

II. ARLINGTON COUNTY DES ENGINEERING
REVISED SPECIAL CONDITIONS

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PROJECT SUMMARY

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

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

Headwaters Donaldson Run Tributary B (Analostan Branch)

The Donaldson Run Tributary B Headwaters (S42D) project is a stream stabilization and storm sewer outfall repair project which includes, but is not limited to, the installation of storm sewer structures and pipes, stacked stone walls, in-stream rock structures, rock step pools, restoration with native plants, post-construction vegetative maintenance and various other improvements. The project extends from the storm sewer outfall at 24th Rd. N to approximately 650 feet downstream and ties into the previously-restored stream segment.

Work for the project will occur entirely on private property and will be located in temporary and permanent construction easements. No work within VDOT Right-of-Way is proposed.

Temporary construction easements have been obtained for addresses **4664 25th St N (Cruley)**, **2009 14th St N (Missionhurst)**, and **2412 N Woodrow St (Fried)**. A permanent easement has been obtained for address **4621 24th Rd N (Madan)**. There is an existing 8" sanitary sewer that runs under the downstream portion of the stream and crosses the stream at various points upstream. Care must be taken to protect the 8" sanitary sewer. Prior to excavation the contractor must perform the necessary test pits to determine the precise location of the sanitary sewer vertically and horizontally. The sanitary sewer will be concrete encased beginning at STA 15+46 and extending to existing manhole structure #6974.

There is a 15" storm sewer outfall into the stream from the Analostan Homes Association (2451 Wakefield Ct). The proposed stream grade will be raised to match the invert out of the storm sewer. No improvements to the 15" storm sewer outfall are proposed.

Construction for this project is almost entirely within the Resource Protection Area and Waters of the U.S. The contractor shall adhere strictly to the Stormwater Pollution Prevention Plan and Details to minimize impact. The limits of disturbance and allowable tree and vegetation clearing must be strictly adhered to per the landscaping sheets and notes.

SUPPLEMENTS TO THE GENERAL CONDITIONS

These Conditions modify the Arlington County Construction General Conditions. All provisions that are not modified or deleted by these Supplemental Conditions shall remain in full force and effect.

The address system used in these Supplemental Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

ARTICLE B – DRAWINGS, SPECIFICATIONS AND RELATED DATA

SC-B.10 TESTS

Add the following new language to Paragraph B.10:

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

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

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

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

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

SC-B.13 SURVEYS AND CONTROLS

Delete Paragraph B.13 in its entirety and insert the following in its place:

Unless otherwise stated, the County will provide horizontal and vertical reference points necessary for the Contractor to proceed with the Work. The Contractor shall carefully preserve all reference points, and in the case of destruction thereof by the Contractor or due to the negligence of the Contractor or of any subcontractor, the Contractor shall be

responsible for expense and damage resulting therefrom and shall be responsible for any mistakes or construction errors that may be caused by the loss or disturbance of such reference points. The Contractor shall be responsible for laying out the Work and shall retain a professional land surveyor licensed in the Commonwealth of Virginia to survey and provide all necessary construction layouts and to establish all control lines, grades, and elevations during construction.

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

SC-C.4 INSPECTION OF WORK

Add the following new language to Paragraph C.4:

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

SC-C.9 CONTRACTOR MANAGEMENT PERSONNEL

Add the following new language to Paragraph C.9:

Site Supervisor:

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

Safety Project Officer:

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

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

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

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

Environmental Project Officer:

For each task order, the Contractor shall have at least one (1) employee that has successfully completed the VDOT Erosion & Sediment Control Contractor Certification

training. The contractor employee shall be on-site during all land disturbance activities. The Contractor shall be responsible for ensuring compliance with all applicable local, State, and Federal erosion and sediment control regulations and permits during land disturbance activities.

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

SC-C.13 PROTECTION OF WORK AND PROPERTY

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

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

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

ARTICLE E – LEGAL RESPONSIBILITY AND PUBLIC SAFETY

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

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

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

SC-E.2 PUBLIC CONVENIENCE

Add the following new language to Paragraph E.2:

The Contractor shall set up controls at the beginning of each work day and take down controls at the end of each work day for the duration of the project. At all times the Contractor shall maintain safe two-way vehicular traffic, and safe accessible pedestrian traffic in conformance with County and VDOT standards.

At all times the Contractor shall use the personnel and traffic control signs and devices necessary to comply with the Virginia Work Area Protection Manual and Part VI of the "National Manual on Uniform Traffic Control Devices." The Contractor has sole responsibility

for ensuring that its operations are conducted in a safe manner and notwithstanding any other provision to the contrary, shall fully indemnify Arlington County, its officers, agents and employees for any damage or injury related to traffic operations which is caused by negligent or otherwise improper or deficient performance under the Contract or nonperformance of the terms of the Contract. All personnel, signs, barricades and any other items necessary for the maintenance of traffic and safety shall be provided by the Contractor.

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

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

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

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

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

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

At the close of each work day, the area of work shall be confined to the smallest area possible, but in no event larger than the area designated in the Construction Documents, so

that the maximum use of the street and sidewalk shall be restored and the hazard to traffic reduced to the minimum.

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

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

Add the following new language to Paragraph E.10:

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

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

Delete Paragraph 2.

ARTICLE F— PROGRESS AND COMPLETION OF THE WORK

SC-F.2 TIME FOR COMPLETION

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

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

ARTICLE G– MEASUREMENT AND PAYMENT

SC-G.1 PAYMENTS TO CONTRACTOR

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

No additional payment for any incidentals will be made unless specifically requested through, and authorized by, the County Project Officer prior to the work. Such determination of additional payment will be at the sole discretion of the County Project Officer, and will be based upon the determination that there exist exceptional conditions which will necessitate significant expenditures of material and/or labor above and beyond the typical installation conditions which could be anticipated in Arlington County.

