processing the construction schedule, substitutions, shop drawings, samples, and other data which are required for the Engineer's review for conformance with the standards, specifications and contract documents.

1.2. Related Requirements Specified Elsewhere

Section 01000 – General Provisions and Requirements

Section 01400 - Testing

1.3. Submittals – General Requirements

A. The Contractor or permit holder shall not begin work which requires the submission of other data, until said submittals are returned with the Engineer's initials or signature indicating review and acceptance.

B. After any Submittal has been reviewed by the Engineer, no change will be considered unless satisfactory evidence is presented to prove that the approved Submittal cannot be obtained or that such change is in the County's best interest.

C. All submittals shall be made so as to cause no delay in the project, allowing reasonable time for review and checking by the Engineer. Except as specified otherwise, all submittals shall be submitted at least ten (10) Business Days before the start of the affected work.

D. Submittal shall be accompanied by all required certifications and other such supporting materials and in such sequence or in such groups that all related items may be checked together.

E. When Submittals cannot be adequately reviewed because a submission is incomplete, does not include all necessary appurtenant submittals, has been submitted out of sequence, is illegible, or for any other reason, the Submittal will be returned by the

Engineer without action, or will be held until such materials as are necessary are received. Incomplete or defective submissions as described above shall not be considered to have been submitted.

F. Submittals shall have been reviewed by the Contractor and coordinated with all other related or affected work before they are submitted for approval. If the submittals indicate variations from the Contract Documents because of standard shop practice or other reasons, the Contractor shall make specific mention of such variations in the Contractor's letter of transmittal such that, if acceptable, suitable action may be taken for proper adjustment. Otherwise, the Contractor will not be relieved of the responsibility of executing the work in accordance with the Contract Documents, even if the Submittal was approved.

G. The Engineer shall review the submittals with reasonable promptness. Review and/or approval of submittals will be general for conformance with the design concept of the project and compliance with the information given in the Contract Documents. Approval shall not be construed as permitting any departure from Contract requirements, as authorization of any increase in price, as verification of quantities or field conditions, nor as relieving the Contractor of the responsibility for any error in details, dimensions, or otherwise that may exist.

H. The Contractor shall be responsible for the detailed accuracy of the submittals. Deviations in submittals from the requirements of the Contract Documents or the construction standards shall not be relieved unless the Engineer specifically accepts deviations named in writing by the Contractor.

I. Unless otherwise specified, submit three copies of all submittals.

J. Accompany submittals with a transmittal letter containing the following information:

1. Date
2. Project title and number
3. Contractor's and supplier's name and address
4. The number of each shop drawing, product data and sample submitted.
5. Identification of product or material
6. Relation to adjacent structure or material
7. Field dimensions, clearly identified as such
8. Applicable specification section number
9. Applicable standards, such as ASTM number or VDOT specifications.
10. Identification of deviations from Contract Documents
11. Contractor's stamp, initiated or signed, certifying his review of the submittal, verification of field measurements and compliance with Contract Documents.

1.4. Construction Schedule - The Contractor shall submit a detailed construction schedule that contains early start, late start and activity duration for the following tasks:

A. Submission of Shop Drawings
B. Submission of Material Certifications
C. Mobilization
D. Construction Survey
E. Verification that all pretreatment of invasive vegetation is complete
F. Installation and Maintenance of E&S Control Measures (Including Temporary Bridge)
G. Set-up and Break Down of Pump Around Facilities
H. Tree Protection and Tree Removal
I. Dredging of Pond
J. Stripping and Stockpiling Topsoil – (In North Turf Area)
K. Re-grading and stabilizing slopes for New Maintenance Access Road
L. Re-grading pond for installation of Forebay and new Conveyance Channels
M. Installing Erosion Control Fabric and Riprap protection
N. Installing of all Wetland areas
O. Seeding, Planting and Mulching
P. Retrofitting Weir, including stairs.
Q. Installing Overlook and Turtle Basking Logs.
R. Installing Upland Plants
S. Demolition/Replacement/Reconstruction of Asphalt Trail (eastern side of pond)
T. Removal of all E&S measures
U. Installing trash control structures.
V. Installing Site Furnishings, Park Fixtures and Signage

1.5. Supplier of Products

A. The Project Officer must approve all subcontractors, suppliers and products prior to the Contractor engaging or ordering any products or subcontractors or suppliers.
B. The Contractor shall submit a list of suppliers and service suppliers listed by specification section and include with each supplier listing:
    1. Name and address of the manufacturer
    2. Trade Name
    3. Model or catalog designation
    4. Manufacturers data:
        a. Engineering computations
        b. Certifications as required by these specifications
        c. Reference standards

1.6. Substitutions

A. All requests for substitution of products identified in these provisions by trade name must be made and approved prior to ordering any supplies, or engaging services.
B. All proposals for substitutions shall be submitted to the Project Officer by the Prime Contractor only, in writing.

C. The Contractor shall submit five copies of all requests for substitution. Included with each request should be:
   1. Complete data substantiating compliance of the proposed substitution with contract documents.
   2. Product identification, including manufacturer's name, address and literature containing a detailed description, product test data and reference to all applicable standards.
   3. Samples, if applicable.
   4. Name and address of similar projects on which product was used and date of installation.
   5. Itemized comparison of proposed substitution with product or method specified including any changes in construction schedule, relation to separate contracts and accurate cost data on proposed substitution in comparison with product or method specified.

D. The Project Officer shall review proposed substitutions and approve or deny their use in writing within 10 working days of *submittal.* The Contractor shall abide by the Project Officer's recommendations when proposed substitute materials or items of equipment are not accepted for installation and shall furnish the specified material or item of equipment in such case.

1.7. Shop Drawings

A. The Contractor shall submit plans that illustrate the portion of the work required by these plans and specifications to the detail specified.
B. All shop drawings will indicate the sheet and or section of these specifications to which it is responsive.
C. The minimum sheet size for shop drawings is 8.5 x 11 inches; the maximum size is 24 x 36 inches.
D. Shop drawings shall contain all information required to determine the adequacy of the proposed work covered by it. This information may include performance specifications, tolerances, operation and maintenance instructions, materials testing results, reports, etc.
E. Shop drawings for items that are an extension of these design documents and special provisions (i.e. Span Bridge Stream Crossing Design) shall include the signature and seal of a Professional Engineer, licensed in the Commonwealth of Virginia.
F. Contractor shall submit 6 (six) copies of all submittals/shop drawings.
G. The Engineer will review the Shop Drawings within ten (10) Business Days.

1.8. Samples

A. Where required, provide physical examples to illustrate materials, equipment or workmanship, and to establish standards by which completed work is to be judged in such quantities and locations as required by the specifications.
B. Samples shall be submitted in single units, unless specified otherwise.
C. Materials and equipment incorporated into the Work shall match the approved Samples.

1.9. Other Submittals

A. The submittals described below are those required and further described in other sections of the technical specifications. Submittals required by the CONTRACT CLAUSES and other non-technical parts of the contract are not included in this section.

1. SD-01 Data:
   Submittals that provide calculations, descriptions, or documentation regarding the work.
2. SD-06 Instructions:
   Preprinted material: 1) Describing the installation of a product, system or material and; 2) Concerning impediments, hazards, and safety precautions (including special notices and material safety data sheets, if any).
3. SD-07 Schedules:
   Tabular lists showing location, features or other pertinent information regarding products, materials, equipment or components to be used in the work.
4. SD-08 Statements:
   A document, required of or through the Contractor, from a supplier, installer, manufacturer or other lower tier Contractor, the purpose of which is to confirm the quality or orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel, qualifications or other verifications of quality.
5. SD-09 Reports:
   Reports of inspections or tests, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used shall be identified and test results shall be recorded.
6. SD-13 Certificates:
   Statement signed by the responsible official(s) of a manufacturer of a product, system or material, attesting that the product, system or material meets specified requirements. The statement must be dated after the award of this contract, must name the project, and must list the specific requirements that are being certified.
7. SD-18 Records:
   Documentation to record compliance with technical or administrative requirements.
8. SD-19 Operation and Maintenance Manuals:
   Data that forms a part of an operation and maintenance manual.

1.10. Resubmission Requirements

A. If Submittals are disapproved or require revision, revise the initial submittal and resubmit as specified for initial submittal. Indicate on re-submittal any changes which have been made other than those requested by the Engineer.

END SECTION

SECTION 01500 TEMPORARY EROSION AND SEDIMENT CONTROL

This Section shall conform to the 2013 Arlington County Construction Standards and Specifications of Section 01500 except as modified herein:

Delete specification 01500 in its entirety and replace with:

PART 1- GENERAL

1.1 Description of Work

This work shall consist of implementation of erosion and sediment control and pollution prevention measures throughout the duration of the work to prevent unauthorized non-stormwater discharges or pollution releases to the storm drain system or surface waters.

Where work is governed by an approved Stormwater Pollution Prevention Plan (SWPPP), the Erosion and Sediment Control and Pollution Prevention components of the SWPPP shall apply.

Erosion and sediment control measures shall include, but are not limited to, the use of berms, dikes, dams, sediment basins, fiber mats, silt fences, straw bales, washed gravel or crushed stone, mulch, grasses, slope drains, temporary seeding, and other methods. Erosion and sediment control measures shall be applied to erodible material exposed by any activity associated with the construction, and consistent with federal, state and local regulations.

All non-stormwater discharges to the County's storm drain system, which includes the curb and gutter as well as the underground pipe network, or any open watercourse must comply with the conditions of the County's Virginia Stormwater Management Program, Municipal Separate Storm Sewer System (MS4) Permit. Examples of unauthorized non-stormwater discharges include but are not limited to, wash water, slurry runoff from saw cutting, discharges associated with vehicle, equipment, and/or material washing, concrete wash water, process water, waste water, leaks from portable lavatories, equipment, vehicles and/or waste receptacles. Only clear, uncontaminated stormwater discharges and/or permitted non-stormwater discharges (as specified in a Virginia Pollutant Discharge Elimination System (VPDES permit)) are allowed to be discharged to the storm drain system or surface waters. Contaminants, including but not limited to, volatile organic compounds, petroleum products, metals, PCBs/Pesticides shall not be discharged to the County's storm sewer system.

1.2 Related Work Specified Elsewhere

Section 02100- Clearing and Grubbing

Section 02200- Earthwork

1.3 Applicable Regulations

Erosion and Sediment Control (Chapter 57 of the Arlington County Code)

Utilities (Chapter 26 of the Arlington County Code)

Stormwater Management (Chapter 60 of the Arlington County Code)

Chesapeake Bay Preservation Ordinance (Chapter 61 of the Arlington County Code)

Trees and Shrubs (Chapter 67 of the Arlington County Code)

Virginia State Water Control Board Regulations

1.4 Applicable References

Virginia Erosion and Sediment Control Handbook

Arlington County Stormwater Management Ordinance Guidance Manual

Arlington County Planning Guide to Erosion and Sediment Control

Arlington County Pre-Storm Erosion and Sediment Control Checklist

Arlington County Planning & Field Guide for Pollution Prevention (P2)

Arlington County Tree Protection and Planting Standards

1.5 Submittals

Prior to the start of any work that does not require a Land Disturbing Activity (LDA) and SWPPP, the Contractor shall prepare and submit a plan for implementing erosion and sediment control and pollution prevention measures. The plan shall include, but is not limited to, the operations of clearing and grubbing, stripping of topsoil, grading, stabilizing cleared areas, dewatering, spill prevention and cleanup, and the construction of structures at watercourses.

Any activity that disturbs greater than or equal to 2500 square feet requires a Stormwater Pollution Prevention Plan per the requirements of Arlington County Code Chapter 60. This plan contains the following elements:

A. Erosion and Sediment (E&S) Control Plan
B. Pollution Prevention Plan (P2 Plan)
C. Stormwater Management Plan (SWMP)
D. Virginia Stormwater Management Program (VSMP) Requirements where applicable

Construction work shall not commence until the schedule of work and the methods of operations have been reviewed and approved by the Engineer / Project Officer.

Erosion and sediment controls shall be coordinated with the construction of permanent stormwater management facilities, drainage facilities and other contract work to the extent practicable to assure economical, effective, and continuous erosion and sediment control, and to prevent any damage, clogging, or other negative impacts upon the Work or other property.

Where work is governed by an approved SWPPP, the Contractor shall be responsible for all SWPPP self-inspection and documentation requirements.

Where work is governed by an approved SWPPP, the Contractor shall be responsible for all SWPPP self-inspection and documentation requirements which includes but is not limited to the following:

A. A SWPPP box is installed and maintained at project site.
B. Permit(s) and applicable documentation are posted near the SWPPP box.
C. All sections of the SWPPP are kept complete and up to date throughout the duration of the project. (For example, notation of when erosion and sediment controls (ESC) are installed and information about the types of pollution prevention measures used.)
D. Any modifications to controls are documented in the SWPPP, which includes the ESC plan.
E. Self-inspections are conducted every four business days or as required.
F. Completed and signed inspection reports are kept at the project site.

G. Items identified during inspections requiring correction action are properly documented and addressed.
H. The ESC Pre-storm checklist provided in the plan / SWPPP is used and followed accordingly.

1.6 Permits

The Contractor is responsible for complying with all applicable State, Federal, and Local permits which are required for construction, including, but not limited to:

A. Virginia Water Protection Permits issued by the Virginia DEQ
B. General Nationwide Permits issued by the US Army Corps of Engineers
C. Land Disturbing Activity (LDA) permits (Virginia Stormwater Management Program (VSMP) authority permits) issued by Arlington County
D. General Virginia Pollutant Discharge Elimination System (VPDES) Permit for Discharges of Stormwater from Construction Activity issued by Virginia DEQ.

A separate VPDES permit, issued by DEQ may be required for certain non-stormwater discharges such as contaminated groundwater.

Unless otherwise specified as the responsibility of the Contractor in the ITB or contract documents, the County will obtain all applicable permits prior to awarding the contract. Permits will then be transferred to the Contractor.

PART 2 - MATERIALS

Materials shall be at the Contractor's option with the approval of the Engineer/Project Officer in accordance with Arlington County Code, Erosion and Sediment Control Ordinance (Chapter 57).

PART 3 - EXECUTION

3.1 Installation and Maintenance of Erosion and Sediment Controls

Where work is governed by an approved SWPPP, the contractor shall follow the plan and Erosion and Sediment Control Pre-Storm Checklist, which includes but is not limited to the conditions below. Where the work is not governed by an approved SWPPP, the contractor shall meet the conditions below as well as those specified in the Erosion and Sediment Control Pre-Storm Checklist.

A. The Contractor, prior to starting work, shall properly protect storm drains to prevent pollutants, waste materials, sediment, or non-stormwater discharges from entering the storm drain system. The Contractor shall implement and maintain controls as specified in the Virginia Erosion and Sediment Control Handbook and/or approved Stormwater Pollution Prevention Plan. Controls, practices, and/or devices must be monitored and maintained at all times to ensure proper operation condition.

B. No grading operations will be allowed until erosion and sediment controls have been installed in accordance with the approved plan conforming to the requirements of Virginia Erosion and Sediment Control regulations and Arlington County Erosion and Sediment Control Ordinance.

C. The Contractor shall keep stockpiled materials covered and perimeter controls shall be employed to minimize exposure to wind, precipitation, and runoff.

D. The Contractor shall implement and maintain dewatering methods as specified in Arlington County Construction Standards and Specifications, VA Erosion and Sediment Control Handbook, Arlington County Planning & Field Guide to Erosion and Sediment Control, Arlington County Planning & Field Guide for Pollution Prevention (P2) and/or approved Stormwater Pollution Prevention Plan. Controls, practices, and/or devices used for dewatering operations must be monitored and maintained at all times to ensure proper operation.

E. 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 will comply with applicable regulations must be included as part of the erosion and sediment control plan.

F. The Contractor is responsible for the installation and maintenance of any additional erosion and sediment control (ESC) measures necessary to prevent erosion and sedimentation as determined by the County, including but not limited to the actions listed in the County's Erosion and Sediment Control Pre-Storm Checklist (perimeter controls, slope stabilization, and covering stockpiles). Erosion and sediment controls shall be modified as needed to ensure clear water is discharged from the site. The County reserves the right to order the implementation of other erosion and sediment controls not specifically described herein to correct an erosion or pollution discharge condition.

G. Control measures shall be properly maintained in accordance with state and local regulations. Immediately after every rainstorm, all control measures shall be inspected and any deficiencies corrected by the Contractor.

H. Erosion and sediment controls shall be removed when the area has been stabilized and approval has been granted by the construction inspector.

I. No further work will be allowed until erosion and sediment controls for the applicable phase have been installed in accordance with the approved plan conforming to the requirements of Virginia Erosion and Sediment Control regulations and Arlington County Erosion and Sediment Control Ordinance.

3.2 Pollution Prevention Measures

Where work is governed by an approved SWPPP, the contractor shall follow the plan, which includes but is not limited to the conditions below. Where the work is not governed by an approved SWPPP, the contractor shall meet the conditions below.

A. The Contractor shall employ good housekeeping at work sites at all times. The Contractor shall collect, remove and legally dispose of all refuse, trash, litter, waste materials, and/or debris generated at the work site as frequently as necessary to prevent pollution releases from the site. Liquid waste must be properly contained prior to being placed into a waste receptacle to

prevent leaking. The County, in its sole discretion, may require the Contractor to provide disposal tickets or other information sufficiently demonstrating legal disposal.

B. The Contractor shall contain, capture, collect and legally dispose of any unauthorized non-stormwater discharge(s), including but not limited to, saw cut slurry from saw cutting operations, concrete / asphalt wash water, waste water, and / or wash water from equipment, material, and/or vehicle washing.

C. A vacuum system shall be used to collect liquid waste / slurry generated from saw cutting operations to prevent a discharge to a storm drain or surface water. Collected slurry must be disposed of at an approved waste receiving facility (e.g. landfill, soil safe, waste water treatment plant, commercial dump pad).

D. Methods used for capturing / collecting unauthorized non-stormwater discharges must be on site and operational prior to starting any work that will generate a non-stormwater discharge.

E. The Contractor shall have designated wash out areas or containers for materials, including but not limited to concrete, asphalt, paint, grout, mortar, stucco, form release oil, curing compounds, and /or sealers.

F. Construction materials shall be properly stored and secured to ensure no pollutants are released into the environment.

G. The Contractor shall ensure waste receptacles and portable lavatories are not damaged and/or leaking.

H. The Contractor shall ensure spill clean-up materials (including but not limited to absorbent materials, spill pads, rags, booms, bags for waste disposal) and tools (including but not limited to shovels, brooms, containers, vacuums) are kept on the work site and accessible at all times. Spills and leaks shall be cleaned up as soon as discovered and wastes properly disposed of at an approved waste receiving facility. Spills shall not be washed into a street, storm drain, or surface waters.

I. The Contractor shall ensure that the County's procedures for disposing of chlorinated water are followed (DES Construction Standards and Specifications, Section 02550 4.12 Discharge of Chlorinated Water).

J. The Contractor shall not dump or dispose of anything in a storm drain, street, or stream that is not authorized under the County's VSMP MS4 permit or violates County Code Chapter 26-5 B and/or C.

3.3 Extent of Grading Operations

A. The Contractor shall limit the surface area of earth material exposed by grubbing, stripping of topsoil and excavation to that which is necessary to perform the next operation within a given area.

B. Unless specifically authorized by the Project Officer, the grubbing of root mat and stumps shall be confined to the area over which excavation is to be actively conducted within 30 days following the grubbing operations.

C. The stripping of topsoil shall be confined to the area over which excavation is to be actively prosecuted within 15 days following the stripping operations; and excavation and embankment construction shall be confined to the minimum area necessary to accommodate the Contractor's equipment and work force engaged in the earth moving work.

D. No disturbed area, including stockpiles, shall remain denuded longer than 7 days without temporary seeding or application of other stabilization practices approved by the Project Officer.

3.4 Tree Protection

1. The Contractor shall ensure the specifications in the County's Tree Protection and Planting Standards are followed throughout the duration of the work.

2. The Contractor shall protect all existing trees within a Tree Protection Zone.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Measurement and Payment

1. Payment shall be in accordance with Section 01200 - Measurement and Payment, and per the parameters described in this sub-section.
2. Temporary Erosion and Sediment Controls as detailed on the approved plan and as indicated in the bid line item shall be paid in lump sum.
3. SWPPP Administration as detailed under section 1.5 of this specification shall be incidental to the lump sum.
4. Unless otherwise specified, no separate payment shall be made by the County for maintenance of erosion and sediment controls or implementation of the pollution prevention measures specified on an approved plan, methods, or sequence of work; this work is considered to be a subsidiary obligation to the Contract.
5. No separate payment shall be made by the County for erosion and sediment controls or pollution prevention measures required to correct conditions created due to the Contractor's negligence, carelessness or failure to install or properly maintain controls in accordance with approved plans
6. No separate payment shall be made by the County for changes to the plans which are the result of the Contractor's work schedule or resource allocation, weather delays, or other factors not controlled by the County.
7. Unless otherwise specified, no separate payment shall be made by the County for implementation of spill clean-up, hauling fees, and/or collection, handling, transport and legal disposal of unauthorized non-stormwater discharges (slurry, waste water, wash water) and/or other waste materials; this work is considered to be a subsidiary obligation to the Contract.

8. In the event the Contractor repeatedly fails to satisfactorily control sediment and pollution releases, the County reserves the right to employ outside assistance or to use its own forces to provide the corrective measures indicated; the cost of such work, plus engineering costs, will be deducted from payments due to the Contractor for other work.

END SECTION

SECTION 02100 CLEARING AND GRUBBING

This Section shall conform to the 2013 Arlington County Construction Standards and Specifications of Section 02100 except as modified herein.

Add the following to Section 02100, PART 2 - MATERIALS:

This section left intentionally blank.

Add the following to Section 02100, PART 3 - EXECUTION:

6. Clearing

The area of clearing (limits of disturbance) shall be maintained within the limits shown on the plans.

The Contractor shall ensure the specifications in the County's Tree Protection and Planting Standards are followed throughout the duration of the work. Trees and other vegetation that will not be removed shall be properly protected to avoid damage and limit adverse impacts. Protection devices around tree protection areas shall be installed and maintained throughout the duration of the work as directed by the Urban Forester (DPR). There shall be no disturbance inside the boundaries of the tree protection area. Equipment and materials may not be stored inside tree protection areas.

9. Salvage

d. Unless otherwise required for use in association with the project, or as directed by the Project Officer, all locust and willow logs of 4 to 18-inch caliper shall be cut into 6 to 12-foot lengths and stockpiled in an accessible location for pick up, which shall be coordinated by the County. Unless otherwise required for use in association with the project, or as directed by the Project Officer, all additional trees shall be cut into firewood lengths. Firewood length cut wood shall be stockpiled in an accessible location on site for pickup, which shall be coordinated by the County.

Add the following to Section 02100 PART 4 – Measurement and Payment

Payment shall be in accordance with Section 01200 - Measurement and Payment.

The removal of any designated tree smaller than 6" DBH shall be consider clearing and incidental to the work.

Demolition of existing infrastructure, including fencing, park amenities and utilities, in accordance with the approved plan shall also be considered incidental to the work. Demolition includes all materials, equipment, and labor necessary for the work including excavation, handling, storage and disposal of materials, backfilling, compaction, testing, and all other activities necessary to comply with these Specifications.

SECTION 02200 EARTHWORK

This Section shall conform to the 2013 Arlington County Construction Standards and Specifications of Section 02200 except as modified herein.

Add the following to Section 02200, PART 1 - GENERAL:

1. Saw Cutting

A vacuum system shall be used to collect liquid waste / slurry generated from saw cutting activities. Collected slurry must be hauled off and disposed of at a proper waste receiving facility (e.g. landfill, soil safe, waste water treatment plant, commercial dump pad).

Modify the following portions of Section 02200:

PART 3 - EXECUTION

18. Dewatering

At all times during construction the Contractor shall keep all excavations dry and promptly remove all water entering trenches and other excavations until the structures, pipes, and appurtenances to be built therein have been completed and backfilled. Dispose of all water pumped or drained from the work without impact to the Work, traffic, or injury to public or private property, and in compliance with all Local, State, and Federal regulations.

The Contractor shall implement and maintain dewatering methods as specified in Arlington County Construction Standards and Specifications, VA Erosion and Sediment Control Handbook, Arlington County Planning & Field Guide to Erosion and Sediment Control, Arlington Planning & Field Guide for Pollution Prevention (P2) and/or approved Stormwater Pollution Prevention Plan. Controls, practices, and/or devices used for dewatering operations must be monitored and maintained at all times to ensure proper operation condition.

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 will comply with applicable regulations must be included as part of the erosion and sediment control plan.

PART 4 - MEASUREMENT AND PAYMENT

25. Excavation

Delete: When explicitly **included** as a pay item, Excavation will be measured by the cubic yard as illustrated on the approved plans, or as approved by the Project Officer. Excavation in excess of that shown on the approved plans will not be compensated, unless specifically approved in advance by the Project Officer. Payment will include all labor, materials, and equipment and will include excavation, handling, storage and disposal of materials, backfilling, compaction, testing, and all other activities necessary to comply with these Specifications.

Add: Payment for excavation shall in accordance with Section 01200 – Measurement and Payment. Excavation in excess of that shown on the approved plans will not be compensated, unless specifically approved in advance by the Project Officer. Payment will include all labor, materials,

and equipment and will include excavation, handling, storage and disposal of materials, backfilling, compaction, testing, and all other activities necessary to comply with these Specifications. Payment for excavation documented by an approved change order shall be measured by the cubic yard as approved by the Project Officer.

26. Fill

Delete: When explicitly **included** as a pay item, Fill will be measured by the cubic yard in place as illustrated on the approved plans, or as approved by the project Officer, and will include all materials, equipment, and labor to construct the fills or embankments as illustrated on the construction drawings. Unless otherwise specified, Backfilling of excavations will not be compensated as Fill. Payment will include all clearing and grubbing, preparation, acquisition, transporting, storing, and handling of material, placement, shaping, compaction, and other activities necessary to comply with these Specifications.

Add: Payment for fill shall be in accordance with Section 01200 – Measurement and Payment. Payment for fill will include all materials, equipment, and labor to construct the fills or embankments as illustrated on the construction drawings. Unless otherwise specified, Backfilling of excavations will not be compensated as Fill. Payment will include all clearing and grubbing, preparation, acquisition, transporting, storing, and handling of material, placement, shaping, compaction, and other activities necessary to comply with these Specifications. Payment for fill documented by an approved change order shall be measured by the cubic yard in place, as approved by the project Officer.

Testing

Delete: Testing will be considered subsidiary to the Work and no compensation will be approved. If the Project Officer directs testing in excess of that required by the Contract Documents, the Contractor shall be entitled to compensation unless such testing reveals noncompliant work

Add: Materials testing shall be in compliance with County Specification Section 01400, and the Special Conditions of this Contract.

Add:

28. Saw Cutting

The cost for saw cutting shall be incidental to other items in the Contract; therefore, there will be no separate payment for saw cutting.

29. Protection of Existing Structures, Utilities or Property

Add: Test pits to verify location of existing utilities are considered incidental to the lump sump price for Earthwork.

Payment units for approved change orders shall be as follows:

FILL that is in excess of what is shown on the approved plans but is required by change order shall be measured in CUBIC YARDS. Payment shall include all labor, materials, and equipment necessary to furnish and install the fill.

EXCAVATION that is in excess of what is shown on the approved plans but is required by change order shall be measured in CUBIC YARDS. Payment shall include all labor, materials, and equipment necessary to complete the excavation.

END SECTION

SECTION 02500 GRAVITY SEWERS AND APPURTENANCES

This Section shall conform to the 2013 Arlington County Construction Standards and Specifications of Section 02500 except as modified herein.

Add the following to Section 02500, PART 2 - MATERIALS:

Polypropylene Pipe (PPP)

1. PPP shall conform to ASTM F2881 and AASHTO M330
2. Joint performance shall meet or exceed ASTM D3212

Add the following to Section 02500, PART 3 – EXECUTION:

1. General
   5. In the event of a water or sewer emergency, the Contractor shall immediately notify the County's Water Control Center at 703-228-5555 and the Project Officer.
2. Laying Pipe .

   A. PPP sewer shall not be installed with less than 2 feet of cover from the top of the pipe to finished grade
   B. PPP shall not be installed at depths greater than 20' without special design analysis

3. Laying Pipe

   J. Install PPP in accordance with ASTM D2321

Modify the following portions of Section 02500:

PART 4 – MEASUREMENT AND PAYMENT

4.2 Manholes

Delete in its entirety and replace with the following:

Manholes for the various internal diameters shall be measured **by each** up to 8 vertical feet from the top of the manhole cover thereafter the measurement shall be in vertical feet to the invert of the outlet pipe. Payment shall include excavation, backfill, bedding, foundation, base and components, channels, sleeves, frame and cover, intermediate landings, steps, restoration and all other work necessary for a complete installation.

Add the following after subsection 4.4 Excavation Below Grade and Additional Bedding:

4.5 PVC Pipe with Perforated PVC Pipe

PVC pipe with Perforated PVC 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, valve box with cap, 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, coredrilling, #57 gravel, filter fabric, top soil, sod, and all work incidental to providing a complete PVC pipe with Perforated PVC pipe sewer installation.

4.6 PVC Cleanout

PVC Cleanout for the various materials, classes, and sizes shown on the plans shall be measured as each. Payment shall include the furnishing of all pipe and fittings, valve box with cap, 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, #57 gravel, filter fabric, and all work incidental to providing a complete PVC Cleanout installation.

4.7 Sump Pump Core and Cleanout Connection

Sump Pump Core and Cleanout Connection for the various materials, classes, and sizes shown on the plans shall be measured as each. Payment shall include the furnishing of all pipe and fittings, valve box with cap, 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, radial core drilling, #57 gravel, filter fabric, top soil, sod, proposed connections to storm structures and storm pipes, and all other work incidental to providing a complete Sump Pump Core and Cleanout Connection installation.

SECTION 02515 TELEVISED INSPECTION OF SEWERS

This Section shall conform to the 2013 Arlington County Construction Standards and Specifications of Section 02515 except as modified herein.

Add the following to Section 02515:

PART 3 – EXECUTION

Add the following at the end of subsection 3.2. Documentation

E. The Contractor shall report any evidence of illicit discharges or illicit connections to the storm drain system to the Department of Environmental Services.

SECTION 02550 WATER MAINS & APPURTENANCES

This Section shall conform to the 2013 Arlington County Construction Standards and Specifications of Section 02550 except as modified herein.

Modify the following portions of Section 02550:

PART 3 – EXECUTION

Delete listed sections and replace with the following:

Subsection 3.4-G Disinfection of Water Mains

1. When each pipe length has been placed and shut off, disinfect each section of the water main. Provide all labor, materials and equipment to perform the disinfection operations in compliance with all state and local regulations. Disinfection shall conform to AWWA C601 and C51 requirements.

3.a. Preliminary Flushing of Mains: All mains shall be flushed prior to disinfection except when the tablet method of disinfection is used. The mains shall be flushed at a minimum velocity of 3 feet per second and all points in the main shall receive a minimum of five (5) consecutive minutes of flushing at this velocity, until the water runs clear.

Subsection 3.4-J Bacteriologic Test

1. After chlorination, hydrostatic testing and final flushing, and before the water main is placed in service, samples shall be collected from the main and tested for enteric bacterial contamination and shall show the absence of coliform organisms. At least two (2) sets of consecutive satisfactory bacteriological samples shall be obtained from the distribution system before the system can be placed into service.

    Samples shall be collected in one of the following manners:

    A. At all accessible locations not exceeding 1,200 feet apart in the line downstream from where the pipe was filled with water. After the initial samples are taken, resample after 16 hours.

    -OR-

    B. At all accessible locations not exceeding 1,200 feet apart in the line downstream from where the pipe was filled with water. Allow main sit for 16 hours without water movement, then take first set of samples with a second set of samples after a 15 minute waiting period.

    Samples shall be taken through the use of sample tap consisting of a corporation cock and copper tube or through other accessible appurtenances on the main. Samples shall be collected by a representative of the testing laboratory.

Add the following to Section 02550:

PART 1– GENERAL

Add the following at the end of subsection 1.4. Applicable References

Arlington County Municipal Separate Storm Sewer System Permit
Arlington County Dechlorination Policy Acknowledgement form
Arlington County Dechlorination Plan form
Arlington County Dechlorination and Disposal Procedures
Virginia Department of Health WaterWorks Regulations (VR 355-18-000)

PART 3 – EXECUTION

Add the following at the end of subsection 3.4. Construction Standards

M. Unless otherwise directed, Contractors are expressly prohibited from operating any water valves or appurtenances. Contractors shall submit all requests for valve operations to the Project Officer at least 3 working days in advance of the required operation.

N. In the event of a water or sewer emergency, the Contractor shall immediately notify the County's Water Control Center at 703-228-5555 and the Project Officer.

Delete SECTION 02800 in its entirety.

SECTION 02600 BITUMINOUS ROADWAY PAVEMENTS

This Section shall conform to the 2013 Arlington County Construction Standards and Specifications of Section 02600 except as modified herein.

Modify the following portions of Section 02600:

1.7 Base Course

Delete: The base course shall be bituminous concrete consisting of course and fine aggregate combined with asphalt cement, resulting in a mixture of Type BM-2 in conformance with Section 211 of the VDOT Specifications.

Add: The base course shall be bituminous concrete consisting of course and fine aggregate combined with asphalt cement, resulting in a mixture of Type BM-25.0A in conformance with Section 211 of the VDOT Specifications.

1.8 Surface Course

Delete: The surface course shall be bituminous concrete consisting of crushed stone, crushed slag, or crushed gravel and the fine aggregate, slag or stone screenings, or combination thereof, combined with asphalt, cement, resulting in a mixture of Type SM-2A in conformance with Section 211 of VDOT Specifications.

