

TOWN OF KILMARNOCK OUTFALL REMEDICATION & STREAM RESTORATION

TECHNICAL SPECIFICATIONS

Town of Kilmarnock

Prepared For:

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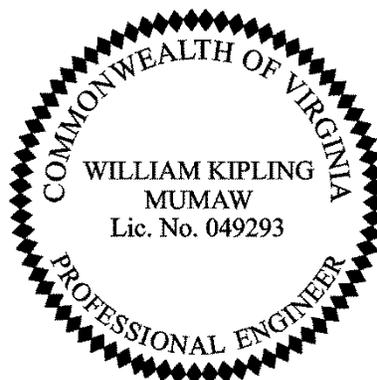


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SECTION 1: SITE PREPARATION

SPECIAL PROVISION 1: MOBILIZATION

1. DESCRIPTION

Mobilization shall consist of furnishing, transporting, and stockpiling of all materials for assembling and setting up for the project's operations. Mobilization shall include all activities and associated costs for transportation of Contractor's personnel, equipment, and operating supplies to the site; establishment of offices, buildings, staging areas, stockpiling areas and other necessary general facilities for the Contractor's operations at the site; including coinsurance and reinsurance agreements as applicable; and other items specified.

Mobilization shall include sanitary facilities. The Contractor shall furnish and install temporary sanitary facilities for use throughout the construction period. This includes containers to dispense drinking water, enclosed toilet facilities and general washing facilities for construction personnel, which complies with OSHA safety and health regulations for these facilities. Appropriate sanitary facilities are to be established within the project site. Mobilization shall include all activities and costs for demobilization as well including transportation of personnel, equipment, and supplies not required or included in the contract from the site in addition to disassembly, removal and site cleanup.

2. MEASUREMENT AND PAYMENT

Mobilization shall be measured and paid for as a lump sum (LS) item. This price shall include demobilization. No additional payment will be made for demobilization and remobilization because of shutdowns, suspensions of work, or other mobilization activities.

Fifty percent (50%) of the mobilization will be paid on the initial movement of equipment and personnel. Another 25% will be paid midway through the project. The last 25% will be paid at completion of demobilization.

SPECIAL PROVISION 2: CONSTRUCTION STAKEOUT

1. DESCRIPTION

Construction stakeout survey shall include but not be limited to setting the construction baseline staking the proposed channel centerline (PT, PC, and radius of curvature), staking of structures, and any other survey incidental to construction or as directed by the Town of Kilmarnock. At a minimum, the Contractor is responsible for:

- All construction staking, including point of tangency, point of curvature, radius point and limits of construction.

- Layout and maintenance of a construction baseline that is offset from the project.
- Staking all horizontal centerline control, elevation benchmarks, and structure location and elevation.
- Limits of disturbance and critical areas.
- Benchmarks shall be set and preserved.

2. MEASUREMENT AND PAYMENT

Construction Stakeout shall be measured and paid for as a lump sum (LS) item. The payment will be full compensation for furnishing, placing, and maintaining construction stakeout necessary to complete the work.

SECTION 2: SITE MAINTENANCE

SPECIAL PROVISION 3: PHOTOGRAPHIC DOCUMENTATION

1. DESCRIPTION

Photographic requirements for photographic documentation of construction and their required submittals. At a minimum, the Construction Oversight Consultant is responsible for:

- Submit photographs taken prior to start of construction to show original site conditions.
- Submit color progress photographs in a digital format (JPEG, JPG, BMP, or TIFF file types) with each payment application. Progress photos are to be taken no more than seven (7) days before inclusion with payment application. Files shall be labeled in such a way so as to easily determine the date taken. Photos should be submitted on a clearly labeled CD or DVD, or other digital media approved by the Town of Kilmarnock.

2. EXECUTION

A. Preconstruction Photographs

- Prior to commencement of any construction, take color photographs of entire limits of project and streets proposed to detour traffic or where construction traffic will ingress/egress the project site. Present digital copy to the Town of Kilmarnock for use in contract administration and inspection.
- Take sufficient number of photographs to show structural condition of concrete/asphalt and conditions of existing trees, shrubs, and grass. Fully document conditions of adjacent features such as driveway entrances, sidewalks, gardens, etc.

B. Progress Photographs

- Progress photos need only be taken in disturbed or active areas of construction.

C. Post-construction Photographs

- Upon final stabilization, but prior to project close-out, take color photographs of all features originally documented in item A.
- Document any changes evident in photographs that represent damage or concerns to adjacent property and provide to the Town of Kilmarnock.
- Contractor shall be responsible for repair or replacement of damaged structures or property.

3. MEASUREMENT AND PAYMENT

Payment is included in the cost of construction administration to the Consultant.

SPECIAL PROVISION 4: EROSION & SEDIMENT CONTROL

1. DESCRIPTION

The Contractor shall submit a Erosion and Sediment Control (ESC) Plan for review and approval and perform all work in accordance with the ESC Plan. No Construction General Permit Registration will be required for this linear development project.

2. MEASUREMENT AND PAYMENT

Erosion and Sediment Control will be measured for payment on a linear foot (LF) basis for silt fence and orange safety fence, and per each (EA) for construction entrances. Pump around practice will be measured and paid for by the Stream Flow Maintenance Special provision. The payment will be full compensation for furnishing, installing, maintaining and removing all erosion and sediment control measures shown on the plans, including all materials, labor, equipment, tools, and incidentals necessary to complete the work as specified in the Construction Drawings, or as directed by the Town of Kilmarnock.