SPECIAL CONDITIONS

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

1. **CONSTRUCTION STANDARDS**

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

- **The Arlington County Department of Environmental Services (DES) Bike Parking Standards**, a copy of which may be downloaded at no charge from the internet at: <https://info.arlingtontransportationpartners.com/arlington-county-bike-parking-standards>
- **The Arlington County Department of Environmental Services (DES) Construction Standards and Specifications**, a copy of which may be downloaded at no charge from the internet at: <http://topics.arlingtonva.us/building/construction-standards-specifications/>
- **The Arlington County Department of Environmental Services (DES) Traffic Signal Specifications**, a copy of which may be downloaded at no charge from the internet at: <https://transportation.arlingtonva.us/traffic-signal-specification-updates/>
- **The Arlington County Department of Environmental Services (DES) Streetlight Specifications**, a copy of which may be downloaded at no charge from the internet at: <https://transportation.arlingtonva.us/streets/street-lights/lighting-standards-specifications-updates/>
- **The Arlington County Department of Environmental Services (DES) Pavement Marking Specifications**, a copy of which may be downloaded at no charge from the internet at: <http://transportation.arlingtonva.us/streets/traffic-signals/>
- **The Arlington County Department of Parks and Recreation (DPR) Specifications**, a copy of which may be downloaded at no charge from the internet at: <https://www.arlingtonva.us/Government/Departments/Parks-Recreation/About/Design-Standards>
- **The Virginia Department of Transportation (VDOT) Road and Bridge Standards and Specifications**, a copy of which may be downloaded at no charge from the internet at: <http://www.virginiadot.org/business/const/spec-default.asp>
- **The Virginia Work Area Protection Manual (WAPM)**, a copy of which may be downloaded at no charge from the internet at: <https://www.virginiadot.org/business/trafficeng-WZS.asp>
- **Manual on Uniform Traffic Control Devices (MUTCD)**, a copy of which may be downloaded at no charge from the internet at: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/pdf_index.htm

- **The Arlington County Department of Environmental Services (DES) Dechlorination and Disposal Procedures**, a copy of which may be downloaded at no charge from the internet at: <https://www.arlingtonva.us/Government/Programs/Water-Utilities/Discharging-Chlorinated-Water>
- **The Supplementary Specifications listed within the Contract.**

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

The Contract Bid Items

Special Conditions

Contract Drawings

Supplemental Specifications

Arlington County Construction Standards and Specifications

External Agency Specifications

2. PERMITS

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

- **County Land Disturbing Activities (LDA) permit**
- **County Public Right-Of-Way (PROW) permit**
- **County Transportation Right-Of-Way (TROW) permits**
- **County Resource Protection Area (RPA) permit**
- **VA DEQ Virginia Storm Water Management Program (VSMP) permit**
- **General Nationwide Permits issued by the US Army Corps of Engineers (USACE NWP)**

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

The County will obtain the County LDA permit, the County RPA permit, VSMP Permit and USACE NWP/DEQ 401 Water Quality Certification prior to the start of work. The Contractor shall transfer the County LDA permit and the VSMP Permit in the Contractors name as the permittee and/or responsible party prior to the start of Work.

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

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

3. SPECIAL CONTRACTOR/SUBCONTRACTOR QUALIFICATIONS

ITB No. 23-DES-ITBPW-483

In determining the lowest responsive, responsible bidder, in addition to price, the County shall consider quantity, delivery time, payment terms, warranties, cost of maintenance, as well as capacity, character, integrity, and reputation of the bidder, and any past experiences with the product(s) offered or the bidder. In consideration of contractor capacity and past experiences, the County will review materials submitted by the Contractor that demonstrate recent experience in constructing in-stream projects.

The Contractor shall demonstrate successful completion of at least three (3) prior in-stream projects, completed in the last ten (10) years, that are similar in scope and/or nature to this project. The projects must have a minimum construction value of \$500,000 directly related to in-stream work. The Construction Manager and Superintendent assigned to provide daily supervision of construction work shall also have this experience.

In order to demonstrate their qualifications and experience, the contractor shall provide a written submission along with the bid. The written submission shall provide the following details for each of the three (3) comparable in-stream projects completed in the last ten (10) years that the contractor chooses to highlight:

- Project Location
- Project Name
- Project description and Bidder's scope of work within the project
- Identification of any unique project considerations
- Equipment used for construction and measures taken to minimize disturbance to the stream corridor and adjacent riparian zone
- Number of linear feet of project
- Contact information for the contractor construction manager, superintendent or equivalent (including email and phone number)
- Project Owner contact information (including a contact name, phone number, and email)
- Work start date, scheduled completion, and actual completion date
- Initial contract cost and final contract cost
- Four (4) photographs, two showing the site prior to construction and two showing the completed project

Provide information for up to three (3) projects only. Bids that do not include the above information may be deemed nonresponsive and are subject to rejection. Contractors that do not provide satisfactory evidence of the above qualifications, in the County's sole judgment, shall not be considered for award. The County reserves the right to check references furnished and consider the responses received in determining this bid.

No contract shall be awarded to other than a responsible Bidder meeting all the requirements of these specifications.

At the County's request, the Contractor may be required to produce copies of Financial Statements, list of employees, crews, equipment, and other items the Owner deems appropriate to ascertain the experience and capacity of the Contractor to perform the work.

The County reserves the right to reject any bid from bidders that do not meet the minimum experience requirements noted herein.