Add: The surface course shall be bituminous concrete consisting of crushed stone, crushed slag, or crushed gravel and the fine aggregate, slag or stone screenings, or combination thereof, combined with asphalt, cement, resulting in a mixture of Type SM-9.5A in conformance with Section 211 of VDOT Specifications.

1.5 Traffic Marking

Delete: Traffic marking will be provided by the County.

Add: Traffic marking will be provided by the Contractor.

SECTION 02601 BITUMINOUS HIKING, BIKING AND JOGGING TRAIL

Delete specification 02601 in its entirety and replace with:

PART 1 – GENERAL

1.1. Purpose of Section

A. Provide all plant, labor, material and equipment to furnish and construct the bituminous hiking, biking and jogging trails in reasonable close conformity with the lines, grades, thickness and typical cross sections shown on the construction standards and as called for on the approved plans and specified herein
B. The specifications referenced for each material shall fully apply and no deviations from said specification limits or quality will be permitted unless specifically stated otherwise in this Section. The failure of any component of a product to comply with the referenced specifications shall constitute failure of the whole produce.

1.2. Related Requirements Specified Elsewhere

Section 2600 – Bituminous Roadway Pavements

1.3. Applicable Specifications

Virginia Department of Transportation, Road and Bridge Specifications (VDOT)

1.4. Applicable References

A. American Asociation of State Highway and Transportation Officials (AASHTO)
B. American Society for Testing and Materials (ASTM)

PART 2 - MATERIALS

2.1 Aggregate Base

The aggregate base shall be 6 inches VDOT 21-A and in conformance with Section 205 of the VDOT specifications

2.2 Surface Course

The surface course shall be 4 inches thick and type SM-9.5A as specified for the surface course in Section 2601 and Section 205 of the VDOT Specifications.

2.3 Tack Coats

Tack cost shall be asphalt cement of viscosity grad CMS-2 or CRS-2 in conformance with Section 310 of VDOT Specifications.

PART 3 - EXECUTION

3.1 Lay the subbase to the compacted thickness as shown on the Construction Standards and define on the Contract Drawings in conformance with Section 308 of VDOT Specifications.

3.2 Lay the asphalt pavement to the compacted thickness as shown on the Construction Standards and defined on the Contract Drawings in conformance with Section 315.04 of VDOT Specifications.

3.3 Place the tack coat in conformance with Section 310 of VDOT Specifications.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Payment shall be in accordance with Section 01200 – Measurement and Payment.

END SECTION

SECTION 02801 SEEDING AND SODDING

Delete SECTION 02801 in its entirety.

COUNTY SPECIFICATIONS ADDED:

SECTION 01200 MEASUREMENT AND PAYMENT

1. Purpose of Section

The purpose of this section is to establish parameters for measurement and payment, including measurement of quantities, scope of payment, payment for in-scope work, contract changes, and eliminated work, partial payment and final payment.

2. Applicability of VDOT Road and Bridge Specifications

Measurement and payment shall be in accordance with the Virginia Department of Transportation, Road and Bridge Specifications, latest edition, Section 109 with the additions outlined in this section. In the event there is a conflict between this section and VDOT Section 109, this section shall govern.

3. Lump sum payment

All items are lump sum. Specific pay items and pay units in the Arlington County Construction Standards and Specifications, including these Supplementation Specifications, and any VDOT Road and Bridge Specifications incorporated by reference, are provided only for the purpose of receiving unit pricing for possible change orders. Arlington County does not guarantee a minimum or maximum number of unit price purchases.

4. Pay items

Each pay item refers to the relevant subsection of the contract unit pricing and quantities estimate sheet.

5. Scope of Payment

a. All contract items will be paid for and bid as lump sum.
    1. Mobilization – the lump sum bid price for mobilization shall include mobilization and demobilization and is based on the bid form. The payment will be a multiplier (expressed as percentage) to be added to the total amount of the Total Bid Amount. See Section 01550.
    2. Survey – the lump sum bid price for survey shall include all survey required for stake out, construction, progress assessment, red-line drawings, quality control or as-built documentation as outlined in the General Provisions and Section 01720 – Project Record Documents.
    3. Maintenance and Control of Traffic (MOT) – the lump sum bid price for MOT shall include all materials, labor, supervision and equipment necessary for maintaining and protecting workers, vehicular and pedestrian traffic through areas of construction within the limits of the project and over the approved traffic detours. See Section 13180.
    4. Erosion and Sediment Control, Tree Protection and SWPPP Administration – the lump sum bid price for erosion and sediment control, tree protection and SWPPP administration shall include all materials, labor, supervision and equipment required for implementation and maintenance of on-site erosion and sediment control and pollution

prevention measures, including but not limited to, a temporary construction entrance, access road, safety fence, super silt fence, temporary seeding, stockpile stabilization, and inlet protection, throughout the duration of the work to prevent unauthorized non-stormwater discharges or pollution releases to the storm drain system or surface waters in accordance with the General Provisions and Section 01500. Required SWPPP self-inspection and reporting, tree protection fencing and root pruning, including all materials, labor, supervision and equipment required for installation and maintenance, are additionally included. See Section 311300 – Tree Protection and Root Pruning.

5. Water Management – the lump sum bid price for Water Management shall include the provision of any erosion and sediment control measures necessary to allow work in a live watercourse and protect active areas of the work site from surface water intrusion. Dewatering during construction and all labor, materials, equipment, supervision and supplies needed to install, maintain and remove the turbidity curtain and Portadam or equivalent water management control device(s) are included in this lump sum bid price. See Sections 01500 and 01552.
6. Temporary Bridge – the lump sum price for temporary bridge shall include all equipment, labor, supervision, and labor needed to obtain, design, install, maintain and remove a temporary stream crossing bridge in accordance with the approved plan, or any alternative operation method approved by the Project Officer.
7. Site Preparation – the lump sum price for site preparation shall include all clearing and grubbing, demolition, tree removal (both by machine and select), stump grinding, and salvage of on-site trees as specified in the approved plans, Section 02100 – Clearing and Grubbing and Section 01551 – Invasive Species Control. The price includes all labor, materials, equipment and supervision necessary for the work, including material disposal.. Chemical treatments of invasive trees in accordance with Section 01551 shall be included in the lump sum price for Invasive Plant Control.
8. Earthwork – the lump sum price for earthwork shall include all labor, materials, equipment and supervision in accordance with Section 02200, including all excavation, disposal of excavated material, grading, and fill, including select borrow. Test pits required to protect existing utilities are incidental to Earthwork lump sum price.
9. Articulating Concrete Block (ACB) System – the lump sum price for the ACB system shall include all labor, materials, equipment, and incidentals required for the installation of the ACB system in accordance with the lines, grades, design and dimensions shown on the Contract Drawings and Section 13148.
10. Site Development – the lump sum price for site development shall include all labor, material, equipment and supervision required to install the following in accordance with the Contract Drawings: forebay weirs, outlet weir box with aluminum stopgate and access stair, beaver levelers, riprap outfall and slope protection, watergoat, trash rack, VDOT chain-link perimeter fencing and gates, and turtle-basking stations. See Section 03101, Section 13140, Section 13142, Section 13143, Section 13144, and Section 13145 of these specifications for more information.
11. Maintenance Access – the lump sum price for maintenance access shall include all labor, material, equipment and supervision required to install the boat launch and Porous Pavement in accordance with the approved plans. See Sections 06250 and 02614. All labor, materials, equipment required to install sod and specialty seeding for Porous Pavement, inclusive of the seeding warranty, and to maintain the pavement prior to

substantial completion, shall also be included in the lump sum price for Maintenance Access. See 02614 and 329200.

12. Bike and Pedestrian Trail – the lump sum price for bike and pedestrian trail shall include trail installation and widening in accordance with the approved plan including asphalt concrete type SM-9.5A, aggregate No. 21A, tack coat, trail surface removal and disposal. Restoration of trail damaged by construction and not identified for replacement in the approved plan shall be incidental to the price of this work. See Section 02601 – Bitumous Hiking, Biking and Jogging Trail.
13. Observation Platform – the lump sum price for the observation platform shall include subsurface exploration, the helical pile foundation, and the observation platform and its structural components including the steel grating, structural cable sytem, and cable railing with wood cap. All testing, quality assurance, design, and installation costs associated with this work shall be included in this price, along with the equipment, labor, tools, materials and supervision required for a complete installation in accordance with the approved plans. See Section 02301, Section 05501, Section 05502, Section 05503, Section 06251 and Section 13146.
14. Park Amenities – the lump sum price for park amenities shall include all labor, materials, equipment and supervision required to install site furnishings such as benches, bikes racks, trash and recycling containers, permanent park signs and platform panel signage. See Section 323300, Section 101400 and Section 101423.
15. Wetland Planting – the lump sum price for wetland planting shall include all labor, materials, equipment and supervision required to install wetland plants and maintain them until substantial completion in accordance with the approved plan and Sections 02803 and 02804. Wetland seed and all wetland herbaceous and woody plants shall be included in the lump sum price for Wetland Planting. Planting preparation including fine grading, application of planting mix (conserved or imported topsoil) and erosion control matting, and mulching shall be included in the lump sum price. Goose protection, including all labor, materials and equipment required for proper installation, shall additionally be included in the lump sum price for Wetland Planting. See Section 02805.
16. Upland Planting – the lump sum price for upland planting shall include all labor, materials, equipment and supervision required to install upland plants, including sod, specialty (upland) seed, deep plugs, bare root shrubs, container shrubs, and trees, and maintain them until substantial completion in accordance with the approved plan and Section 329100, Section 329200 and Section 329300. Installation and maintenance of biodegradeable tree shelters (Section 02806) prior to substantial completion shall be considered incidental to the price.
17. Invasive Species Control – the lump sum price for invasive plant control shall include all labor, materials, equipment and supervision necessary to provide pre-contruction invasive plant eradication, maintenance control prior to substantial completion, and post-construction invasive control using chemical or physical methods in accordance with the approved plans and Section 01551. Cut stump or similar chemical treatment on trees removed during Site Preparation, inclusive of all labor, materials and equipment necessary for such treatment, shall be included in this lump sum price. However, tree removal (select or by machine) shall be excluded from this price.
18. Wetland Planting Warranty and Post-Construction Maintenance – the lump sum price for wetland planting warranty and post-construction maintenance shall include all labor, materials, equipment and supervision necessary to warranty, inspect annually, maintain

as needed, re-seed wetland seed and replace dead and dying wetland plants for two years following the date of substantial completion as determined by the Project Officer in accordance with the approved plans, Section 02803 and Section 02804. Maintenance and removal of installed goose exclusion fencing shall be included in the price. See Section 02805.

19. Upland Planting Warranty and Post-Construction Maintenance – the lump sum price for upland planting warranty and post-construction maintenance shall include all labor, materials, equipment and supervision necessary warranty, inspect annually, maintain and water as needed, re-seed specialty (upland) seed and replace upland plants for two years following the date of substantial completion as determined by the Project Officer in accordance with the approved plans, Section 329200 and Section 329300. Maintenance and removal of biodegradeable tree shelters on trees outside the perimeter fence shall be included in the price. See Section 02806.

b. All contract items will be full compensation for all equipment, labor, tools, materials and incidentals necessary to complete the work as shown on the contract documents and as specified herein.
c. No direct or separate payment will be made for providing miscellaneous temporary or accessory work, services, field offices, field engineering, job signs, sanitary requirements, water supplies, power, watchmen, and all other requirements of the General Provisions. Compensation for all such services, equipment and materials shall be included in the prices stipulated for the lump sum and unit pay items listed herein.
d. Payment for determining the location of all existing utilities, known and unknown shall be included in the lump sum bid.
e. Restoration is not a separate pay item. Restoration is an integral part of the work under the contract, and all contract bid prices include the cost of restoration necessitated by the work related to that bid item. Restoration is defined as follows: any existing structures and property including, but not limited to, paving, stabilized roads, utility services, drainage piping and ditches, inlets, head walls, yard culverts, walls, fences, shrubs, trees, driveways, lawns, ground areas, walkways, and irrigations systems which are altered, removed or damaged during construction but not as intended by the plans shall be restored to the same or better condition than existed prior to construction. Cleanup is an integral part of restoration.
f. No separate payment will be made by the County for SWPPP implementation.
g. No modification of these lump sum prices shall result from the approval of change orders during construction.

6. <u>Pay items for possible change orders</u>

a. **Excavation**, including Cut to Dispose, Borrow and Cut to Fill, shall be measured and paid for in cubic yards. No additional payment shall be provided for disposal. See Section 02200 as amended.
b. **Fill** shall be measured and paid for in cubic yards. See Section 02200 as amended.
c. **Riprap** –Stone Riprap, Dumped Riprap– shall be measured and paid for in tons, which shall be full compensation for to furnish and install riprap as shown on the contract plans or as directed by the Project Officer. See Section 02210 in 2013 Arlington County Construction Standards & Specifications.

d. **Sod** shall be measured and paid for per square yard. See Section 329200 within these specifications.

END SECTION

SECTION 01550 MOBILIZATION

PART 1 - GENERAL

This work shall consist of performing preparatory operations, including moving personnel and equipment to the project site; paying bonds and insurance premiums; and establishing field offices and other facilities necessary to allow work to begin on a substantial phase of the Contract.

PART 4 - MEASUREMENT AND PAYMENT

Payment for mobilization shall be lump sum in accordance with Section 01200 – Measurement and Payment and based on the bid form. The payment will be a multiplier (expressed as percentage) to be added to the total amount of the Total Bid Amount. This price shall also include demobilization. There will be no escalation for mobilization percentage multiplier for the initial contract term and the extensions thereafter.

Payment for mobilization for each site will be made in two equal installments. The first installment of 50% of the unit price for mobilization will be made on the first progress estimate following partial mobilization and initiation of construction work. The second installment will be made on the next progress estimate following completion of substantial mobilization.

No additional payment will be made for demobilization and remobilization because of shutdowns, suspensions of work, or other mobilization activities.

In case of Change Order outside the project area, mobilization shall be included in the price for other appropriate items.

In case of a Change Order within the project area, mobilization shall be considered as incidental and included in the unit bid price for mobilization. There will be no separate measurement and payment made for this work.

END SECTION

SECTION 01551 INVASIVE SPECIES CONTROL

PART 1 — GENERAL

This work shall consist of activities to control or eradicate invasive vegetation within the project area. Control areas shall include emergent wetlands, side slopes, and upland forested areas. Initial invasive species control has commenced at the project site. The effort will continue invasive species control and is comprised of pre-construction control and eradication, control during construction, and post construction control through the application of approved herbicides, and may include hand extraction, or grubbing in combination with the herbicide application throughout the duration of the contract.

Related specifications include:

Section 02804 – Wetland Planting
Section 329300 – Exterior Plants

All work shall be performed in accordance with this specification, the plans, and as directed by the County. Invasive vegetation control shall include plants on the Virginia Department of Conservation & Recreation (DCR) Division of Natural Heritage *Virginia Invasive Plant Species List* and the *Non-Native Invasive Plants of Arlington County, Virginia Plant List* (https://environment.arlingtonva.us/wp-content/uploads/sites/13/2013/10/Invasive-Plant-List-2-19-15.pdf), and shall include English ivy (*Hedera helix*), alligator-weed (*Alternanthera philoxeroides*), Purple loosestrife (*Lythrum salicaria*), common reed (*Phragmites australis*), Porcelainberry (*Ampelopsis brevipedunculata*), Mile-a-Minute (*Persicaria perfoliata*), Canada Thistle (*Cirsium arvense*), Bradford pear (*Pyrus calleryana)* and other species designated by the County.

Contractor performing the invasive plant removal should survey and map invasive species locations and provide treatment records so the Arlington County can include this information in a GIS geo-data base that is fully compatible with Arlington County's GIS System. For control of non-native invasive species, it is solely the contractor's responsibility to obtain all necessary permits to use pesticides (the application must be performed by Virginia certified pesticide applicators). All work must be approved by Arlington County staff. A list of Arlington County pre-approved contractors for this scope is available from the County.

PART 2 — MATERIALS

All herbicides shall be EPA registered chemicals that are approved for use in or adjacent to waterways to control and prevent re-growth of undesirable vegetation. The Contractor shall use triclopyr, glyphosphate, or imazapyr at concentrations and locations as specified on plans using application methods appropriate to the size and quantity of invasive plans at a rate as approved by the County. The Contractor shall select herbicide appropriate to the species being managed and shall submit selection to the County for approval. The Contractor shall submit a written request for use of herbicides other than those listed above and receive written approval prior to use of such chemicals on the project. Manufacturer's specification sheets

(labels) for herbicide, wetting agent, basal oil, and dyes shall be submitted to the County. A colorant shall be added to the herbicide in order to easily identify plants that have been treated.

PART 3 — EXECUTION

Herbicide application is strictly regulated, and the Contractor must ensure that all regulations are followed. Application equipment, personal protective equipment and application rates of the herbicide shall be in conformance with manufacturer's recommendations as shown on the product label and in accordance with state pesticide application laws.

1. Pre-Construction Meeting: A pre-construction meeting shall be scheduled prior to commencement of invasive plant control operations. Meeting shall include Arlington County Department of Parks and Natural Resources Natural Resource Division staff.

2. Qualifications: The Contractor shall employ at least one Botanist, Practical Botanist, Species Surveyor, Certified Arborist or Landscape Architect that is qualified to distinguish between beneficial native plant species and harmful invasive plants. Additional qualifications are as follows:
   a. One such contractor professional shall directly supervise all work being performed.
   b. Any person working on this scope of work shall receive training that will minimalize non-target damage.
   c. All field staff shall receive training that will minimize non-target damage.
   d. All laborers shall receive basic safety instructions before beginning work at each site.
   e. The County reserves the right to conduct random tests of project staff and shall have the authority to direct the Contractor to remove certain staff from the project if, in **the County's** opinion, such staff is not qualified to do the work.
   f. The Contractor shall ensure that the herbicide applicator is certified by the Virginia Department of Agriculture and Consumer Services for Category VI herbicide application. The Contractor shall be responsible for obtaining all necessary permits prior to initiating application and will ensure that all regulations are followed. The Contractor shall submit qualifications of key personnel who will be performing and/or supervising work on site, including a copy of the herbicide applicator's license.

3. Notification: The Contractor shall notify the County at least 48 hours prior to all herbicide applications.

4. Flagging: The areas planned for treatment shall be clearly flagged in the field and reviewed by the County and Natural Resources Division Staff prior to commencement of treatment activities. The Contractor shall be prepared to discuss invasive species control and native plant preservation methodologies during this field review.

5. Timing of Herbicide Application: Herbicide shall be applied as specified on the plans. Herbicide application shall only be conducted during appropriate weather conditions as indicated on the product label. The herbicide shall not be applied when it is raining or if rain is forecasted within 24 hours of the planned application. The wind speed cannot be greater than 10 mph at the time of application

6. Application Method: Herbicide application shall be selective low volume treatments with a backpack sprayer, truck mounted spray rig with low volume pump and spray gun, squirt bottle, injection gun, paint brush or other methods, as approved by the County. Broadcast high volume applications will not be permitted. The herbicide shall be applied with approved spraying apparatus directly to the target plant. Extreme caution shall be used when spraying adjacent to off-target, non-invasive vegetation or directly adjacent to any waterways/wetlands. Overspray of herbicide onto non-target plants shall be avoided to the greatest extent possible. The Contractor shall be responsible for any act of negligence in applying and handling of the herbicide on the project.

7. Pre-Construction Invasive Plant Eradication: The Contractor shall conduct a field walk of the project area to identify the location and density of the invasive plant species to be managed. Once the Contractor has identified these areas and approved the locations and methods to be used, he will manage the invasive plants as described below.

   A. Arlington County has commenced with Invasive Plant Eradication targeting invasive woody stem vegetation less than three (3) inches in September 2018, Spring 2019, and Fall 2019 and English ivy in Winter 2019 and Winter 2020.

   B. Wetland areas and upland slopes with dense stands of invasive plants: Thoroughly wet all leaves with approved herbicides. Cut large stems and apply approved herbicides to cut surfaces immediately using spray bottle or paint brush.

   C. Wetland areas and upland slopes with individual plants or small patches of invasive plants: Utilize spot treatment methods being sure to minimize over spray onto surrounding desirable plants. Cut large stems and apply these herbicides to cut surfaces immediately using spray bottle or paint brush.

   D. Targeted invasive tree removal in tree protection zones within upland slopes: Cut trees near ground and swab the stump surface using a spray bottle of paint brush with 3% to 5 solution of glyphosphate in water using a surfactant. Cutting and treatment of trees within tree protection zones shall be done by hand only. There shall be no mechanical clearing of targeted trees within tree protection zones.

   E. Targeted invasive tree removal within wetland areas and within upland slopes outside of tree protection zones: Mechanical removal may be utilized. No chemical treatment is required within wetland areas.

   F. Targeted removal of Bradford pear (Pyrus calleryana) trees along Custis Trail: Cut trees near ground and treat cut stumps (per 3.7.D above). Ensure re-sprouting has/will not occur. Grind existing stumps prior to replanting.

   G. Maintenance prior to Substantial completion: Inspect planted areas monthly during the growing season (April to October) and undertake manual or chemical invasive species control as necessary to maintain the planted areas prior to substantial project completion as determined by the Project Officer.

8. Post-Construction Invasive Plant Eradication: The Contractor will be responsible for post-construction management of invasive plants for two years starting from the date of substantial completion.

   a. Upland slopes: Inspect all areas within the limits of work monthly during the growing season (April to October). Identify and flag individual plants and areas dominated by invasive plants. Manually pull plants and treat the remnants left in the ground at the appropriate time of year to best control the target plant, between July 1st and October 1st for most species. Spot treat individual invasive plants being sure to minimize over spray onto surrounding desirable plants. Cut large stems and apply these herbicides to cut surfaces immediately using spray bottle or paint brush.

   b. Created wetland: Inspect all areas within the limits of work monthly during the growing season (April to October). Identify and flag individual plants and areas dominated by invasive plants. Where feasible, manually pull plants between July 1st and October 1st. Utilize spot treatment of invasive plants from July 1st to October 1st, with triclopyr or glyphosate, being sure to minimize over spray onto surrounding non-target plants.

9. Herbicide Handling: The Contractor shall store, transport and handle the herbicide in accordance with the manufacturer's recommendations. Materials shall be stored in the original container at a secured location. Any spills or leaks must be cleaned up immediately.

10. Mapping: Contractor shall provide survey and/or GPS services for locating and/or establishing property lines, RPA boundaries, specific areas to be treated, etc. All completed work shall be submitted to the Arlington County Project Manager in digital format.

    a. Maps/data shall be fully compatible with Arlington County's GIS (Arc) System.

    b. Maps/data shall contain at a minimum: Delineations of treatment areas in polygon format with attribute data that includes the names of invasive plants treated, their density, chemicals used, percent of chemical used, treatment method, type of equipment used, weather conditions, and date of treatment.

11. Site Cleanup: During the execution of invasive vegetation control measures, all areas shall be kept neat and clean and free of trash and debris. Final cleanup shall be the responsibility of the Contractor and shall consist of the removal of all trash and materials incidental to the project to an approved off-site disposal location.

12. Replacement of Native Plants Damaged: The Contractor shall be responsible for replacing and/or pruning of any native plant material that is killed or damaged through any act of negligence by the Contractor in applying and handling of the herbicide on the project.

13. Final Inspection: The Contractor shall be responsible for correcting all deficiencies within seven (7) calendar days of inspection. The County's representative and the Contractor shall perform a final inspection and any corrective actions at the closeout of the contract.

PART 4 — MEASUREMENT AND PAYMENT

Payment shall be in accordance with Section 01200 – Measurement and Payment.

A. Pre- and post-construction Invasive Species Control

Pre-construction invasive species control and post- construction invasive species control shall be measured and paid for at the contract lump sum price for Invasive Plant Control. Hand extraction prior to or following herbicide application will be considered part of the contract unit. Cut stump treatments or similar chemical applications following select tree removal and any other additional work required to ensure invasive vegetation control during construction shall be included in the lump sum price. Payment includes labor, materials, including chemicals, transport and disposal as needed to perform the intended work.

B. Tree Removal

Tree removal shall be measured and paid for at the lump sum price for Site Preparation. This includes tree removal by machine as well as select tree removal by hand. All work may include hand extraction which will be considered incidental to the lump sum price. This work will only be undertaken as approved or directed by the County, and price and payment will constitute full compensation for furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work.

END SECTION

PART 1 – GENERAL

1.1. Section Includes

A. Temporary Portadam (or equivalent).
B. Temporary water diversion structure.
C. Temporary retention basin.
D. Temporary flood protection structure.
E. Temporary levee height-extension structure.
F. Temporary overflow weir structure.
G. Temporary turbidity containment structure.

1.2. Related Sections

A. Section 01500 – Temporary Erosion and Sediment Control

B. Erosion and Sediment Control Ordinance (Chapter 57 of the Arlington County Code).

C. Virginia Erosion and Sediment Control handbook

1.3. System Description

A. Temporary, portable, Portadam (or equivalent) uses steel support frame with continuous-reinforced vinyl liner membrane to provide means of water diversion or retention.

B. Clearances: Layout Portadam (or equivalent) to provide adequate clearances in all directions as required for execution of work to be performed in dewatered area, including room for excavation, dewatering pumps, and Portadam (or equivalent) installation and removal operations.

C. Steel support frame units of different heights are compatible and can be arranged in line, switching from one height unit to another as required by existing site condition contour changes.

D. Full height of Portadam (or equivalent) can be used as equipment is designed to hold loading up to top of steel support frame.

E. Steel support frame can be installed in almost any configuration and to any horizontal length required.

F. Steel Support Frame Adjustment
1. Sliding clamp arrangement for assembly of steel support frame in field allows adjustment of frame alignment every 30 inches along required installation line.
2. Horizontal Adjustment: Allows turning or curving installation line.
3. Vertical Adjustment: Allows working up or down slopes and over irregular

contours and obstructions.

G. Installation and removal of Portadam (or equivalent) can be performed in underwater or dry locations.

H. Steel Support Frame: Reusable, steel support frame transfers hydraulic loading to a near vertical downward load, thereby reducing lateral forces and creating a free-standing structure with no back bracing to interfere with work area and no anchoring into foundations.

I. Liner
   1. Reusable, continuous, flexible, liner membrane provides water stop when positioned along diagonal face of steel support frame and extended around perimeter of support frame assembly.
   2. Extended out horizontally as sealing apron providing sealing effect by hydrostatic pressure beyond toe of steel support frame.
   3. Seals over most irregular contours.
   4. Standard widths can be modified to accommodate site-specific requirements.

1.4 Submittals

A. Comply with Section 01300 Submittals of the Arlington County Specifications.

B. Product Data: Submit manufacturer's product data, including installation and removal instructions.

C. Shop Drawings: Submit manufacturer's shop drawings, including plans, elevations, sections, and details, indicating layout, dimensions, and materials.

D. Dewatering Plan: Contractor shall follow the dewatering plan as indicated on the Drawings and submit any additional information for approval to the County Project Officer.

1.5 Quality Assurance

A. Notification
   1. Notify County Project Officer 48 hours in advance of installation of temporary Portadam (or equivalent).
   2. Notify County Project Officer 48 hours in advance of removal of temporary Portadam (or equivalent).

1.6 Delivery, Storage, and Handling

A. Delivery: Deliver materials to site with load lists clearly identifying product components and manufacturer.

B. Storage: Store materials in accordance with manufacturer's instructions.

C. Handling: Protect materials during handling, installation, and removal to prevent damage.

1.7 Alternative Operation Methods

A. The contractor may develop alternative operation methods for containing stream flows, protecting the construction area from flooding and ensuring a dry work area in accordance with the approved plans. Documentation for alternative operation methods proposed by the Contractor, including any required shop drawings or submittals, shall be sufficient for the Project Officer and Engineer to determine that the alternative product or approach protects public safety and provides adequate surface water protection. Notification of the intent to use alternative operation methods and all related documentation should be provided to the Project Officer for approval prior to the initiation of construction. Any increase in cost due to an alternative operation method shall be the responsibility of the contractor. See Section 01500 – Temporary Erosion and Sediment Control.

PART 2 – PRODUCTS

2.1 Portadam (or equivalent)

A. Temporary Portadam (or equivalent): Portadam (or equivalent) system.
   1. Steel Support Frame: Tubular, welded steel structural support members.
   2. Liner: Impervious, inert, flexible fabric membrane.
      a. Upper Portion Positioned Against Steel Support Frame: Nylon-reinforced PVC liner.
      b. Lower Portion: Polyethylene bed sealing apron with heavy chain on outside perimeter to assist with sinking liner.
   3. Vertical Height of Steel Support Frame: 10 feet, as indicated on the Drawings.

2.2 Accessories

1. Sandbags: Woven poly bags. Fill with washed, clean sand.

PART 3 – EXECUTION

3.1 Examination

A. Examine area to receive temporary Portadam (or equivalent).
   1. Notify the County Project Officer of conditions that would adversely affect installation or removal.
   2. Do not begin installation or removal until unacceptable conditions are corrected.

B. Evaluate foundation consistencies relating to load bearing capacity before installation, based on anticipated water depth (hydraulic loading).

3.2 Surface Preparation

A. Prepare riverbed surfaces in accordance with manufacturer's instructions.

3.3 Installation

A. In most riverbed situations where clay, firm mud, sand and gravel, or cobbles are found, the equipment will get the proper lateral support required by digging in at the heel of the steel support frame. Rock and concrete foundations afford good support under the

steel support frame and offer good surfaces for the liner sealing apron, however, additional pinning may be required to resist the minimal sliding forces not overcome by the back leg of the steel support frame digging in.

Some softer foundation materials that are encountered may require additional support. This can be accomplished using a combination of remedies, such as installation of special geotextile underlayment fabrics or bracing with vertical, horizontal, and backraker (45 degrees) heavy scaffold piping. These additional treatments are used to address and minimize settlement of the steel support frame that might occur because of the softer bottom conditions and allows maximum freeboard required to protect the work area. Protect Existing utilities during pond construction. Before construction begins, submit utility protection plan to engineer for review and approval.

B. Install temporary Portadam (or equivalent) in accordance with manufacturer's instructions at locations indicated on the Drawings.

C. Steel Support Frame
1. Install steel support frame in accordance with manufacturer's instructions.
2. Assemble individual support frames into pairs onshore.
3. Place support frame pairs directly into position along configuration perimeter line, making progressive connections.
4. Make final elevation and direction adjustments.
5. Remove obstructions, if required.
6. Install support frame pairs using varying height frames as required, at different elevations as encountered over irregular contours and up and down slopes.

D. Liner
1. Install liner in accordance with manufacturer's instructions.
2. Prepare liner onshore by laying out individual liner sections and joining into desired configuration.
3. Place assembled liner sections around perimeter of steel support frame and secure to top at each frame pair location.
4. Clear rocks, debris, and obstructions from proposed sealing apron location.
5. Unroll liner down diagonal face of steel support frame and extend out onto existing riverbed at toe of frame.
6. Pull extension of liner horizontally out away from toe of steel support frame to form sealing apron.
7. Bury outside perimeter of sealing apron in soft material and place sandbags to form cutoff.
8. Make final liner adjustments after pumps are started in enclosed area and water head differential draws liner tightly onto steel support frame and surrounding riverbed area.
9. Locate minor leaks under sealing apron and seal with sandbags.

3.4 Removal

A. Remove temporary Portadam (or equivalent) in accordance with manufacturer's instructions.

B. Re-water enclosed area after completion of re-grading of pond and stabilization of wetland plantings in pond, and cleanup, equalizing water pressure on steel support frame and releasing head differential on liner.

C. Allow for inspection and acceptance of the dry work by the County Project Officer as specified in before re-watering enclosed area.

D. Remove liner sections.

E. Lift out steel support frame by reverse method used for installation.

F. Remove sandbags.

3.5 Field Quality Control

A. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for installation and removal of temporary Portadam (or equivalent).

3.6 Returning

A. Check steel support frame and liner for damage.

B. Inventory and account for materials.

C. Package materials for return shipping to manufacturer in accordance with manufacturer's instructions.

PART 4 – MEASUREMENT AND PAYMENT

In accordance with Section 01200 – Measurement and Payment, Portadam (or equivalent) will be paid for at the contract lump sum price for Water Management, which shall be full compensation for furnishing, installing, maintaining, resetting, repairing, and removal of all labor, equipment, and materials necessary to complete the work. Manufacturer will provide all installation instructions when the order is shipped.

END SECTION

SECTION 01720 PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 Purpose of Section

This section outlines the requirements for keeping record drawings (As-Built Drawings) and other data in accordance with the General Conditions and in accordance with the following specifications.

1.2 Record Drawings

A. The Contractor shall maintain one complete set of drawings specifically for the purpose of recording changes during the construction of the project. During the course of construction, the Record Drawings shall be updated daily by the end of each working day.

B. Record Drawings will be neat, accurate and complete. The Record Drawings will be available for periodic inspection by the Engineer.

C. Record Drawings shall include the following, as a minimum:

1. Details not shown on original Contract Drawings.
2. Actual locations (horizontal and vertical) of all utilities uncovered during the course of the work.
3. Any changes in grade and location of duct banks and appurtenances.
4. Any changes, additions or deletions made by Change order or Addenda.
5. Final coordinates of all structures built or modified under this Contract.

D. The Contractor shall certify the Record Drawings as accurate and complete.

1.3 Submission Requirement

The Contractor shall submit the Record Drawings (both in digital format (AutoCAD and Adobe PDF) and 2 full size hardcopy sets) to the Project Officer upon completion of a major milestone construction stage or substantial completion of theProject. Final payment will not be issued until the Record Drawing has been accepted by the Project Officer. The Contractor shall make any necessary corrections and resubmit until acceptable to the County Project Officer.