SPECIAL PROVISION 5: POLLUTION PREVENTION

1. DESCRIPTION

The Contractor shall submit a Stormwater Pollution Prevention Plan (SWPPP) for review and approval and shall perform all work in accordance with the approved Stormwater Pollution Prevention Plan (SWPPP). The SWPPP shall be maintained throughout construction in accordance with the Construction General Permit and Virginia Stormwater Management Program (VSMP) Regulation (9VAC25-870).

SPECIAL PROVISION 6: MULCH ACCESS PATH

1. DESCRIPTION

This work shall consist of the installation of a mulch access paths in areas specified in the Construction Drawings, or as directed by the Town of Kilmarnock. The primary purpose is to minimize disturbance to existing ground, and surrounding residential landscaped areas.

2. MATERIALS

Shredded Hardwood Mulch - Shall consist of natural wood and bark from hardwood trees that has been milled and screened to a maximum 4 in. particle size.

3. CONSTRUCTION

A. Installation

1. The mulch access path shall be a minimum of 10-foot wide and 6 inches in depth. These dimensions shall be maintained throughout the duration of the project.
2. Upon completion of construction activities, mulched access paths will be removed or abandoned in place as directed.

B. Clean-up

1. During installation of mulch paths, all areas shall be kept neat, clean and free of all trash and debris, and all reasonable precautions shall be taken to avoid damage to existing plants, turf, structures, and private property.
2. The Contractor shall be responsible for onsite and/or offsite removal of mulch during final stabilization and close-out of project.

4. MEASUREMENT AND PAYMENT

Much access paths shall be measured and paid for as a lump sum (LS) item. The payment will be full compensation for the installation, maintenance, and removal of the mulch as shown on the plans, including all materials, labor, equipment, tools, stockpiling and incidentals necessary to complete the work as specified in the Construction Drawings, or as directed by the Town of Kilmarnock.

SPECIAL PROVISION 7: STREAMFLOW MAINTENANCE

1. DESCRIPTION

This work shall consist of furnishing, installing, maintaining and removing any and all equipment and materials to conduct pump around and dewatering operations used on this project. The Contractor shall install a pump around system in select locations as tentatively shown on plans and approved by the Town of Kilmarnock. The pump around system shall dewater the channel being constructed. The number of pump arounds may be increased, decreased, or eliminated. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of the work.

2. MEASUREMENT AND PAYMENT

Stream Flow Maintenance (also referred to as pump around practice) shall be measured and paid for as a lump sum (LS) item. The payment will be full compensation for installing and maintaining stream flow maintenance. Payment shall include sand bags, geotextile fabric, pumps, hoses, and any other materials, labor, equipment, tools, stockpiling and incidentals necessary to complete the work as specified in the Construction Drawings, or as directed by the Town of Kilmarnock.

SECTION 3: STREAM CONSTRUCTION

SPECIAL PROVISION 8: EARTHWORK

1. DESCRIPTION

Earthwork shall consist of performing all operations necessary to excavate and transport all cut & fill material, process material as required, deposit, place, and compact material in accordance with the grades as shown on the plans or as directed by the Town of Kilmarnock. Such earthwork shall include the loosening, removing, loading, transporting, stockpiling, depositing, and compacting of all materials (including topsoil) wet and dry, as required for the purposes of completing the work. Earthwork also includes the offsite disposal of excess cut material that does not meet the criteria of fill material as specified below.

2. MATERIALS

- A. Excavated material shall consist of material excavated within the limits of the project. It is assumed that this material will not meet the criteria below for suitable fill therefore will be hauled off to an approved disposal site at the expense of the Contractor. If excavated material meets the criteria specified below for fill material then it shall be stockpiled and used as necessary in conjunction with furnished fill material.
- B. Furnished fill material shall consist of material used to raise the site elevations to those specified in the grading plan. If sufficient satisfactory soil materials for use as earth fill are not available from onsite excavations, it shall be the Contractor's responsibility to provide suitable earth fill material. Soils sufficient for use as earth fill include ASTM D 2487 Soil Classification Groups GW, GP, GM, GC, SW, SP, SM, and SC, or combination of these groups or as approved by the Town of Kilmarnock. Earth fill shall be free of debris, waste, frozen materials, vegetation, invasive species, pathogens, and any other deleterious matter.
- C. Class A topsoil – See Special Provision 18 – Topsoil
- D. Class B topsoil – See Special Provision 18 - Topsoil

3. CONSTRUCTION

- A. Existing elevations and grades may have changed since the original survey was completed due to erosion, sediment accretion, or fill. It is the Contractor's responsibility to confirm existing grades and adjust earthwork as necessary at no additional cost to the Town of Kilmarnock.
- B. All erosion and sediment control devices shall be in place prior to commencement of earthwork activities.
- C. All excess material shall be removed from the site and disposed of at a properly permitted disposal site at the expense of the Contractor. The alternate bid deduction consists of the Contractor hauling excess material to the Owner's facility located at 655 Wades Lane and

dumping excess material in a location identified by the Owner.