The Contractor or identified sub-Contractor shall also demonstrate experience in planting and maintenance of ecological restoration plantings. The contractor shall provide:

- A project portfolio detailing a minimum of three (3) successfully completed plantings similar in size and scope in the Chesapeake Bay watershed over the past five (5) years.
- A summary of staff qualifications identifying the name and experience of an ISA-certified arborist who shall be on the worksite during planting and/or re-planting and the name and experience of the project manager and crew chief (if different) supervising the maintenance of ecological restoration plantings.

In addition to these qualifications, the Contractor shall have:

- At least one (1) employee certified by VDOT in Basic Work Zone Traffic Control who will be on-site at all times that work is occurring.
- The ability to deploy a flagger certified in accordance with the VDOT Flagger Certification Program, the American Traffic Safety Services Association Flagger Certification Program or any other VDOT approved flagger program. The flagger shall have his/her certification card with them at all times while performing flagging activities.
- At least one (1) employee certified in OSHA 10 who will be on-site at all times while work is occurring and shall be designated as the Project Safety Officer. The employee shall have served as a Project Safety Officer on at least three (3) prior projects.
- At least one (1) employee that has successfully completed the VDOT Erosion & Sediment Control Contractor Certification training who shall be on-site during all land disturbance activities and shall be designated as the Environmental Project Officer.
- At least one (1) person who has obtained certification as a Responsible Land Disturber (RLD) who will be on-site during all land disturbance activities. This person may also hold the VDOT Erosion and Sediment Control Contractor certification and serve as the Environmental Project Officer.

The Contractor shall provide sufficient documentation to demonstrate that the above qualifications are met including:

- The names and experience of the qualified employees

- Proof of certification

The Contractor may attend an optional Pre-bid meeting.

4. STAKEOUT AND CUT-SHEETS

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

5. SCHEDULE, DURATION, AND PHASING REQUIREMENTS

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

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

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

6. WORK HOURS

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

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

In addition, the County reserves the right to restrict working days and hours to accommodate special site conditions as required.

7. GENERAL SITE SECURITY AND CONTROLS

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

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

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

Homeowners shall be notified by the Contractor a minimum of fourteen (14) calendar days in advance of any driveway closure, and driveways can only be closed for a maximum of five (5) calendar days.

The Contractor shall monitor parking of construction personnel's private vehicles and ensure that the public has unobstructed access to and through parking areas.

8. SPECIAL TRAFFIC MAINTENANCE CONSIDERATIONS

Entrance to the work area shall be from 25th St. N. There will be no access for construction vehicles from 24th St. N. Contractor to adhere to the Maintenance of Traffic Plan within the approved set.

9. EXISTING CONDITIONS DOCUMENTATION

In addition to the stipulations outlined in Supplemental Specifications Section 01520, the Contractor shall capture extensive photo documentation of pre-construction conditions of the existing retaining wall on the Analostan Homes Association property (approx. STA 10+43 to 10+71 RT in the Construction Plans). The Contractor shall also capture photo documentation of pre-construction conditions of the following trees: #6225, #6232, #6233, #6250, #6254, #6265, #6326, and #6329. See the Existing Conditions Plan (Sheet C011.1) and Tree Inventory (Sheet C011.2) in the Construction Plans for tree locations and sizes, respectively. Special care shall be taken to minimize the risk of the trees falling and to prevent worsened conditions during and after construction.

10. CONSTRUCTION EQUIPMENT

The Contractor shall confirm that prior to moving on to the Project Area, all equipment is free of soil, seeds, vegetative matter, or other debris that could contain or hold seeds. Verify that all equipment has been pressure washed and is free of exotic species prior to start-up of operations and moving of equipment to Project Area.

Equipment shall be considered free of soil, seeds, and other debris when a visual inspection does not disclose such material. Disassembly of equipment components or specialized inspection tools are not required.

Contractor shall notify the Contracting Officer at least 2 days prior to moving any equipment onto the Project Area. Notification will include identifying the location of the equipment's most recent operations. The Contractor shall arrange for the Contracting Officer to inspect each piece of equipment prior to it being placed in service.

Use of the smallest feasible equipment and use of tracked equipment is desirable to minimize tree and private retaining wall impacts during construction. The Contractor shall submit an equipment schedule to the Project Officer for approval prior to mobilization to the project site.

11. MILLING AND OVERLAY

During milling and overlay of the Missionhurst driveway at 4675 25th St. N the Contractor shall ensure the existing grate inlet (see Construction Plans for approximate location) is flush with the overlaid asphalt surface and the inlet capacity is preserved.

The Contractor shall also restore the asphalt hump (see Construction Plans for approximate location) along the same driveway to pre-construction conditions. The limits of pavement restoration shall be determined by the County Project Officer.

12. TEST PITS

Protecting existing utilities is the Contractor's responsibility and any test pits performed to protect the existing utilities shall be incidental to the work and no separate payment shall be made for that purpose.

13. BYPASS PUMPING/TEMPORARY FLOW DIVERSION/DEWATERING

The Contractor shall utilize temporary pumps to divert storm flows during construction as required. All equipment used for these purposes shall comply with the requirements of the Arlington County Noise Ordinance. The Contractor shall be responsible for the installation, operation, and removal of the temporary pumps. The Contractor shall be responsible for utilizing pumps sufficient to bypass the normal flow and dewater the work area.

The Contractor shall furnish, install, operate and maintain all sumps, pumps, casings, wellpoints, dewatering device, portable dams/barriers and other equipment needed to perform the temporary flow diversion and dewatering of the construction site as needed for proper execution of the construction work.