PART 4 - MEASUREMENT AND PAYMENT

Project Record Documents shall be measured as lump sum in accordance with Section 01200 – Measurement and Payment and shall be paid for at the contract lump sum price for Survey.

END SECTION

SECTION 02301 HELICAL SCREW PILES

PART 1 - GENERAL

1.1 Description of Work

This work shall consist of performing subsurface exploration, designing and constructing helical screw pile foundations as specified in the contract documents or as directed by the Engineer.

Subsurface Exploration: Work under this item shall consist of performing two Standard Penetration Test (SPT) borings in accordance with AASHTO T 206 at the structure location. The SPT borings shall be drilled to a minimum depth of 30-ft below the ground surface. Borings shall not be terminated until the final three contiguous SPT N-values are greater than 12 blows per foot sampled at 5-ft intervals.

Helical Anchor Foundation: Work under these items consists of furnishing all materials for and installing helical anchors according to the specifications contained herein, including the installation of all necessary connections to the supported structures. The terms “anchor” and “pile” are used interchangeably in these Contract Documents.

The Contractor shall be responsible for the design of the helical anchor system from the connection to the supported structure down. Design elements shall include the connection to the supported structure, vertical piles, and battered piles. The Contractor shall select the helical anchor type, size, installation means and methods, and means and methods of connecting the helical anchor caps to the supported structures. The Contractor shall perform all geotechnical and structural design and will install helical anchors that will develop the load capacities required in accordance with the latest edition of the International Building Code (IBC); anticipated loads are shown on the plans. The helical anchors shall be designed with a minimum Factor of Safety equal to 2.0 for bearing capacity. Special Inspection and certification of installation of the Helical Screw Piles will be performed by Arlington County, in accordance with County special inspection requirements.

1.2 Submittals

Where a conflict exists between this section and 01300 Submittals, this section shall govern.

Prior to commencement of construction, verification of the following requirements and documents shall be submitted for approval.

1.3 Qualifications

A. The Contractor shall have experience designing and installing helical anchors with similar site access, loading, and subsurface conditions. The Contractor shall submit descriptions of projects completed including construction and structural details and point of contact information for at least three previous successful projects utilizing helical anchor foundations of similar scope to this project completed in the last ten years.

B. The Contractor shall assign a Geotechnical Engineer to supervise the work with

experience on at least two projects of similar scope to this project completed over the past five years. The Engineer shall be licensed to practice engineering in the Commonwealth of Virginia. The Contractor shall not use a manufacturer's representatives to satisfy the supervising Engineer requirement of this section. A manufacturer's representative shall be on-site during installation of at least the first helical anchor.

C. The on-site foreman, who will be in charge full time of all operations, shall also have experience on at least two projects over the past five years installing helical anchor foundations of similar scope to this project.

D. The helical anchors shall be designed by a licensed Professional Engineer, licensed in the Commonwealth of Virginia, with experience in the design of at least three successfully completed helical anchor foundation projects over the past five years. The helical anchors designer may be either an employee of the Contractor or a separate Consultant designer meeting the stated experience requirements.

E. The Contractor shall submit the completed project reference list and personnel list with resumes. The project reference list shall include a brief project description with the owner's name and current phone number. The personnel list shall identify the supervising project Engineer, Licensed Professional Engineer, and on-site foremen to be assigned to the project. The personnel list shall contain a summary of everyone's experience and be sufficiently complete for the Engineer to determine whether everyone satisfies the required qualifications. Additional time required due to incomplete or unacceptable submittals will not be cause for time extension or impact or delay claims. All costs and delays associated with incomplete or unacceptable submittals shall be borne by the Contractor.

1.4 Subsurface Exploration

A. The Contractor shall submit a boring location plan and sample boring log to the Engineer for approval at least 15 days prior to mobilizing the drill rig.

B. The subsurface exploration shall be performed under the direct supervision of an NHI accredited drill rig inspector. The NHI accredited drill rig inspector shall be under the supervision of the Contractor's geotechnical engineer, specified in Section 1.2 Submittals A.b.

C. The accredited drill rig inspector shall describe, classify, and log the subsurface conditions encountered in the soil borings.

D. The boring logs shall be submitted to the Engineer within two working days of completion of the boring for evaluation to determine the uniformity/variability of the foundation materials. If the Engineer's evaluation determines that additional soil borings are required, additional borings shall be drilled at locations specified by the Engineer.

1.5 Working Drawing Submittals

A. The Contractor shall submit complete engineering calculations and Shop Drawings for review and approval. The calculations and drawings shall be signed and sealed by a Licensed Professional Engineer licensed in the Commonwealth of Virginia.

B. Provide shop drawings indicating product components and accessories, and indicating the following:

1. Helical screw anchor number.
2. Location and pattern by assigned identification number.
3. Helical screw anchors design load.
4. Type and size of central steel shaft.
5. Helix configuration (number, vertical spacing, and diameter of helix plates).
6. Required minimum effective installation torque.
7. Displacement plates/ centralizers and their location.
8. Minimum overall length.
9. Inclination of helical screw anchors.
10. Grout column length.
11. Minimum cased length.
12. Grout column diameter(s).
13. Cutoff elevation.
14. Details of the attachment to the supported structure.
15. Details of bracing of the pile free length as required by design.

C. General notes for constructing and installing the structures with a helical anchor foundation including construction sequencing, acceptance criteria, or other special construction requirements.

D. Within twenty-four (24) hours after installation, submit to Engineer the installation record(s).

1.6 Construction Submittal

A. The Contractor shall prepare and submit for review and approval a detailed step-by-step description of the proposed helical anchor installation procedure, including personnel, and equipment to assure quality control. This step-by-step procedure shall be indicated on the working drawings in sufficient detail to allow the Engineer to monitor construction and quality.

1.7 Quality Assurance/Control Submittals.

A. Certified test reports showing compliance with specified characteristics and physical properties.

B. Manufacturer’s certificate that products meet or exceed specified requirements.

C. Mill test reports.

D. Accurately record the type, size and actual locations of helical screw anchors, torque installation records on all helical screw anchors and torque monitoring calibration data.

1.8 Final Location Drawings

A. Within thirty (30) days after completion of required work, the Contractor shall submit an accurate print or prints showing the locations and top and bottom elevations of all installed helical anchors.

B. Within thirty (30) days after completion of required work, the Contractor shall submit as-built drawings, including installation records. Provide revised design calculations signed by the approved Licensed Professional Engineer for all design changes made during the construction and installation of the helical anchors.

PART 2 - MATERIALS

All materials for this work shall be new and without defect. Defective materials shall be removed from the job site at no additional cost. All helical anchors shall be hot dipped galvanized for corrosion protection.

2.1 Central Steel Shaft:

A. Consists of lead sections, helical extensions, and plain extensions. Hot rolled round or round-cornered-square solid steel bars meeting dimensional and workmanship requirements of ASTM A29. The bar shall be either modified medium carbon steel grade with a minimum yield strength of 70 ksi, or high strength low alloy, low to medium carbon steel grade with a minimum yield strength of 90 ksi.

2.2 Helix Bearing Plate:

A. Hot rolled carbon steel sheet, strip or plate formed on matching metal dies to true helical shape and uniform pitch. Bearing plate material shall conform to the following ASTM specifications:

1. ASTM A572, or ASTM A1018 or ASTM A656 with a minimum yield strength of 50 ksi. Plate thickness $^{3}/_{8}$-inch.
2. ASTM A656 or ASTM A1018 with a minimum yield strength of 80 ksi. Plate thickness $^{3}/_{8}$-inch.
3. ASTM S656 or ASTM A1018 with a minimum yield strength of 80 ksi. Plate thickness ½-inch.
4. ASTM A36, or ASTM A572, or ASTM A1018 or ASTM A656 depending on helix diameter, per the minimum yield strength requirement cited above. Plate thickness $^{3}/_{8}$-inch.

2.3 Bolts:

A. The size and shape of bolts used to connect the central steel shaft section together shall conform to the following ASTM specification:

1. ¾-inch diameter bolt per ASTM A320 Grade L7.
2. $^{7}/_{8}$-inch diameter bolt per ASTM A193 Grade B7.
3. $1^{1}/_{8}$-inch diameter bolt per ASTM A193 Grade B7.
4. 1¼-inch diameter bolt per ASTM A 193 Grade B7.
5. ¾-inch diameter bolts (3 per coupling) per SAE J429 Grade 5.

2.4 Couplings shall be formed as an integral part of the plain and helical extension material.

2.5 Fabricate displacement plates from steel or other material that will not affect the structural integrity of the central steel shaft or grout column. Do not use wood for this purpose.

2.6 For structural steel plates and shape for helical screw anchors top attachments, conform to ASTM A36 or ASTM A572, Grade 50 (Grade 345).

2.7 Steel casing shall conform to requirements of ASTM A53 Type E or S Grade B, ASTM A252 Grade 2, ASTM A500 Grade B or ASTM A618.

2.8 Corrosion Protection shall be provided in accordance with helical screw anchor manufacturer's recommendations. Above ground portions of the piles shall be hot dip galvanized per ASTM A123 and A153.

PART 3 – CONSTRUCTION METHODS

The following minimum procedures shall be performed.

Work shall not be started, nor materials ordered until the Engineer's written approval of the Contractor's experience qualifications is given. The Engineer may suspend work if the Contractor uses non-approved personnel. If work is suspended, the Contractor shall be fully liable for all resulting costs and no adjustment in contract time or cost will result from the suspension.

The Contractor shall visit the site to assess the site geometry, equipment access conditions, and location of existing structures and utilities. The Contractor is responsible for field location and verifying the locations of all utilities shown on the plans prior to starting work.

All helical anchor material shall be handled and transported carefully to prevent any deformation or damage. Care should be taken to prevent the accumulation of dirt, mud or other foreign matter on the steel materials. Such accumulation shall be completely removed prior to the installation.

4.1 General:

A. Comply with the instructions and recommendations of the power installed helical screw

anchors manufacturer.

B. Verify that site conditions are acceptable, and installation of power installed helical screw anchors are in accordance with all pertinent codes and regulations regarding such items as underground obstructions, right-of-way limitations, utilities, etc.

C. The helical screw anchors installation technique shall be consistent with the geotechnical, site access, logistical, environmental and load carrying conditions of the project.

D. Installation equipment shall be rotary type, hydraulic power-driven torque motor with clockwise and counterclockwise rotation capabilities.

E. Utilize a torque motor capable of continuous adjustment to number of revolutions per minute (RPM) during installation and with a torque capacity 15% greater than the torsional strength rating of the central steel shaft to be installed. Do not use percussion drilling equipment.

F. Utilize equipment capable of applying adequate downward pressure and torque simultaneously to suit project soil conditions and load requirements, and capable of continuous position adjustment to maintain proper helical screw anchors alignment.

G. A calibrated torque indicator shall be used during helical screw anchors installation. The torque indicator may be an integral part of the installation equipment or mounted inline with the installation tooling.

4.2 Installation:

A. Engage and advance helical screw anchors into soil in a smooth, continuous manner at a rate of 5-20 RPM. Provide extension sections to obtain the required minimum overall length and installation torque as shown on the shop drawings. Connect sections together using coupling bolt and nut tightened to a torque of 40 ft-lb or as specified in approved shop drawings.

B. Apply sufficient down pressure to uniformly advance the helical screw anchor a minimum of 80% of the distance equal to the pitch of the helix plate per revolution. Adjust the rate of rotation and magnitude of down pressure for different soil conditions and depths.

C. Position a lead displacement plate of appropriate diameter on the central steel shaft at the location necessary to install the grout column as shown on the shop drawings. Do not position the lead displacement plate closer than 12 inches above the top helix plate. Position additional lead displacement plates or extension displacement plates no more than 7 feet apart. Displacement plates shall permit the free flow of grout without misalignment of the central steel shaft.

D. If required, install casing in segments corresponding to the section of the central steel shaft. Advance casing into the soil by direct connection with lead and extension

displacement plates. Fill each casing segment with grout immediately after placement.

E. Satisfy the minimum installation torque and minimum overall length criteria as shown on the shop drawings prior to terminating the helical screw anchors. The torque as measured during the installation shall not exceed the torsional strength rating of the central steel shaft.

F. The uppermost helix shall be installed at least three diameters into competent load-bearing soil.

G. The center-to-center spacing of adjacent piles shall be greater than or equal to five diameters of the largest helix.

H. If the helical screw anchors are refused or deflected by a subsurface obstruction, Contractor shall terminate the installation and remove the pile. Remove the obstruction, if feasible, and reinstall the helical screw anchors. If not feasible to remove the obstruction, install the helical screw anchor at an adjacent location, subject to review and acceptance by the Professional Engineer that was responsible for the helical screw anchor system design, and approved by the Engineer.

I. Install helical screw anchors to the following allowable tolerances:

1. Centerline of piling shall not be more than 3 inches from the indicated plan location.
2. Pile plumbness shall be within 2 degrees of design alignment.
3. Top elevation of pile shall be within +1 inch to -2 inches of the design vertical elevation.
4. Centerline of the central steel shaft shall not be more than ¾ inch from the centerline of the pile.

4.3 Testing:

A. Perform helical screw anchors load test in accordance with ASTM D1143 Quick Procedure. Load tests shall be performed for representative helical anchors supporting loads greater than or equal to 40 kips. At least one helical anchor shall be load tested in each area of uniform subsoil conditions.

B. Site Test Records: Provide the Engineer copies of field test reports within 24 hours after completion of the load tests. Include, at a minimum, the following information.

1. Name of project and Contractor.
2. Name of Contractor’s supervisor during installation.
3. Name of third party test agency, if applicable.
4. Date, time and duration of the test.
5. Location of helical screw anchors by assigned identification number.
6. Type of test (i.e., tension or compression).
7. Description of calibrated testing equipment and test setup.
8. Actual helical screw anchor type and configuration, including lead section,

number, and type of extension sections.

9. Steps and duration of each load increment.
10. Cumulative pile-head movement at each load step.
11. Comments pertaining to interruptions, obstructions or other relevant information.
12. Signed by a third-party test agency representative, registered Professional Engineer or as required by the local jurisdiction.

4.4 Protection:

A. Protect installed work from damage due to subsequent construction activity on the site.

PART 4 - MEASUREMENT AND PAYMENT

Payment for Helical screw piles shall be in accordance with Section 02100 – Measurement and Payment and shall be paid for at the contract Lump Sum Price for Observation Platform. Payment to include subsurface exploration using AASHTO T206, the helical screw anchor foundation, and testing. The payment will include full compensation for designing, all material, labor, equipment, tools and incidentals necessary to complete the work. Furnishing and setup of helical screw anchor installation and testing equipment required for permanent and test helical screw anchors will not be measured but the cost will be incidental to the Lump Sum Price for the pertinent item.

END SECTION

SECTION 02614 POROUS PAVEMENT (GRASSPAVE2 OR EQUIVALENT)

PART 1 – GENERAL

1. Description of Work

   A. The Grasspave2 (or equivalent) porous pavement system provides vehicular and pedestrian load support for grass areas, while protecting grass roots from harmful effects of traffic.

   B. Major Components of the Complete System

      1. Grasspave2 (or equivalent) units, assembled in rolls.

      2. Engineered sand and gravel base course.

      3. Hydrogrow soil amendment and fertilizer, supplied with Grasspave2 (or equivalent).

      4. Sand fill

      5. Selected grass from seed, hydroseeding/hydro-mulching, or sod.

      6. Selected topsoil (only for seeded installation).

      7. Mulch (needed only for seeded or hydroseeded installations).

   C. The Grasspave2 (or equivalent) grass paving units, sand, and base course work together to support imposed loading.

   D. The Grasspave2 (or equivalent) grass paving units, Hydrogrow, and sand fill contribute to vegetation support.

2. Related Work Specified Elsewhere

   Arlington County Department of Environmental Services Construction Specifications and Standards (Arlington County Specifications):

   A. Section 02200 – Earthwork

   B. Section 329200 – Seeding and Sodding

3. References

   2 ASTM F 1951-08 Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment Section 02200 – Earthwork.

   3 ASTM D 638-10 Standard Test Method for Tensile Properties of Plastics

   4 ASTM C 33 Standard Specification for Concrete Aggregates

5 AASHTO M6 Standard Specification for Fine Aggregate for Hydraulic Cement Concrete

4. Submittals

A. Submit under provisions of Section 01300.

B. Shop Drawings: Submit design detail showing proper cross-section.

C. Samples: Submit manufacturer's sample of 10” x 10” section of Grasspave2 (or equivalent) material.

D. Installation Instructions: Manufacturer’s printed installation instructions. Include methods for maintaining installed products.

E. Certificates:

A. Manufacturer signed certificate stating the product is made in the USA.

B. Submit Material Certificates for base course and sand (or USGA mix) fill materials

C. Product certificates signed by the manufacturer certifying material compliance of polyethylene used to make Grasspave2 (or equivalent) units.

D. ISO Certificate certifying manufacturer’s quality management system is currently registered to ISO 9001:2008 quality standards.

F. Substitutions: A material will be considered as an equivalent to the Grasspave2 provided it meets all areas of this specification. Manufacturers seeking to supply what they represent as equivalent material must submit records, data, independent test results, samples, certifications, and documentation deemed necessary by the Specifier to prove equivalency.

G. Manufacturer’s Material Certification: Product manufacturers shall provide certification of compliance with all applicable testing procedures and related specifications upon written request. Request for certification shall be submitted by the purchasing agency no later than the date of order placement.

H. Product manufacturers shall also have a minimum of 30 years’ experience producing products for porous pavement systems.

I. Manufacturer Quality Certification: Any alternate materials submitted shall provide a certification that their porous pavement system manufacturing process is part of an ISO quality management program and a certification will be required specifically stating that their testing facility is certified and in accordance with ISO.

5. Delivery, Storage, and Handling

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Protect Grasspave2 (or equivalent) units/rolls from damage during delivery and store rolls upright, under tarp, to protect from sunlight, when time for delivery to installation exceeds one week.

C. Store Hydrogrow (or equivalent) in a dark and dry location

D. Handling: Protect materials during handling and installation to prevent damage

6. Project Conditions

1. Maintain environmental conditions within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

2. Do not begin installation of porous pavements until all hard surface paving adjacent to porous pavement areas, including concrete walks and asphalt paving, is completed.

3. Install turf when ambient air temperatures is at least 55 degrees F (13 degrees C).

4. In cold weather, do not use frozen materials or materials mixed or coated with ice or frost, and do not build on frozen base or wet, saturated or muddy subgrade.

5. Protect partially completed paving against damage from other construction traffic when work is in progress.

6. Adequately water sod or grass seed to assure germination of seed and growth of root system.

7. Grass coverage on the sand-filled Grasspave2 (or equivalent) rings must be completed within one week: See Part 3 Execution.

8. DO NOT DRIVE, PARK ON, or use Grasspave2 (or equivalent) system for two or three mowing cycles until grass root system has matured (about 3 to 4 weeks for sod or 6 to 8 weeks for seeded areas). Any barricades constructed must still be accessible by emergency and fire equipment during and after installation.

7. Warranty

1. Any product warranty shall be extended to the County. All documentation necessary to implement the warranty shall be provided to the Project Officer.

PART 2 – PRODUCTS

2.1 Grasspave2 (or equivalent)

A. Composition:

1. Manufactured in the USA.

2. High density polyethylene (HDPE): 100 percent recycled materials.
3. Color: black
4. Color Uniformity: Uniform color throughout all units' rolls.
5. Carbon Black for ultraviolet light stabilization.
6. Hydrogrow soil amendment and fertilizer, provided by manufacturer with Grasspave2 (or equivalent).

B. Performance Properties:

1. Maximum Loading Capability: 15,940 psi (2.29 million psf, 109,906 kPa) when filled with sand.
2. Wheelchair Access testing for ADA Compliance: Passing ASTM F 1951-08.
3. Wheelchair Access testing for ADA Compliance: Passing Rotational Penetrometer testing.
4. Tensile strength, pull-apart testing: 458 lbf/in from ASTM D638 Modified.
5. System Permeability (Grasspave2 (or equivalent), sand, base course): 2.63 to 38.55 inches of water per hour.
6. Effective Imperviousness (E.I.): 10%.

C. Dimensions (individual units are assembled and distributed into rolls):

1. Roll area: From 108 sq ft (10 sq m) to 538 sq ft (50 sq m), in 108 sq ft (10 sq m) increments
2. Roll Widths: From 3.3 ft (1 m) to 8.2 ft (2.5 m), in 1.6 ft (0.5 m) increments.
3. Roll Lengths: From 32.8 ft (10m) to 65.6 ft (20 m), in 3.3 ft (1 m) increments.
4. Roll Weights: From 41 lbs (19kg) to 205 lbs (93kg), in 41 lbs (19 kg) increments.
5. Unit Nominal Width by Length: 20 inches by 20 inches (0.5 m by 0.5 m) or 40 inches by 40 inches (1 m by 1 m).
6. Nominal Depth: 1 inch (2.5 cm) – for rolls and individual units.
7. Unit Weight: 18 oz (510 g) or 5 lbs. (2.27 kg).
8. Volume Solid: 8 percent.

2.2 SYSTEM MATERIALS

A. Base Course: Sandy gravel material from local sources commonly used for road base construction (recycled materials such as crushed concrete or crushed asphalt are NOT acceptable).

1. Conforming to the following sieve analysis and requirements:
   a. 100 percent passing sieve size 1 inch (25 mm).
   b. 90-100 percent passing sieve size 3/4 inch (19 mm).
   c. 70-80 percent passing sieve size 3/8 inch (9 mm).
   d. 55-70 percent passing sieve size #4.
   e. 45-55 percent passing sieve size #10.
   f. 25-35 percent passing sieve size #40.
   g. 3-8 percent passing sieve size #200.
2. Provide a base course material nearly neutral in pH (range from 6.5 to 7.2) to provide adequate root zone development for turf.

3. Material may be either "pit run" or "crusher run." Avoid using clay-based crusher run/pit run. Crusher run material will generally require coarse, well-draining sand conforming to AASHTO M6 or ASTM C 33 to be added to mixture (20 to 30 percent by volume) to ensure long-term porosity.

B. Sand Fill for Rings and Spaces Between Rings: Clean sharp sand (washed concrete sand). Choose one of the following:
   1. Coarse, well-draining sand, such as washed concrete sand conforming to AASHTO M6 or ASTM C-33.
   2. United States Golf Association (USGA) greens, section - sand mix "The Root Zone Mixture."

C. Turf Conditioner:
   1. For Grasspave2, Hydrogrow a proprietary soil amendment manufactured by Invisible Structures, Inc. For equivalent systems, consult manufacturer.

D. Sod and Native Seed:

   1. Sod: Use 13 mm (0.5") thick (soil thickness) rolled sod from a reputable local grower. Species should be as specified in Section 329200 and as shown on the plans. Sod shall be grown in sand or sandy loam soils only. Sod grown in soils of clay, silt, or high organic materials such as peat, will not be accepted.
   2. Native Seed: Use seed from certified sources. Seed shall be provided in containers clearly labeled to show seed name, lot number, net weight, % weed seed content, and guaranteed % of purity and germination. Pure Live Seed types and amount shall be as shown on plans.

      a. Mulch – needed only for hydroseeding: Wood or paper cellulose commercial mulch materials compatible with hydroseeding operations. Mulch depth according to mulch manufacturers' recommendation. DO NOT use mulch of straw, pine needles, etc., because of their low moisture holding capacity.
      b. Topsoil – needed only for seeding, recommended for hydroseeding: Obtain specified topsoil for a light "dusting" (no more than ½" or 13mm) above rings filled with sand for seeding germination.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine subgrade and base course installed conditions. Do not start porous paving installation until unsatisfactory conditions are corrected. Check for improperly compacted trenches, debris, and improper gradients.

B. For fire lane installations: prior to installing base course for turf paving, obtain approval of local fire authorities of sub-base.

C. Start of installation constitutes acceptance of existing conditions and responsibility for satisfactory performance. If existing conditions are found unsatisfactory, contact Architect for resolution.

3.2 PREPARATION

A. Subgrade Preparation:

1. Prepare and verify subgrade in accordance with porous paving system manufacturer's instructions.
2. Proper subgrade preparation will enable the Grasspave2 (or equivalent) rolls/units to connect properly and remain level and stationary after installation.
3. Excavate area allowing for unit thickness, the engineered base depth (where required), and 0.5 inch (1.25 cm) for depth of sod root zone or topsoil germination area (when applicable).
4. Provide adequate drainage from excavated area if area has potential to collect water, when working with in-place soils that have poor permeability.
5. Ensure in-place soil is relatively dry and free from standing water.
6. Uniformly grade base.
7. Level and clear base of large objects, such as rocks and pieces of wood.

B. Base Preparation:

1. Generally, excavation into undisturbed normal strength soils will require no additional modification. Fill soils and otherwise structurally weak soils may require modifications, such as geotextiles, geogrids, and/or compaction (not to exceed 90%). Ensure that grading and soil porosity of the subbase will provide adequate subsurface drainage.
2. Prepare and verify engineered base (if required) is installed in accordance with porous paving system manufacturer's instructions.
3. Coordinate base installation and preparation with subdrains in accordance with porous paving system manufacturer's instructions.
4. If required, place a geotextile separation layer between the natural ground and the 'engineered base'.
5. If required, install the specified sub-drain and outlet according to construction drawings.
6. Place engineered base in lifts not to exceed 6 inches (150 mm), compacting each lift separately to 95 percent Modified Proctor.
7. Leave 1 inch (2.5 cm) of depth below final grade for porous paver unit and sand fill and 0.5 inch (1.25 cm) for depth of sod root zone or topsoil germination area (when applicable).

ON-SITE MANUFACTURER'S FIELD REPRESENTATIVE

A qualified Manufacturer's field representative shall be available for a pre-construction meeting via phone or in person and will provide installation videos, design details, installation instructions, and the technical specifications.

3.3 TURF CONDITIONER INSTALLATION

For Grasspave 2 (or equivalent): Spread all Turf Conditioner mix provided (spreader rate = 4.53 kg per 100 m2 (10 lbs per 1076 ft2) evenly over the surface of the base

course with a hand-held, or wheeled, rotary spreader. Refer to manufacturer's instructions for installation of turf conditioners for equivalent systems.

The Hydrogrow (or equivalent) mix should be placed immediately before installing the Grasspave2 (or equivalent).

3.4 GRASSPAVE2 (OR EQUIVALENT) INSTALLATION

A. Install the Grasspave2 (or equivalent) units by placing units with rings facing up, and using snap-fit connectors, pegs and holes, provided to maintain proper spacing and interlock the units. Units can be easily shaped with pruning shears or knife. Units placed on curves, slopes, and high traffic areas shall be anchored to the base course, using 40d common nails with fender washer, as required to secure units in place. Tops of rings shall be between 6 mm to 13 mm (0.25" to 0.5") below the surface of adjacent hard-surface pavements.

B. Install sand in rings as they are laid in sections by "back-dumping" directly from a dump truck, or from buckets mounted on tractors, which then exit the site by driving over rings already filled with sand. The sand is then spread laterally from the pile using flat bottomed shovels and/or wide "asphalt rakes" to fill the rings. A stiff bristled broom should be used for final "finishing" of the sand. The sand must be "compacted" by using water from hose, irrigation heads, or rainfall, with the finish grade no less than the top of rings and no more than 6 mm (0.25") above top of rings.

3.5 INSTALLATION OF SEED AND SOD

A. Seed and sod installation on the sand-filled rings must be completed within one week. Sand must be re-installed and leveled and Grasspave2 (or equivalent) checked for integrity if rings become exposed due to wind, rain, traffic, or other factors.

1. Apply native seed via hydroseeding/hydro-mulching at rates shown on plans and per hydroseeding manufacturer's recommendations. Coverage must be uniform and complete. Following germination of the seed, areas lacking germination larger than 20 cm x 20 cm (8" x 8") must be reseeded immediately.
2. Install thin sod directly over sand filled rings, filled no higher than the top of the rings. Sod strips should be placed with very tight joints.

B. Adequately water sod and/or seeded areas to assure germination of seed and growth of root system. Keep areas moist during root establishement. Sod shall be fertilized during root establishment.

C. DO NOT DRIVE ON SYSTEM. Sod and seeded areas shall be protected from traffic, other than emergency vehicles for two to three mowing cyles (3 to 4 weeks) for sod and 6 to 8 weeks for seeded areas, or until the root system has penetrated and established well below the Grasspave 2 (or equivalent units.)

3.6 FIELD QUALITY CONTROL

A. Remove and replace segments of Grasspave2 (or equivalent) units where three or more adjacent rings are broken or damaged, reinstalling as specified, so no evidence of

replacement is apparent.

B. Perform cleaning during the installation of work and upon completion of the work. Remove all excess materials, debris, and equipment from site. Repair any damage to adjacent materials and surfaces resulting from installation of this work.

3.7 MAINTENANCE

The Contractor shall be responsible for maintenance of plants – water/irrigation, fertilizing, mowing – for one complete growing season or until project acceptance whichever is later.

PART 4 - MEASUREMENT AND PAYMENT

4.1. Measurement shall be Lump Sum and shall be paid for at the lump sum price for Maintenance Access in accordance with Section 01200 . Payment shall include the labor, materials (including soil, sod and seed) and equipment necessary for a proper and complete installation in accordance with manufacturer recommendations.

END SECTION

SECTION 02619 PERMANENT SIGNS

PART 1 – GENERAL

1.1 Description of the Work

Provide all necessary labor, materials and equipment to provide, fabricate, and install the permanent signs, posts, and connections as shown on plans, details, and these specifications. All work under this section is subject to the Special and General Conditions and Instruction to Bidders which form a part of these specifications and to the current editions of the Arlington County Construction Standards and Specifications Manual and Virginia Department of Transportation Road and Bridge Specifications (VDOT). The Contractor shall be responsible for and governed by all the requirements thereunder.

PART 2 – MATERIALS

2.1 All traffic control signage shall conform to the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD).

2.2 Sign anchors bases, or sleeve bases shall meet current AASHTO, FHWA, and VDOT requirements for breakaway and yielding and shall be galvanized or stainless steel.

2.3 Sign posts set in earth shall be U-type rolled rail post (2 lbs/foot) with full length punching of 3/8-inch diameter holes spaced 1 inch on center starting 1 inch from each end. Posts shall be re-rolled steel or an equivalent steel. Posts shall conform to the mechanical requirements of ASTM A-499-81, Grade 60 (Hot-Rolled Carbon Steel Bars and Shapes Re-Rolled from Rail Steel). All posts are to be hot dipped zinc galvanized.

2.4 The use of other than U-type posts at any location requires approval from Arlington County.

2.5 Where square posts are permitted the following standards must be met.

2.5.1 Steel posts shall conform to ASTM A570, Grade 50 for Hot-Rolled Carbon Sheet Steel.

2.5.2 Post cross section shall be square formed from 14 or 12-gauge steel and shall be welded at the corner.

2.5.3 Posts shall be straight and have a smooth finish.

2.6 Banding used with saddles and buckles to fasten sign panels to streetlight or signal poles shall be stainless steel with a minimum width of ¾ inch.

2.7 Saddles shall be stainless steel with stainless steel bolts.

2.8 Buckles shall be stainless steel with a minimum width of ¾ inch.

2.9 Fasteners shall be 3/8" O.D. galvanized bolts with nylon washer for the sign front and galvanized hex nut and washer for the sign back.

2.10 Sign surface image shall conform to applicable portions of Sections 247 and 701 of the VDOT Road and Bridge Specifications. The sign colors and backgrounds shall conform to the details. Colors and shop drawings of signs shall be approved by the Owner prior to fabrication. Sign shall be drilled for bolts prior to painting

2.11 Post footings shall be Class A-3 concrete per Section 03100 of the Arlington County Construction Standards and Specifications Manual

PART 3 – EXECUTION

3.1. The signs shall be installed in locations as shown on the plans.

3.2. Posts located in earth shall be anchored or driven to a minimum depth of 36 inches.

3.3. Driving caps shall be used when driving posts following the manufacturer's instructions.

3.4. Posts located in concrete sidewalk or concrete medians A 12-inch minimum diameter cylindrical excavation to depth shown on detail shall be made to install the sign post. The post shall extend 36" (thirty-six inches) minimum below finished grade.

3.5. Concrete for footings shall be poured in accordance with the requirements outlined in the Section 03100 of the Arlington County Construction Standards and Specifications Manual.

3.6. The sign shall be centered on the post and fastened with the specified bolts. The lower edge of the signs shall be to the dimension above finished grade as shown on the details for each sign type.

PART 4 – MEASUREMENT AND PAYMENT

Payment shall be in accordance with Section 01200 – Measurement and Payment. The lump sum price for Mobilization and Control of Traffic (MOT) shall include all equipment, labor, materials and supervision necessary to provide traffic signs. Movement of any existing signs as required to implement the MOT shall also be included in the MOT lump sum price.

END SECTION

SECTION 02803 WETLAND SEEDING

PART 1 – GENERAL

1.1. Description of Work

Provide all labor, materials, tools and equipment as required to have topsoil, mulch, and seed applied in wetland planting areas as called for on the approved plans.

1.2. Related Work Specified Elsewhere

Arlington County Department of Environmental Services Construction Standards and Specifications (Arlington County Specifications):

A. Section 02100 - Clearing and Grubbing
B. Section 02200 - Earthwork for Structures and Pipelines
C. Section 329100 – Planting Preparation
D. Section 329200 – Seeding and Sodding

1.3. Submittals

In accordance with Sections 01300, 329100 and 329200. Submit material samples, testing results and proposed names of seed mixtures together with their composition and any certificates requested to the Project Officer for approval.

PART 2 – MATERIALS

2.1 Topsoil

Topsoil shall be a natural, fertile, friable soil, typical of productive soil in the vicinity, neither excessively acid nor alkaline, and containing no substances harmful to native plant growth.