4. MEASUREMENT AND PAYMENT

Earthwork will be paid for as a lump sum (LS) item. The Contractor shall be paid in full compensation for all earthwork required to install the measures in accordance with the plans and specifications, including but not limited to accessing the site, light bank grading, channel bank excavation, over excavating unsuitable materials, placing and compacting select material, backfilling undercut areas, channel bank sloping, hauling of suitable excavated material to locations within the project limits for use, hauling of suitable or unsuitable excavated material to a satisfactory off-site location for disposal.

SPECIAL PROVISION 9: COIR FIBER MATTING

1. DESCRIPTION

This work shall consist of furnishing, transporting, maintaining, stockpiling and properly installing coir fiber matting (secured with biodegradable stakes) on all stream bank slopes which will not receive additional stabilization techniques and at other locations designated in the Construction Drawings, or as directed by the Town of Kilmarnock.

2. MATERIALS

Coir fiber matting for both stream bank grading and soil lifts shall meet the specifications shown in the construction plans. Biodegradable stakes used to secure coir matting shall be made of native hardwood species and meet the specifications shown in the construction plans. Source of coir fiber matting and stakes shall be submitted to the Town of Kilmarnock for review and approval prior to beginning construction. Installation shall be in accordance with the Construction Drawings, or as directed by the Town of Kilmarnock.

3. CONSTRUCTION

- A. The Contractor shall place coir fiber matting along the stream edge as shown in the Construction Documents or as directed by the Town of Kilmarnock. The coir fiber matting shall be unrolled along the top of bank and across the full width of any bankfull or low flow benches, if present. Matting shall be placed in full contact with the soil. All exterior edges (those edges not overlapping with an adjacent coir fiber matting roll) shall be "keyed" into the ground a minimum of 6 inches in such a way that a seamless grade is created (no humps or bulges in fabric will be permitted).
- B. Coir fiber matting edges (matting installed side by side at any given elevation) shall be overlapped a minimum of 6 inches and staked down using biodegradable stakes at 2 foot on center.
- C. Coir fiber matting ends (where upstream roll abuts downstream roll) shall be placed such that the upstream roll overlaps the downstream roll a minimum of 6 inches and staked down using biodegradable stakes at 2 foot on center.

- D. Coir fiber matting ends (matting installed where ends of matting abut in-stream structures) shall be 'keyed-in' a minimum of 6 inches in such a way that a seamless grade, or transition, is created. (No humps or bulges will be accepted.) These edge areas shall be staked as specified on Construction Drawings.

4. MEASUREMENT AND PAYMENT

Coir Fiber Matting, including biodegradable stakes, shall be measured and paid for as a lump sum (LS) item. Payment for coir fiber matting shall be full compensation for furnishing, transporting, maintaining, stockpiling, and properly installing all materials, labor, equipment, tools and incidentals necessary to complete the work as specified in the Construction Drawings, or as directed by the Town of Kilmarnock.

SPECIAL PROVISION 10: GEOTEXTILE FABRIC

1. DESCRIPTION

This work shall consist of furnishing, transporting, maintaining, stockpiling, and properly installing geotextile fabric in the stream channel as specified in the Construction Drawings, or as directed by the Town of Kilmarnock.

2. MATERIALS

Geotextile fabric shall be Class D non-woven polypropylene geotextile. The fabric shall have a typical weight of 8 oz/sy (ASTM D-5261), apparent maximum opening size of 0.212 mm (ASTM D4751), minimum grab tensile strength of 120 lbs. (ASTM D-4632), and minimum puncture strength of 65 lbs. (ASTM D-4833). Specifications are also shown on plans.

3. MEASUREMENT AND PAYMENT

Geotextile fabric shall not be measured but shall be incidental to the materials used in the construction and installation of the Step Pool/Cascade and J-hook structures.

SPECIAL PROVISION 11: STREAM BED MATERIAL

1. DESCRIPTION

This work shall consist of furnishing, transporting, stockpiling, maintaining and placing stream bed material to be utilized for construction of the proposed channel and protection of in-stream structures and at other locations as specified in the Construction Drawings or as directed by the Town of Kilmarnock.

2. MATERIALS

- A. Stream bed material shall consist of natural field rock or natural river rock or crushed rock. The stream bed material shall be sound, tough, dense, resistant to the action of air and water, and suitable in all respects for the purpose intended.

- B. Source of stream bed material shall be from an approved mining operation with up-to-date regulatory permits. Stream bed material shall NOT be indiscriminately mined from active streams and rivers.
- C. Stream bed material shall be a mixture that matches as closely as possible the gradation provided in the construction plans.
- D. Samples of stream bed material shall be reviewed and approved by the Town of Kilmarnock (in consultation with Consultant) from the Contractor's selected source, prior to its use in the project. Any unsuitable material brought onsite shall be removed at the Contractor's expense.

3. CONSTRUCTION

The Contractor shall install stream bed material to a minimum depth of 12 inches in restored areas as specified in the Construction Drawings, and as directed by the Town of Kilmarnock.

4. MEASUREMENT AND PAYMENT

Streambed Material shall not be measured but shall be incidental to the materials used in the construction and installation of the Step Pool/Cascade and J-hook structures.

SPECIAL PROVISION 12: BOULDER MATERIAL

1. DESCRIPTION

This work shall consist of furnishing, transporting, stockpiling, maintaining and placing of rock for cascade/steps, J-hook, and other structures as specified in the Construction Drawings, or as directed by the Town of Kilmarnock.