The Contractor shall furnish to the County in writing, a plan for diverting flows and removal of water from the work area before beginning the construction work. Acceptance of this plan will not relieve the Contractor of responsibility for completing the work as specified.

Bypass pumping of stream flows shall be in accordance with Supplemental Specification 01501.

14. TREE PROTECTION AND TRIMMING

Minimizing damage to existing trees is essential. The critical root zone of existing trees is shown on the Construction Plans. Construction within the critical root zone of trees to remain requires root pruning to be performed as shown on the approved Plans in advance of the construction. If roots for trees not marked 'to be removed' on the Construction Plans are found during construction, the Contractor shall notify the Project Officer. The Project Officer shall consult with the Arlington County Urban Forester, then the Project Officer shall determine if additional root pruning is required. The additional root pruning performed by the Contractor shall be considered incidental to the lump sum bid price. Several trees adjacent to the project Limits of Disturbance pose a risk of falling onto neighboring residential structures if disturbed during construction. Special care should be taken to minimize the risk of the trees falling and to prevent worsened conditions during and after construction. The pre-construction condition is to be photographed per Section 9 – Existing Conditions Documentation.

15. STACKED STONE WALL

For the proposed stacked stone walls along both channel banks from the upper end of the project to Cross Vane A (STA 10+00 to 10+39), the Contractor shall submit signed shop drawings, including stability analysis, to the County for approval prior to construction.

16. SUBSTANTIAL COMPLETION AND WARRANTY

The determination of substantial completion will be made by the Project Officer. Landscaping must have been installed and approved and site restoration must be complete, as determined by the Project Officer, for the project to be determined substantially complete. The warranty period will start on the date of substantial completion as determined by the Project Officer.

17. AS-BUILTS

At the end of construction, the Contractor shall submit a field run topographic survey prepared by a licensed professional surveyor in electronic CAD file format. The survey shall include the following at a minimum:

- Surface grading of the area within the LOD (limits of disturbance) with sufficient spot elevations to document the final grades of the stabilized banks and the stream

channel. The spot elevations shall be taken at each grade break and a minimum of 20-foot spacing in areas of continuous grade.

- Invert elevations of the outfall pipes.
- Top and bottom elevations of in-stream structures at the mid-point of the structure. Left and right bank tie-in points or base of wall tie-in points, whichever applicable.

SUPPLEMENTS TO THE DES CONSTRUCTION STANDARDS AND SPECIFICATIONS

SECTION 01500 – TEMPORARY EROSION AND SEDIMENT CONTROL

PART 3 - EXECUTION

PARAGRAPH 3.1 Installation and Maintenance of Erosion and Sediment Controls

Delete

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

Add

3.1.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 shall comply with applicable regulations shall be prepared by the Contractor.

PART 4 - MEASUREMENT AND PAYMENT

Delete PARAGRAPHS 4.1 – 4.4 and add the following:

PARAGRAPH 4.1 Temporary Erosion and Sediment Controls as detailed on the approved plan and as indicated in the bid line item shall be paid per unit cost.

PARAGRAPH 4.2 Unless otherwise specified, no separate payment shall be made by the County for maintenance of erosion and sediment controls or pollution prevention measures specified on an approved plan (including pre-storm checklist and pollution prevention plan), methods, or sequence of work; this work is considered to be a subsidiary obligation to the Contract.

PARAGRAPH 4.3 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, including the pre-storm checklist and pollution prevention plan.

PARAGRAPH 4.4 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.

PARAGRAPH 4.5 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.

PARAGRAPH 4.6 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.

SECTION 02100 – CLEARING AND GRUBBING

PART 1 - GENERAL

PARAGRAPH 1.1 Applicable Standards and Specifications

Add

3.1.F ANSI Z133 Safety Requirements

PART 3 - EXECUTION

PARAGRAPH 3.1 Clearing

Add

3.1.B Stumps shall not be left higher than three (3) inches above ground level. Logs twenty-four (24) inches in diameter and less shall not exceed six (6) feet in length. Logs in excess of 24 inches in diameter shall not exceed four (4) feet in length. No logs shall exceed six (6) feet in length.

3.1.C Tree felling shall be completed under the direction of the Urban Forester.

PARAGRAPH 3.2 Grubbing

Delete

3.2.A The area of grubbing shall be maintained within the limits of disturbance shown on the approved plans. Remove stumps and matted roots to a depth of 24 inches below existing ground surface. Refill excavations made by removal of stumps or roots as specified for backfill in Section 02200.

Add

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3.2.A The Contractor will be responsible for scheduling and coordinating utility marking. The Contractor shall notify Miss Utility when performing stump removal services.

3.2.B Stumps (including root flares) and surface roots within three (3) feet of root flare shall be ground to a depth of eight inches (8") below grade. Access to stumps may be limited at some locations. In the event of said limitations, the Contractor will still be required to complete the work. Stump removal outside the limits of disturbance shall occur only on the Missionhurst property, as shown on Sheet C031.1 (Siltation and Erosion Control Plan) of the approved plans.

3.2.C Chips and residue may be returned to the hole to level the grade. The Contractor shall remove any excess grindings and transport to Arlington County Trades Center Mulching Facility located at, 4300 South 29th Street, Arlington, Virginia 22206, or a County-approved facility by the Contractor for legal disposal.

3.2.D A layer of screened topsoil at least four (4) inches thick shall be placed over the stump area. The area shall be crowned at least two (2) inches above surrounding grade to allow for settling and shall be raked smooth. In no case shall the final grade be any higher than six (6) inches above the surrounding grade. The Contractor shall re-seed the area with certified grass seed approved by the County, and mulch with straw.

3.2.E The Contractor shall restore any turf areas and grades damaged by vehicles or mechanical operations to their original condition.