2.2 Fertilizer: None.

2.3 Seed

Seed shall be as specified on the plans with species composition determined by weight of pure live seed for each species. Seed with guaranteed germination rates may be used, however composition and application quantities must be increased to compensate of the non-germinating components of the seed and seed mix.

2.4 Lime: None.

2.5 Mulch

Per acre: 2 tons of small grain mulch of high quality. Provide air-dry, clean, mildew and seed-free, salt hay or threshed straw of wheat, rye, oats or barley showing no rotting or caking and reasonably free of weeds.

1.9 Soil stabilization/Erosion Control Fabric

Erosion Control Fabric used in wetlands shall conform to the VDOT Specification Section 244.02. Rolled Erosion Control Products EC-2 Type 2.

PART 3 – EXECUTION

3.1 Topsoil

A. After approval of rough grading rototill all wetland seeding areas indicated on the drawings to a depth of 4 inches, removing stumps, all foreign objects and stones larger than one-inch diameter; place topsoil on all wetland seeding areas and incorporate by rototilling into subsoil. Topsoil origin and testing shall be in accordance with Section 329100 and shall be approved by the Project Officer before delivery. Soil shall not be tilled or amended when the soil's moisture capacity is above field capacity or when the soil is frozen.

B. Remove stripped topsoil not used at the job site and dispose in a location approved by the Project Officer.

3.2 Smooth Harrow/ Rake

Smooth Harrow and/or rake topsoil until the surface is finely pulverized and smooth. Compact with rollers weighing not over 100 pounds per linear foot of tread, to an even surface conforming to the prescribed lines and grades. Minimum depth shall be 3 inches after compaction.

3.3 Seeding

A. Seed as soon as possible following final grading between April 1 and October 1, unless approved by the Engineer.

B. If there is a delay in seeding, during which weeds grow or soil is washed out, remove the weeds or replace the soil before sowing the seed, without additional compensation. Immediately before seeding is begun, lightly rake the soil.

C. Sow seed with mechanical spreaders at the specified rate on a calm day. Sow one-half the seed in one direction and the other half at right angles. Seed shall be raked lightly into the soil to a depth of 1/4-inch and rolled with a roller weighing not more than 100 pounds per linear foot of tread.

D. If seeding by hydroseeder, add 500 pounds of wood cellulose fiber per acre and mix with the seed. Apply all seed mix within 45 minutes after mixing in hydroseeder to prevent fertilizer damage to seed and inoculants.

3.4 Mulching

Apply mulch immediately after seeding. Loosen baled straw and thoroughly break up before

placing. Begin placement of mulch on the windward side and from the toe to slopes. Do not grind, cut or crush mulch into pieces so small as to form a mat. Cutting mulch to aid in distribution may be accomplished, provided that 10 to 25 percent of the seeded area will be exposed.

3.5 Soil stabilization/Erosion Control Fabric

A. This section shall conform to the VDOT Road and Bridge Standards Section 113.02. Rolled Erosion Control Products EC-2 Type 2.

A. EC matting to be used in all wetland areas unless otherwise directed by the Project Officer.

3.6 Acceptance and Warranty

A. Wetland seeding shall be accepted provided all requirements of the approved plans and specifications have been met. A two (2) year warranty from the date of substantial completion applies to wetland seeding. Re-seeding shall be required in the second growing season, to occur between April 1 and October 1 unless otherwise directed by the Project Officer, where vigorous, healthy planting is not observed.

PART 4 – MEASUREMENT AND PAYMENT

In accordance with Section 01200 – Measurement and Payment.

Payment shall be at the Lump Sum Price for Wetland Plants to include full compensation, including all labor, materials and equipment necessary to prepare seed beds, apply topsoil, seed, erosion control matting and mulch, and maintain seeded areas until project acceptance as determined by the Project Officer.

Payment shall be at the Lump Sum Price for Wetland Plant Warranty and Post-Construction Maintenance to include full compensation including all labor, materials and equipment necessary for replacement seeding and maintenance during two years post-construction starting from the date of substantial completion as determined by the Project Officer. Payment will be made in two installments, each 50 percent of the total lump sum payment. One payment shall occur at the end of the first year of maintenance and the second at final project acceptance.

END SECTION

SECTION 02804 WETLAND PLANTING

PART 1 – GENERAL

1.1. Description of Work

Provide all plant, materials and labor required to execute wetland planting as indicated on the approved plans, as specified and as necessary to complete the Contract, including, but not limited to, soil treatment; planting of trees, shrubs, and herbaceous plants; protection, maintenance, warranty, and replacement of plants; related items of work as indicated on drawings; inspection; and maintenance.

1.2. Related Work Specified Elsewhere

Arlington County Department of Environmental Services Construction Standards and Specifications (Arlington County Specifications):

A. Section 02100 - Clearing and Grubbing
B. Section 02200 - Earthwork for Structures and Pipelines
C. Section 02803 – Wetland Seeding
D. Section 329300 – Exterior Plants General

1.3. Applicable References

A. Arlington County Cooperative Extension Office

B. Erosion and Sediment Control Ordinance (Chapter 57 of the Arlington County Code)

C. Hortus III, 1979 Edition

D. American Association of Nurseryman's Standards

E. Maryland Forest Conservation Manual

1.4. Plant Warranty and Replacement

A. Warranty: Guarantee that plants will be alive and in satisfactory growth for a period of two (2) Years, beginning the date of substantial completion as determined by the Project Officer.

B. Inspect herbaceous wetland plants annually in late summer to determine required replacement for the following spring. Replace dead or dying herbaceous plants between April 1 and May 15 of each year at no additional cost to the County. Inspect woody wetland plants annually in spring following leaf out to determine required replacement for the subsequent fall. Replace dead or dying woody plants between September 15 and December 1 of each year at no additional cost to the County.

C. Plants used for replacement shall be the same species and size as specified in Plant List;

plant, mulch, maintain and warrant as specified.

D. Properly maintain all planting and planting areas during the warranty period to include as needed watering, invasive control, excessive soil rutting/erosion, and pruning.

1.5. Submittals

Submittals shall be in accordance with Section 329300 (1.03) .

1.6 Quality Assurance

A. Pre-installation Conference: Conduct conference at Project site with Project Officer, Arlington County Urban Forester and/or Department of Parks and Recreation (DPR) representative or County Landscape Architect.

B. Urban Forester Notification: Notify the Project Officer at least 72 hours prior to commencement of tree planting operations, so that the County's Urban Forester can be present on-site to observe the work.

C. The Contractor shall provide a minimum of seven (7) business days' notice to the Project Officer prior to installing the plant material (this is not the same as inspection notification).

D. The Urban Forester may perform periodic inspections to check on tree plantings.

1.7 Workmanship

In accordance with Section 329300 (1.05).

1.8 Watering Requirements

A. Initial Waterings: The Contractor shall supply water for all plantings and shall water all plants at time of installation and 48 hours after installation, even if it is raining.

B. Contractor shall then water plantings at least twice per week at amounts specified below until wetland conditions are established (as agreed to by the Project Officer) or substantial completion of the work. Each watering shall consist of:

- 20 gallons per individual tree
- 4 gallons per individual shrub

1.9 Final Inspection

In accordance with Section 329300 (1.07).

1.10 Maintenance Prior to Substantial completion

Contractor shall maintain plantings at his/her own expense until substantial completion of the plantings. Maintenance shall include watering, removal of invasive species and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Contractor shall

perform invasive plant removal monthly from April through October if time between planting and substantial completion extends through any months of the growing season.

PART 2 – MATERIALS

2.1 Herbaceous Plants, Shrubs and Trees

Herbaceous plants, shrubs and trees shall be of a variety, size and quantity as shown on the approved plans and shall be planted where shown on the planting plan. Deep plugs/peat pot shall have a minimum soil volume of 10 in^3 and a minimum depth of four (4) inches. Plants shall be symmetrical, typical for variety and species, sound, vigorous, free from plant disease, insect pests or their eggs, and shall have healthy, normal root systems, well filling their containers, but not to the point of being root-bound. Plants not conforming to these requirements shall be considered defective, and shall be removed from the site immediately, and replaced with approved stock at the Contractor's expense. Plants shall be locally native or mid-Atlantic stock.

2.2 Water

Water shall be provided by the Contractor for use of this trade.

2.3 Miscellaneous

Mulch:	None.
Soil:	Natural for the area, fertile, friable and within acceptable pH limits for the herbaceous plants, shrubs and trees.
Fertilizer:	None.

PART 3 – EXECUTION

3.1 Delivery and Storage

Deliver plants to the site in a healthy condition and properly store and protect for planting.

3.2 Grading

Do not plant until finish grades are established and planting areas are properly prepared and graded.

3.3 Planting of Herbaceous Plants, Shrubs and/or Trees

A. Plant herbaceous plants between Apr 1 and May 15. Plant shrubs and trees between March 15 and May 15 or between September 15 and December 1, unless otherwise directed by the Project Officer and Urban Forester.

B. Remove canned stock by cutting can vertically on two opposite sides of can with

instrument approved for the purpose.

C. Spacing: Spacing and density shall be as specified on the plans. Plants shall be arranged in a natural random planting scheme that avoids repetitive patterns, rows, or unnatural planting schemes.

D. Dig tree and shrub pits 2 times as wide as the root ball and to a depth such that the top of the root ball is flush with the surrounding grade.

E. Setting: Plants shall bear some relation to soil level when planted as they did when in container. Place each plant in center of plant pit.

F. Cut burlap, twine and wire baskets from top 12 inches of rootball and remove from site.

G. Backfill with clean existing soil.

H. Firmly tamp backfill material into plant pits around and under the root ball to force out all air pockets.

PART 4 – MEASUREMENT AND PAYMENT

Measurement and payment shall be in accordance with Section 01200.

The measurement for Wetland Planting shall be lump sum, to include the labor, materials, and equipment necessary for a proper and complete installation and for required maintenance prior to substantial completion.

The measurement for Wetland Plants Warranty and Post-construction Maintenance shall be lump sum, to include all invasive species control, watering, pruning, and plant replacement in wetland planting areas during the two (2) year warranty period, which shall initiate upon the date of substantial completion as determined by the Project Officer. Payment will be made in two installments, each 50 percent of the total lump sum payment, One payment shall occur at the end of the first year of maintenance and the second at final project acceptance.

END SECTION

SECTION 02805 GOOSE EXCLUSION FENCING

PART 1 – GENERAL

1.1. Description of Work

This work shall consist of installing and maintaining during the warranty period a goose exclusion fence in all wetland areas. The goose exclusion fence shall be established using hardwood stakes, string, and vinyl flagging.

1.2. Related Work Specified Elsewhere

Arlington County Department of Environmental Services Construction Standards and Specifications (Arlington County Specifications):

A. Section 02803 – Wetland Seeding
B. Section 02804 – Wetland Plants

1.3. Maintenance

A. Installed goose exclusion fencing will be inspected monthly during the growing season and repaired as needed by the Contractor for the duration of the wetland plant warranty period.

PART 2 – MATERIALS

2.1 Hardwood Stakes

A. Hardwood stakes used in the wetland 2 inches by 2 inches by 72 inches.

2.2 String

A. String shall consist of 12-gauge (minimum 0.08-inch diameter) polypropylene string.

2.3 Vinyl flagging

A. Vinyl flagging shall consist of 1-3/16” width brightly colored or patterned vinyl flagging.

PART 3 – EXECUTION

3.1 Timing and Extent

Installation shall occur after excavation and grading of the wetland areas is complete and coincident with wetland seeding and plug planting. The Contractor shall install goose exclusion fence within all wetland areas to cover wetland seed and plug.

3.2 Installation

The string connecting each hardwood stake shall be tied and knotted independently to connecting hardwood stakes. The connecting string shall be tied and knotted with enough tension to pull the string taut between hardwood stakes with minimal sag.

Vinyl flagging shall be tied to the top of each hardwood stake and the midpoint of each length of string, and at least 6 inches of free flying vinyl flagging shall extend from the knot.

3.3 Removal

The goose exclusion fencing, including all stakes, string and flagging, will be completely removed from the project site at the conclusion of the warranty period or as directed by the Project Officer.

PART 4 – MEASUREMENT AND PAYMENT

Measurement and payment shall be in accordance with Section 01200.

The goose exclusion fencing will not be measured for separate payment. The cost thereof shall be included in the lump sum price for Wetland Planting. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete the work.

Maintenance throughout the warranty period and removal of the goose exclusion fencing shall be paid for at the lump sum price for Wetland Planting Warranty and Post-Construction Maintenance. Repairs due to the Contractor's negligence as determined by the Project Officer shall be done at no additional expense to the County.

END SECTION

SECTION 02806 BIODEGRADEABLE TREE SHELTERS

PART 1 – GENERAL

1.1. Description of Work

This work shall consist of installing and maintaining during the warranty period biodegradeable tree shelters on upland trees less than two-inch caliper and that are located outside the chain link fence. The intent of the shelters is to protect newly-planted trees from herbivory or damage from deer.

1.2. Related Work Specified Elsewhere

Arlington County Department of Environmental Services Construction Standards and Specifications (Arlington County Specifications):

A. Section 329300 – Exterior Plants General
B. Section 02804 – Wetland Plants

1.3. Maintenance

A. Installed tree shelters will be inspected monthly during the growing season and maintained as needed by the Contractor for the duration of the upland plant warranty period.

PART 2 – MATERIALS

2.1 Biodegradeable Tree Shelters:

A. Tree Shelters shall be BioBark tree shelters provided by EcoDept LLC, 1405 Benson Ct, Suite D, Arbutus, MD 21227, www.ecodepot.com or equivalent.
B. The shelters shall be in accordance with the detail included in the Contract Special Provisions.
C. The shelters shall meet the following criteria:
    1. Pre-assembled all-in-one units
    2. Fully biodegradeable
    3. ¼" acacia wood slats woven together with natural roping.
    4. Installed with a minimum of three rope tie-offs and 4 extended anchor stakes.
    5. ¼"-1/2" openings between the slats to allow passage of air.
    6. Minimum 4-ft height

PART 3 – EXECUTION

3.1 Timing and Applicability

Installation shall occur coincident with upland tree planting. Tree shelters shall be installed on all trees of 2-inch caliper or less that are located exterior to the chain link fence.

3.2 Installation

A. Plant trees according to the approved design plans.
B. Place a shelter upright around each tree driving the longer anchor stakes into the ground securely.
C. Ensure that there is a minimum of 2-inches between the shelter and tree trunk.
D. Tie-off rope ends around the tree.

3.3 Maintenance

Tree shelters shall be inspected monthly. Any vines, or invasive plant species, shall be removed from inside the shelter. Shelters shall be straightened, re-secured and inspected for damage. Replacement, if necessary, shall not result in an additional cost to the County.

PART 4 – MEASUREMENT AND PAYMENT

Biodegradeable tree shelters will not be measured for separate payment. The cost thereof shall be included in the lump sum price for Upland Planting. The payment will be full compensation for all material, labor, equipment, tools, and incidentals necessary to complete furnish and install the shelters and maintain them prior to substantial completion.

Monthly inspection and maintenance, including replacement, of shelters during the warranty period shall be not be measured. The cost thereof shall be incidental to the lump sum price for Upland Planting Warranty and Post-Construction Maintenance. Removal of the shelters at the direction of the Project Officer is also included in the lump sum price. Repairs due to the Contractor's negligence as determined by the Project Officer shall be done at no additional expense to the County. Shelters identified as too damaged to provide the intended function or missing during the warranty period shall be replaced at no cost to the County.

END SECTION

SECTION 03101 **WEIR BOX MODIFICATION**

PART 1 – GENERAL

1.1 Description of Work

The work consists of modifications to the existing weir box as described in the Contract Plans.

1.2 Related Work Specified Elsewhere

None.

PART 2 – MATERIALS

2.1 As per Contract Plans and Arlington County Construction Standards and Specifications.

2.2 Weir Box steps shall be installed per Contract Plans and VDOT Road and Bridge Standards and VDOT Specifications, standard step item ST-1.

PART 3 – EXECUTION

3.1 As per Contract Plans and Arlington County Construction Standards and Specifications.

3.2 Weir Box steps shall be installed per Contract Plans and VDOT Road and Bridge Standards and VDOT Specifications, standard step item ST-1.

PART 4 - MEASUREMENT AND PAYMENT

Weir Box Modification will be measured and paid for at the contract lump sum price for Site Development. The payment will be full compensation for all material, formwork, labor, equipment, tools, disposal fees and incidentals necessary to complete the Work.

END SECTION

SECTION 05501 **STEEL GRATING**

PART 1 - GENERAL

1.1 Description of Work

Provide all plant labor, supervision, material and equipment to furnish and install all steel grating, with accessories, fasteners, anchors, etc., complete in place as shown on the approved plans.

1.2 Related Work Specified Elsewhere

05500 Structural Steel & Miscellaneous Metals

1.3 Applicable Specifications

A. American Institute of Steel Construction (AISC)
B. American Society for Testing and Materials (ASTM)
C. American National Standards Institute (ANSI)
D. American Welding Society (AWS)
E. Americans with Disabilities Act (ADA)

1.4 Submittals

A. Product Data: Submit manufacturer's product data, load tables, anchor details, storage and handling requirements and recommendations, and standard installation details.

B. Shop Drawings: Before any fabrication begins, submit for approval detailed shop drawings for the fabrication and erection of all gratings. Shop drawings shall include, but not be limited to, the following:

1. Cut sheets, detail drawings, and installation instructions. Include type and location of all fasteners.
2. A grating layout that takes into consideration the platform geometry and physical constraints.

C. Design Modifications: Submit for review any proposed variations in details or substitutions in materials required to meet specified performance requirement or to coordinate work.

D. Samples: Submit manufacturer's samples of gratings and anchorage systems for approval.

E. Warranty: Submit manufacturer’s standard warranty.

1.5 Project Conditions

Verify actual location of Observation Platform framing and other construction contiguous with gratings by field measurements, prior to fabrication, and indicate measurements on shop drawings.

No field trimming or fitting of the Steel Grating is permitted.

1.6 Quality Assurance

A. Manufacturer Qualification: A company specializing in the manufacture of metal bar gratings with not less than 10 years of documented experiences.

B. Fabrication and installation procedures shall conform to the specifications, Arlington County Special Inspection Guidelines, and practices of the American Institute of Steel Construction."

C. Fabrication tolerances shall be in accordance with applicable provisions and recommendations of ANSI/NAAMM 531-09 Metal Bar Grating Manual.

D. Welders and machine operators shall be certified for all applicable AWS & ASTM standards.

1.7 Delivery, Storage and Handling

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage: Store materials in a clean, dry area in accordance with the manufacturer's instructions. Keep materials in manufacturer's original, unopened containers and packaging until inspection for installation.

C. Handling: Protect materials and finish during handling and installation, to prevent damage.

PART 2 - MATERIALS

2.1 Manufacturer

Steel Grating and components shall be provided by the following manufacturer or an approved equal:

All American Grating
3001 Grand Avenue
Pittsburgh, Pennsylvania 15225
800-962-9692
11-P-4 Carbon Steel Press-Locked Grating with Galvanized Finish

2.2 Products

A. Steel Grating:

1. Description: Carbon Steel Press-Locked Grating with Galvanized Finish

a. Bearing Bar Depth: 1-inch

b. Bearing Bar Thickness: 3/16-inch

c. Bearing Bar Spacing: 11/16-inch on center

d. Cross Bar Spacing: 4-inches

e. Top of main bearing bars is to be smooth.

2. Design Criteria:

a. Loading: Steel Grating shall be capable of withstanding the effects of gravity loads and the loading and deflection requirements indicated on the Contract Plans.

b. Traction / Slip Resistance: When tested per ANSI-NFSI B101.3- 2012, the top surface shall provide a minimum Wet Dynamic Coefficient of Friction (Wet DCOF) of 0.45 to meet High Traction classification. Also, per ADA section 302.1, walking surfaces shall provide a slip-resistant surface with sufficient frictional counterforce to the forces exerted in walking to permit safe ambulation.

3. Materials: Main bearing bars, rectangular cross bars, and banding are to be Carbon Steel meeting the requirements of ASTM A36.

4. Finish: Steel Grating shall be hot-dip galvanized per ASTM A123 . The final finish shall be smooth, without roughness or protrusions.

B. Accessories: Provide vandal resistant anchoring devices and hidden hold down clips to secure grating rigidly in place and support indicated loads.

PART 3 - EXECUTION

3.1 Examination

A. Examine all areas to receive the product for correct alignment and conditions for proper attachment and support of the gratings.

B. Notify Engineer of conditions that would adversely affect installation or subsequent use.

C. Do not begin installation until unacceptable conditions are corrected.

3.2 Installation

A. Install in accordance with manufacturer's instructions at locations indicated on the Shop

Drawings.

B. Use the approved attachment system and fasteners to secure grating to supporting members.

3.3 Protection

A. Protect installed product to ensure that, except for normal weathering, the grating is without damage or deterioration at the time of Substantial Completion.

B. Finish Damage: Repair any minor damage to finish in accordance with manufacturer's instructions.

C. Component Damage: Remove and replace damaged components that cannot be successfully repaired at no expense to the County.

PART 4 - MEASUREMENT AND PAYMENT

Steel Grating will be measured and paid for at the Contract lump sum price for Observation Platform. The payment will be full compensation for all labor, materials, and equipment necessary to complete the Work in accordance with this specification and the Contract Plans.

END SECTION

SECTION 05502 CABLE RAILING

PART 1 - GENERAL

1.1 Description of Work

The work consists of furnishing and installing cable railing on the steel platform and abutments as shown on the Contract Plans and described in the Special Provisions.

1.2 Related Work Specified Elsewhere

Section 06251-Wood Cap for Railing
Section 13146 – Ipe Timber

1.3 Applicable Specifications

A. Virginia Construction Code, 2012 Edition (VCC)
B. International Building Code, 2012 Edition (IBC)
C. American Institute of Steel Construction (AISC)
D. American Society for Testing and Materials (ASTM)
E. American Welding Society (AWS)

1.4 Submittals

A. Product Data: Submit manufacturer's product data, storage, and handling requirements and recommendations, installation methods and available colors, styles, patterns, and textures.

B. Shop Drawings: Before any fabrication is begun, submit detailed shop drawings of all items required in this section as a combined submittal. Shop drawings shall include, but not be limited to, the following:

1. Cut sheets, detail drawings, and installation instructions.
2. Railing post layout taking into consideration the proposed platform geometry and physical constraints. Railing post layout and connection to steel platform shall be coordinated with steel fabricator and associated shop drawings.
3. Detail of the interface of railings between different railing attachment conditions.
4. Detail of the interface of different post mounting conditions to varying materials.
5. Design calculations prepared, signed and sealed by a registered Professional Engineer, licensed in project jurisdiction for materials or fabrications required to comply with structural requirements.

C. Design Modifications: Submit for review any proposed variations in details or substitutions in materials required to meet specified performance requirement or to coordinate work.

D. Samples: Submit manufacturer's samples of materials, finishes, and colors.

E. Warranty: Submit manufacturer's standard warranty.

1.5 Quality Assurance

A. Fabrication and installation procedures shall conform to the specifications and practices of the American Institute of Steel Construction.

B. Welders and machine operators shall be certified for all applicable AWS & ASTM standards.

1.6 Delivery, Storage and Handling

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage: Store materials in a clean, dry area in accordance with the manufacturer's instructions. Keep materials in manufacturer's original, unopened containers and packing until inspection for installation.

C. Handling: Protect materials and finish during handling and installation, to prevent damage.

PART 2 - MATERIALS

2.3 Manufacturer

Cable Railing components shall be provided by the following manufacturer or an approved equal:

Hansen Architectural Systems
5500 SE Alexander Street
Hillsboro, OR 97213
503-356-0959
Hybrid Cable Railing System

2.4 Products

A. Cable Railing shall:

1. meet the loading and geometric requirements for guards per the Virginia

Construction Code, 2012 Edition.

2. include a wood top rail along its full length.

B. Railing posts shall:

1. have a maximum spacing of 6 feet.
2. be surface mounted to the top of the fascia stringers along the observation platform. Locations and attachments shall be coordinated with steel fabricator. Isolation between dissimilar materials to prevent galvanic corrosion shall be provided.
3. be surface mounted to the top of the concrete wing walls at the observation platform abutments.
4. have a connection to the observation platform superstructure sufficient to transmit the railing loads to the superstructure. Additional blocking, brackets, etc. may be required and shall be included in the railing design.

C. Cables used as infill shall:

1. be stainless steel.
2. not deflect more than 1/4 inch under load.

D. Top rail shall be 2x4 Ipe Lumber.

E. All aluminum railing components shall be powder coat finished in Bronze matte color.

PART 3 - EXECUTION

3.1 Examination

A. Examine all areas to receive the product.

B. Notify Engineer of conditions that would adversely affect installation or subsequent use.

C. Do not begin installation until unacceptable conditions are corrected.

3.2 Installation

A. Install in accordance with manufacturer's instructions at locations indicated on the Shop Drawings.

B. Install posts level and plumb.

C. Check on-center spacing for accuracy, and anchor posts securely in place.

D. Install cable parallel to either horizontal or rake per manufacturer's instructions.

E. Clean products promptly after installation, in accordance with the manufacturer's instructions. Do not use harsh cleaning materials or methods that could damage the finish.

3.3 Protection

A. Protect installed product to ensure that, except for normal weathering, railing will be without damage or deterioration at the time of Substantial Completion.

B. Finish Damage: Repair any minor damage to finish in accordance with manufacturer's instructions.

C. Component Damage: Remove and replace damaged components that cannot be successfully repaired at no expense to the County.

PART 4 - MEASUREMENT AND PAYMENT

Measurement and payment shall be in accordance with Section 1200 – Measurement and Payment.

Cable Railing will be measured and paid for at the Contract lump sum price for Observation Platform. The payment will be full compensation for all design, posts, cables, railings, fasteners, material, fabrication, furnishing, installation, labor, equipment, tools, disposal fees and incidentals necessary to complete the Work.

END SECTION

SECTION 05503 STRUCTURAL TENSION CABLE SYSTEM

PART 1 - GENERAL

1.1 Description of Work

This work shall consist of fabricating, transporting, erecting and tensioning of the Observation Platform structural cable system as per Contract Plans. Each cable assembly includes a structural strand and associated sockets, adjustment rods, pins, hardware, and appurtenances.

1.2 Related Work Specified Elsewhere

Section 05500 – Structural Steel & Miscellaneous Metal
Section 09900 – Protective Coatings

PART 2 - MATERIALS

2.1 As per Contract Plans and Arlington County Construction Standards and Specifications.

PART 3 - EXECUTION

3.1 As per Contract Plans and Arlington County Construction Standards and Specifications.

PART 4 - MEASUREMENT AND PAYMENT

Structural Tension Cable System will be measured and paid for at the contract lump sum price for Observation Platform. The payment will be full compensation for furnishing, installing, and maintaining the full structural cable system and for all material, labor, equipment, tools, and incidentals necessary to complete the Work.

END SECTION

SECTION 06250 COMPOSITE WOOD TIMBERS

PART 1: GENERAL

1.1. Section Includes

A. Composite wood timbers made using 100% recycled synthetic carpet fiber and proprietary resins.

B. Composite fascia, risers, fasteners and trim.

1.2. References

A. ASTM International (ASTM):

1. D696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics. Between −30°C and 30°C with a Vitreous Silica Dilatometer
2. D1413 - Standard Test Method for Wood Preservatives by Laboratory Soil-Block Cultures.
3. D3274 - Standard Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Microbial (Fungal or Algal) Growth or Soil and Dirt Accumulation.
4. D7032 - Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)
5. E84: Standard Test Method for Surface Burning Characteristics of Building Materials.
6. F1679 - Standard Test Method for Using a Variable Incidence Tribometer (VIT).

B. American Wood Preservers Association (AWPA)

1. AWPA E1-97: Standard Method for Laboratory Evaluation to Determine Resistance to Subterranean Termites.

C. International Code Council Evaluation Service (ICC-ES)

1. AC-10 Acceptance Criteria for Quality Documentation.
2. AC-174 Acceptance Criteria for Deck Board Span Ratings and Guardrail Systems.

1.3. Submittals

A. Comply with Section 01300 - Submittal Procedures.

B. Product Data: Submit manufacturer's published product data, including sizes, profiles, surface finishes, performance characteristics and installation instructions.

C. Samples: 12 inch long wood timbers samples illustrating size, profile, color and surface finish.

D. Warranty: Submit manufacturer's warranty.

1.4. Quality Assurance

A. Regulatory Requirements: Composite wood timbers shall be compliant with the following major model building codes:

1. 2012 International Building Code (IBS)

B. Follow all local building codes and regulations.

1.5. Delivery, Storage and Handling

A. Comply with manufacturer's recommendations for delivery, storage and handling.

B. Deliver materials to site in manufacturer's original, unopened packaging, with labels clearly identifying product name and manufacturer. Do not drop units off delivery trucks. Upon delivery, materials shall be inspected for damage. Deficient materials shall not be used.

C. Storage: Store composite wood timbers level and flat, off ground or floor. Cover with waterproof covering, vented to prevent moisture buildup. Place supports at either end of the stack and every 24" in between, lined up vertically. Do not stack over 12 feet high.

D. Handling: Protect materials and finish from damage during handling and installation.

PART 2: PRODUCTS

2.1 Composite wood timbers shall be provided by the following manufacturer or an approved equal:

NyloBoard, LLC
14187 Industrial Park Blvd
Covington, GA 30014
Tel: 877.695.6909
fax: 770.786.5158
web: *www.nyloboard.com*

2.2 Materials

A. Composite wood timbers:

1. Nylodeck: made using 100 percent recycled synthetic carpet fiber combined with proprietary resins, Owens Corning Advantex ® ECR glass reinforcement, and

state-of-the art UV protection, all compressed into one incredibly strong– yet lightweight – monolithic board. Equivalent: Submit testing and product documentation to demonstrate comparable strength, durability and density.

2. Profiles:
   a. NyloDeck (or equivalent) board: 2” x 8” x 12’ length, traditional
   b. NyloDeck (or equivalent) rails: 2” x 4”
3. Surface Texture: three dimensional embossed stain and scratch-resistant unique wood grain finish.
4. Colors: Mountain Mocha, Saddle Rose or Desert Spice or comparable.
5. Characteristics:
   a. Mold Resistance ASTM D 3274: 10 rating
   b. Fungal Resistance ASTM D 1413: No decay
   c. Termite Resistance AWPA E1-97: 10 rating
   d. Screw Retention ASTM D 1037: 747 lbf
   e. Span Rating 24” on center (ASTM D 7032. 24/100)
   f. Coefficient of Friction ASTM F 1679: 0.72 Dry / 0.68 Wet
   g. Coefficient of Thermal Expansion ASTM D 696: 0.64 x 10-5 in/in/°F
   h. Flame Spread ASTM E84: Class C
   i. Average Weight per LF 1.6 lbs./LF+
   j. Corrosion Resistant Reinforcement in accordance with ASTM D578, ISO 20789, and DIN 1259-01
6. Span Ratings:
   a. 100 lbs/ft2 when installed on support framing spaced up to 24” on center for boards installed at a 90º angle relative to the joists.

1.6. Accessories

A. Surface Fasteners: recommended by composite deck manufacturer for profile being fastened.
   1. Color: Mountain Mocha, Saddle Rose or Desert Spice or comparable.
   2. Reference manufacturer’s instructions.

PART 3: EXECUTION

2.1. Installation

A. Install composite wood timbers according to manufacturer’s instructions.

B. Cut, drill and route using only high quality carbide tipped blades.

C. Do not use NyloDeck (or equivalent) for structural applications or railing supports.

D. Do not exceed maximum spans recommended by manufacturer.

E. Maximum board overhang is 1-1/2” beyond the fascia board or deck frame.

F. Place boards as detailed in Plans.

G. Leave expansion spaces between abutting boards and between boards and adjacent construction:

1. Gap boards a minimum of 1/8” between boards (side to side).
2. For picture frame detail, gap boards a minimum of 1/8” between the end of the boards being picture framed and the long edge of the picture frame board.
3. For butt joints, gap boards based on installed temperature:
4. Installed below 75°F, gap butt joints 1/8”
5. Installed above 75°F, gap butt joints 1/16”
6. Add an additional joist or blocking where butt joints occur over a single joist.
7. Use (2) fasteners per joist on both sides of the butt joint.
8. Leave a minimum of 3/16” gap between the end of the deck board and any solid surface such as a wall or post.

2.2. Cleaning

A. Remove construction debris from project site in accordance with provisions outlined in Division 1.

B. Submit manufacturer’s cleaning guidelines.

PART 4 - MEASUREMENT AND PAYMENT

Composite Wood Timber shall be measured and paid for at the contract lump sum price for Maintenance Access. The payment will be full compensation for furnishing and installing the boat launch and for all material, labor, equipment, tools, and incidentals necessary to complete the work.

END OF SECTION

SECTION 06251 **WOOD CAP FOR RAILING**

PART 1 – GENERAL

1.1 DESCRIPTION

These specifications cover the uses and requirements for Ipe Lumber for top rail on cable railing.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 05502 - Cable Railing for metal railing to which wood cap is attached.

1.3 APPLICABLE SPECIFICATIONS

A. American Society for Testing and Materials (ASTM)

1.4 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage: Store materials in a clean, dry area in accordance with the manufacturer's instructions. Keep materials in manufacturer's original, unopened containers and packing until inspection for installation.

C. Handling: Protect materials and finish during handling and installation, to prevent damage.

PART 2 - PRODUCTS

2.1 MATERIAL SPECIFICATIONS

A. Lumber shall be Ipe.

B. Surface: All Ipe to be supplied S4S-E4E 9surfaced four sides – eased four edges). Edges shall be eased to a radius of 1/8 inch.