2. MATERIALS

- A. Rock shall consist of angular flat rock of appropriate color (e.g., green/gray, brown/gray, dark gray, and/or dark brown in color) obtained from an approved source. Rock shall NOT be harvested from streams or rivers outside a commercial quarry operation. All rock shall be free from laminations, weak cleavages and shall not disintegrate from the action of air, salt water and in handling and placing. Granular sedimentary rock shall generally be unacceptable. Concrete shall not be considered as an alternative for rock. White rock is not acceptable.
- B. Rock sizes shall be as specified in the Construction Drawings for cascade/step pools, J-hooks, cross vane and other structures. Rock sizes are shown in the table below.
- C. The rock shall have a minimum unit weight of 160 pounds per cubic foot and meet the dimensions specified in the construction plans.

- D. The Contractor shall obtain from the quarry and submit to the Town of Kilmarnock a certificate verifying the following – 1) Rock, 2) Classification, 3) Weight per cubic foot, 4) Weight of rock being supplied, and 5) Rock quantity shall meet all the above specifications.
- E. Due to the anticipated quarry preparatory time, and/or demand for the rock as specified in the Construction Drawings, it shall be the Contractor’s responsibility to make all necessary arrangements with the source of supply in a timely fashion, so that the Contractor shall maintain an adequate supply of rock material and that work shall not be unnecessarily delayed due to insufficient supply.

3. CONSTRUCTION

The Contractor shall install boulders as specified in Construction Drawings.

4. MEASUREMENT AND PAYMENT

Boulder Material shall not be measured but shall be incidental to the materials used in the construction and installation of the Step Pool/Cascade and J-hook structures.

SPECIAL PROVISION 13: STEP POOL AND CASCADE STRUCTURE

1. DESCRIPTION

This work shall consist of furnishing, stockpiling, transporting, installing and maintaining step pool and cascade structures within the stream channel, as specified in the Construction Drawings, or as directed by the Town of Kilmarnock.

2. MATERIALS

A. Footer Rock

Footer rock shall meet the specifications for Special Provision 12 - Boulder Material. Footer rock consists of rock placed below the invert of the proposed channel to provide support for the top rock and prevent downstream scour.

B. Top Rock (Header)

Top rock (header rock) shall meet the specifications for Special Provision 12 - Boulder Material. Top rock consists of rock placed upon the footer rock.

C. Geotextile Fabric

Geotextile fabric shall meet the Specifications for Special Provision 10 – Geotextile Fabric and as specified in the Construction Drawings.

D. Stream Bed Material

Stream Bed Material shall meet the specifications of Special Provision 11 - Stream Bed

Material and as specified in the Construction Drawings.

3. CONSTRUCTION

A. Installation

1. The step pool shall be constructed so that rocks perpendicular to the channel taper downstream in an arc formation with the center of the arc set in the thalweg of the stream channel furthest upstream. The top rock set in the thalweg of the stream channel shall be set at the stationing and elevation specified in the Construction Drawings, or as directed by the Town of Kilmarnock.
2. The footer rocks shall be installed by excavating a trench to accommodate both the footer rocks and an additional area upstream.
3. If bedrock is present at the channel invert, footer rock shall still be required unless approval for elimination of footer rock is obtained from the Town of Kilmarnock. For example, where bedrock is friable and weathered and can be trenched, footer rock will be required. In areas where bedrock is resistant and blasting would be required, the Town of Kilmarnock shall determine whether or not to eliminate footer rock.
4. Geotextile fabric shall be placed in the bottom and upstream side of the trench across the entire structure. Footer rocks shall be placed at the bottom and downstream side of the trench so that a minimum of one (1) foot of geotextile fabric lies under the rock. The rocks shall abut one another. The top elevation of the footer rock placed at the centerline of the stream shall be flush with the proposed stream grade immediately below the step structure. Footer rocks shall be firmly embedded into the trench bottom.
5. In the event that other constraints besides bedrock are encountered which prohibit the structure installation to meet design specifications, adjustments/modifications will be considered. This may include reducing the length of the step or eliminating trenching for footer rocks and stream bed material. This decision shall be field determined and authorized by the Town of Kilmarnock in consultation with the Consultant.
6. Top rocks shall be placed tightly together (touching) on top of the footer rocks, but offset slightly upstream (approx. 1/3rd of the rock diameter), as shown in the construction details of the Construction Drawings. Any remaining gaps present between the rocks shall be filled-in ("chinked") with appropriately sized rock. The seams between top rocks shall not line up with the seams between the footer rocks. The top elevation of the top rock placed at the centerline of the stream shall be flush with the proposed stream grade immediately upstream of the step structure. Starting at the thalweg, adjacent rocks shall taper up to the bankfull elevation. The outermost top rocks shall be installed with the rock keyed into the bank and oriented so that the top face is flush with the surrounding proposed grade.
7. The trench behind the top rocks shall be backfilled with stream bed material with the geotextile fabric between the stream bed material and top rocks. The geotextile fabric shall be left so that it is visible above the top rocks until the rocks and stream bed material have been installed and inspected.
8. Stream bed material shall be placed along the entire restored channel upstream and downstream of the top rocks, as specified in the Construction Drawings. In addition to the area behind the header rock (glide portion), stream bed material shall be placed

throughout the bottom of the pool at the design elevation indicated in the Construction Drawings.