PARAGRAPH 3.5 Disposal

Add

3.5.D The trunks of felled and stockpiled trees are to be hauled off and disposed of in accordance with the Trash, Recycling, and Care of Premises Ordinance of the Arlington County Code.

PART 4 - MEASUREMENT AND PAYMENT

PARAGRAPH 4.1

Delete

No separate measurement of quantities shall be made for this work. Clearing and grubbing is considered a subsidiary obligation of the contract and, therefore, no separate payment shall be made for this work.

Add

Unless otherwise specified on the project bid sheet, no separate measurement of quantities shall be made for this work. Clearing and grubbing is considered a subsidiary obligation of the contract and, therefore, no separate payment shall be made for this work.

PARAGRAPH 4.2

Delete

The removal of any designated tree smaller than 6" DBH shall be considered clearing and incidental to the WORK. Therefore, no separate payment shall be made for the removal of any tree smaller than 6" DBH.

Add

The measurement of Tree Felling shall be for EACH (by DBH size) and shall include the cost of all labor, materials, equipment, and incidental expenses necessary to complete the work.

PARAGRAPH 4.3

Add

The measurement of Stump Removal/Grinding shall be for INCH of grinding performed and shall include the cost of all labor, materials, equipment, and incidental expenses necessary to complete the work.

PARAGRAPH 4.4

Add

The measurement of Trunk Haul-Off and Disposal shall be for EACH (by DBH size) and shall include the cost of all labor, materials, equipment, and incidental expenses necessary to complete the work.

SECTION 02200 – EARTHWORK

PART 3 - EXECUTION

PARAGRAPH 3.5 Dewatering

Delete

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

Add

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

SECTION 02500 – GRAVITY SEWERS AND APPURTENANCES

PART 4 – MEASUREMENT AND PAYMENT

PARAGRAPH 4.1 Sewer

Delete

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

Add

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

SECTION 02600 - BITUMINOUS ROADWAY PAVEMENTS

PART 4 – MEASUREMENT AND PAYMENT

Delete

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

Add

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

SECTION 02900 - PAVEMENT MARKINGS

PART 3 - EXECUTION

PARAGRAPH 3.2 Provision for Temporary Markings

Add

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

PART 4 - MEASUREMENT AND PAYMENT

PARAGRAPH 4.4 Removal/Eradication of Existing Pavement Markings

Delete

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

Add

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

Add

PARAGRAPH 4.5 Pavement Message Marking

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

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

SECTION 329100 - PLANTING PREPARATION

PART 4 - MEASUREMENT AND PAYMENT

Add

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

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

SECTION 01501 - PUMP AROUND DIVERSION

PART 1 - GENERAL

1.1 Description of Work

- A. This work consists of furnishing and installing Pump Around Diversion and all materials, labor, and equipment required for the installation, maintenance, and removal of the Pump Around Diversion.
- B. The work includes:
 - 1. Control of surface water runoff to prevent flooding of excavations, trenches, and adjacent properties, and the saturation and loosening of soils.
 - 2. Removal of subsurface water from excavations and trenches.
 - 3. Provision of equipment and facilities to remove sediment and control the rates and volumes of disposal of surface and subsurface waters removed from the work areas.
 - 4. Provisions for the protection of adjacent and down gradient properties and environmental resources.

PART 2 - PRODUCTS

2.1 The following materials are acceptable for use in pump around diversions:

- A. Diesel Pump
- B. Sump Pit
- C. Sandbags
- D. Filter Bags
- E. Other materials deemed acceptable by the Project Officer

PART 3 - EXECUTION

3.1 The Contractor shall design the dewatering systems to:

- A. Effectively reduce the hydrostatic pressure and lower the groundwater levels to a minimum of 2 feet below the bottom of excavations;
- B. Develop a substantially dry and stable sub grade for the proposed work;

- C. Prevent damage to adjacent properties, buildings, structures, utilities and other facilities;
- D. Ensure that, after 12 hours of initial pumping, no soil particles will be present in the discharge;
- E. Retain all sediments on-site within the work area;
- F. Locate dewatering facilities where they will not interfere with utilities and construction work to be done by others; and
- G. Modify dewatering equipment and procedures when operations threaten to cause damage to new or existing facilities or adjacent areas not within the Limits of Disturbance.

3.2 The Contractor shall control surface water to:

- A. Intercept and divert surface water runoff away from excavations through the use of dikes, curbing, walls, ditches, pipes, sumps or other approved means;
- B. Provide and maintain ditches of adequate size to collect and prevent surface and subsurface water seepage from entering the excavations; and
- C. Divert the water to settling basins or other approved equipment required to reduce the amount of fine particles before discharge into drainage pipes and natural water courses.

3.3 The Contractor shall dewater excavated areas to:

- A. Perform dewatering operations to lower the groundwater level in excavations as required to provide a stable, dry sub grade for the prosecution of the proposed work;
- B. Maintain dewatering operations in a manner that prevents buildup of excessive hydrostatic pressure and damage to structures and the sub grade;
- C. Not allow water to accumulate in excavations. Contractor shall provide and maintain ample means and devices to remove promptly, and to dispose of properly, all water entering excavations and to keep them dry until the proposed work is completed; and
- D. Not discharge water to protected environmental resources without treatment to remove suspended solids and sediments.

3.4 No pipe shall be laid in water. No masonry shall be laid in water, and no water shall be allowed to inundate new concrete and new brick masonry within 48 hours after installation. Contractor shall constantly guard against the possibility of flotation of pipe or structures after installation. Backfill or other means shall be placed promptly to prevent this occurrence. If a drainage system or water course is silted or becomes blocked due to dewatering operation, it shall be cleaned by the Contractor at no additional cost to the Owner. Any enforcement actions or fines resulting

from improper dewatering and/or discharge of turbid water and sediment to protected areas shall be the sole responsibility of the Contractor.