C. Moisture Content: Ipe shall be partially air dried to a moisture content of 15% - 25%.

D. Dimension Tolerance: Ipe shall be supplied at plus or minus 0.06 inches in both wide and thickness, measured at 30% moisture content.

E. Description: All Ipe shall be specified in actual or net dimensions (i.e., Finished Thickness x Finished Width x Finished Length).

F. Overlength: All Ipe shall be supplied 2 inches over the specified length, to allow for final trim and proper fit in the field.

G. End Coating: All Ipe Lumber is to be supplied with the ends sealed with aqueous wax log end sealer.

2.2 GRADE SPECIFICATIONS

A. Premium Selected Clear All Heart

All lumber shall be graded and inspected by a third-party to (Premium Selected Clear All Heart) grading rules, defined as follows:

1. Lumber shall be graded four faces and four edges.
2. Lumber shall be straight grained and parallel cut without heart center.
3. Lumber shall be all heartwood, no sapwood allowed.
4. Lumber shall be in sound condition, free from wormholes and knots.
5. Allowable Imperfections include: small drying cracks, small end splits (less than 5/32 inches in width) that do not impair the strength of the material or fastening, discoloration caused by weathering or chemical reaction, bow or twist which can be removed using normal installation methods and tools, and roey/scale grain (one face only).
6. Not Allowable Imperfections include: longitudinal heart cracks, internal cracks, firm or soft sapwood, fungi affects (blue to gray, brown to red, white to yellow, or incipient decay), and bow or twist which cannot be removed by normal installation methods and tools.

2.3 MECHANICAL PROPERTIES

The Ipe supplied shall meet or exceed mechanical properties as defined by U.S. Forest Product Laboratories testing methods. The values for mechanical properties based on the 2" standard are as follows:

M.C.	Bending Strength	Modulus of Elasticity	Max. Crush Strength
12%	25,400 psi	3,140,000 psi	13,010 psi

Janka side hardness is 3,680 pounds at 12% M.C.
Average air-dry density is 66 to 75 pcf
Basic specific gravity is 0.85-0.97

2.4 FIRE RATING

Ipe supplied shall be naturally fire resistant without the use of any fire-resistant preservatives to meet NFPA Class A and UBC Class I.

2.5 MATERIAL CERTIFICATES

A. Mechanical Certification: A test report from an independent U.S. testing laboratory indicating conformance to Ipe mechanical properties in accordance with the procedures outlined in ASTM Test Method D143 shall be submitted with the material bid.

B. Fire Rating Certification: A test report from an independent U.S. testing laboratory indicating conformance to NFPA Class A and UBC Class I surface burning

characteristics in accordance with ASTM Test Method E84 shall be submitted with the material bid.

C. Inspection Certification: A Certificate of Grade and Inspection from an independent third-party inspection and grading agency, Mallinckrodt or preapproved equal, indicating compliance with material specifications as to producing mill, FEQ grade, species, dimensions, quantity, condition, packaging, and documentation. The inspection will include the physical examination of 100% of the timber produced against the buyer's order, piece by piece, prior to packaging. Inspections are to take place at the mill throughout production and the certificate is to be submitted with the material bid prior to delivery.

PART 3 - MEASUREMENT AND PAYMENT

Ipe Lumber for railing cap shall not be measured for separate payment. The cost thereof shall be included in the lump sum price bid for the Observation Platform.

END OF SECTION

SECTION 13140 TRASH RACK WITH PEAK ROOF

PART 1 – GENERAL

1.1. Scope

A. The trash screen and attachments shall be fully fabricated by a qualified supplier as outlined in this specification.

1.2. Applicable Code and Standards

A. Arlington County Department of Environmental Services Construction Standards and Specifications (Arlington County Specifications)

B. Virginia Construction Code, Latest Edition

C. American Institute of Steel Construction Specification for Structural Steel Buildings, Latest Edition

D. American Institute of Steel Construction Manual, 13th Edition (AISC Manual)

E. ANSI/NAAMM MBG 531 09 Metal Bar Grating Manual, 2009

F. American Welding Society, Structural Welding Code, D1.1, Latest Edition

1.3. Action Submittals

A. Shop drawings: The contractor shall submit for approval design calculations and shop drawings for the fabrication and erection of all structural supports, and the trash rack based on the contractor's design and information shown in the construction drawings of current issue. Include plans, elevations, and details of sections and connections as required. Show type and location of all fasteners. Fabrication drawings and calculations shall be prepared and submitted, shall be unique drawings to this project, prepared to illustrate the specific portion of the trash rack fabricated. All relative design information such as member size, material specification, dimensions, and required critical welds shall be clearly shown on the drawings. Drawings shall have cross referenced details and sheet numbers. All drawings shall be stamped and signed by a Professional Engineer registered in the state of Virginia.

B. The trash rack supplier shall submit guidelines for construction inspection and maintenance procedures. These guidelines must be approved by the Project Engineer.

C. The trash rack supplier shall warrant their structure to be free of design, material and workmanship defects for a period of 5 years from the date of delivery. This warranty shall not cover defects in the trash rack caused by abuse, misuse, overloading, accident, improper maintenance, alteration or any other cause not the result of defective materials or workmanship. This warranty shall be void unless owner's records can be supplied which shall indicate compliance with the minimum guidelines specified in the inspection and maintenance procedures. Repair or replacements shall be the exclusive

remedy for defects under this warranty. The trash rack supplier shall not be liable for any consequential or incidental damages for breach of any express or implied warranty on their structure.

1.4. Quality Assurance

A. Fabrication and installation procedures shall conform to the applicable provisions and recommendations of the AISC Manual and ANSI/NAAMM 531-09 Metal Bar Grating Manual.

PART 2 – MATERIALS

2.1 Deck Grating

A. Bearing bars, cross bars and banding shall be Carbon Steel Type ASTM A-1011 CS Type B.

B. Description: Carbon Steel Dove Tail Pressure Lock Grating with rectangular bearing bars slotted to receive slotted rectangular cross bars assembled in egg-crate fashion and hydraulically pressed to permanently lock the bars in place.
1. Bearing Bar Spacing: 11/16” on center.
2. Bearing Bar Depth: based on loading requirements and clear span.
3. Bearing Bar Thickness: 3/16” to provide 1/2” space between bars.
4. Cross Bar Spacing: 4” on center.

C. Fabrication: Fabricate cutouts in grating sections for penetrations indicated. Arrange cutouts to permit grating removal without disturbing items penetrating gratings. Band ends and cuts in grating with bars of same size and material as bearing bars.

D. Provide appropriate galvanized steel fasteners for type, grade, and class as recommended by the deck grating manufacturer. Each deck grating panel shall be attached with a minimum of two fasteners to each supporting member.

2.2 Structural Support

A. Structural supports shall conform to Section 05500 of the Arlington County Specifications.

2.3 Trash Rack

A. The trash rack shall conform to Section 05500 of the Arlington County Specifications.

B. Steel plates and angles shall be ASTM A36.

C. The trash screen shall have a 2’x2’ access door for accessing the inside of the weir and lifting the screen for cleaning, as shown in the plans.

2.4 Finish

All steel members, including grating structural steel and guardrail, shall be Hot-Dip Galvanized per ASTM A123, ASTM A153 or ASTM F2329.

PART 3 – INSTALLATION

3.1 Field Verification

Take field measurements prior to preparation of final shop drawings and fabrication where required to ensure proper fitting of the work.

3.2 Installation

A. Prior to installation, contractor shall inspect supports for correct alignment and conditions for proper attachment and support of the trash rack. Any inconsistencies between contract drawings and supporting structure deemed detrimental to placement of the trash rack shall be reported in writing to the architect or owner's agent prior to placement.

B. Tools Required to install trash rack include:

C. The following instructions will guide the contractor through ha quick and successful installation of concrete riser boxes.

1. Step 1: Lift trash rack onto concrete structure (typically can be done with 1-2 persons) Note: Top of structure must be sound and flat (within 118") around top of mounting surface. Mounting a trash rack to a structure that is not sound is not recommended.

2. Step 2: Position (center) trash rack on structure and mark all mounting hole locations.

3. Step 3: Remove trash rack from concrete structure.

4. Step 4: Drill mounting holes using a 3/8" diameter masonry drill bit.

5. Step 5: Install 3/8" x 3" anchor bolts (supplied).

6. Step 6: Lift trash rack over anchor bolts. Ensure trash rack is completely flush against concrete mounting surface and then secure using flat washers and nuts (supplied).

7. Step 7: Ensure all anchor bolt nuts are tight and secure. DO NOT OVERTIGHTEN!

PART 4 – EXECUTION

4.1 Field Verification

Take field measurements prior to preparation of final shop drawings and fabrication where

required to ensure proper fitting of the work.

4.2 Installation

A. Installation of structural supports, guard rails, and trash rack shall conform to Arlington County Specifications, Section 05500.

B. Prior to installation, contractor shall inspect supports for correct alignment and conditions for proper attachment and support of the trash rack. Any inconsistencies between contract drawings and supporting structure deemed detrimental to placement of the trash rack shall be reported in writing to the architect or owner's agent prior to placement.

PART 5 – Measurement and Payment

The trash rack and all structural supports, and incidentals necessary to complete construction of the trash rack shall will be paid for at the contract lump sum price for Site Development. Price and payment will constitute full compensation for furnishing and placing all materials, and for all equipment, tools, labor, and incidentals required to complete the work.

END SECTION

SECTION 13142 STOP GATE

PART 1 – GENERAL

1.1. System Description

This work consists of installation and maintenance of an aluminum stop gate on the front of the concrete outlet structure, including all handles, bolts and framework in accordance with this provision and in reasonably close conformity with the lines, grades and details shown on the plans or established by the Engineer. The stop gate shall be provided as a permanent measure to allow for manual draining of the pond for emergency situations and routine maintenance.

1.2. Submittals

A. Comply with Section 01300– Submittals.

B. Product Data: Submit manufacturer's product data, including installation and removal instructions.

C. Shop Drawings: Submit manufacturer's shop drawings, including plans, elevations, sections, and details, indicating layout, dimensions, and materials.

1.3. Quality Assurance

A. Notification:

1. Notify County Project Officer 48 hours in advance of installation of temporary cofferdam.

2. Notify County Project Officer 48 hours in advance of removal of temporary cofferdam.

1.4. Delivery, Storage, and Handling

A. Delivery: Deliver materials to site with load lists clearly identifying product components and manufacturer.

B. Storage: Store materials in accordance with manufacturer's instructions.

C. Handling: Protect materials during handling, installation, and removal to prevent damage.

PART 2 – PRODUCTS

2.1 Materials and Installation

Material List

Frames and Slides

Mild Steel – ASTM A-36 or DIN 17100 St. 37-2
Stainless Steel – ASTM A-240/A-276, Type 304 or 316 as specified
Aluminum – ASTM B-209 and B-211 alloy 6061-T6

Fasteners an Anchor Bolts
Steel – ASTM A-307 Galvanized per ASTM A-153, or
Stainless Steel – ASTM A-276, Type 304 or 316, or
Stainless Steel – ASTM A-193 18-8, as specified

Flushbottom Seals and "J" Bulb Seals
Rubber – ASTM D-2000 or other suitable composition for extended use in water and sewage

Finish
Mill finish on all stainless steel and aluminum surfaces
Epoxy paint for mild steel surfaces
Galvanize (optional)

Guides

The gate frame shall be a rigid, welded unit with a clear opening the same size as the waterway, unless otherwise specified. The guides shall be of structural stainless steel shapes or aluminum extrusions. The guides shall be of the length specified.

Slide

The slide shall be plate reinforced with structural shapes welded to the plate. The slide shall not deflect more than 1/360 of the span of the gate under maximum head.

Flushbottom Closure

When indicated on the plans or in the gate schedule, gates shall be furnished with a flush seal arrangement. A resilient neoprene seal shall be securely attached to the frame along the invert and shall extend to the depth of the guide groove.

"J" Bulb Seals

When an unseating head is shown on the plans, or specified in the gate schedule, the gate shall be provided with "J" Bulb seals along the sides of the gate. Seals shall be mounted either on the frame or slide, such that seals do not protrude into the specified opening of the gate.

As an option, Gats can be furnished complete with ultra high molecular weight (U.H.M.W.) polymer seats which contact the slide face.

For steel and stainless-steel gates, ultra-high molecular weight bearing strips shall be mechanically retained to lock seat in place.

The Contractor shall submit working drawings to the County Project Officer for review in accordance with Section 01300 of the Arlington County Specifications.

PART 3 – EXECUTION

3.1 Field Quality Control

A. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for installation of permanent stop gate.

PART 4 – MEASUREMENT AND PAYMENT Stop Gate will not be measured for separate payment. The cost thereof shall be included in Site Development. All frames, slides, fasteners, seals, finishes and bolts will be included. Payment shall include materials and equipment necessary for a proper and complete installation. Manufacturer will provide all installation instructions when the order is shipped.

END SECTION

SECTION 13143 WATERGOAT (OR EQUIVALENT)

PART 1 – GENERAL

1.1. System Description

This work consists of installation and maintenance of a watergoat debris boom (or equivalent), including all necessary cables, anchors, and nets in accordance with this provision and in reasonably close conformity with the lines, grades and details shown on the plans or established by the Engineer. The watergoat (or equivalent) shall be provided as a permanent measure to minimize the accumulation of trash in the pond after all major storm events.

1.2. Submittals

A. Comply with Section 01300– Submittals.

B. Product Data: Submit manufacturer's product data, including installation and removal instructions.

C. Shop Drawings: Submit manufacturer's shop drawings, including plans, elevations, sections, and details, indicating layout, dimensions, and materials.

1.3. Quality Assurance

A. Notification:
1. Notify County Project Officer 48 hours in advance of installation of temporary cofferdam.
2. Notify County Project Officer 48 hours in advance of removal of temporary cofferdam.

1.4. Delivery, Storage, and Handling

A. Delivery: Deliver materials to site with load lists clearly identifying product components and manufacturer.

B. Storage: Store materials in accordance with manufacturer's instructions.

C. Handling: Protect materials during handling, installation, and removal to prevent damage.

PART 2 – PRODUCTS

2.1 Materials

The floating devices of the watergoat (or equivalent) shall be comprised of sponge balls, 25" in circumference at center. Floating devices will be anchored on both ends by posts. The posts shall be galvanized metal poles, 3" in diameter. The post will be anchored on each side of pond as designated in the plans, 13 feet from bottom of pond with a top elevation of 263.00 ft. The posts will have a 4" PVC sleeve which allows the cable to rise and lower. 3-4 feet minimum of rebar or

stainless steel shall be placed below bottom of pond. Floatation shall be flexible, buoyant units connected to a net to collect trash at entrance of triple box culvert.

The net shall be polyurethane net mesh of dimensions 7/8" x 1" with a recommended depth of 1 to 3 feet from to surface to a maximum of 6 feet.

The Contractor shall submit working drawings to the County Project Officer for review in accordance with Section 01300 of the Arlington County Specifications.

2.2 Installation

The watergoat (or equivalent) shall be placed at the location shown on the plans and in accordance with the approved working drawings. The Contractor shall install the watergoat (or equivalanet) as a last measure after all grading work and stabilization of wetland plants in the pond is complete.

2.3 Maintenance

If watergoat (or equivalent) is left uninstalled in work area for long periods of time in cold weather, a tarp must be placed over it to keep the net from freezing.

PART 3 – EXECUTION

3.1 Field Quality Control

Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for installation of permanent watergoat (or equivalent).

PART 4 – MEASUREMENT AND PAYMENT

Watergoat (or equivalent) will be measured in lump sum. Watergoat (or equivalent) will be paid for at the contract lump sum price for Site Development, which price shall be full compensation for furnishing, installing, maintaining and removal of all materials necessary to complete the work including anchors, connections, posts, support foundations, etc. Manufacturer will provide all installation instructions when the order is shipped.

END SECTION

SECTION 13144 BEAVER POND LEVELER

PART 1 – GENERAL

1.1. System Description

This work consists of installation and maintenance of a beaver pond leveler, including all necessary cables, anchors, mesh screens, and pipe fittings in accordance with this provision and in reasonably close conformity with the lines, grades, and details shown on the plans or established by the Engineer. The beaver pond leveler shall be provided as a permanent measure to minimize potential flooding situations such as a beaver dam built at the outlet of the pond.

1.2. Submittals

A. Comply with Section 01300– Submittals.

B. Product Data: Submit manufacturer's product data, including installation and removal instructions.

C. Shop Drawings: Submit manufacturer's shop drawings, including plans, elevations, sections, and details, indicating layout, dimensions, and materials.

1.3. Quality Assurance

A. Notification:
1. Notify County Project Officer 48 hours in advance of installation of temporary cofferdam.
2. Notify County Project Officer 48 hours in advance of removal of temporary cofferdam.

1.4. Delivery, Storage, and Handling

A. Delivery: Deliver materials to site with load lists clearly identifying product components and manufacturer.

B. Storage: Store materials in accordance with manufacturer's instructions.

C. Handling: Protect materials during handling, installation, and removal to prevent damage.

PART 2 – PRODUCTS

2.1 Materials

The beaver pond leveler intake device will consist of an 8"x 9ft. PVC pipe with 24" diameter wire cage. Supporting attachments will include five additional 8" x 9ft. PVC discharge pipe sections and 1 -8" PVC 90 Degree Elbow.

Tools needed to install device include:

A. PVC Cement and Primer – Axe and/or Chain Saw
B. #2 Shovel – Pick Axe or Grapple
C. Saw to cut PVC Riser Pipe if needed – leather gloves are recommended

The Contractor shall submit working drawings to the County Project Officer for review in accordance with Section 01300 of the Arlington County Specifications.

2.2 Installation

The beaver pond leveler shall be placed at the location shown on the plans and in accordance with the approved working drawings. The Contractor shall install the beaver pond leveler as a last measure after all grading work and stabilization of wetland plants in the pond is complete.

Installation Instructions:

A. Create an 8" minimum opening through the weir 1.0 ft from the top of the outlet structure. This opening should be large enough to accept the discharge pipe.
B. Connect at least 3 discharge pipes to the Intake Device before placing it into the water. The discharge pipes come with a male and female end that fit together.
C. Attach the brace support to the back of the intake device where the coupler is attached. Attach wires to the bottom of the brace support. See details on plans for further clarification.
D. Insert PVC discharge piping through the opening in the weir and extend the beaver pond leveler head 20 feet upstream out into the pond. Attach elbow to end of PVC pipe inside the weir. PVC pipe should be secured inside weir a total length of 5 feet.
E. Patch hold in weir. Secure braces with wire support to bottom of pond to anchor the leveler in the pond.
F. Set the PVC elbow at the height of the top of the weir. The riser pipe will need to be cut to the desired height.

2.3 Maintenance

In order to prolong the life of the beaver pond leveler, the intake device must be fully submerged once the pond level reaches the depth desired.

PART 3 – EXECUTION

3.1 Field Quality Control

A. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for installation of permanent beaver pond leveler.

PART 4 – MEASUREMENT AND PAYMENT

Beaver Pond Levelers , including supporting pipe sections, steep support posts, coupler and elbow

will be paid for at the contract lump sum price for Site Development. Payment shall include the labor, materials and equipment necessary for a proper and complete installation.

Manufacturer will provide all installation instructions when the order is shipped.

END SECTION

SECTION 13145 TURTLE BASKING STATION

PART 1 – GENERAL

1.1. Description of Work

Provide all labor, materials, tools and equipment as required to install turtle basking stations as indicated on the approved plans, as specified and as necessary to complete the Contract.

1.2. Submittals

In accordance with Section 01300 (Arlington County Specifications), submit working drawings to the Engineer for approval.

PART 2 – MATERIALS

Logs for the turtle basking stations shall be salvaged on-site from trees cleared as part of Section 02100 - Clearing and Grubbing for this contract and shall be of sufficient size to exceed the minimum lengths and diameter shown on the details. The branches shall be removed, but bark shall remain attached. The Project Officer shall have final approval of the logs used for the Turtle Basking Stations.

Boulders shall be of sufficient size and shape to prevent the trunk from floating or sinking.

PART 3 – EXECUTION

The turtle basking stations shall be placed at the locations shown on the plans and installed per the details shown on the plans and in accordance with the approved working drawings. The Contractor shall install the turtle basking stations during the final grading of the pond.

PART 4 – MEASUREMENT AND PAYMENT

Turtle Basking Stations will be paid for a the contract lump sum price for Site Development. Payment shall include the labor, materials and equipment necessary for a proper and complete installation.

END SECTION

SECTION 13146 IPE TIMBER

PART 1 – GENERAL

1.1 Description

These specifications cover the uses and requirements for Ipe Lumber for top rail on cable railing.

1.2 Related Work Specified Elsewhere

Section 05502 - Cable Railing

Section 06251 – Wood Cap for Railing

1.3 Applicable Specifications

A. American Society for Testing and Materials (ASTM)

1.4 Delivery, Storage and Handling

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage: Store materials in a clean, dry area in accordance with the manufacturer's instructions. Keep materials in manufacturer's original, unopened containers and packing until inspection for installation.

C. Handling: Protect materials and finish during handling and installation, to prevent damage.

PART 2 – PRODUCTS

2.1 Material Specifications

A. Lumber shall be Ipe.

B. Surface: All Ipe to be supplied S4S-E4E 9surfaced four sides – eased four edges). Edges shall be eased to a radius of 1/8 inch.

C. Moisture Content: Ipe shall be partially air dried to a moisture content of 15% - 25%.

D. Dimension Tolerance: Ipe shall be supplied at plus or minus 0.06 inches in both wide and thickness, measured at 30% moisture content.

E. Description: All Ipe shall be specified in actual or net dimensions (i.e., Finished

Thickness x Finished Width x Finished Length).

F. Overlength: All Ipe shall be supplied 2 inches over the specified length, to allow for final trim and proper fit in the field.

G. End Coating: All Ipe Lumber is to be supplied with the ends sealed with aqueous wax log end sealer.

2.2 Grade Specifications

A. Premium Selected Clear All Heart

All lumber shall be graded and inspected by a third-party to (Premium Selected Clear All Heart) grading rules, defined as follows:

1. Lumber shall be graded four faces and four edges.
2. Lumber shall be straight grained and parallel cut without heart center.
3. Lumber shall be all heartwood, no sapwood allowed.
4. Lumber shall be in sound condition, free from wormholes and knots.
5. Allowable Imperfections include: small drying cracks, small end splits (less than 5/32 inches in width) that do not impair the strength of the material or fastening, discoloration caused by weathering or chemical reaction, bow or twist which can be removed using normal installation methods and tools, and roey/scale grain (one face only).
6. Not Allowable Imperfections include: longitudinal heart cracks, internal cracks, firm or soft sapwood, fungi affects (blue to gray, brown to red, white to yellow, or incipient decay), and bow or twist which cannot be removed by normal installation methods and tools.

2.3 Mechanical Properties

The Ipe supplied shall meet or exceed mechanical properties as defined by U.S. Forest Product Laboratories testing methods. The values for mechanical properties based on the 2" standard are as follows:

M.C.	Bending Strength	Modulus of Elasticity	Max. Crush Strength
12%	25,400 psi	3,140,000 psi	13,010 psi

Janka side hardness is 3,680 pounds at 12% M.C.
Average air-dry density is 66 to 75 pcf
Basic specific gravity is 0.85-0.97

2.4 Fire Rating

Ipe supplied shall be naturally fire resistant without the use of any fire-resistant preservatives to meet NFPA Class A and UBC Class I.

2.5 Material Certificates

A. Mechanical Certification: A test report from an independent U.S. testing laboratory indicating conformance to Ipe mechanical properties in accordance with the procedures outlined in ASTM Test Method D143 shall be submitted with the material

bid.

B. Fire Rating Certification: A test report from an independent U.S. testing laboratory indicating conformance to NFPA Class A and UBC Class I surface burning characteristics in accordance with ASTM Test Method E84 shall be submitted with the material bid.

C. Inspection Certification: A Certificate of Grade and Inspection from an independent third-party inspection and grading agency, Mallinckrodt or preapproved equal, indicating compliance with material specifications as to producing mill, FEQ grade, species, dimensions, quantity, condition, packaging, and documentation. The inspection will include the physical examination of 100% of the timber produced against the buyer's order, piece by piece, prior to packaging. Inspections are to take place at the mill throughout production and the certificate is to be submitted with the material bid prior to delivery.

PART 3 - MEASUREMENT AND PAYMENT

Ipe Lumber shall not be measured for separate payment. The cost thereof shall be included in the price bid for Observation Platform.

END SECTION

SECTION 13148 ARTICULATING CONCRETE BLOCK (ACB) SYSTEM

PART 1 – GENERAL

1.1 Scope of Work

The contractor shall furnish all labor, materials, equipment, and incidentals required for, and perform all operations in connection with, the installation of the Articulating Concrete Block (ACB) system in accordance with the lines, grades, design and dimensions shown on the Contract Drawings and as specified herein.

1.2 Submittals

A. The Contractor shall submit to the Engineer of Record (EOR) evidence of full-scale hydraulic testing in accordance with ASTM D-7277, and if necessary, Factor of Safety (FoS) calculations in support of the proposed ACB system stamped and signed by a Professional Engineer licensed to practice in the state where the project is located. The Contractor shall also submit to the EOR an appropriate geotextile, selected for the site being protected on the basis of the gradation and permeability of the surface soils, which information shall have been provided by the EOR or the designated geotechnical engineer.

B. The Contractor shall furnish manufacturer's certificates of compliance for ACBs/mats, revetment cable, geotextile, and any revetment cable fittings and connectors. The Contractor shall also furnish the manufacturer's specifications, literature, preliminary shop drawings for the layout of the mats, installation and safety instructions, and any recommendations, if applicable, that are specifically related to the project. If a color has been specified for the block, the Contractor shall submit a color chart indicating the specified standard color.

C. The Tapered Series Armorflex ACB system or equivalent shall be installed. The Tapered Series Armorflex or approved equal is considered a system composed of a site specific geotextile placed on a properly compacted subgrade. This geotextile is overlaid with a 4” to 6” thick layer of crushed, angular, free-draining stone having a maximum equivalent diameter no greater than 1.5” and being free of fines, followed by a layer of geogrid. The geogrid apertures will be sized smaller than the D_{50} of the specified crushed stone. The tapered blocks are then placed upon the geogrid. Specifications of the geogrid and geotextile are found in Part 3 of this document.

D. Alternative materials from qualified suppliers may be considered; to qualify, proposed alternative suppliers must own and operate their own manufacturing facility, and shall directly employ a minimum of five (5) registered Professional Engineers. Full documentation consistent with the foregoing must be submitted in writing to the EOR a minimum of twenty (20) business days prior to bid date, and must be pre-approved in writing as an addendum to the bid documents and drawings by the EOR at least ten (10) business days prior to bid date. Submittal packages must also include, as a minimum, the following:

1. Evidence of satisfactory full-scale laboratory testing in accordance with *ASTM D 7277, Standard Test Method for Performance Testing of Articulating Concrete Block (ACB) Revetment Systems for Hydraulic Stability in Open Channel Flow*, performed on behalf the submitting manufacturer on a qualifying test flume of sufficient length for the test flows to achieve normal depth in all cases, and associated engineered calculations quantifying the FoS of the proposed ACB system under the design conditions of the specific project, stamped and signed by a registered Professional Engineer residing in and licensed to practice in the state where the project is located;

2. A list of 5 comparable projects, in terms of size and applications, in the United States, where the satisfactory performance of the specific alternate ACB system can be verified after a minimum of five (5) years of service life;

3. Information about, or certifications of, all materials associated with the ACB system as detailed above, including (but not limited to) cable, fittings, geotextile, and any other materials required for satisfactory installation in accordance with *ASTM D 6884, Standard Practice for Installation of Articulating Concrete Block (ACB) Revetment Systems*;

4. The names and contact information (phone numbers and e-mail addresses, at a minimum) for the suppliers' representatives, for technical, production or logistics questions, at least one of whom must reside in the state where the project is located.

PART 2 – PRODUCTS

2.1 General

A. All ACB mats shall be prefabricated as an assembly of concrete blocks having specific hydraulic capacities, and laced with revetment cables. The ACB system may also be assembled on-site by hand-placing the individual units either with or without subsequent insertion of cables.

B. Individual units in the system shall be staggered and interlocked for enhanced stability. The mats shall be constructed of open cell units only as shown on the contract drawings. The open cell units have two (2) vertical openings of rectangular cross section with sufficient wall thickness to resist breakage during shipping and installation. The open cell units have an open area of 18-23% as measured from the base of the mat. Parallel strands of cable shall extend through a minimum of two (2) cable ducts in each block allowing for longitudinal binding of the units within the mat and subsequent ability of the blocks to move freely along the cable. Each row of units shall be laterally offset by one-half of a block width from the adjacent row so that any given block is cabled to four other blocks (two in the row above and two in the row below).

C. Each block shall incorporate interlocking surfaces that minimize lateral displacement of the blocks within the mats when they are lifted by the longitudinal revetment cables. The interlocking surfaces must not protrude beyond the perimeter of the blocks to such an

extent that they reduce the flexibility or articulation capability of the mats or become damaged or broken when the mats are lifted during shipment or placement. Once the mats are in place, the interlocking surfaces shall minimize the lateral displacement of the blocks even if the cables should become damaged or removed. The mats must be able to flex a minimum of 18° between any given row or column of blocks in the uplift direction and a minimum of 45° in the downward direction.

D. The cables inserted into the mats shall form lifting loops at one end of the mat with the corresponding cable ends spliced together to form a lifting loop at the other end of the mat. The EOR shall approve appropriate sleeves for use in order to splice the lifting loop. The cables shall be inserted after sufficient time has been allowed for the concrete to complete the curing process.

E. The ACB mats shall be placed on a filter fabric as specified herein. Under no circumstances shall the filter fabric be permanently affixed or otherwise adhered to the blocks or mats; i.e., the filter fabric shall be independent of the block system.

F. **Certification (Open-Channel Flow):** ACB mats will only be accepted when accompanied by documented hydraulic performance characteristics that are derived from tests under controlled flow conditions. Testing shall conform to *ASTM D 7277, Standard Test Method for Performance Testing of Articulating Concrete Block (ACB) Revetment Systems for Hydraulic Stability in Open Channel Flow*, as amended and updated from time to time. Note that all hydraulic performance testing shall be performed in a 2H:1V flume, and that the tested length be long enough that the test flows achieve normal depth in all cases. Analysis and interpretation of the test data shall conform to the guidance contained in *ASTM D 7276, Standard Guide for Analysis and Interpretation of Test Data for Articulating Concrete Block (ACB) Revetment Systems in Open Channel Flow*, as amended and updated.

Performance (Open-Channel Flow): The design of the ACB mats shall be in accordance with the Factor-of-Safety design methodology as described in "Erosion and Sedimentation" by Pierre Julien, Cambridge University Press, Second Ed. 2010. The minimum designed safety factor shall be 1.5 by utilizing the following equation.

$$SF = ((\vartheta_2 / \vartheta_1)\,\alpha_\theta) / ((1 - \alpha_\theta^2)^{0.5} \cos\beta + \eta\,(\vartheta_2 / \vartheta_1) + (\vartheta_3\, F_d' \cos\delta + \vartheta_4\, F_l')) / \vartheta_1 W_s) \geq 1.5$$

where ϑ_1, ϑ_2, ϑ_3, and ϑ_4 are geometric properties of the block, α_θ, β, and δ are angles characteristic of the site and application, η is the stability number for a sloped surface, F_d & F_l are the drag and lift forces, respectively, and W_s is the submerged weight of the block. ArmorFlex block geometric parameters are available upon request.

The analysis shall be performed based upon the stability of the ACBs due to gravity forces alone, neglecting conservative forces added by cabling, mechanical anchorage, contact with adjacent blocks, or other restraints not attributable to gravity based forces. The analysis must be in accordance with *ASTM D 6884, Standard Practice for Installation of Articulating Concrete Block (ACB) Revetment Systems.*

All design calculations submitted must be based upon the smallest block utilized in the mats. Partial "half blocks" must be analyzed separately.

In order to analyze the performance of the unit, the hydraulic information listed below is required:

ACB HYDRAULIC INFORMATION

Design Volumetric Flow Rate (ft^3/sec)	20
Minimum Shear Stress (lb/ft^2)	-
Channel Friction or Bed Slope (ft/ft)	0.04 (controlling)
Channel Side Slopes (_H:1V)	3H:1V
Channel Bottom Width (ft)	46 (average)
Allowable Unit Protrusion (in)	0.5

2.2 Articulating Concrete Blocks

A. **Scope:** This specification covers ACB mats used for general erosion control, spillway armoring, steep channel armoring, channel protection and other high-velocity applications. Concrete units covered by this specification are made from lightweight or normal weight aggregates, or both. The values stated in U.S. customary units are to be regarded as the standard.

B. **Materials:** Cementitious Materials - Materials shall conform to the following applicable ASTM specifications:
1. Portland Cements - Specification C 150, for Portland Cement.
2. Blended Cements - Specification C 595, for Blended Hydraulic Cements.
3. Hydrated Lime Types - Specification C 207, for Hydrated Lime Types.
4. Pozzolans - Specification C 618, for Fly Ash and Raw or Calcined Natural Pozzolans for use in Portland Cement Concrete.
5. Aggregates – Specification C 33, for Concrete Aggregates, except that grading requirements shall not necessarily apply.

C. **Casting:** The ACB units shall be produced using a dry cast method. Dry cast units obtain strength more quickly than wet cast blocks, and will also achieve a greater uniformity of quality and greater durability.

D. **Physical Requirements:** At the time of delivery to the work site, the ACB units shall conform to the physical requirements prescribed in Table 2 listed below.