9. After inspection, trim the geotextile fabric flush with the top rocks and stream bed material.

4. MEASUREMENT AND BASIS OF PAYMENT

Payment for Step Pool/Cascade structures shall be measured and paid for at the Contract unit price per each (EA) structure. Payment shall be full compensation for the furnishing, transport, stockpiling, and placement, and for all material, labor, equipment, tools and incidentals necessary to complete the work as specified in the Construction Drawings, or as directed by the Town of Kilmarnock. The quantity of material to be installed shall be affected by the actual conditions that occur during the construction of the project. Such variations in quantity shall not be considered as alterations in the details of construction or a change in the character of the work.

SPECIAL PROVISION 14: ROCK J-HOOK

1. DESCRIPTION

This work shall consist of furnishing, stockpiling, transporting, installing and maintaining Rock J-hooks as specified in the Construction Drawings, or as directed by the Town of Kilmarnock. The quantity of Rock J-Hook structures may be increased, decreased, or eliminated entirely at the direction of the Town of Kilmarnock and Consultant. Such variations will not be considered as alterations in the details of construction or a change in the character of the work.

2. MATERIALS

A. Footer Rock

Footer rock shall meet the specifications for Special Provision 12 - Boulder Material. Footer rock consists of rock placed below the invert of the proposed channel to provide support for the top rock and prevent downstream scour.

B. Top Rock (Header)

Top rock (header rock) shall meet the specifications for Special Provision 12 - Boulder Material. Top rock consists of rock placed upon the footer rock.

C. Geotextile Fabric

Geotextile fabric shall meet the Specifications for Special Provision 10 – Geotextile Fabric and as specified in the Construction Drawings.

D. Stream Bed Material

Stream Bed Material shall meet the specifications of Special Provision 11 - Stream Bed Material and as specified in the Construction Drawings.

3. CONSTRUCTION

- A. A trench shall be dug in such a manner that the footer boulders and a minimum of 95 percent of the header boulders area buried beneath the bed surface elevation in locations specified on the Construction Drawings. Refer to the Construction Drawings for exact installation guide and locations of Rock J-Hooks to be installed.
- B. Footer boulders shall be placed first with header boulders placed on top prior to backfilling the trench.
- C. For the vane, boulders shall be selected and positioned such that they butt tightly together and there are multiple contact points between all vane boulders (flat smooth surfaces that fit together).
- D. Geotextile fabric shall be placed on the upstream side of structure to prevent the washout of sediment through boulder gaps. Fabric shall extend from the bottom of footer boulder (minimum of 1 foot fabric underneath of footer) to the finished grade elevation and shall be placed the entire length of the structure. Gaps between boulders shall be filled with Stream Bed material until plugged.
- E. In the center of the channel, the header boulders shall be placed at the bed elevation, while the header boulders on the banks shall be placed at the bankfull elevation. The header boulders slope upward from the center of the channel until it ties into the outside bank as specified by Construction Drawings. Header and footer boulders at the bank shall be fitted securely into the bank in such a way that eliminates the possibility of stream flow diverting around them.
- F. The area between the streambank and the vane on the upstream side of the structure will be backfilled with Stream Bed Material (see specification).
- G. For the J-Hook, a trench shall be dug in such a manner that the footer and a minimum of 70 percent of the header boulders area buried beneath the bed surface elevation. The half of the header boulders shall be set at the channel invert elevation, while the other half shall be exposed above the invert 3-4 inches. Footer boulders shall be placed first with header boulders placed on top prior to backfilling the trench.
- H. The Town of Kilmarnock may adjust the number and placement of structures during construction. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of the work.

4. MEASUREMENT AND PAYMENT

Payment for Rock J-hook structures shall be measured and paid for at the Contract unit

price per each (EA) structure and as specified in the Construction Drawings, or as directed by the Town of Kilmarnock. Payment shall be full compensation for the furnishing, transport, stockpiling, and placement, and for all material, labor, equipment, tools and incidentals necessary to complete the work as specified in the Construction Drawings, or as directed by the Town of Kilmarnock. The quantity of material to be installed shall be affected by the actual conditions that occur during the construction of the project. Such variations in quantity shall not be considered as alterations in the details of construction or a change in the character of the work.

SECTION 4: PLANTING

SPECIAL PROVISION 15: TOPSOIL

1. DESCRIPTION

This work shall consist of furnishing and placing topsoil as specified in the Construction Drawings, or as directed by the Town of Kilmarnock. Contractor shall provide documentation of furnished topsoil to the Town of Kilmarnock for approval.

2. MATERIALS

- A. Topsoil furnished by the Contractor Topsoil shall consist of friable surface soil reasonably free of grass, roots, weeds, sticks, stones, or other foreign materials. The topsoil shall consist of sandy loam, with soil particles within the following percentages: clay; 0-25; silt; 25-50; sand; 50-70; decomposed organic matter; 5-10. The clay content is optional. The soil shall have a soil acidity range between a pH 5.0 to pH 7.0.
- B. Class A topsoil shall consist of material salvaged on site during excavation and shall consist of the original layer of the soil profile formed under natural conditions, technically defined as the "A" horizon. It shall be free from refuse and any other materials toxic to plant growth and subsoil, stumps, viable noxious weeds, roots, brush, rocks, clay lumps, or similar objects larger than 3 inches in any dimension.
- C. Class B topsoil shall be topsoil furnished from sources outside the project limits and shall be the original top layer of a soil profile formed under natural conditions, technically defined as the "A" horizon or a mixed material meeting the following specifications. Class B topsoil shall be a "sandy loam," "loamy sand," or "sandy clay loam" soil as defined by the USDA Soil Textural Classification System with an organic matter content greater than 10% or as approved in writing by the Town of Kilmarnock. Material shall be free from refuse and any other materials toxic to plant growth and subsoil, stumps, viable noxious weeds, roots, brush, rocks, clay lumps, or similar objects larger than 3 inches in any dimension.