- 3.5 Any areas where dewatering equipment was operated along with ditches and settling basins shall be restored to existing conditions.

PART 4 - MEASUREMENT AND PAYMENT

- 4.1 All work completed under this section will be measured and paid for per each Pump Around Diversion. This work includes all materials, labor, and equipment required by the above specification.

- 4.2 Payment will be made under:

Pay Item	Pay Unit
01501 Pump Around Diversion	PER DAY (DAY)

END OF SECTION 01501

SECTION 01520 - EXISTING CONDITIONS DOCUMENTATION

PART 1 - GENERAL

- 1.1 Recording video footage of the existing site conditions within the limits of disturbance and of existing roads, entrances, gates, and vegetation prior to the start of construction by the Contractor is highly recommended to document the condition of the site and prevent claim of damages not incurred by the Contractor.
- 1.2 If recording video footage is not possible, the Contractor is required to take photographs at 50-foot intervals looking downstream at the stream channel. Photographs shall be taken from the middle of the stream and photos will capture the left and right banks.
- 1.3 Video or photograph submittals by the Contractor to the County shall follow the criteria outlined in Section 01330.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

PART 4 - MEASUREMENT AND PAYMENT

- 4.1 There will be no direct payment for Video Existing Conditions. Work and materials for Existing Conditions Documentation will not be paid separately but will be considered incidental to 01550 Mobilization.

END OF SECTION 01520

SECTION 02221 - IMPORTED STREAM BED MATERIAL

PART 1 - GENERAL

1.1 Description of Work

- A. This work consists of constructing the Imported Stream Bed Material with imported stone in the sections of channel as indicated on the plans. Stream bed material is installed once channel excavation is complete and adjacent step pool and stacked stone wall structures are constructed.

PART 2 - PRODUCTS

2.1 Imported material shall meet the following grain size distribution:

	Min	Max	Min	Max
	(mm)	(mm)	(in)	(in)
D16	25	50	1	2
D35	76	102	3	4
D50	203	254	8	10
D84	356	406	14	16

- 2.2 Cobble-Gravel void ratio is estimated at over 20%. Therefore, Coarse Sand and Bank Run Gravel shall be added to the imported Cobble-Gravel-Sand material prior to placement in the stream reach. See construction specifications for details relative to mixing, placing, and compacting stream bed material.

Material Composition

Material	Size	Quantity (Volume)	Percent
Coarse Sand	0.04-0.08" (1-2 mm)	0.75 bucket	7-12%
Bank Run Gravel	0.08-2.5" (2-64 mm)	2 buckets	35-40%
Rock/Cobble	Well Graded 8-12"	2 buckets	35-40%
Rock/Boulder	12-16"	0.5 bucket	12-17%

- 2.3 The above material table is for general information only and may vary in product name and size depending on availability and supplier. Contractor should provide the supplier with the material

size distribution matrix so the supplier may evaluate what combination of currently available products will meet the specified distribution.

PART 3 - EXECUTION

- 3.1 Imported Stream Bed Material shall be constructed according to the Construction Details and Stream Typical Sections Detail shown on the approved plans, or as directed by the Project Officer in the field.
- 3.2 No bedding shall be placed until foundation preparation is completed and has been inspected and approved by the Project Officer.
- 3.3 The cobble/gravel/sand mixture shall be placed and spread uniformly and neatly in one horizontal layer on the prepared sub-grade surfaces as indicated in the Stream Typical Section Detail to achieve the proposed stream profile.
- 3.4 The bedding layer shall be compacted by at least 4 passes, over the entire surface, of the track of a crawler-type tractor weighing not less than 8 tons or an equivalent method approved by the Project Officer.

PART 4 - MEASUREMENT AND PAYMENT

- 4.1 Imported Stream Bed Material shall be paid per quantity of stone installed and accepted by the Project Officer. Such price and payment shall be full compensation for the items of work, including the cost for furnishing all materials, labor, equipment, tools, and incidentals required by the above specification.
- 4.2 Payment will be made under:

Pay Item	Pay Unit
02221 Imported Stream Bed Material	TON

END OF SECTION 02221

SECTION 02223 - ROCK CROSS VANES

PART 1 - GENERAL

1.1 Description of Work

- A. This work consists of constructing Rock Cross Vanes. Rock Cross Vanes are in-stream flow structures primarily used for grade control, reducing near bank shear stresses, and providing habitat at locations designated on the plans to diversify the low flow path. The rock structures extend across the entire streambed and tie into both banks. Pools are excavated below the rock structures, and the streambed upstream and downstream of the rocks are lined with imported riffle bed material.

PART 2 - PRODUCTS

2.1 Stone/Rock and Gravel shall conform to the following requirements:

- A. Boulders for rock step pools shall be imported imbricated riprap.
- B. Footer rocks consist of rocks placed below the invert of the proposed channel to provide support for the Vane Rocks and prevent excessive downstream scour.
- C. Top Vane rocks that form the finished grade consist of rocks placed upon Footer Rocks. Top Vane Rocks shall not be larger than Footer Rocks.
- D. Rock dimensions shall fall within the dimensions shown in the Construction Details as follows: 3-6' length, 2-4' width, and 1'-2.5' depth. Of the rock supply, the larger rocks shall be used for Footer Rocks with the following dimensions: 4-6' length, 3-4' width, and 1.5-2.5' depth. The smaller rocks shall be used for the Top Vane Rocks and shall have the following dimensions: 3-5' length, 2-3.5' width, and 1-2' depth.
- E. Poorly Graded Gravel – Gravel for backfilling and “choking” shall be a poorly graded gravel mix consisting of river run sand, and gravel-cobble material that meets the gradation requirements indicated in the Imported Streambed Material Gradation Table. The source of gravel material and samples shall be provided to the Project Officer for review and approval prior to commencing construction operations. Installation shall be in accordance with the Contract Documents and these specifications and as directed by the Project Officer.
- F. All filter fabric installed as part of the Rock Cross Vanes shall be a non-woven fabric.