PHYSICAL REQUIREMENTS

Compressive Strength Net Area Min. p.s.i (mPa)		**Water Absorption Max. lb/ft^3 (kg/m^3)**	
Avg. of 3 units	Individual Unit	Avg. of 3 units	Individual Unit
4,000 (27.6)	3,500 (24.1)	9.1 (160)	11.7 (192)

Units will be sampled and tested in accordance with *ASTM D 6684, Standard Specification for Materials and Manufacture of Articulating Concrete Block (ACB) Revetment Systems.*

E. **Visual Inspection:** All units shall be sound and free of defects which would interfere with the proper placement of the unit, or which would impair the performance of the system. Surface cracks incidental to the usual methods of manufacture, or surface chipping resulting from customary methods of handling in shipment and delivery, shall not be deemed grounds for rejection.

F. Cracks exceeding 0.25" (.60 cm) in width and/or 1.0" (2.5 cm) in depth, or chipping resulting in a weight loss exceeding 10% of the average weight of a concrete unit, shall be deemed grounds for rejection.

G. Blocks rejected prior to delivery from the point of manufacture shall be replaced at the manufacturer's expense. Blocks rejected at the job site shall be repaired with structural grout or replaced upon request at the expense of the contractor.

H. **Sampling and Testing:** The purchaser (or their authorized representative) shall be accorded access to the relevant manufacturing facility or facilities, if desired, in order to inspect and/or sample the ACB units from lots ready for delivery prior to release for delivery to the job site. Such inspections are at the sole expense of the requesting entity.

G. Field installation shall be consistent with the way the system was installed in preparation for hydraulic testing pursuant to *ASTM D 7277, Standard Test Method for Performance Testing of Articulating Concrete Block (ACB) Revetment Systems for Hydraulic Stability in Open Channel Flow*. Any external restraints, anchors, or other ancillary components (such as synthetic drainage mediums) shall be employed as they were during testing; e.g., if the hydraulic testing installation utilized a drainage layer, then the field installation must also utilize a drainage layer. This does not preclude the use of other section components for other purposes, e.g., a geogrid for strengthening the subgrade for vehicular loading, or an intermediate filter layer of sand to protect very fine-grained native soils.

H. Hydraulic testing shall be conducted on the thinnest block in a "family" of similar blocks (i.e., same footprint but different thicknesses), with the tested critical shear value then converted to a critical shear at 0° before extrapolation to thicker blocks within the same family. Such extrapolation may not be made from a thicker block to a thinner block. The extrapolation method is detailed in the National Concrete Masonry Association (NCMA) "Design Manual for Articulated Concrete Block (ACB) Revetment Systems", section 4.2.

I. Purchaser may request additional testing other than that provided by the manufacturer as needed. Such requested testing will extend any stated lead times for manufacturing and delivery, if the results of such testing are a prerequisite to approval (i.e., approval for release to manufacturing). Costs associated with such testing shall be borne by the purchaser.

2.3 Manufacturer

The articulating concrete block system shall be the Tapered Series by ARMORFLEX or equivalent and shall have the following characteristics:

CLASS	TYPE	MIN. BLOCK WEIGHT		BLOCK SIZE			OPEN AREA %
		Lbs.	Lbs./ft^2	Length, in.	Width, in.	Height, in.	
40T	Open	58.1	32.8	17.4	15.5	4.0	20

2.4 Revetment Cable and Fittings

A. **Option 1. Polyester Revetment Cable and Fittings:** Revetment cable shall be constructed of high tenacity, low elongating, and continuous filament polyester fibers. Cable shall consist of a core construction comprised of parallel fibers contained within an outer jacket or cover. The size of the revetment cable shall be selected such that the minimum acceptable strength is at least five (5) times that required for lifting of the mats, in accordance with ASTM D-6684 paragraph 5.5.2.

B. Elongation requirements specified below are based upon stabilized new, dry cable. Stabilization refers to a process in which the cable is cycled fifty (50) times between a load corresponding to 200D^2 and a load equal to 10%, 20% or 30% of the cable's approximate average breaking strength. Relevant elongation values are as shown in the table below. The tolerance on these values is $\pm$ 5%.

ELASTIC ELONGATION		
at Percentage of Break Strength		
10%	20%	30%
0.6	1.4	2.2

C. The revetment cable shall exhibit resistance to most concentrated acids, alkalis and solvents. Cable shall be impervious to rot, mildew and degradation associated with marine organisms. The materials used in the construction of the cable shall not be affected by continuous immersion in fresh or salt water.

D. Selection of cable and fittings shall be made in a manner that insures a safe design factor for mats being lifted from both ends, thereby forming a catenary. Consideration shall be taken for the bending of the cables around hooks or pins during lifting. Fittings such as sleeves and stops shall be aluminum and washers shall be plastic unless otherwise shown on the Contract Drawings.

E. **Option 2. Galvanized Steel Revetment Cable and Fittings**: Revetment cable shall be constructed of preformed galvanized aircraft cable (GAC). The cables shall be made from individual wires and strands that have been formed during the manufacture into the shape they have in finished cable.

F. Cable shall consist of a core construction comprised of seven (7) wires wrapped within

seven (7) or nineteen (19) wire strands. The size of the revetment cable shall be selected such that the minimum acceptable strength is at least five (5) times that required for lifting of the mats.

G. The revetment cable shall exhibit resistance to mild concentrations of acids, alkalis, and solvents. Fittings such as sleeves and stops shall be aluminum, and the washers shall be galvanized steel or plastic. Furthermore, depending on material availability, the cable type (7x7 or 7x19) can be interchanged while always ensuring the required factor of safety for the cable.

H. Selection of cable and fittings shall be made in a manner that insures a safe design factor for mats being lifted from both ends, thereby forming a catenary. Consideration shall be taken for the bending of the cables around hooks or pins during lifting. Revetment cable splicing fittings shall be selected so that the resultant splice shall provide a minimum of 75% of the minimum rated cable strength.

2.5 Anchors

A. The specifying EOR *may* require, at his/her discretion, permanent anchoring of the mats, e.g., by the use of ancillary earth anchors or attachment to other structures using the lifting cable loops, or through the open cells of an open-cell block. The design of the ArmorFlex system is intended to provide hydraulic stability without the use of such anchors; consequently, any such anchor design shall be by others as approved by the EOR.

2.6 Filter Fabric

A. The geotextile filter shall meet the minimum physical requirements listed in Table No. 3 of these Specifications. Consultation with the manufacturer is recommended; the standard for sizing geotextile for these applications is AASHTO M-288, Permanent Erosion Control. Either woven or non-woven geotextile are acceptable, as long as they meet the other project requirements.

B. The geotextile must be permitted to function properly by allowing relief of hydrostatic pressure; therefore fine soil particles shall not be allowed to clog the filter fabric.

C. The geotextile fiber shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of propylene, ethylene, ester, or amide, and shall contain stabilizers and/or inhibitors added to the base plastic, if necessary, to make the filaments resistant to deterioration due to ultraviolet and heat exposure. The edges of the geotextile shall be finished to prevent the outer fiber from pulling away from the geotextile.

D. The Contractor shall furnish manufacturer's certified test results to the EOR, showing actual test values obtained when the physical properties are tested for compliance with the specifications.

E. During all periods of shipment and storage, the filter fabric shall be protected from direct sunlight, UV radiation, and temperatures greater than 140°F. To the extent possible, the fabric shall be maintained wrapped in its protective covering. The geotextile shall not be

exposed to sunlight or UV radiation until the installation process begins.

PHYSICAL REQUIREMENTS

Physical Property	Test Procedure	Minimum Value
Grab Tensile Strength (Unaged Geotextile)	ASTM D4632	*IAW AASHTO M288 Class 2*
Breaking Elongation (Unaged Geotextile)	ASTM D4632	50% max. (in any principal direction)
Burst Strength	ASTM D3786	*IAW AASHTO M288 Class 2*
Puncture Strength	ASTM D4833	*IAW AASHTO M288 Class 2*
A.O.S., U.S. Std. Sieve	ASTM D4751	0.425mm minimum
Permittivity	ASTM D4491	0.05 sec^{-1}

A. Final acceptance of the filtration geotextile must be made by the Project Officer based on project specific soil information. Soil characteristics such as grain size distribution, permeability, and plasticity shall be determined for every 200,000 square feet of geotextile installed or for each source of borrow material used during construction. Significant differences in soil characteristics may require the performance of further sieve and possible hydrometer testing at the discretion of the Project Officer. The locations for which the material to be tested is extracted shall be approved by the Project Officer. The Contractor shall provide the site-specific soil and modified proctor curves for the site soil, at his own expense, to the manufacturer. Also, the contractor shall be responsible for the performance of the test by a certified independent laboratory experienced in performing such test. The test shall be performed under the actual field soil conditions or as otherwise required by the Project Office.

B. At the time of installation, the filter fabric shall be rejected if it has been removed from its protective cover for over 72 hours or has defects, tears, punctures, flow deterioration, or damage incurred during manufacture, transportation or storage. With the acceptance of the EOR, placing a filter fabric patch over the damaged area prior to placing the mats shall repair a torn or punctured section of fabric. The patch shall be large enough to overlap a minimum of three (3) feet in all directions.

2.7 Size of ACB Mats

A. **General:** The concrete blocks, cables and fittings shall be fabricated at the manufacturer or another approved location into mats with a width of up to eight (8) feet and a length up to forty (40) feet, which is approved by the Project Office. The maximum mat length may be shorter for heavier blocks.

B. **Mat Length:** The ACB mats shall have the ability for fabrication in various lengths, widths, and in combinations of length and/or widths. Special mats are a combination of two opposing dimensions either in the longitudinal or transverse direction of the mats. The

special mats are available in various dimensions that allow for a custom fit to a site-specific project. Obstructions, such as manholes, pipe outfalls, or other fixed structures, will be accommodated to the extent that accurate information is provided about them prior to the preparation of mat layout drawings.

2.8 Geogrid

i. **Description:** The geogrid shall be a regular grid structure of polymeric material and shall have aperture geometry, rib and junction cross-sections sufficient to permit significant mechanical interlock and retain the underlying material. The geogrid shall impart a) high resistance to loss of load capacity or structural integrity when the geogrid is subjected to mechanical stress during installation, b) high resistance to deformation when the geogrid is subjected to applied force in use, and c) high resistance to loss of load capacity or structural integrity when the geogrid is subjected to all forms of ultraviolet, biological or chemical degradation normally encountered in earthwork construction.

ii. **Construction Requirements:** All areas immediately beneath the installation area for the geogrid shall be prepared properly as shown on the plans, as specified, or as directed by the Engineer. The geogrid shall be installed in accordance with the manufacturer's recommendations. Only that amount of geogrid required for immediately pending work shall be placed to prevent undue exposure or damage to the geogrid. The geogrid shall be placed taut prior to concrete block placement. After a layer of geogrid has been placed, suitable means shall be used to anchor the geogrid in position until the concrete blocks can be placed. Adjacent rolls of geogrid shall be overlapped by 12 inches minimum.

iii. **Measurement and Payment:** This item of work shall be measured and paid for by the square yard, completed in place. No allowances shall be made for overlap, splices or material cut off or wasted. Payment for geogrid shall include furnishing the material, labor and equipment required to furnish, place and anchor the geogrid, and any hand work necessary to establish grades, make geogrid splices and repairs to protective coatings.

PART 3 – FOUNDATION PREPARATION, GEOTEXTILE AND MAT PLACEMENT

3.1 Subgrade Preparation

A. **General:** All subgrade preparation shall be performed in accordance with *ASTM D 6884, Standard Practice for Installation of Articulating Concrete Block (ACB) Revetment Systems*, as updated and amended.

B. **Grading:** The slope shall be graded to a smooth plane surface to ensure that intimate contact is achieved between the slope face and the geotextile (filter fabric), and between the geotextile and the entire bottom surface of the individual ACBs. All slope deformities, roots, grade stakes, and stones which project normal to the local slope face must be re-graded or removed. No holes, "pockmarks", slope board teeth marks, footprints, or other voids greater than 0.5 inch in depth normal to the local slope face shall be permitted. No

grooves or depressions greater than 0.5 inches in depth normal to the local slope face with a dimension exceeding 1.0 foot in any direction shall be permitted. Where such areas are evident, they shall be brought to grade by placing compacted homogeneous material. The slope and slope face shall be uniformly compacted, and the depth of layers, homogeneity of soil, and amount of compaction shall be as required by the EOR.

C. Excavation and preparation for all termination trenches or aprons shall be done in accordance to the lines, grades and dimensions shown in the Contract Drawings. The termination trench hinge-point at the top of the slope shall be uniformly graded so that no dips or bumps greater than 0.5 inches over or under the local grade occur. The width of the termination trench hinge-point shall also be graded uniformly to assure intimate contact between all ACBs and the underlying grade at the hinge-point.

D. **Inspection:** Immediately prior to placing the filter fabric and ACB mats, the prepared subgrade shall be inspected by the EOR as well as the owner's representative. No fabric or blocks shall be placed thereon until that area has been approved by each of these parties.

3.2 Placement of Geotextile Filter Fabric

A. **General.** All placement and preparation should be performed in accordance with *ASTM D 6884, Standard Practice for Installation of Articulating Concrete Block (ACB) Revetment Systems,* as updated and amended.

B. Filter Fabric, or filtration geotextile, as specified elsewhere, will be placed within the limits of ACBs shown on the Contract Drawings.

C. **Placement.** The filtration geotextile shall be placed directly on the prepared area, in intimate contact with the subgrade, followed by a 4- to 6-inch thick granular drainage layer consisting of angular crushed rock with no fines (max. D^{100} is 1.5”; other stone types to be discussed with manufacturer). The geotextile shall be free of folds or wrinkles prior to placement of the granular drainage layer. The geotextile will not be walked on or disturbed when the result is a loss of intimate contact between the ACB and the geotextile or between the geotextile and the subgrade. The geotextile filter fabric will be placed so that the upstream strip of fabric overlaps the downstream strip. The longitudinal and transverse joints will be overlapped at least one and a half (1.5) feet for dry installations and at least three (3) feet for below-water installations. The geotextile will extend at least one (1) foot beyond the top and bottom revetment termination points, or as required by the EOR.

3.3 Placement of ACBs/Mats

A. **General.** ACB placement and preparation should be performed in accordance with *ASTM D 6884, Standard Practice for Installation of Articulating Concrete Block (ACB) Revetment Systems*, as amended and updated.

B. ACB block/mats, as specified in Part 2:A of these Specifications, will be constructed within the specified lines and grades shown on the Contract Drawings.

C. **Placement.** The articulating concrete block mats shall be placed on a minimum 6-inch thick granular drainage layer. No individual block within the plane of placed concrete blocks shall protrude more than one-half inch or as otherwise specified by the Project Office. ACBs should be flush and develop intimate contact with the drainage layer confinement geogrid, as approved by the Project Office. Proposed hand placing is only to be used in limited areas, specifically identified by the Project Office or manufacturers' mat layout drawings, as approved by the Project Office.

D. If assembled and placed as large mattresses, the ACB mats will be attached to a spreader bar or other approved device to aid in the lifting and placing of the mats in their proper position by the use of a crane or other approved equipment. The equipment used should have adequate capacity to place the mats without bumping, dragging, tearing or otherwise damaging the underlying fabric. The mats will be placed side-by-side, so that the mats abut each other, and/or end-to-end. Mat seams or openings between mats greater than two (2) inches will be backfilled with 4000 p.s.i. non-shrink grout, concrete or other material approved by the Project Office. Whether placed by hand or in large mattresses, distinct changes in grade that results in a discontinuous revetment surface in the direction of flow will require backfill at the grade change location so as to produce a continuous surface.

E. Termination trenches will be backfilled and compacted flush with the top of the blocks. The integrity of the trench backfill must be maintained so as to ensure a surface that is flush with the top surface of the ACBs for its entire service life. Termination trenches will be backfilled as shown on the Contract Drawings. Backfilling and compaction of trenches will be completed in a timely fashion. No more than 500 linear feet of placed ACBs with non-completed termination trenches will be permitted at any time.

F. **Finishing.** The cells or openings in the ACBs will be backfilled and compacted with suitable material, as specified by the Project Office. Backfilling and compaction will be completed in a timely manner so that no more than 500 feet of exposed mats exist at any time. Finishing requirements are explicitly at the discretion of the Project Office.

G. **Consultation.** The manufacturer of the ACBs/mats shall provide design and construction advice during the design and initial installation phases of the project when required or as necessary, at the discretion of the Project Office. The ACB supplier shall provide, at a minimum, one full day or two half-days of on-site project support upon request.

PART 4- MEASUREMENT AND PAYMENT

ACB system will be measured as Lump Sum (See Section 01200). Payment shall include the labor, materials and equipment necessary for a proper and complete installation.

END SECTION

SECTION 13180 MAINTENANCE AND CONTROL OF TRAFFIC

PART 1 – GENERAL

This work shall consist of maintaining and protecting workers, vehicular and pedestrian traffic through areas of construction within the limits of the project and over the approved traffic detours. All work shall be in accordance with the latest Arlington County Construction Standards and Specifications, Virginia Department of Transportation (VDOT) Road and Bridge Specifications, the Manual on Uniform Traffic Control Devices (MUTCD), and the Virginia Work Area Protection Manual (WAPM), the standard drawings, and the Contract, as directed by the Project Officer.

1.1 Description of Work

Provide all plant, labor, supervision, materials, and equipment to install, maintain, relocate, and remove all temporary traffic control devices.

1.2 Related Work Specified Elsewhere

1.3 Applicable Specifications

A. Virginia Department of Transportation (VDOT)
B. VDOT Road and Bridge Specifications
C. Manual on Uniform Traffic Control Devices (MUTCD)
D. Virginia Work Area Protection Manual (WAPM)
E. Occupational Safety and Health Act, State & Federal (OSHA)

1.4 Quality Assurance

Work Zone Traffic Control Certification

The Contractor shall have at least one (1) employee who is certified by VDOT in Basic Work Zone Traffic Control; and who will be responsible for the placement, maintenance and removal of work zone traffic control devices within the project limits in compliance with the permit requirements and conditions, the approved plan, specifications, the Virginia Work Protection Manual and the Manual of Uniform Traffic Control Devices. An Employee certified by VDOT in the Intermediate Work Zone Traffic control shall be on-site to provide supervision during work zone adjustments or changes to traffic control due to field conditions. This employee shall provide evidence of this certification upon request from Arlington County personnel.

PART 2- MATERIALS

2.1 General

Material shall conform to the requirements of the applicable VDOT specification.

2.2 Signalization, Barricades, Channelizing Devices, Safety Devices, and Pavement Markings

Signalization, barricades, channelizing devices, safety devices, and pavement markings shall conform to the requirements of Division VII of the latest VDOT specifications and the MUTCD.

2.3 Temporary Pavement Markers

Temporary pavement markers shall conform to the requirements of VDOT Section 235, Retroreflectors.

2.4 Construction Pavement Markings

Construction pavement markings shall conform to the requirements of VDOT Section 231 (Paint), and Section 246 (Pavement Marking).

2.5 Portable Changeable Message Signs

Portable changeable message signs shall meet the requirements of Section 512.03 subsection q of the VDOT Road and Bridge Specifications.

PART 3- EXECUTION

This section shall conform to the VDOT Specification Section 512.03.

PART 4- MEASUREMENT AND PAYMENT

Payment for Maintenance and Control of Traffic shall be lump sum in accordance with Section 01200 – Measurement and Payment.

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.

Payment for maintenance of traffic is full compensation for providing the proper pedestrian and vehicular traffic controls during all stages of construction and includes furnishing, preparing, fabricating, installing, maintaining, removing, relocating, repairing, or replacing pedestrian and vehicular traffic control devices and signs as necessary, and all other materials, labor, hardware, equipment, tools,

supplies, and incidentals. Contractor shall be responsible for acquiring VDOT permit for any revision during construction and/or as required by the project contract to the approved traffic control plan.

Payment for maintenance of traffic for each site will be made as partial payments. The first installment of 50 per cent of the unit price for maintenance of traffic will be made on the first progress estimate following partial mobilization and initiation of construction work for the particular site. The remaining 50% of the contract lump sum price bid will be paid on each subsequent estimate based on the percent of work completed at the site all the way through Final Acceptance of work. The Project Officer shall have the authority to decide on the appropriate payment for each subsequent estimate.

END SECTION

SECTION 101400 PARK SIGNS

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Post and panel Park Signs

1.2 REFERENCES

A. Aluminum shall conform to ASTM designation B209, of either 5052-H38, or 6061-T6 alloy.

1.3 SUBMITTALS

A. Product Data: For each product indicated.

B. Shop Drawings: Include plans, elevations, sections of components, and installation details for each type of sign.

C. Samples: For each material, finish, and color.
   1. Include a sample of graphic-image process.
   2. Aluminum: For each form, finish, and color, squares of at least 4 inches by 4 inches.

D. Digital file: Provide digital file to Project Officer for review prior to manufacture.

1.4 WARRANTY

A. Sign post and footing shall be guaranteed for a period of five (5) years against defects in materials and workmanship from the date of Substantial Completion.

B. Sign panel shall be guaranteed for a period of five (5) years against fading or defects in materials/ paint from the date of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Do not deliver until conditions are ready for installation.

C. If delivered and not installing immediately, store units to avoid damage from other construction activities and elements.

1.6 QUALITY ASSURANCE

A. Manufacturer shall have worked in the field of sign manufacturing for a minimum of ten (10) years.

PART 2 – PRODUCTS

2.1 Manufacturer

D. Acceptable Sign Supplier: Engraphix Architectural Signage, Inc., 132 Hanley Industrial Court, St. Louis, MO 63144 or approved equivalent. The sign manufactured must comply with drawings and specifications

1. Sign graphics, text layout and color shall be as shown on the drawings.

2. All sign types shall be from a single manufacturer

2.2 MATERIALS

A. Aluminum Sheet and Plate: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of alloy 5005-H15.

B. Vinyl Film: Opaque, non-reflective vinyl film, 0.0035-inch minimum thickness, with pressure-sensitive adhesive backing, suitable for exterior applications.

C. Colored Coatings for Plastic Sheet: Nonfading coatings, including inks and paints for copy and background colors. Use coatings that are recommended by manufacturers for optimum adherence to type of plastic used.

D. Concrete for Postholes: Comply with requirements in Division 3 Section "Cast-in-Place Concrete."

E. Hardware: Stainless steel.

F. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products that will be exposed to view.

G. Regulatory requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines and ICC/ANSI A1117.1.

H. Sheet aluminum shall be a minimum .080 (.203 cm) thickness, with measurement uniform throughout the blank.

I. All cutting, punching of holes, leveling, and straightening of the blanks shall be performed prior to degreasing and etching operations.

J. Aluminum shall be free of corrosion, white rust, and dirt, and shall be degreased by either of the following methods:

1. Vapor degreasing. Blank shall be completely immersed in a saturated vapor of trichlorethylene or perchlorethylene.
2. All trademark printing shall be removed using either lacquer thinner or controlled alkaline cleaner, then entire blank rinsed thoroughly with running water, or Alkaline degreasing. Blank shall be immersed completely in a tank containing alkaline solution controlled and titrated to the specification of the solution manufacturer. Immersion time shall depend of the amount of dirt for removal. After immersion, the blanks shall be thoroughly rinsed with running water.
3. Blanks shall require etching by either: Acid etch, using a six percent to eight percent (6% to 8%) phosphoric acid solution @ 100 degrees F (38C). After blank is well etched it shall be thoroughly rinsed with running water, then rinsed additionally through a hot water tank or Alkaline etched. Process shall well etch pre-cleaned blanks in an alkaline solution controlled by titration.

K. Regardless of the methods employed for degreasing and etching, the blanks shall be dried with forced air-dryer.

L. Fabrication to a finished sign blank, including a hole pattern, shall be done in such manner as to assure that finished blanks shall be free of buckle, crevice, warp, dent, cockles, burrs, and/or other irregularities.

M. Finished blanks shall have an allowable variation from the plane of no more than .04" (.016cm) per lineal foot of blank surface.

N. All sign blank corners shall have a radius even if not shown on the details. No sharp corners will be accepted

2.3 POSTS

A. General: Fabricate posts to lengths required for mounting method indicated.
   1. Direct-Burial Method: Provide posts 30 inches longer than height of sign to permit direct embedment in concrete foundations.
   2. Steel Posts:
      a. Size: As indicated on the drawings.
      b. Color: As shown on the drawings.

2.4 SIGN PANELS

A. Unframed Single-Sheet Panels: Provide unframed single-sheet sign panels with edges mechanically and smoothly finished.

B. Panel Material: 0.125-inch- thick aluminum sheet.
   1. Panel Finish: Baked enamel.

2.5 TEXT

A. Sign text shall be confirmed with Project Officer prior to manufacture.

2.6 GRAPHICS

A. Graphic Content and Style: Provide sign copy that complies with requirements indicated in Drawings for size, style, spacing, content, mounting height and location, material, finishes, and colors of signage.

B. Surface-Applied, Die-Cut Vinyl Copy: Provide die-cut characters from non-reflective vinyl film with pressure-sensitive adhesive backing. Apply copy to exposed face of sign panel.

2.7 PANEL/ POSTS ALUMINUM FINISHES

A. Baked-Enamel Finish: Cleaned with inhibited chemicals; acid-chromate-fluoride-phosphate conversion coating; thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603, medium gloss.

B. Color: As selected by Landscape Architect from manufacturer's full range.

2.8 ACCESSORIES

A. Mounting Methods: Use fasteners fabricated from materials that are not corrosive to sign material and mounting surface, see detail on plans.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Excavation: In firm, undisturbed or compacted soil, drill or (using a post-hole digger) hand-excavate holes for posts to diameters and spacing indicated.
1. Excavate hole depths as indicated on the drawings.

B. Setting Posts: Center and align posts in holes 3 inches above bottom of excavation, unless otherwise indicated. Place concrete and vibrate or tamp for consolidation. Check for alignment and hold in position until concrete has achieved its initial set.

C. Install signs level, plumb, and at height indicated, with surfaces free from distortion and other defects in appearance.

D. Comply with requirements in Division 3 Section 033000 ‘Cast in Place Concrete’.

E. Use non-removable mechanical fasteners placed through predrilled holes. Attach signs with fasteners and anchors suitable for secure attachment to substrate as

recommended in writing by sign manufacturer.

F. After installation, clean soiled sign surfaces according to manufacturer's printed instructions. Protect signs from damage until acceptance by Project Officer.

PART 4 – MEASUREMENT AND PAYMENT

In accordance with Section 01200 – Measurement and Payment, the lump sum price for Park Amenities shall include the cost of all labor, materials, and incidental expenses necessary to furnish and install all park signs inclusive of hardware and concrete footings, in accordance with the plans and specifications, to the satisfaction of the Project Officer.

END OF SECTION

SECTION 101423 PANEL SIGNAGE

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

A. The work consists of fabrication and installation of aluminum rail mounted sign frame and backer plate to receive sign panel provide by county mounted on wood top rail of cable railing.

1.2 RELATED DOCUMENTS

A. Section 05502 - Cable Railing for metal railing

B. Section 06251 -Wood Cap for Railing for wood cap on cable railing

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

1.3 SUMMARY

A. Section Includes:

Panel sign, including frame, backer plate and mounting hardware.

1.4 COORDINATION

A. Furnish templates for placement of sign-anchorage devices embedded in permanent construction by other installers.

B. Panel frame must accept 36-inch width x 24-inch height x 0.090-inch thick Fiberglass Embedded single-faced sign panels with a visual area of 35-inch width x 23-inch height produced by Pannier Graphics, 345 Oak Road, Gibsonia, PA 15044, (724)-265-4900, www.panniergraphics.com and provided by the County.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For panel signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.

C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.

D. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:

1. Panel Signs: Full-size Sample, including corner
2. Full-size Samples, if approved, will be returned to Contractor for use in Project.

E. Delegated-Design Submittal: For rail mounted Signs

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1.9 FIELD CONDITIONS

A. Field Measurements: Verify locations of anchorage devices embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Deterioration of finishes beyond normal weathering.
   b. Separation or delamination of sheet materials and components.
2. Warranty Period: Five years from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Design calculations prepared, signed and sealed by a registered Professional Engineer, licensed in project jurisdiction for materials or fabrications required to comply with structural requirements.

B. Railing Mounted according to structural performance requirements.

C. Structural Performance: Signs and supporting elements shall be designed per the International Building Code, 2012 Edition, and include at a minimum wind and live load.

1. Wind Load Parameters: Basic Design Wind Speed: 115 mph
   Risk Category: II
   Exposure Category: C
2. Minimum Live Load: 200 pounds acting in any direction and applied at any point

2.2 PANEL SIGNS

A. Acceptable Supplier: Pannier Graphics, 345 Gibsonia, PA 15044, 724-265-4900, www.PannierGraphics.com or equivalent.

B. Panel Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:

1. Solid Backer Plate Aluminum
   a. Thickness: 0.1875 inch (4.76 mm)
   b. Graphic Panel to sit above backer plate in frame to be provided by county
2. Frame
   a. Entire perimeter hold changeable sign panel
   b. Top rail removable to allow panel changes
   c. Material: Aluminum
   d. Material Thickness: As Indicated on Drawings
   e. Frame Depth: As indicated on Drawings
   f. Visual area: 35-inch width x 23-inch height, as indicated on the Drawings.
   g. Size: Frame – 35.5 inch width x 24.5 inch height; Trim – 35.875-inch width x 23.875-inch height
   h. Profile: Rounded edges
   i. Corner Condition in Elevation with Rounded Edges
   j. Frame and Mounting Plate Finish and Color: Powder coat textured finish – bronze color to match cable railing.
3. Mounting: As indicated on Drawings mounted on wood cap of cable railings.
4. Flatness Tolerance: Sign shall remain flat under installed conditions as indicated on Drawings and within a tolerance of plus or minus 1/16 inch (1.5 mm) measured diagonally from corner to corner.

2.3 PANEL-SIGN MATERIALS

A. Aluminum Sheet and Plate: ASTM B209 (ASTM B209M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

2.4 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the

following unless otherwise indicated:

1. Use concealed fasteners and anchors unless indicated to be exposed.
2. For exterior exposure, furnish stainless-steel devices unless otherwise indicated.
3. Sign Mounting Fasteners:
    a. Through Fasteners: Exposed metal fasteners stainless steel, with type of head indicated, and installed in predrilled holes.

2.5 FABRICATION

A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

1. Preassemble signs in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
3. Rounded, smooth corners on all edges for safety.
4. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
5. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
6. Internally brace signs for stability, to meet structural performance loading without oil-canning or other surface deformation, and for securing fasteners.
7. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.

B. Signs with Changeable Message Capability: Fabricate signs to allow insertion of changeable messages as follows:

1. For frame to hold changeable sign panel, fabricate frame without burrs or constrictions that inhibit function. County to Furnish initial sign panel. Subsequent changeable sign panels are by County

2.6 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 ALUMINUM FINISHES

A. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.

C. Verify that anchorage devices embedded in permanent construction are correctly sized and located to accommodate signs.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Install signs so they do not protrude or obstruct according to the accessibility standard.
3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
4. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

B. MOUNTING METHODS

1. Through Fasteners: Drill holes in substrate using predrilled holes in sign as template. Countersink holes in sign if required. Place sign in position and flush to surface. Install through fasteners and tighten.

3.3 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor

repair procedures.

B. Remove temporary protective coverings and strippable films as signs are installed.

C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

PART 4 - MEASUREMENT AND PAYMENTPanel signs will be measured and paid for at the Contract lump sum price for Park Amenities, complete and installed. The payment will be full compensation for all panel signs, finish, anchoring devices and for all material, labor, equipment, tools, and incidentals necessary to complete the Work.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Protection of existing trees to remain:

   a. Pruning of existing trees roots that are affected by execution of the Work, whether temporary or permanent construction.
   b. Aeration and Root Protection Matting
   c. Tree Protection Fencing

Provide all labor, materials, tool and equipment as required to have tree protection applied on all areas called for on plans.

B. In addition to the specifications contained herein, Work shall be performed in accordance with the Arlington County Department of Parks & Recreation Design Standards for Tree Protection and Trimming as shown on plans and available online at:

http://parks.arlingtonva.us/design-standards/

C. Related Sections:

1. 02200 Earthwork
2. 02100 Clearing and Grubbing
3. 01500 Erosion and Sediment Control and Pollution Prevention
4. 329000 Exterior Plants
5. 329200 Seeding and Sodding

1.02 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Imported Topsoil: Soil obtained off-site that meets the specifications herein for topsoil and is suitable for use in planting soil/backfill soil mixture when existing soil quantities are insufficient. Refer to Section 329100 “Planting Preparation.”

C. Planting Soil/Backfill Soil Mixture: Existing soil modified as specified to be suitable for planting. Refer to Section 329100 “Planting Preparation.”

D. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.

E. ISA: International Society of Arboriculture

F. CBAY: Chesapeake Bay, typically referring to CBAY watershed.

G. Urban Forester/County Urban Forester: Refers to the Arlington County Urban Forester

H. Landscape Architect: Refers to an Arlington County Landscape Architect or their designee.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated in Section 2.0

B. Certification: From Contractor's arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.

C. Maintenance Requirements: From Contractor's arborist, for care and protection of trees affected by construction during and after completing the Work.

D. Contract arborist Qualifications: Contractor shall submit a copy of valid ISA certification to the Project Officer for approval with confirmation by Urban Forester.

E. List products to be used and firms, including qualifications to perform work.

F. Provide schedules for performance of work.

1.04 QUALITY ASSURANCE

A. Contractor shall ensure that tree and plant protection methods are implemented by an arborist Certified by the International Society of Arboriculture (ISA) to provide for the care of the trees and plants impacted by construction activities. Provide ISA certification verification to Project Officer per section 1.03 "Submittals" prior to beginning work.

B. The Contractor shall identify to the Project Officer at least one authorized on-site Point of Contact(POC) who is, by training or experience, familiar with the policies, regulations and standards applicable to the work being performed. The POC and the certified arborist may be the same individual.