Excess topsoil shall become the responsibility of the Contractor and shall be completely removed from the project site prior to final site inspection and approval of the project.

D. Straw Mulch

Straw mulch shall be un-rotten small grain straw.

3. CONSTRUCTION

- A. Prior to the start of placing topsoil, all grass, weeds, brush, stumps, and other objectionable material shall be removed from the surface of stockpiles.
- B. Placing and spreading of topsoil shall not be done when the ground is frozen, excessively wet

or otherwise in a condition detrimental to the work. Furnished topsoil shall be placed, spread, and maintained over the areas designated to a depth of at least 6 inches, that after settlement, the completed work shall be in conformance with the thickness, lines, grades, and elevations specified in the Construction Drawings.

- C. Surfaces designated to be covered shall be lightly scarified just prior to the spreading operation. Compaction of topsoil will not be required. After placement is completed the surface of the topsoil shall be finished to a reasonably smooth surface.
- D. The Contractor shall completely prepare and finish the surface of all areas to be covered with topsoil as specified in the Construction Drawings.
- E. Seeding of topsoil should be carried out simultaneously to prevent excessive and undesirable soil compaction.

4. MEASUREMENT AND PAYMENT

Furnished Topsoil shall be measured and paid for as a lump sum (LS) item. Payment shall be full compensation for the transport of all materials, excavation, installation, and maintenance of clay cores, and for all material, labor, equipment, tools, stockpiling and incidentals necessary to complete the work as specified in the Construction Drawings or as directed by the Town of Kilmarnock.

SPECIAL PROVISION 16: PLANTING TREES, SHRUBS, AND GRASSES

1. DESCRIPTION

- A. This work shall consist of furnishing, transporting, storing and installing trees, shrubs, and grasses to complete the work for the planting plan as specified in the Construction Drawings, or as directed by the Town of Kilmarnock.
- B. Prior to start of work, the Contractor shall submit a proposed planting schedule, including species and quantities, anticipated planting dates, and the source of plant material to the Town of Kilmarnock for review. No work shall be performed until this information has been reviewed and approved by the Town of Kilmarnock.
- C. The Town of Kilmarnock may request the Contractor to stake the location of individual plants within the approved Planting Zones.
- D. The Contractor shall coordinate planting with the Town of Kilmarnock.

2. MATERIALS

- A. Plant Material
 - 1. All plant material shall conform to the current issue of the American Standard for Nursery Stock published by the American Association of Nurserymen.

2. Plant materials must be selected from certified nurseries that have been inspected by state and/or federal agencies. Nursery inspection certificates shall be furnished to the Town of Kilmarnock upon request.
 3. The nursery supply source shall certify that the origin of the seeds from which the trees, shrubs, and grasses were produced is Hardiness Zone 6 or 7, east of the Mississippi River. Stock from different zones may be accepted, subject to approval by the Town of Kilmarnock.
 4. Plant material collected from the wild is prohibited unless approved by Town of Kilmarnock and Consultant.
 5. Container grown stock shall have been grown in a container long enough for the root system to have developed sufficiently to hold its soil. Roots shall visibly extend to the inside face of the growing container. All container grown plants shall be grouped and kept moist and cool until they are planted. Plants left to dry in the sun prior to planting may be rejected on-site by the Inspector.
 6. Bare Root grown stock shall be freshly dug. The packing material must be moist when delivered to the site. All bare root plants shall be dormant when planted.
 7. The Town of Kilmarnock may reject plants damaged in handling or transportation.
 8. No plants shall be installed unless the Town of Kilmarnock approves both the condition of the plantings and the process of installation.
- B. Substitute Plant Material
1. Prior to Contractor mobilization, the Town of Kilmarnock must approve all plant substitutions.
 2. If a substitute is selected, it must be native to the Ridge & Valley physiographic province of Virginia and of the same size, value, and quality as the original plant.
- C. Water
1. Water used in the establishment or caring of plants and seed shall be free from any substance that is injurious to plant life.
- D. Fertilizer
1. No broadcast fertilization shall be permitted on stream restoration projects unless specifically noted in Construction Drawings.
 2. The Contractor shall use organic fertilizers in lieu of petroleum-based fertilizers. Suitable products that are commercially available are marketed and certified as 'organic' or 'natural' fertilizers. Organic materials shall include such items as sea grasses/kelp, rock powder, bone meal, whey, bean meal, blood meal, composted manure, etc. Product

nutrient content shall be identified in the standard form of Nitrogen (N), Phosphorous (P) and Potassium (K) ratios. Fertilizer nutrient content shall be 20-10-5. The application rate shall be equivalent to a 5-gram tablet per plant. Contractor shall submit the label to Town for review prior to installation. The Town must approve any proposed substitution to this nutrient content.

E. Mycorrhizal Fungi

All bare root seedlings shall be treated with root dip absorbent polymers and mycorrhizal root dip inoculates in accordance with the manufacturer's recommendations.

F. Root Growth Hormone

All live stake plantings shall be treated with Root Growth Hormone prior to installation.