PART 3 - EXECUTION

- 3.1 Rock Cross Vanes shall be constructed according to the Rock Cross Vane Detail shown on the plans or as directed by the Project Officer. The elevation tolerance for in-stream structures will be +/-0.1ft of design elevations. Footer rocks used in in-stream structures shall extend inward toward the center of the channel, past the header rocks so that the footers act as a splash rock.
- 3.2 The Rock Cross Vanes shall be constructed in a manner such that adjoining rocks taper up in elevation towards the stream bank in a downstream direction. Each side or arm of the structure has a horizontal departure angle from the stream bank (from the stream bank toward mid-channel), which ranges from 12 to 30 degrees as specified in the Construction Details.
- 3.3 A trench shall be excavated for the structure. The width of excavation in the direction of flow shall be a minimum of one foot wider than the structure. After the footer rocks are placed in the downstream edge of the trench, the trench shall be backfilled to the proposed invert with the specified gravel mix.
- 3.4 Top rocks shall be placed so that they lean on the footer rocks and fit snugly together in a puzzle-like fashion. Care should be taken when placing top rocks that the seams between top rocks do not line up with the seams between the footer rocks. The top elevation of the rocks placed at the thalweg (deepest portion of the stream) shall be equal to the elevation of the thalweg +/- 0.1ft.
- 3.5 The outermost top rock of the Rock Cross Vanes shall be installed with at least one half (1/2) the diameter of the end top rock buried into the stream bank.
- 3.6 Permanent Erosion Control Coir Matting shall be keyed in between the top rock on the bank and the rock immediately below it, then folded behind and temporarily overtop the top vane rock. Reshape the upper bank slopes to specified elevations and fold the matting over the face of the slope. Key the matting back into the bank a minimum of one foot deep at the top of bank.

PART 4 - MEASUREMENT AND PAYMENT

- 4.1 Such price and payment shall be full compensation for the items of work, including the cost for furnishing all materials, labor, equipment, tools, and incidentals required by the above specification.
- 4.2 Rock Cross Vanes shall be paid per quantity of stone installed for each structure and accepted by the Project Officer in the field.

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4.3 Payment will be made under:

Pay Item	Pay Unit
02223 Rock Cross Vanes	TON

END OF SECTION 02223

SECTION 02227 - STACKED STONE

PART 1 - GENERAL

1.1 Description of Work

- A. This work consists of constructing the Stacked Stone wall at various locations along the left and right banks. The Stacked Stone wall will serve as toe and bank stabilization.

PART 2 - PRODUCTS

2.1 Stone/Rock and Gravel shall conform to the following requirements:

- A. Boulders for Stacked Stone wall shall be imbricated stone boulders meeting the following dimensions: 3'-6' length, 2'-4' width, and 1'-2.5' depth.
- B. #57 Gravel Backfill Material.
- C. Non-woven Filter Fabric.
- D. Topsoil as specified under Section 329100 Planting Preparation.

PART 3 - EXECUTION

- 3.1 Stacked Stone wall shall be constructed according to the Stacked Stone wall detail shown on the plans or as directed by the Project Officer. The elevation tolerance for the wall will be +/- 0.1 ft of design elevations. Footer rocks used in in-stream structures shall extend inward toward the center of the channel, past the header rocks.
- 3.2 A trench shall be excavated for the structure. The width of excavation shall be a minimum of one foot wider than the structure. After the footer rocks are placed in the trench, the trench shall be backfilled to the proposed invert with the specified gravel mix.
- 3.3 Permanent Erosion Control Coir Matting shall be keyed into the top of the bank and placed along the stable cut/backfill face. Shape the slope to specified elevations and fold the matting over the face of the slope. Key the matting back into the bank a minimum of one foot deep at the top of bank.

- 3.4 Place header rocks such that the upstream and downstream end stones are flush with the stream bank. Backfill (#57 stone) shall be placed and tamped behind the header stone and along the fabric draped on the cut/backfill slope. Repeat the header stone and backfill installation procedure until design height as shown on the Construction Plans.
- 3.5 A minimum of 18-inches of topsoil as specified under Section 329100 Planting Preparation shall be placed along the top of the bank behind the top header rock.

PART 4 - MEASUREMENT AND PAYMENT

- 4.1 The Stacked Stone wall shall be paid per quantity of stone installed for each wall structure and accepted by the Project Officer in the field.
- 4.2 Such price and payment shall be full compensation for the items of work, including the cost for furnishing all materials, labor, equipment, tools, and incidentals required by the above specification.
- 4.3 Payment will be made under:

Pay Item	Pay Unit
02227 Stacked Stone	TON

END OF SECTION 02227

SECTION 02228 - PERMANENT EROSION CONTROL COIR MATTING

PART 1 - GENERAL

1.1 Description of Work

- A. This work consists of permanently stabilizing channel banks and floodplain areas with erosion control coir matting.