C. Crews shall be directly supervised by an ISA certified arborist.

D. All workers, through related training and on the job experience, shall be familiar with the technical aspects of arboricultural work and equipment used in such operations.

E. Trucks and mechanized equipment shall not enter tree protection areas.

F. Stump grinding shall be with small machines specifically designed for that purposes. No stumps shall be excavated except as described herein. Stumps shall be ground not more than 8" below grade and care must be taken to minimize damage to root of the trees to remain.

G. No stump grinding within tree protection areas.

H. All work in or near tree protection areas shall be carefully performed by Contractor in order to avoid damage to tree trunks, branches, root system, and other existing plant materials and soils that are to remain.

I. Silt shall not be allowed to collect in preservation or reforestation areas. Silt accumulating in preservation areas shall constitute damage and will require remedial activity. All silt shall be removed from preservation areas within 24 hours of siltation. The methods and procedures for silt removal within tree preservation and reforested areas shall be approved by the Project Officer with confirmation by the Urban Forester.

J. Tree Pruning Standard: Comply with ANSI A300 (Part 1), "Tree, Shrub, and Other Woody Plant Maintenance--Standard Practices (Pruning)."

   a. Pruning shall remove only dead, dying, damaged or broken limbs greater than 1" – 1.5" in diameter.

   b. Pruning for clearance shall be reviewed and approved by Project Officer with confirmation by the Urban Forester.

K. Urban Forester Notification: The Contractor shall notify the Project Officer 72 hours prior to the following events, so that the County's Urban Forester can be notified and present at a pre-construction site meeting (refer to Section 3) and to observe work:

   a. Tree protection fencing installation
   b. Tree or root-pruning operations.
   c. Work within tree protection zones.
   d. Tree planting.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Temporary Tree Protection Fence: Unless otherwise indicated in approved plans, tree protection fence shall be two-inch wire mesh fabric measuring 72 inches in height mounted on 1.9" O.D. steel pipes driven 24 inches into the ground, placed 120 inches on-center maximum. Refer to Arlington County DPR standard detail on approved plans.

B. Tree Protection Signs: Shall be of heavy-duty sheet aluminum or weatherproof plastic material measuring 12 inches by 18 inches. Signs shall state "NO ENTRY, TREE PROTECTION AREA, CALL 703-228-6557 TO REPORT VIOLATIONS" in both English and Spanish. Signs shall be mounted on fence every 50 feet maximum.

C. Topsoil: Refer to Section 329100 – Plant Preparation.

D. Bark Mulch: Refer to Section 329100 –Plant Preparation

E. Temporary Root Protection Matting: If required in approved plans, temporary root protection matting shall be a double-sided geocomposite, geonet core, non-wove covering such as Tendrain 770-2, as manufactured by Tenax Corporation, Baltimore, MD or approved equal. Six (6) inches of wood chip mulch shall be applied to area to receive root protection matting prior to installation. Matting shall be installed in a single layer.

F. Landscape nails: When required, spikes shall be 12" as indicated on the drawings.

PART 3 - EXECUTION

3.01 PREPARATION

A. Prior to the construction activities, the Contractor shall meet on-site with the Project Officer and Urban Forester to review trees to remain and protective measures required.

B. Temporary Tree Protection Fencing: Install temporary tree protection fencing and signs around tree protection zones to protect remaining trees and vegetation from construction damage. Maintain temporary fence and remove when construction is complete after approval by Project Officer with confirmation by the County Urban Forester.

C. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

D. No personnel, vehicles, equipment, construction materials, or construction debris shall be allowed inside the tree protection areas at any time during construction without the written

E. consent of the Project Officer with confirmation by the Urban Forester. If a violation is observed, the Contractor will be notified by the Project Officer and shall immediately rectify the situation. Continued and subsequent violations will result in a fine of $500 per day of violation.

F. Special Demolition Procedures:

1. Demolition of walks and hardscape within tree protection areas shall be directly supervised by an ISA certified arborist.

2. Mechanized equipment shall not enter tree protection areas (TPAs) or reforestation areas.

3. Backfill of voids created by demolition within the TPAs and reforestation areas shall be loosely placed topsoil. Only the amount of topsoil necessary to fill the void without spreading over existing grades shall be allowed.

3.02 EXCAVATION

A. Install shoring or other protective support systems to minimize sloping or benching of excavations if indicated in the approved plans.

B. Do not excavate within tree protection zones, unless otherwise indicated.

C. Where utility trenches are required within tree protection zones, Contractor shall perform root pruning prior to trenching.

D. Where excavation is proposed within the critical root zone of trees to remain, Contractor shall perform root pruning as indicated in approved plans prior to excavation.

E. Where new finish grade is indicated below existing grade around trees, Contractor shall slope grade outside of tree protection zones. Maintain existing grades within tree protection zones.

3.3 ROOT PRUNING:

A. When required, root pruning locations will be indicated on the approved plans. Exact location and depth shall be determined on site with Project Officer and Urban Forester during the pre-construction meeting.

B. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots with clean, sharp pruning instruments; do not break or chop. All root pruning shall be performed by an ISA certified arborist. Refer to Arlington County Department of Parks & Recreation Design Standards “Tree Protection and Trimming” as shown on plans and available online at:

http://parks.arlingtonva.us/design-standards/

3.4 TREE REPAIR AND REPLACEMENT

A. Promptly repair trees damaged by construction operations within 24 hours. Treat damaged trunks, limbs, and roots according to Arlington County Urban Forester or contract arborist's written instructions.

B. The Contractor shall be responsible for any damage to trees within the Tree Protection Area caused by the Contractor’s personnel, vehicles, or equipment at the site. Any damage to a tree to remain shall result in a payment by the Contractor to the Project Officer for the amount of damage based on the latest edition of the Council of Tree and Landscape

Appraisers Guide for Plant Appraisal published by the International Society of Arboriculture (ISA). All trees are to be valued as landscape trees.

3.5 DISPOSAL OF WASTE MATERIALS

A. Burning is not permitted.

B. Disposal: Remove excess excavated material and displaced trees from Owner's property and legally dispose.

PART 4 – MEASUREMENT AND PAYMENT

Measurement and payment for Tree Protection Fence shall be at the lump sum price for Erosion and Sediment Control, Tree Protection and SWPPP Administration in accordance with Section 01200 – Measurement and Payment. The measurement of Root Pruning shall include the cost of all labor, materials, equipment and shall be incidental to the price of Tree Protection Fence.END SECTION

SECTION 323300 SITE FURNISHINGS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

This work shall consist of the procurement, finish, and installation of prefabricated site furnishings on the Overlook Platform and other locations designated on the Plans, and all necessary material, labor, incidentals, tools, and equipment necessary to complete this work.

Site Furnishings shall be installed in accordance with the Standard Specifications, the Plans, these Special Provisions, the manufacturer's recommendations, and as directed by the Engineer.

Site Furnishings Include:

A. Benches
B. Trash and Recycling Receptacles
C. Bicycle Racks

1.2 APPLICABLE SPECIFICATIONS

A. American Society for Testing and Materials (ASTM)
B. American National Standards Institute (ANSI)

1. ANSI/BIFMA X5.4-2012 Lounge Seating

C. American Welding Society (AWS)

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's product data, storage, and handling requirements and recommendations, installation methods and available colors, styles, patterns, and textures.

B. Shop Drawings: Before any fabrication is begun, submit detailed shop drawings of all items required in this section as a combined submittal. Shop drawings shall include, but not be limited to, the following:

1. Cut sheets, detail drawings, and installation instructions.
2. Proposed furnishings and anchor locations.
3. Detail of the interface of benches with Observation Platform deck and proposed anchorage.

C. Design Modifications: Submit for review any proposed variations in details or substitutions in materials required to meet specified performance requirement or to coordinate work.

D. Qualification Data: Submit installer qualifications verifying years of experience; include

a list of completed projects having a similar scope of work identified by name, locations, date, reference names and phone numbers.

E. Samples: Submit manufacturer's samples of type and finish colors.
1. Bench - Ipe Wood Seat Slats
2. Bench - Aluminum Frame Finish
3. Trash and Recycling Receptable – Steel Frame Finish
4. Bicycle Rack – Steel Tube Finish

F. Warranty: Submit manufacturer's standard warranty.

1.4 QUALITY ASSURANCE

A. Fabrication and installation procedures shall conform to the specifications and the manufacturer's recommendations.

1.5 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage: Store materials in a clean, dry area in accordance with the manufacturer's instructions. Keep materials in manufacturer's original, unopened containers and packing until inspection for installation.

C. Handling: Protect materials and finish during handling and installation, to prevent damage.

PART 2 - MATERIALS

2.1 MANUFACTURER

Benches, Trash and Waste Receptacles, and Bicycle Racks shall be provided by the following manufacturer or an approved equal:

Victor Stanley
P.O. Box 330
Dunkirk, MD 20754
800-368-2573

2.2 PRODUCTS

A. Benches shall:
1. match basis of design: *"Lily Backless"* model LIL-23CA with end and intermediate armrests, as manufactured by Victor Stanley or approved equivalent.
2. be 6 feet in length, 18⅞ inches in depth, and 24½ inches in overall height with a seat height of 17⅛ inches.

3. have wood (ipe) slat seating.
4. be powder coated, in bronze color
5. be surface mounted to the top of the Observation Platform, per manufacturer's recommendations.

B. Anchoring devices and fasteners shall be stainless steel and vandal resistant.
1. Trash Receptacles shall:
   a. match basis of design Model SD-42 with dome lid and side door, as manufactured by Victor Stanley or approved equivalent.
   b. be 41.75" to rim x 28" diameter.
   c. be all welded steel.
   d. be powder coated in Black color.
   e. be surface mounted on concrete base with stainless steel, vandal resistant fasteners.
2. Recycling Receptacles shall:
   a. match basis of design Model SD-42 with recycle package dome lid and decals and side door, as manufactured by Victor Stanley or approved equivalent.
   b. be 41.75" to rim x 28" diameter.
   c. be all welded steel.
   d. be powder coated in VS Blue color.
   e. have Arlington County Logo and Recycle Decal on dome lid and band.
   f. be surface mounted on concrete base with stainless steel, vandal resistant fasteners.
3. Bicycle Rack shall:
   a. match basis of design Model BRWS-101 as manufactured by Victor Stanley or approved equivalent.
   b. be 36" tall x 22" wide
   c. be 2-3/8" o.d. Sch 40 steel pipe
      i. be powder coated in Black color.
      ii. Be in-ground mounted in concrete footing

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine all areas to receive the site furnishings.

B. Notify Engineer of conditions that would adversely affect installation or subsequent use.

C. Do not begin installation until unacceptable conditions are corrected.

3.2 INSTALLATION

A. Coordinate and verify final furnishing locations and layout with Engineer prior to installation.

B. Furnishing frame shall be securely anchored as detailed and as recommended by the manufacturer.

C. Furnishings shall be installed level, anchored securely, and shall not rock after installation.

D. Clean products promptly after installation, in accordance with the manufacturer's instructions. Do not use harsh cleaning materials or methods that could damage the finish.

3.3 PROTECTION

A. Protect installed product to ensure that, except for normal weathering, benches will be without damage or deterioration at the time of Substantial Completion.

B. Finish Damage: Repair any minor damage to finish in accordance with manufacturer's instructions.

C. Component Damage: Remove and replace damaged components that cannot be successfully repaired at no expense to the County.

PART 4 - MEASUREMENT AND PAYMENT

Site Furnishings will be measured and paid for at the Contract lump sum price for Park Amenities, complete and installed. The payment will be full compensation for all furnishing, finish, anchoring devices and for all material, labor, equipment, tools, and incidentals necessary to complete the Work.

END OF SECTION

SECTION 329100 PLANTING PREPARATION

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes erosion control materials, soil amendments, mulching and topsoil for non-wetland areas. Wetland plantings shall be in accordance with 02803 "Wetland Seeding" and 02804 "Wetland Planting."

B. Provide all labor, materials, tools and equipment as required to have topsoil, planting soil mix, soil stabilization, amendments, and mulch applied per the specifications on all non-wetland areas disturbed by construction to receive plant materials as indicated in the approved plans.

C. Related Sections:

a. Section 02200 Earthwork

b. Section 02100 Clearing and Grubbing

c. Section 311300 Tree Protection and Root Pruning

d. Section 01500 Erosion and Sediment Control and Pollution Prevention

e. Section 329200 Seeding and Sodding

f. Section 329300 Exterior Plants

D. In addition to the specifications contained herein, Work shall be performed in accordance with the:

a. Drawings and general provisions of the contract, including general and supplementary conditions

b. Arlington County Department of Parks & Recreation Design Standards as shown on the plans and available online at:

http://parks.arlingtonva.us/design-standards/

1.02 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Imported Topsoil: Soil obtained off-site that meets the specifications herin for topsoil and is suitable for us in planting soil/backfill soil mixture when existing soil quanitities are insufficient.

C. Planting Soil/Backfill Soil Mixture: Existing soil modified as specified to be suitable for planting.

D. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.

E. ISA: International Society of Arboriculture

F. CBAY: Chesapeake Bay, typically referring to CBAY watershed.

G. Urban Forester/County Urban Forester: Refers to the Arlington County Urban Forester

H. Landscape Architect: Refers to the project Landscape Architect or their designee.

1.03 SUBMITTALS

A. Samples of all materials specified shall be submitted to the Project Officer for approval with coordination of the Landscape Architect. All approvals shall be in writing.

B. Samples:

1. Existing Topsoil: Provide 1-pound sample of existing topsoil with the following soil test reports.

   a. Fertility: pH, nitrate nitrogen, ammonia nitrogen, phosphate phosphorous, potassium, calcium, magnesium, zinc, iron, manganese.

   b. Suitability: total salinity, boron, sodium, potassium, calcium, magnesium, chloride, sulfate.

   c. Physical properties including organic content and particle size distribution.

2. Imported Topsoil: If imported topsoil is required, Contractor shall provide a 1-pound sample of the imported topsoil with the soil test reports as noted above for “Existing Topsoil.”

3. Imported Topsoil for Bioretention Areas: If bioretention areas are indicated in the approved plans, the Contractor shall submit soil sample per specifications.

4. Mulches and Organic Matter/Compost: Sample of mulch and organic matter/compost may be requested in lieu of inspection.

5. Product certificates: Contractor shall submit for each type of manufactured product, to be approved by the Project Officer in coordination with Landscape Architect or Urban Forester and complying with the following:

a. Manufacturer's certified analysis for standard products.

6. Geotextile/Soil Stabilization/Erosion Control Fabric: Sample

1.04 QUALITY ASSURANCE

A. Contractor shall have all existing and furnished topsoil to be used for seeding and sodding, and for planting areas tested by a state laboratory or recognized commercial soil-testing laboratory in order to determine recommendations for the types and quantities of soil amendments. The results of this test will determine the rates and types of fertilizers, lime, soil conditioners, and other amendments, if necessary.

1. Soil tests shall use a representative sample of on-site soils. If existing soil has been undisturbed and is suitable as determined by the soil test, no additional amendments are required.

2. Adjustments should be made based on soil test results.

PART 2 - PRODUCTS

2.01 MATERIALS

A. All materials shall conform to those stipulated below, unless otherwise approved in writing by the Project Officer with confirmation by the Landscape Architect or County Urban Forester.

B. Specified materials to be applied in amounts and methods herein stipulated.

C. Delivery tickets indicating date, weight, analysis and vendor's name, to be submitted to Project Officer.

2.02 SOIL AMENDMENTS

A. Lime: Application rates for liming materials and lime material type chosen shall be determined by required soil tests and approved by the Project Officer in coordination with the Landscape Architect or Urban Forester.

a. When required and unless test results indicate otherwise, lime material shall be dry and free flowing pulverized limestone, hydrate lime or burnt lime that contains at least 50% total oxides (calcium oxide plus magnesium oxide). Ground limestone shall be ground to such fineness that at a minimum of 50% will pass

through a 100 mesh sieve and 98% - 100% will pass through a 20 mesh sieve. Lime material shall meet the Virginia Agricultural Liming Materials Act, Code of Virginia Section 3.1-126.1.

B. Fertilizer: Fertilizer type and application rate shall be determined by results of required soil tests and approved by the Project Officer in coordination with the Landscape Architect or Urban Forester:

a. When required and unless test results indicate otherwise, commercial-grade complete fertilizer will be of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

i. Composition: 10 percent nitrogen, 20 percent phosphorous, and 10 percent potassium, by weight.

b. All fertilizers shall be uniform in composition, free flowing, and suitable for application with approved equipment.

c. Fertilizers shall be delivered to the site fully labeled according to applicable state fertilizer laws and shall bear the name, trade name, or trademark and warranty of the product.

C. Delay mixing fertilizer with planting soil if planting will not proceed within 2 days.

D. Spread fertilizer and lime with approved equipment.

2.03 EXISTING TOPSOIL

A. Existing, native surface topsoil formed under natural conditions with the duff layer retained during excavation period and stockpiled.

a. Contractor shall verify suitability of stockpiled soil to produce or to be amended to produce viable planting soil for lawns and planting beds as described herein.

B. Existing topsoil is to be used to extent possible for lawn areas and is to be amended per the specifications to become the Planting Soil/Backfill Soil Mixture for use in planting pits and bed areas.

C. Prior to use for lawn areas or in planting soil mix, Contractor shall remove all stones, roots, plants, sod, clods, and clay lumps larger than 1/2 –inch in any direction, pockets of coarse

D. sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris and other extraneous materials that are harmful to plant growth.

E. After removal of debris and extraneous materials noted above, the Contractor shall obtain soil tests for the existing soil per the requirements in section 1.04 “Quality Assurance.”

F. Contractor shall submit soil test results to the Project Officer for approval with confirmation by the Landscape Architect or Urban Forester.

G. Contractor shall supplement the existing soil as recommended in soil test results to achieve a viable planting soil for lawns and/or planting beds. Contractor shall supplement with imported topsoil per the specifications from off-site sources when quantities of approved, existing topsoil are insufficient for lawns and planting beds.

H. Contractor shall submit a sample of the topsoil that has been amended based on soil test results for approval by the Project Officer with confirmation by Landscape Architect or Urban Forester prior to use in lawn areas or planting beds or pits.

I. Topsoil installed on grade shall attempt to match existing soil texture, except for situations where clay subsoil exists. In the event that clay subsoil exists, use loam or silt loam topsoil.

J. Imported topsoil rather than existing topsoil is to be used for planting in bioretention areas, unless otherwise indicated on the approved plans.

2.04 PLANTING SOIL MIX/BACKFILL SOIL MIXTURE

A. The planting soil mix (also known as backfill soil mixture) shall consist of existing topsoil that has been approved for planting per the specifications above and approved organic matter.

B. The planting soil mix/backfill soil mixture shall be composed of ¾ approved existing topsoil and ¼ approved organic matter as described in the Arlington County DPR Standard planting details, unless otherwise indicated by the Project Officer with confirmation by the Landscape Architect or Urban Forester.

2.05 IMPORTED TOPSOIL

A. Contractor shall add imported topsoil when required on the drawings, when quantity of existing topsoil is insufficient or when determined to be necessary due to soil testing results.

B. Topsoil shall be the natural, original surface soil, a sandy loam uniform in composition and shall be in a friable condition and shall contain less than 3 percent subsoil, hardpan material, stones and clods larger than 1/2 inch in diameter in any direction. It shall also be free of sticks, tree or shrub roots, debris and other material undesirable for plant growth. The area and the topsoil shall be free of undesirable plant such as, but not limited to, Bermuda grass, nut sedge, mugwort or noxious weeds as set forth in the Federal Seed Act.

C. The topsoil shall contain at least 5 percent organic matter. It shall be a sandy loam consisting of at least 5 but not more than 20% clay, at least 10 but not more than 80% sand. It shall have a pH between 5.5 to 6.5. Soluble salts (salinity) shall not exceed 500 ppm. Soil fertility shall be “High” in natural nutrients based on the coordinated ratings in pounds per acre as

established by the National Soil and Fertilizer Research Committee.

D. Topsoil which has been manufactured by blending materials which individually do not meet the requirements of this specification will not be accepted even thought the resulting blend meets the organic matter, mechanical analysis, pH and soluble salts requirements. Agricultural limestone at not more than 5 pounds per cubic yard of topsoil any be used to adjust the pH provided it is well mixed in a manner which does not destroy the structure of the soil.

2.07 MULCHES AND ORGANIC MATTER

A. Straw Mulch for Seeded Areas: Provide air-dry, clean, mildew and seed-free, salt hay or threshed straw of wheat, rye, oats or barley.

B. Wood Chip Bark Mulch for Planted Areas: Wood Chip Bark Mulch shall be double-shredded hardwood bark mulch, uniform in size and free of stones, clods, non-organic debris or other foreign material and aged for at least 6 months from an approved source. Insufficiently or improperly aged mulch containing high bacterial counts or high levels of bark or other materials resistant to decomposition shall not be used. Mulch shall not contain the trunk of trees.

C. Organic Matter/Compost Mulch: Well-composted, trash-free, stable, and weed-free organic matter such as composted bark, leaf mold or other plant debris material that has been composted to a point of decay and is mature.

a. pH ranges of 5.5 to 8; moisture content 35 to 55 percent by weight
b. 100 percent passing through 1-inch sieve
c. Peat moss shall not be used.
d. Organic amendments shall be commercially prepared and shall comply with the U.S. Compost Council Seal of Testing Assurance Program's Test Methods for the Examination of Composting and Compost (STA/TMECC) criteria, or as modified in approved plan documents.

2.08 SOIL STABILIZATION/EROSION CONTROL FABRIC

A. ECS-2B Double New Straw Biodegradable Rolled Erosion Control Product, or an approved equal shall be used in all planting beds/reforestation areas.

1. Shall meet Type 2.D specifications for ECTC and HFWA FP-03 Section 713.17

2. Shall have two (2) layers of organic jute netting sewn together with biodegradable thread.

3. Overlap sections 12" and secure with manufacturer's recommended steel wire staples, 6 inches long.

B. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches long.

C. Erosion-Control Fiber Mesh: Biodegradable burlap or spun-coir mesh, a minimum of 0.92 lb/sq. yd with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches.

D. Erosion-Control Mats: Cellular, non-biodegradable slope-stabilization mats designed to isolate and contain small areas of soil over steeply sloped grades, of 3 inch nominal mat thickness. Include manufacturer's recommended anchorage system for slope conditions.

1. Products: Subject to compliance with requirements and plan documents, the products below, or an approved equivalent, be used:

a. Invisible Structures, Inc.; Slopetame 2

b. Tenax Corporation – USA; Tenweb.

PART 3 - EXECUTION

3.01 PREPARATION

A. No tilling, deep loosening of soil, or soil disturbance, other than excavation for individual plant pits shall be performed outside the designated Limit of Development.

B. All excavation for plant pits within Zone B shall be done by hand under the supervision of the County Project Officer or designee to avoid disturbance is existing tree roots or other plantings intended to remain.

C. Except as described above, all identified areas within the project limits shall have approved topsoil mix spread on them and be prepared for seeding and sodding by bringing ground surfaces to grades shown on the drawings. Planting pits and bed areas identified on the approved plans shall be prepared in accordance with the applicable DPR Landscape Standard details.

1. No seeding shall be done on frozen ground or when the temperature is 32F or lower. Refer to specification 329200, "Seeding and Sodding." Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties, sidewalks and areas.

2. Rototilling shall not be performed within the critical root zone of trees to be preserved.

3. The soil shall not be tilled or amended when the soil's moisture capacity is above field capacity or when the soil is frozen.

4. Contractor shall identify utilities, existing irrigation and underground utilities. All areas on either side of the utility marking shall be amended by hand.

5. Contractor shall verify that no foreign or deleterious material or liquid has been deposited in soil within a planting area.

6. Contractor shall proceed with installation only after both unsatisfactory conditions have been corrected and rough grading has been completed and approved by the Project Officer in coordination with the Landscape Architect or Urban Forester.

7. Contractor shall protect structures, utilities, sidewalks, pavements and other facilities, trees, shrubs and plantings from damage caused by planting operations.

    a. Protect adjacent and adjoining areas from hydro-seeding and hydro-mulching overspray.

    b. Protect grade stakes set by others until directed to move them.

8. Surfaces shall conform to finish grade, free of water retaining depressions, soil friable, free of clay and of uniformly firm texture.

D. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 6 inches. Remove stones larger than 1/2 inch in any direction and sticks, roots, rubbish, and other extraneous matter including grass vegetation and turf and legally dispose of them off of Arlington County property. Do not mix into surface soil.

1. Thoroughly blend planting soil mix off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix. Delay mixing amendments with soil if planting will not proceed within 2 days.

2. Loosen surface soil to a depth of at least of 6 inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches of soil. Till soil to a homogeneous mixture of fine texture.

3. Spread planting soil mix to a depth of 4 inches but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

E. Unchanged Subgrades: If lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface soil stripping operations, prepare surface soil as follows:

1. Remove stones larger than 1/2 inch in any dimension and sticks, roots, trash, and other extraneous matter. Legally dispose them off of Arlington County property. Do not mix into surface soil

2. Loosen surface soil to a depth of at least 6 inches, apply soil amendments and fertilizers according to the planting soil mix proportion and mix thoroughly into the top 4 inches of soil.

F. Finish Grading: Grade landscape areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Adjust for the thickness of sod, where applicable. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future.

G. Contractor shall avoid unnecessary compaction of the soil during grading.

H. Contractor shall ensure appropriate slopes of the swales, berms and final grades.

I. Immediately following each day's work, contractor shall clean all dirt, excess soil, debris and trash from the site. Contractor shall protect and store additional soils in stockpiles protected from saturation, erosion, weed growth and contamination with plastic sheeting or tarps.

J. Amendments for seeding and sodding areas shall be applied after determining by soils test as follows:

1. Lime as specified shall be spread uniformly over designated area. Rate depends on soil tests. Soil tests shall be made before lime application at 8 to 10 plugs per acre taken by the method prescribed the United States Department of Agriculture.

2. Fertilizer shall be spread after the lime has been applied. Rate shall be as recommended per the soil tests.

3. Fertilizer shall be spread with approved equipment and at an even rate over the area to be seeded or sodded.

4. Work lime and fertilizer into top 4 inches of topsoil and grade to smooth surface ready for seeding.

K. Restore areas if eroded or otherwise disturbed after finish grading and before planting.

L. Prepared lawns and planting areas shall be inspected and approved by Project Officer in coordination with Landscape Architect prior to seeding, sodding or planting.

M. If the graded areas develop volunteer weed growth, the growth shall be eliminated at the expense of the Contractor.

3.02 SOIL STABILIZATION MATERIALS

A. Prepare planting area as specified.

B. Moisten prepared planting area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

C. Install Soil Stabilization from top of slope, overlapping joints by 12 inches, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.

D. Plant shrubs, trees and perennials through Soil Stabilization fabric by carefully separating fabric layers to allow space for planting.

E. Remove non-biodegradable stabilization materials after plant establishment.

F. Soil stabilization materials shall only be utilized if directed by the Project Officer or designee.

PART 4 - MEASUREMENT AND PAYMENT

Preparation of seeding and planting areas shall not be measured for separate payment, but shall be considered incidental to seeding and installation of plants under Sections 02803, 02804, 329200 and 329300.

END OF SECTION

SECTION 329200 SEEDING AND SODDING

PART 1 -GENERAL

1.01 SUMMARY

A. The work includes, but is not limited to the provision of all material, services, labor, and equipment necessary to perform the following as required per the plans for the establishment of turf, meadow grasses and/or wildflowers in non-wetland areas:
   a. Seeding
   b. Sodding
   c. Hydro-seeding
   d. Plugging

B. Related Sections:
   a. Section 02200 – Earthwork
   b. Section 329100 – Planting Preparation
   c. Section 311300 – Tree Protection and Root Pruning
   d. Section 329300 – Exterior Plants
   e. Section 01500 – Erosion and Sediment Control and Pollution Prevention
   f. Section 02803 – Wetland Seeding
   g. Section 02804 – Wetland Planting
   h. Section 02614 – Porous Pavement (Grasspave2 or equivalent)

C. In addition to the specifications contained herein, Work shall be performed in accordance with the:
   a. Drawings and general provisions of the contract, including general and supplementary conditions.
   b. Arlington County Department of Parks & Recreation (DPR) Design Standards as shown on the plans and available online at:

      http://parks.arlingtonva.us/design-standards/

1.02 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Imported Topsoil: Soil obtained off-site that meets the specifications herein for topsoil and is suitable for use in planting soil/backfill soil mixture when existing soil quantities are insufficient. Refer to Section 329100 “Planting Preparation.”

C. Planting Soil/Backfill Soil Mixture: Existing soil modified as specified to be suitable for planting. Refer to Section 329100 “Planting Preparation.”

D. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.

E. ISA: International Society of Arboriculture

F. CBAY: Chesapeake Bay, typically referring to CBAY watershed.

G. Urban Forester/County Urban Forester: Refers to the Arlington County Urban Forester

H. Landscape Architect: Refers to a Landscape Architect or their designee.

1.03 SUBMITTALS

A. Samples of all materials shall be submitted to the Project Officer for approval with confirmation by the County Landscape Architect prior to delivery to site.

B. Contractor shall submit qualifications per section 1.04 “Quality Assurance” to Project Officer for approval.

C. Samples:

1. Seed Mix: Certification of grass seed including the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and the date of packaging.

2. Sod: Sod grower's name, together with substantiating information as to field location from which sod is to be cut and species, percent purity and mixture of grass sod to be applied. Samples or photos of sod mix may be requested in lieu of inspection.

3. Special Seed Mixes: Contractor shall submit product data per section 2.03.

1.04 QUALITY ASSURANCE

A. Contractor qualifications:

1. Evidence of completion of at least three (3) projects of similar nature and scope to this project completed within the last five (5) years that have resulted in successful turf and meadow establishment

2. Contractor shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.

3. Experience: Three to Five years’ experience in turf installation.

B. Contractor shall maintain an experienced full-time supervisor on Project site when work is in progress.

PART 2 - PRODUCTS

2.01 MATERIALS

A. All materials shall conform to those stipulated below, unless otherwise approved in writing by the Project Officer with confirmation by the Landscape Architect.

B. Specified materials to be applied in amounts and methods herein stipulated.

C. Delivery tickets indicating date, weight, product data including all analyses for purity and other information as required herein, and vendor's name, to be submitted to Project Officer for approval.

2.02 SEED

A. Grass seed shall be fresh, clean, dry new crop seed complying with purity and germination requirements stipulated herein. All cultivars must be on the current "Virginia Turfgrass Variety Recommendations" or in the top 25 for transitional zone sites-overall of the latest National Turfgrass Evaluation Program (NTEP) as approved by Project Officer with confirmation by the Landscape Architect. The Turf-type Tall Fescue component shall be comprised of a minimum of two cultivars with each cultivar comprising neither less than 30 percent nor more than 70 percent of the blend. The use of K-31 Tall Fescue or Common Kentucky Bluegrass in the mix is prohibited. The mix shall have 2.5 percent maximum inert matter, 0.5 percent maximum crop seed, and 0.1 percent maximum weed seed and 0.0 percent noxious weed. The mix shall comply with the current Virginia Seed Law and Virginia Seed Regulations and approximate the following:

Kind of Seed	% by Weight	% Purity	% Germination
Turf-type Tall Fescue	80	97	85
Bluegrass	10	97	80
Perennial Ryegrass	10	97	90

B. Substitution of seed type or percent only on approval of Project Officer in coordination with Landscape Architect. Seed to be free of noxious weed seed.

2.03 SOD

A. Cultivated Grass Sod shall be certified and obtained from State Certified nurseries and have been grown on natural native mineral soils comparable to those afforded at the job

site. Sod containing netting is not acceptable. Sod grower's information and sod information to be submitted for approval by Project Officer per section 1.03 "Submittals." Failure to obtain advance approval will constitute grounds for rejection of all sod delivered to the site. Invoices for all sod to clearly state point of origin and have attached to them a facsimile of the Grower's Nursery Certificate issued by the U.S. Department of Agriculture or Certified Delivery Ticket per truckload. All grass sod shall meet the following basic requirements.

1. Sod shall be free of disease and soil borne insects.

2. Sod shall be free of clover, broadleaf weeds and noxious weeds. Sod considered free of such weeds if less than 2 such plants are found per 100 square feet of area.

3. Sod shall be of uniform color and density and contain:

Kind of Seed	% by Weight
Turf Type Tall Fescue	90
Kentucky Bluegrass	10

4. All cultivars must be on the current approved list of the Virginia Turfgrass Variety Recommendations and the sod shall be certified by the Virginia Sod Certification Program. Provide appropriate certifications at the time of installation.

5. Sod sample shall be submitted to and approved by Project Officer in coordination with the Landscape Architect before cutting. Sod placed on the job shall conform to the approved sample or shall be removed and replaced at the Contractor's expense.

6. Sod shall have been mowed prior to stripping and shall have been maintained for a minimum of three months.

7. Sod shall be relatively free of thatch. Thatch build up that significantly detracts from the appearance of the sod may be sufficient cause for rejection.

8. Sod shall be machine stripped at a uniform soil thickness of approximately ¾-inch. Measurement for thickness to exclude tip growth and thatch. Refer to Grasspave Section 02614 for sod thickness at Grasspave.

9. Individual pieces of sod shall be cut to supplier's standard width and length. Maximum allowable deviation from standard widths and lengths shall be 5%. Broken pads, torn or uneven ends shall not be permitted.

10. Root development shall be such that standard size pieces will support their own weight and retain their size and shape when suspended vertically from a firm grasp on uppermost 10% of the area.

11. Under moderate moisture conditions, weight shall not exceed 7 pounds per square foot. Minimum weight shall not be less than 4 lbs. per square foot.

12. Follow porous pavement (Grasspave2 or equivalent) system manufacturer's instructions for planting turf sod on pavement (Grasspave2 or equivalent) base.