G. Straw Mulch

Straw mulch shall consist of un-rotten small grain straw.

H. Topsoil – See Special Provision 16 – Topsoil.

3. CONSTRUCTION

A. All areas shall be planted in accordance with the composition and planting schedules for each designated planting zone. Areas within designated planting zones not disturbed by construction shall be supplemented with trees and shrubs to meet the acre quantities specified in the schedule.

B. The Contractor shall refer to the planting plan, vegetation schedule, planting details and notes in the Construction Drawings for specific spacing requirements.

C. The Contractor shall use the overall spacing requirements and the Planting Notes and Details in the Construction Drawings to determine the spacing between each species of vegetation and among the same species vegetation.

D. Immediately after site preparation and approval, trees, shrubs, and grasses shall be planted. Containerized plants shall be installed between September 30 and March 31, or as directed by the Town of Kilmarnock. Live stakes shall only be planted between February 1 and March 31 (when stock is dormant). Tubelings shall be planted between September 30 and March 31. No planting shall occur when soil is frozen.

E. Root stock of the plant material shall be kept moist during transport, from the source, to the job site and until planted.

F. The Contractor may be required to flag and label individual planting pits at specific locations. Upon planting a typical area within each planting zone, the Contractor shall have the Town of Kilmarnock inspect and approve plant spacing and planting techniques before proceeding.

- G. All planting pits shall be dug by hand. Walls of planting pits shall be dug so that they are vertical or sloping outward in heavy soils. Scarify the walls of the pit after digging.
- H. Excavate the planting pit to a depth of 1 foot plus the container depth in which the plant was grown and 2 feet wider than the container.
- I. Planting holes for bare root trees shall be 1-2 inches deeper than the root collar (i.e. 1-2 inches deeper than they were growing in the nursery). Bare root seedlings shall be installed with the use of a "sharpshooter shovel".
- J. Remove all non-organic debris from the pit and tamp loose soil in the bottom of the pit by hand.
- K. Remove the plant either by cutting or inverting the container.
- L. Do not handle the plant by the branches, leaves, trunk or stem.
- M. Place the plant straight in the center of the planting pit, carrying the plant by the root mass. Never lift or carry a plant by the trunk or branches.
- N. Place controlled release fertilizer in the planting hole in accordance with Section 24.2.D of these specifications (above).
- O. Treat all bare root seedlings with root dip absorbent polymers and mycorrhizal root dip inoculates in accordance with the manufacturer's recommendations.
- P. Treat all live stake plantings with Root Growth Hormone prior to installation.
- Q. Backfill planting pit with existing soil and hand tamp as pit is being backfilled to completely fill all voids and air pockets. Do not over compact soil. Make sure plant remains straight during backfilling/tamping procedure.
- R. Do not cover the top of the root mass with soil.
- S. An additional 18-inch diameter area of topsoil shall be placed around each tree and shrub. Topsoil shall be 2 inches thick.
- T. Water plants thoroughly immediately after planting, unless otherwise directed by the Town of Kilmarnock.
- U. Town of Kilmarnock reserves the right to require supplemental watering during construction or during the first growing season after substantial completion, at their sole discretion. Such watering may be required, for example, if plant materials are installed outside the approved planting window or in areas where vegetative establishment does not provide adequate cover (85% min.) to protect against erosion. Supplemental watering shall be done using an submersible-style pump to pump water from an adjacent pool whenever possible in order to avoid damage associated with vehicular access. Any such supplemental watering shall be at the Contractor's expense, not subject to change order requests.

- V. The Contractor shall leave no open planting pits at the close of each day.
- W. Remove all tags, labels, strings and wire from the plant materials, unless otherwise directed by the Town of Kilmarnock.

4. WARRANTY

- A. The Contractor shall maintain a 2-year care and replacement warranty of 85% on all B&B, container grown, and tubelings and 60% on all bareroot and tuber stock.
- B. The period of care and replacement shall begin after final inspection and approval of the initial installation of all plants and continue for 2 years, with a potential plant replacement period after the year warranty inspection.
- C. Plant warranty replacements shall be performed in accordance with the Construction Drawings and these specifications.

5. MEASUREMENT AND PAYMENT

Planting trees and shrubs shall be measured and paid for at the Contract unit price per each (EA) plant in accordance with the plant schedule and planting plan. Payment for planting trees and shrubs shall be full compensation for furnishing, installing, maintenance and warranty, including all materials, labor, equipment, stockpiling, tools, and incidentals necessary to complete the work as specified in the Construction Drawings, or as directed by the Town of Kilmarnock.

SPECIAL PROVISION 17: HERBACEOUS TEMPORARY & PERMANENT SEEDING

1. DESCRIPTION

- A. This work shall consist of furnishing, transporting, storing, and installing all herbaceous temporary and permanent seeding for the Planting Zones as specified in the Construction Drawings, or as directed by the Town of Kilmarnock.
- B. Prior to start of work on this item, the Contractor shall submit all herbaceous permanent seeding paperwork, to include shipping invoices, seed bag tickets for the herbaceous permanent seed mixes to be installed and the source of the seed to the Town of Kilmarnock for review. No work shall be performed until the seeding paperwork is approved by the Town of Kilmarnock.

2. MATERIALS

- A. Seed Mix

Seed Mix shall consist of the varieties specified in the vegetation schedule located within the Construction Drawings for all planting zones. All seed and seed varieties shall be free from State and Federal prohibited noxious weed seeds.