1.2 Related Work Specified Elsewhere

- A. Section 02802 – Live Stakes

PART 2 - PRODUCTS

2.1 Permanent erosion control coir matting shall be machine-produced mat made of 100% coconut fiber and shall provide at least the same tractive force and velocity rating as VDOT EC-3 Type 1 erosion control matting.

2.2 Stakes used to secure fabric will be wooden stakes 12 inches in length with a square cross-section of 2 inches by 2 inches, with a notch cut 1 inch from the top or a 6-inch nail driven through the top. No metal stakes will be accepted.

PART 3 - EXECUTION

3.1 The Contractor will install permanent erosion control coir matting in locations and to the widths and lengths as shown on the plans and details or as directed. Fabric overlap at seams will be a minimum of three (3) feet. Fabric will be overlapped so that the upstream mat end is on top of the downstream mat start. Stakes will secure fabric at three (3) foot spacing on the overlapping seams. Mat will be installed in a six (6) inch deep trench at the toe of slope and at the top of slope as shown in the details. Mat will be dry when installed. Mat will be installed to lie on slopes not too loosely but not in tension.

3.2 Prior to mat placement, proposed grades shall be achieved and no voids will occur in the slope. The area will be treated with fertilizer, soil amendments, and or seeding as specified in the

approved plans and Sections 329100 Planting Preparation and 329200 Seeding and Sodding. Straw mulch will be used to cover the finished grade to achieve 60% coverage on the soil.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Permanent erosion control coir matting will be measured and paid for in square yards measured along the surface of the ground over erosion control mat that has been acceptably placed. No separate measurement will be made for overlapping fabric at seams or for material required for trenching at toe and top of slope.

4.2 Such price and payment will be full compensation for all work covered by this section, including but not limited to all labor, machinery, maintenance, hauling, preparation, and installation to complete the work in an acceptable manner. Wooden stakes will be considered incidental to permanent erosion control coir matting installation.

4.3 Payment will be made under:

Pay Item	Pay Unit
02228 Permanent Erosion Control Coir Matting	Square Yard (SY)

END OF SECTION 02228

SECTION 02802 - LIVE STAKES

PART 1 - GENERAL

1.1 Description of Work

- A. This work consists of furnishing and installing live stakes on stream banks and other areas as applicable to the plans and details. Live staking is a standard bioengineering technique which involves planting of dormant plant cuttings using species known to produce roots from cuttings.
- B. The quantity of live stakes to be installed will be affected by the actual conditions that occur during the construction of the project. The quantity of live stakes may be increased, decreased, or eliminated entirely as directed. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of the work.

1.2 Related Work Specified Elsewhere

- A. Section 02100 - Clearing and Grubbing
- B. Section 02228 – Permanent Erosion Control Coir Matting
- C. Section 329100 – Planting Preparation
- D. Section 329200 – Seeding and Sodding
- E. Section 329300 – Exterior Plants

1.3 Submittals

- A. In accordance with Section 329300 – Exterior Plants.

PART 2 - PRODUCTS

- 2.1 Live stake cuttings shall be approximately three quarters of an inch to one and a half inches (0.75" to 1.5") in diameter. Cuttings shall not exceed two inches (2") in diameter and shall not be less than 0.5" in diameter. Cuttings shall be three feet (3') in length minimum and reasonably straight.
- 2.2 Live stakes shall be cut at a 45° angle at the basal end and cut flat on the top end. The basal end is the end that will take root and will be the end installed in the ground.

- 2.3 Plant material with excessive damage or oblique cuts, or with excessive damage to the bark, will not be acceptable. All live materials shall be properly stored to insure viability.

PART 3 - EXECUTION

3.1 Protection of Plant Materials

- A. Contractors shall protect plant materials from drying and overheating during transport and during the installation process.
- B. Live plant material shall receive continuous shade and well as protection from the wind. Shade fabric, heeling, mulches, plastic, and watering are all techniques that may be used.

3.2 Installation

- A. Installation locations shall be determined in the field and approved by the Project Officer and Urban Forester.
- B. Live stake harvesting and installation shall occur during the growing season as determined by local NRCS WETS data. Using the published growing season dates for a local WETS station, the growing season will be defined as that period of time with a 50% probability that the average daily temperature is less than 28 degrees, based on historic weather data.
- C. Live stakes shall be installed according to the Planting Summary Notes and Details. The top end of the stake will protrude approximately 3" above the finished ground elevation. On sloped ground surfaces, stakes will be installed perpendicular to the finished grade slope.
- D. The Live Stakes/Posts shall be placed so that 80% of their length is buried. Side branches shall be removed and the bark left intact prior to installation. Buds on the stake shall be oriented in an upward position. All live stakes shall be planted such that the stake is tamped and has full contact between the soil and cutting. In the event of hard ground, a 0.5" metal bar may be used to initiate a pilot hole for live stakes. The rod must be carefully removed without rotating to enlarge the hole.
- E. Live Stake/Posts shall be installed at the spacing and density as shown in the project drawings or as directed by the Project Officer. Typical spacing for Live Stakes will be 2'-3' apart using a diamond-pattern spacing.
- F. Live stakes should not be split during installation. Live stakes which are split shall be removed and replaced, or if the split is less than 1/6 of the cutting length, the top may be re-trimmed after installation to remove the damaged portion.

3.3 Warranty

- A. Contractor shall maintain, inspect, and replace plants in accordance with this Section and Section 329300 Exterior Plants.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Live stakes will be measured and paid for at the unit price per stem. Such payment shall be considered full compensation for the item of work, including the cost for furnishing all materials, labor, equipment, incidentals, storage, preparation, and planting of the live stakes.

4.2 Payment will be made under:

Pay Item	Pay Unit
02802 Live Stakes	Stems (EA)

END OF SECTION 02802