2.04 SPECIALTY SEED (WILFLOWERS, BIORETENTION, and/or REFORESTATION)

A. Unless otherwise indicated, the specialty seed mix shall be as follows:

1. Restoration Mesaures for Natural Areas and RPAs Permanent Seeding Mix variation. Fresh, clean and dry new weed, of
mixed species as follows:
   a. 20% Annual rye – (Lolium mutliflorum)
   b. 30% Virginia Wildrye (Elymus virginicus)
   c. 15% dear-tongue grass (Panicum clandestinum)
   d. 15% Riverbank Wildrye (Elymus riparius)
   e. 5% Bottle-brush grass (Elymus hystrix)
   f. 2% Partridge pea (Chamaecrista facsisulata)
   g. 1% Common milkweed (Asclepsias syriaca)
   h. 1% Grass-leaved goldenrod (Euthamia graminifolia)
2. Seed carrier: Inert material, sharp clean sand mixed with seed at a ratio of not less than two parts seed carrier to one part seed.

3. Seed should be applied to roughened soil (soil surface broken up) by broadcast seeding

4. Due to significant demand for native seed mix, it is recommended that seed be pre-ordered and stored. Seed mixes are best used within 1 year of ordering, but can be kept for up to 2 years if necessary. Potential sources for native seed mix and native plants:

   a) Earth Sanha – Wild Plant Nursery (seed mix must be pre-ordered) – www.earthsangha.org

   b) Ernst Conservation Seeds – www.ernsteed.com

5. Refer to Section 329100 – 3.02 for Erosion Control requirements.

B. Contractor shall supply the germination test results and the percent purity of the seeds upon delivery to the site to the Project Officer. All seed shall be cleaned, processed, analyzed for purity, stored, and germination tested before being used. Every seed variety contains different germination rates and requirements.

C. Execution:

1. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.

2. Brush seed into top 1/8 inch of soil, roll lightly and water with light spray.

3. Protect seeded areas by applying compost mulch within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 3/16 inch and roll surface smooth.

4. Water newly planted areas and keep moist until established.

5. For application of seed over porous pavement (Grasspave2 or equivalent), follow manufacturer's instructions.

2.05 SOILS & SOIL AMENDMENTS

A. Refer to Section 329100 "Plant Preparation" soils and soil amendment specifications.

2.06 MULCHES/ ORGANIC MATTER

A. Refer to Section 329100 "Plant Preparation" for mulch specifications.

2.07 SOIL STABILIZATION/EROSION CONTROL FABRIC

A. Refer to Section 329100 "Plant Preparation" for specifications.

PART 3 - EXECUTION

3.01 PREPARATION

A. Refer to Section 329100 "Plant Preparation" for specifications.

3.02 SEEDING - GRASS

A. Only apply grass seeding where specified per the plans.

B. Seeding shall take place between August 15th and October 15th or between March 15th to May 15th. Approval from Project Officer/Landscape Architect will be required before seeding is to begin.

C. Use 4" of prepared topsoil as base for areas to be seeded.

D. No seeding shall be done during windy weather (winds over 5 mph) or when ground is wet or otherwise non-tillable. No seed shall be done on frozen ground or when the temperature is 32 or lower.

E. Seed shall be uniformly distributed by hydro-seeding methods as specified:

a. Slurry

i. Seed as specified at a rate of 350 lbs./acre.

ii. Mulch: virgin wood fiber type applied at a rate of 1200 lbs./acre.

iii. Tackifier: Guar type or approved equal applied at a rate of 40 lbs./acre.

iv. Fertilizer: 19-19-19 granular applied at a rate of 500 lbs./acre.

v. Lime: Flowable liquid lime at a rate of 5 gallons per acre.

vi. Dye: Slurry must be green with dye added if not included with the mulch.

vii. Application rate: 3000 gallons per acre. Agitation must be maintained throughout mixing and application.

viii. Slurry shall be applied within 8 hours of the start of mixing.

ix. In lieu of hydro-seeding, seed may be drilled or an alternate method may be used. If an alternate method is used, seeding will have to be run in two directions. The second direction being at right angles to the first direction. Requests for using alternate methods shall be approved by the Project Officer prior to application of seed.

x. Sow seed at the rate of 5 to 8 lb/1000 sq. ft.

xi. Rake seed lightly into top 1/8 inch of topsoil, roll lightly, and water with fine spray.

xii. Protect seeded areas with slopes not exceeding 6:1 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose depth over seeded areas. Spread by hand, blower, or other suitable equipment.

xiii. Areas indicated on plan or exceeding 6:1 slope shall be protected with erosion control fabric, jute mat, or similar slope protection, installed according to manufacturer's written instruction, and/or as approved by the Project Officer.

3.03 SODDING

A. All sod shall be transplanted within 24 hours from the time it is harvested unless stacked at its destination in a manner satisfactory to the Project Officer. Do not lay down if dormant or if the ground is frozen or muddy.

B. All sod in stacks shall be kept moist and protected from exposure to air and sun and from freezing. Any sod permitted to dry out may be rejected whenever, in judgment of Project Officer, its survival after placing is doubtful. No payment shall be made for rejected sod.

In any event, no more than forty-eight hours shall lapse between cutting and planting of sod is permitted.

C. Before placing or depositing sod upon any surfaces, all shaping and redressing of such surfaces as described under Seeding Soil Preparation shall be completed. The bed area for sod shall be dug out so that when the sod is installed the adjacent soil will be flush with the top of the sod root mat. Areas shall be watered lightly before the placing of sod; sod shall not be placed on dry surfaces. Completed areas to be sodded shall be a smooth, uniform, well-tilled surface true to line and cross section. Any raking required shall be done immediately prior to placement of the sod at no additional cost to Owner.

D. No sod shall be placed at any time temperature is below 32 degrees Fahrenheit. No frozen sod shall be used and no sod shall be placed upon frozen, powder dry or excessively wet soil.

E. Use 4” of prepared topsoil as base for areas to be sodded. Refer to Section 02614 for soil preparation for porous pavement.

F. Sod shall be lifted from trucks or storage piles by hand and placed with closed joints and no overlapping. All cracks, seams and voids shall be closed with small pieces of sod. After laying sod shall be sprinkled thoroughly and then tamped. "Tamping" consists of firmly closing seams between strips by use of hand tampers or approved rollers. All sod shall be thoroughly rolled after closing all seams. Correct any slipping of sod.

G. Adequate water and watering equipment must be on hand before sodding begins and sod shall be kept moist until root system adheres to original seed bed and becomes established and accepted by Project Officer.

H. Sod shall be laid with long edges parallel to contours, except in swales or ditches where it shall be placed perpendicular to the flow line. Only sod placed in swales or ditches shall be staked using 2 stakes per roll of sod. Stakes shall be wood wedges ½” x 1” x 12”. Successive strips to be neatly matched and all joints staggered. Sod will be laid in all areas indicated on landscape plans.

3.04 SODDING FOR POROUS PAVEMENT (GRASSPAVE2 OR EQUIVALENT)

A. Follow porous pavement (Grasspave2 or equivalent) manufacturer’s instructions for planting turf sod on paver (Grasspave2 or equivalent) base.

3.05 SPECIALTY (UPLAND) SEEDING

A. Prepare planting area per the specifications.

B. Seeding process:

a. Speciality seed mix shall be applied prior to installation of Erosion Control Fabric. Rake seed lightly into the top 1/8 inch of soil, roll lightly and water with fine spray.

i. Do not use wet seed or seed that is moldy or otherwise damaged.

ii. Do not seed against existing trees or vegetation to remain within reforested area limits.

iii. Top dress seed by applying composted mulch within 24 hours after seeding operation. Soak areas, scatter mulch uniformly to a thickness of 1/2 inch and roll surface smooth.

b. Install erosion control fabric from top of slope, overlapping joints by 12 inches, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.

c. Moisten prepared planting area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

d. Plant shrubs, trees and perennials through erosion control fabric by carefully separating fabric layers to allow space for planting.

C. Remove non-degradable erosion-control measures after grass establishment period.

3.06 PROTECTION

A. Install post and rope barriers around seeded areas. Tie cloth or ribbon to rope at 10' intervals.

B. Install "KEEP OFF LAWN" signs at appropriate locations.

C. Remove non-biodegradable erosion control measures after plant establishment period.

3.07 MAINTENANCE

A. Maintain surfaces and supply additional topsoil where necessary, including areas affected by erosion.

B. Water to ensure uniform seed germination and to keep surface of soil damp:

a. Each watering shall consist of 1 gallon per 3 sq. yd. of seed or sod

b. Apply water slowly so that surface of soil will not puddle and crust

C. Cut lawn areas when grass reached height of 3". Maintain minimum height of 2". Do not cut more than 1/3 of blade at any one mowing.

D. After first mowing of lawn, water grass sufficiently to moisten soil from 3” to 5” deep.

E. Reseed damaged grass areas showing root growth failure, deterioration, bare or thin spots and erosion.

3.08 GUARANTEE

A. The Contractor shall be responsible for maintaining all sodded and seeded areas in a healthy, vigorous condition in accordance with Section 3.05 “Maintenance” at his/her own expense until all contracted work is completed and accepted by Project Officer with confirmation by the Landscape Architect or Urban Forester.

B. The Contractor shall, at his own expense, replace any seed or sod which has died or been damaged during the establishment period.

C. Cost of seed and sod will be withheld from final payment until final approval is given by Project Officer.

3.09 ACCEPTANCE

A. Seeded areas will be accepted when an even, healthy, close and uniform stand of turf, 3” tall, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10sq. ft. and bare spots not exceeding 4 by 4 inches is properly established. Bare spots in excess of 4” shall be re-seeded at a rate per section 3.02 of this specification.

B. Reforestation/speciality seeded areas will be accepted upon application. A two (2) year warranty extending from the date of substantial completion applies to all specialty seeding. Re-seeding will be required in the second growing season where the vigorous, healthy planting is not observed.

C. Sodded areas shall be accepted provided all requirements, including maintenance, have been complied with and sod is well established in a healthy, vigorous growing condition. Reestablish lawns that do not comply with requirements and continue maintenance until lawns are satisfactory.

D. Upon completion, all debris and waste material resulting from seeding/sodding/mulching activities shall be removed from the project area and legally disposed of. Any damaged areas shall be restored to their original condition.

E. Upon acceptance by Project Officer, Arlington County shall assume all lawn maintenance

responsibilities.

PART 4 - MEASUREMENT AND PAYMENT

Payment shall be in accordance with Section 01200 – Measurement and Payment.

4.01 SPECIALITY (UPLAND) SEEDING in non-wetland areas shall measured and paid for at the lump sum price for Upland Plants. The lump sum price shall include the cost of fur furnishing all labor, materials, equipment and incidental expenses necessary to complete the work, including but not limited to erosion control, topsoil, mulch, protection and maintenance prior to substantial completion in accordance with the approved plans and specifications.

4.02 SOD shall be measured and paid for at the lump sum price for Upland Plants. The lump sum price shall include the cost of furnishing all labor, materials, equipment and incidental expenses necessary to complete the work, including but not limited to erosion control, protection and maintenance prior to substantial completion in accordance with the approved plans and specifications

4.03 POST-CONSTRUCTION MAINTENANCE during the two (2) year warranty period shall be measured and paid for at the lump sum price for Upland Plants Warranty and Post-Construction Maintenance. The price shall include all labor, materials, equipment and incidental expenses necessary to provide re-seeding (if required) and maintain the seeded areas for two years post-construction. Payment shall be in two installments, each 50 percent of the total lump sum payment, One payment shall occur at the end of the first year of maintenance and the second at final project acceptance.

For approved change orders only:

4.04 The measurement of SOD, that placement is not shown on the approved plans, to be paid for shall be per SQUARE YARD of sod installed in accordance with the approved plans and specifications.

The unit price for SOD shall include the cost of furnishing all labor, materials, equipment and incidental expenses necessary to complete the work, including but not limited to erosion control, protection and maintenance, all in accordance with the approved plans and specifications.

END SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes trees, shrubs, groundcover, bulbs, and perennial plants, including bare root and deep plug plants.

B. Provide all labor, materials, tools and equipment as required to have plants, topsoil, amendments, mulch and seed and/or sod applied on all areas called for on the approved plans.

Related Sections:

a. 02200 Earthwork

b. 329100 Planting Preparation

c. 311300 Tree Protection and Root Pruning

d. 01500 Erosion and Sediment Control and Pollution Prevention

e. 329200 Seeding and Sodding

f. 02803 Wetland Seeding

g. 02804 Wetland Planting

In addition to the specifications contained herein, Work shall be performed in accordance with the:

a. Drawings and general provisions of the contract, including general and supplementary conditions

b. Arlington County Department of Parks & Recreation Design Standards as shown on the plans and available online at:

http://parks.arlingtonva.us/design-standards/

1.02 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Imported Topsoil: Soil obtained off-site that meets the specifications herein for topsoil and is suitable for use in planting soil/backfill soil mixture when existing soil quantities are insufficient. Refer to Section 329100 “Planting Preparation.”

C. Planting Soil/Backfill Soil Mixture: Existing soil modified as specified to be suitable for planting. Refer to Section 329100 “Planting Preparation.”

D. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.

E. ISA: International Society of Arboriculture

F. CBAY: Chesapeake Bay, typically referring to CBAY watershed.

G. Urban Forester/County Urban Forester: Refers to the Arlington County Urban Forester

H. Landscape Architect: Refers to the project Landscape Architect or their designee.

1.03 SUBMITTALS

A. All submittals specified in Section 329100 “Planting Preparation” shall be provided to Project Officer for approval with confirmation by Landscape Architect or Urban Forester. All approvals shall be in writing.

B. Product Certificates: Contractor shall submit for each type of manufactured product, to be approved by the Project Officer and complying with the following:

a. Manufacturer’s certified analysis for standard products.

C. Refer to Section 329100, “Planting Preparation” for soil test requirements.

D. Confirmation of Plant Availability: Within 60 days of the Notice to Proceed, contractor to provide evidence of plant orders or custom growing contract for the plants specified in the design plans. Submittal to include plant list with plants identified by both common name and genus and species. The quantity, size, provenance, supplier and anticipated delivery date for each species shall be provided. The Contractor shall submit a written request for any substitute plants included in the plant order or growing contract.

E. Contractor shall submit State Nursery inspection certificates to the Project Officer.

F. Planting Schedule: Contractor shall submit the planting schedule to the Project Officer for approval with confirmation by the Landscape Architect or Urban Forester. The plant schedule will indicate anticipated planting dates for exterior plants. Contractor shall be responsible for furnishing and installing all plant material shown on the drawings and plant list, as submitted with the contract. Contractor shall have investigated the sources of supply and satisfied himself/herself that he/she can supply all of the plants specified on the drawings in the size, variety, quantity and quality noted before submitting the bid. Failure to take this precaution will not relieve the successful bidder from the responsibility of furnishing and installing all of the plant material in strict accordance with the contract documents.

G. Substitutions:

a. The Contractor shall submit a written request for a substitute plant a minimum of forty-five (45) calendar days prior to planting date if specific plants will not be available in time for the scheduled planting. Contractor shall submit the request to the Project Officer for approval with confirmation by the Landscape Architect or Urban Forester.

b. Contractor shall be responsible for documenting any plant suitability or availability problems.

c. If a substitute plant is offered to the County, it shall be of the same size, value and quality as the plant originally specified on the plan, as determined by the Project Officer in coordination with the Landscape Architect or Urban Forester. If the County does not accept the substitute plant, the Contractor shall provide the type and size of plant material specified on the plans, or a substitute requested by the Project Officer in coordination with the Landscape Architect or Urban Forester

1.04 QUALITY ASSURANCE

A. Installer Qualifications:

a. ISA Certified Arborist shall be on the worksite during planting.

b. Demonstrate experience in Reforestation/Afforestation, Wetland and Stream Restoration projects through:

i. Project portfolio detailing a minimum of three (3) successfully completed restoration projects in the CBAY watershed area over the past three years.

c. The County will, throughout the contract term, have the right of reasonable rejection and approval of staff or subcontractors assigned to the project by the Contractor. If the County reasonably rejects staff or subcontractors, the Contractor shall 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 any employees of any of it subcontractors, shall be solely the responsibility of the Contractor.

B. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory. Comply with requirements in Section 329100, "Planting Preparation."

C. Provide quality, size, genus, species, and variety of exterior plants indicated, complying with applicable requirements in the most current version of ANSI Z60.1, "American Standard for Nursery Stock." Plants shall be nursery grown stock and conform to the requirements described in the most current issue of the American Standard for Nursery Stock (ANSI) published by the American Nursery and Landscape Association. The Project Officer with confirmation by the Landscape Architect or Urban Forester may reject any non-conforming stock and has the option to field-select plant materials prior to purchasing.

D. Collected material may be used only when approved by Project Officer with confirmation by Arlington County Urban Forester and/or DPR PNR Natural Resource Manager

E. Nomenclature shall be in accordance with *Hortus III*, by L.H. Bailey. All trees and shrubs shall be labeled with a securely attached, waterproof tag bearing legible designation of botanical and common name. Perennials and groundcovers shall be clearly identified with a waterproof tag bearing legible designation of botanical and common name within the container.

F. Pre-installation Conference: Conduct conference at Project site with Project Officer, Arlington County Urban Forester and/or Landscape Architect.

G. Urban Forester Notification: Notify the Project Officer at least 72 hours prior to commencement of tree planting operations, so that the County's Urban Forester can be present on-site to observe the work.

H. The Contractor shall provide a minimum of seven (7) business days' notice to the Project Officer prior to installing the plant material (this is not the same as inspection notification).

I. At the request of the Project Officer in coordination with the Urban Forester or Landscape Architect, the Contractor shall supply information specifying the provenance of the plant material. Provenance is the geographical origin of the seed or cutting used in propagation and can have a direct effect on plant vigor and survivability.

J. Inspections:

a. Urban Forester may perform periodic inspections to check on tree plantings.

b. Contractor shall arrange a meeting on site with the Project Officer in coordination with the Urban Forester and/or Landscape Architect to perform final inspection of plantings. Refer to section 1.07 "Final Inspection."

1.05 WORKMANSHIP

A. Any tree pruning shall conform to the most current version of ANSI A-300 Standard Practices for Trees, Shrubs, and Other Woody Plant Maintenance. Do not prune trees and shrubs before delivery.

B. Protect bark, branches, and root systems from sun-scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of exterior plants during delivery. Do not drop exterior plants during delivery. Plants shall not be bound with wire or rope at any time so as to damage the bark or break branches. Plants shall be handled from the bottom of the root ball only.

C. All plants in transit shall be tarped or covered and shall be kept from drying out. Desiccation damage shall be cause for rejection. Plants damaged in handling or transportation may be rejected by the Project Officer with confirmation by the Urban

Forester/Landscape Architect. Any tree or shrub found to have wounds over 12.5% of the circumference of any limb or trunk, or over 1 inch in any direction, whichever is smaller, shall be rejected.

D. Deliver exterior plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set exterior plants trees in shade, protect from weather and mechanical damage, and keep roots moist. Plants shall not remain unplanted for longer than a three-day period after delivery. Any plants not installed during this time period shall be rejected, unless Project Officer and contractor provide otherwise by written agreement. All plants kept on site for any period of time shall be watered and cared for using ANSI A300 standards.

E. Plants shall be installed immediately following excavation of the hole. No holes shall remain open overnight. The Contractor shall cover and barricade any open holes to effectively prevent any danger of injury to pedestrians.

F. During delivery and installation, the landscape contractor shall perform in a professional manner, coordinating his/her activities so as not to interfere with the work of other trades, and leaving his/her work area(s) clean of litter and debris at the close of each workday.

G. During planting, all areas shall be kept neat and clean, and precautions shall be taken to avoid damage to existing plants, trees, turf and structures. Where existing trees are to be preserved, additional precautions shall be taken to avoid unnecessary accumulation of excavated materials, soil compaction, or root damage. The Contractor shall cover sidewalks or pavers with plywood, and cover turf with plywood, burlap or tarp during excavation.

H. Any damaged areas caused by the Contractor shall be restored to their original condition at no cost to the County. All debris and waste material, including small stones and clumps of clay or dirt exceeding 1” by 1” in any direction, resulting from planting operations shall be removed from the project, **legally disposed,** and the area cleaned up by the Contractor.

I. Plants with soil covering the root flare, if not removed by Contractor, shall be rejected by Project Officer with confirmation by Landscape Architect or Urban Forester.

J. Contractor shall take full responsibility for any cost incurred due to damage of utilities by their operations.

K. The Contractor will not be held responsible for uncommon concealed conditions such as concrete/asphalt/stone spoils encountered in excavation work which are not apparent at the time of bidding. Rocks, tree roots and hard clay are common elements of “urban” soils and will frequently be encountered in the execution of the contract.

L. No plants shall be planted in locations where drainage may, in the opinion of the Contractor, be unacceptable. Such situations shall be brought to the attention of the

Project Officer before work continues and, if deemed necessary by the Project Officer with confirmation by the Landscape Architect/Urban Forester, the plants shall be relocated or the contract shall be modified to allow for drainage correction at a negotiated cost. Any such modification shall be in writing and signed by both parties.

M. The Contractor shall layout plants according to the project's landscape plan. The Project Officer shall approve the layout with confirmation by the Landscape Architect prior to plant installation. Plants installed without layout approval from the Project Officer with confirmation by Landscape Architect are subject to removal and replanting by the Contractor at no additional cost to Arlington County.

1.06 WATER REQUIREMENTS

A. Initial Waterings: The Contractor shall supply water for all plantings and shall water all plants at time of installation and 48 hours after installation, even if it is raining. Contractor shall then water plantings at least twice per week at amounts specified below until substantial completion of work.

B. Each watering shall consist of:

1. 20 gallons per individual tree
2. 4 gallons per individual shrub
3. 1 gallon per 1 sq. yd. of shrub or perennial bed
4. 1 gallon per 3 sq. yd. of seed or sod

1.07 FINAL INSPECTION

A. Contractor shall schedule the final inspection with the Project Officer in coordination with the Urban Forester and/or Landscape Architect.

1. Contractor shall notify Project Officer at least one week in advance to arrange final inspection meeting with the Urban Forester and/or Landscape Architect.

2. Contractor shall conduct the final inspection of the landscape materials no less than three months after the installation of the plants or substantial completion of construction work, whichever comes last, and in the presence of the Project Officer, the Urban Forester and/or Landscape Architect.

3. The landscaping inspection will review all landscape work under the contract.

4. All plants shall be alive and in good health at the time of final inspection.

5. Any plant material that is 25% dead or more shall be considered dead and shall be replaced at no charge to the County. A tree shall be considered dead when the main leader has died back, or 25% of the crown is dead.

6. It shall be the Contractor's responsibility to provide in writing the results of this inspection.

7. The Contractor shall make replacements during the next planting period unless the County specifies an earlier date.

8. The replacement plants will be reviewed for substantial completion no less than three months after installation. Contractor is responsible for maintenance and watering of replacement material per Section 1.06 and Section 1.09 after planting and until the replacement plantings are finally accepted by Project Officer.

9. A replacement plant shall be of the same size as the original plant with no additional soil additives to be used.

10. The Contractor will not be responsible for plants that have been damaged by vandalism, fire, removal or other activities beyond the control of the Contractor.

1.08 PLANT WARRANTY

A. Warranty: Guarantee that plants will be alive and in satisfactory growth for a period of two (2) Years, beginning on the date of substantial completion as determined by the Project Officer.

B. Inspect herbaceous plants annually in late summer to determine required replacement for the following spring. Replace dead or dying herbaceous plants between April 1 and May 15 or between September 15 and November 15 of each year at no cost to the County. Inspect woody plants annually in spring following leaf out to determine required replacement for the subsequent fall. Replace dead or dying woody plants between September 15 and December 1 at no cost to the County.

C. Post-construction invasive species control during the two (2) year warranty period shall be in accordance with Section 01551.

D. During the warranty period, the Contractor shall water all landscape trees weekly between April 1 and October 1, in weeks with less than 1-inch of rain.

E. Maintenance of biodegradeable tree shelters shall be in accordance with Section 02806.

1.09 MAINTENANCE PRIOR TO FINAL ACCEPTANCE SUBSTANTIAL COMPLETION

A. Trees, Shrubs, Perennials, Bulbs & Groundcovers: Contractor shall maintain plantings at his/her own expense until substantial completion of the plantings as specified herein section 1.07.

B. Maintenance shall include pruning, mulching, cultivating, watering, weeding, invasive plant control, fertilizing, tightening and repairing stakes and guy supports, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings.

C. Pruning: Remove all sucker growth, dead or broken branches at initial planting and as needed during the warranty period. Pruning will conform to ANSI-300 Tree Pruning Standards.

D. Fertilizing: No plants shall be fertilized without prior approval of Project Officer with confirmation by the Urban Forester or Landscape Architect.

E. Mulching: Contractor shall re-mulch areas to a depth of two to three inches prior to substantial completion if the time between planting and substantial completion extends beyond six months. Mulch will be of the same quality as mulch provided at the time of planting. Keep mulch six-inches away from trunks of trees and shrubs.

F. Invasive Plant Control: Contractor shall perform invasive plant control monthly from April through October if time between planting and substantial completion extends through any months of the growing season. .

G. Stakes and Guy Supports: If installed, Contractor shall monitor and adjust all stakes and guy supports until substantial completion.

PART 2 - PRODUCTS

2.01 EXTERIOR PLANTS

A. Contractor shall select plants only from nurseries that have been inspected by state or federal agencies and shall have been grown in USDA Plant Hardiness Zones 4, 5, 6, or 7, and in one of the following states: Maryland, Virginia, Delaware, New Jersey, North Carolina or Pennsylvania.

B. Tree and Shrub Material: Furnish nursery-grown trees and shrubs complying with ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun-scald, injuries, abrasions, and disfigurement.

1. Provide balled and burlapped, bare root or container-grown trees and shrubs, as indicated on the Drawings.

2. Balled and Burlapped (B&B) plants shall be dug with firm root balls of earth and free of noxious weeds. There shall be no extra soil on top of the root ball or around the trunk. Balled and burlapped trees shall be securely held in place by untreated burlap and stout rope. Nylon rope is NOT acceptable. Loose, broken or manufactured balls are unacceptable.

3. Ball sizes shall be in accordance with current ANSI standards.

4. In size-grading B&B single stem trees, caliper shall take precedence over height. For multiple-trunk trees, height measurement shall take precedence over caliper.

5. Trees over 1” in caliper shall have a strong central leader (free and clear of branches or splits in the trunk) from the top of the root ball to a height of at least

6’-6”. Only minimal bends in the trunk will be acceptable. Co-dominant stems and V-crotches shall be cause for rejection.

6. The root system of container-grown plants shall be well developed and well distributed throughout the container.

7. All container-grown trees and shrubs that have circling and matted roots shall be rejected.

C. Perennials: Provide healthy, container-grown plants with well-developed, fibrous root systems from a commercial nursery, of species and variety shown in the Drawings. All container grown plants shall be healthy, vigorous, well rooted and established in the container in which they are growing. A container grown plant shall have a well-established root system reaching the sides of the container to maintain a firm root ball, but shall not have excessive root growth outside the container.

D. Bulbs: Provide top size bulbs as indicated on plan in accordance with most current version of ANSI A60 specification.

E. Deep plugs: Provide healthy, well-rooted plants with no evidence of over or under-watering. Plugs shall not be dormant at the time of planting and shall display vigorous top growth unless otherwise approved by the Landscape Architect or Urban Forester. Plugs shall have a minimum soil volume of $10in^3$ and a minimum depth of four (4) inches.

F. Field grown trees and shrubs shall be grown in soils of the Piedmont region, or west of that region in the above approved states and zones.

1. All plant materials shall be labeled by grower to identify genus, species, and cultivar, if applicable, in accordance with Section 1.04 “Quality Assurance,” above.

2. Bare root plant materials: Bare root plants will be dug with adequate fibrous roots. Do not root prune. Roots shall be protected during handling and planting to guard against drying out and damage.

3. Plant Materials for ecologically sensitive areas: Plant materials identified on planting plan as being located within an Arlington County Natural Resource Conservation Area (NCRA) shall be native species of local provenance.

    a. Plant stock shall originate from a location within 150 miles of Arlington County.

2.02 OTHER MATERIALS

A. Refer to Section 329200 “Seeding and Sodding” for specifications for seeding, specialty seeding, sodding, and soil stabilization/erosion control fabric.

B. Refer to Section 329100 “Planting Preparation” for specifications for soils, mulch, soil amendments and other items related to planting preparation.

PART 3 - EXECUTION

3.01 EXTERIOR PLANTING

A. Contractor shall install plant materials in accordance with the current Arlington County Standard Planting Details as published on the Arlington County website and as specified below.

B. Refer to Section 329100 “Planting Preparation” for specifications on soil amendments.

C. Do not rototill, deeply loosen or disturb soil other than excavation for individual plant pits and to fill shallow depressions and fine grading.

D. In Zone B, layout plants under the supervision of the Urban Forester, Landscape Architect or designee to avoid disturbance of existing trees or other plants to be preserved.

E. Planting soil is only to be used as backfill mix for individual plant pits, and for limited fine grading within the limits of disturbance

F. Do not remove any existing tree not specifically identified for removal in the approved design plans. Removal of other plants, is limited to those designated to be removed as part of the invasive species removal process.

G. Within the Limits of Disturbance:

1. Remove existing sod, turf, weeds or other plant material.

2. Rototill subgrade of planting beds to a minimum depth of 8 inches with the addition of 3 inches organic material. Edge and rake the entire planting bed.

3. Remove stones, clods, debris, sticks, roots and other foreign or extraneous matter larger than 1/2 inch in any dimension. Contractor shall legally dispose of them off Arlington County property.

4. Thoroughly blend planting soil mix off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.

5. Spread planting soil mix to a depth of 8 inches but not less than required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

6. Finish Grading: Grade planting beds to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

7. Planting operations shall be performed during periods within the planting season when weather and soil conditions are suitable and in accordance with accepted local practice. Plants shall not be installed in top soil that is in muddy or frozen condition. **Sod and deep plugs shall be installed between 03/15 and 05/15**
8. **or between 09/15 and 11/15. Trees and shrubs shall be installed between 9/15 and 12/1.** If a project completion is outside of this planting period, contact the Arlington County Urban Forester to obtain a deferral or approval for planting out of season.

H. Plant Layout

1. The Contractor shall layout and space plants according to the project landscape plan.

2. When the layout is complete, the Contractor shall notify the Project Officer for approval with confirmation by the Landscape Architect prior to installation of the plants.

I. Landscape Plantings (Trees, Shrubs, Ground Covers and Perennials)

1. Contractor shall install plantings in accordance with Arlington County DPR standard details available online at: http://parks.arlingtonva.us/design-standards/. Refer to plans for appropriate planting details.

2. Handling: Prepare pit and/or planting bed per standards. Place plant in pit by carrying by the root ball (not by branches or trunk) and plant per the DPR Standards. Make sure the plant remains plumb during the backfilling procedure.

J. Tree and Shrub Pruning: Contractor shall conform to the most current version of ANSI A-300 Tree Pruning Standards. Do not cut tree leaders; remove only injured or dead branches from trees and shrubs, or those that pose a hazard to pedestrians. Make all cuts back to a lateral branch or bud. Cuts should be perpendicular above branch collar. Final pruning shall be done after the tree is in place. Do not prune into old wood on evergreens.

K. Plant Protection: Contractor shall protect exterior plants from damage due to landscape operations, operations by other contractors and trades, and others. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged exterior planting. Injured roots shall be pruned to clean ends before planting with clean, sharp tools per most current ANSI 300 specifications.

a. Protect shrubs, groundcovers and perennials from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

L. Contractor shall remove all tags, labels, strings and wire from the plants, unless otherwise directed.

M. Contractor shall remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them off of Arlington County property.

N. Refer to Section 1.06 'Water Requirements.'

3.01.1 STAKING & GUYING TREES

A. Contractor shall stake and guy trees only if required by Urban Forester.

B. If staking and guying is required, the Contractor shall provide and install stakes and guying in accordance with DPR standard staking details for deciduous and evergreen trees.

PART 4 – MEASUREMENT AND PAYMENT

Measurement shall be lump sum in accordance with Section 01200 – Measurement and Payment.

Payment for Upland Plants shall be paid for at the lump sum price and shall include the cost of all labor, materials, and other expenses necessary to complete the work, including but not limited to staking and guying, required waterings (at time of planting and second watering for each plant 48 hours after installation), and maintenance necessary to keep plants healthy until substantial completion as described herein, in accordance with the approved plans and specifications.

Measurement and payment for Upland Plants Warranty and Post-Construction Maintenance shall include all labor, materials and other expenses necessary to warranty upland plantings for two years following substantial completion, including maintenance of biodegradeable tree shelters and two (2) years of post-installation watering for landscape trees. Payment shall be paid for at the lump sum price in two installments, each 50 percent of the total lump sum payment, One payment shall occur at the end of the first year of maintenance and the second at final project acceptance. Post-construction invasive control shall be paid separately per the lump sum price.

Payment for Deep Plug shall be paid for at the lump sum price, included in Upland Planting, and shall include the cost of all labor, materials, and other expenses necessary to complete the work.

Payment for Bare-Root Shrub shall be paid for at the lump sum price, included in Upland Planting and/or Wetland Planting, and shall include the cost of all labor, materials, and other expenses necessary to complete the work.

Payment for Container Shrub shall be paid for at the lump sum price, included in Upland Planting and/or Weltand Planting, and shall include the cost of all labor, materials, and other expenses necessary to complete the work.

Payment for Replacement Trees shall be paid for at the lump sum price, included in Upland Planting and/or Weltand Planting, and shall include the cost of all labor, materials, and other expenses necessary to complete the work.

END SECTION