B. Topsoil – See Special Provision 16.

C. Straw Mulch

Straw mulch shall consist of un-rotten small grain straw.

D. Water

Water used in the establishment or caring of plants and seed shall be free from any substance that is injurious to plant life.

3. CONSTRUCTION

A. All areas disturbed by construction shall be seeded in accordance with the planting plans and schedules. The herbaceous permanent seeding is specified on the planting schedules in the Construction Drawings. Areas not disturbed, shall not be seeded.

B. All areas to be seeded shall conform to the finished grades as specified on the plans and be free of all weeds, trash, debris, brush, clods, loose rocks and other foreign that would interfere with seeding. All gullies, washes or disturbed areas that develop subsequent to final dressing shall be repaired prior to seeding.

C. Seeding shall be accomplished by using a broadcast spreader. The broadcast spreader used shall be capable of placing seed at the specified rate.

D. Seed shall be spread immediately following fine grading of an area, as construction progresses, in order to achieve rapid stabilization. After seeding and raking, the Contractor shall cover the seeded areas with straw mulch (overbank areas) or coir matting along the stream banks, as indicated in the Construction Drawings. No seed shall be spread on top of straw or coir matting.

E. At the sole discretion of the Town of Kilmarnock, additional seeding may be required in areas where poor vegetative establishment is observed (less than 85% surface coverage). Additional seeding may be requested at any time prior to substantial completion or in association with planting inspections during the two-year warranty period. Additional seeding shall be considered within the original contract scope and shall not be subject to change order request.

4. WARRANTY

A. The period of care and replacement shall begin after final inspection and approval of the initial installation of all plants and continue for 2 years.

B. Herbaceous permanent seeding warranty replacements shall be performed in accordance with the Construction Drawings and these specifications.

5. MEASUREMENT AND PAYMENT

Herbaceous temporary and permanent seeding shall be measured and paid for on a lump sum (LS) basis. Payment will be full compensation for furnishing and incorporating all seed, including all maintenance and warranty, materials, labor, equipment, tools, and incidentals necessary to complete the work as specified in the Construction Drawings, or as directed by the Town of Kilmarnock. The Contractor shall maintain a minimum 85% aerial coverage of herbaceous seeding for two (2) years after final inspection. This shall include necessary care and replacement to achieve the required coverage.

SECTION 5: INFRASTRUCTURE

SPECIAL PROVISION 18: CONCRETE AND CHAIN LINK FENCE REMOVAL

1. DESCRIPTION

This work shall consist of removing existing concrete and chain link fence in order to complete stream work as specified in the Construction Drawings, or as directed by the Town of Kilmarnock.

2. MATERIALS

Contractor shall use equipment necessary to complete the work.

3. CONSTRUCTION

Work shall be completed as specified in construction plans or as directed by Town of Kilmarnock.

4. MEASUREMENT AND PAYMENT

Concrete and chain link fence removal work will be measured and paid for as a lump sum (LS) item. Payment shall include all materials, labor, equipment, stockpiling, tools, maintenance and any incidental costs necessary to complete the work specified in the Construction Drawings, or as directed by the Town of Kilmarnock.

SPECIAL PROVISION 19: HDPE REMOVAL AND MODIFICATIONS

5. DESCRIPTION

This work shall consist of removing sections of a four inch and eight inch HDPE as specified in the Construction Drawings, or as directed by the Town of Kilmarnock.

6. MATERIALS

Contractor shall use equipment necessary to complete the work.

7. CONSTRUCTION

Work shall be completed in conjunction with construction of outfall channel and placement of outlet protection.

8. MEASUREMENT AND PAYMENT

HDPE removal and modification work will be measured and paid for as a lump sum (LS) item. Payment shall include all materials, labor, equipment, stockpiling, tools, maintenance and

any incidental costs necessary to complete the work specified in the Construction Drawings, or as directed by the Town of Kilmarnock.

SECTION 6: CONSTRUCTION TOLERANCES AND OVERSIGHT

SPECIAL PROVISION 20: CONSTRUCTION TOLERANCES

1. DESCRIPTION

All stream work shall be performed such that the finished product adheres to the stream restoration construction tolerances contained herein. The Contractor is solely responsible for ensuring the finished product meets the tolerances. The Town of Kilmarnock staff shall issue final approval and acceptance.

2. SPECIFICATIONS

- A. Locations, elevations, and dimensions of all structures and channel features shall be constructed within the tolerances provide below:

Vertical tolerance	+/- 0.1 ft maximum
Horizontal tolerance	+/- 0.5 ft maximum

- B. It is recognized that field conditions may warrant adjustments to design elements (such an adjustment requires the prior written approval of the Town of Kilmarnock staff). In addition, certain design elements that fail to meet the above listed tolerances may be acceptable. Such acceptance will be on a case-by-case basis by the Town of Kilmarnock staff. Contractor is encouraged to identify these cases with the Consultant during construction and keeps a record of changes or modifications.

SPECIAL PROVISION 21 CONSTRUCTION OVERSIGHT

1. DESCRIPTION

Construction shall be inspected by both Town of Kilmarnock and the firm which produced the plan set, Ecosystem Services (ES).

2. MEASUREMENT AND PAYMENT

Construction oversight and management services shall be performed under a separate contract, and shall not be a pay item paid to the Contractor.