SP-154060
(New)

SPECIAL PROVISIONS FOR BIORETENTION CELLS

Dallas County
STBG-SWAP-7875(651)--SG-25

Effective Date
March 15, 2022

THE STANDARD SPECIFICATIONS, SERIES OF 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

154060.01 DESCRIPTION

The purpose of this specification is for construction of Bioretention cells for treatment of storm water runoff.

154060.02 MATERIALS.

A. Subdrain Cleanout.
Use solid wall PVC riser pipe and sitting of the same diameter as the adjacent subdrain. Use Type A-2 Cleanouts. Refer to detail in plan.

B. Filter Aggregate.
Provide aggregate complying with Section 4115 of the Standard Specifications, Gradation No. 3, Class 2 durability crushed stone (AASHTO M 43/ASTM D 448, Size 57).

C. Subdrain.
Provide slotted pipe(s) complying with the requirements of Section 2502 of the Standard Specifications. Pipe size as specified in contract documents, should match diameter of pipe used for subdrain cleanouts.

D. Nonwoven Geotextile Fabric.
Comply with Article 4196.01, B, 2, of the Standard Specifications meeting the requirements for subsurface drainage.

E. Choker Aggregate.
3/8 inch aggregate complying with Section 4125 of the Standard Specifications, Gradation No. 21 (AASHTO M 43/ASTM D 448, Size 8).

F. Amended Soils.

1. **Organic Material:**
   a. Provide suitable organic material composed of products from plant material such as:
      - Compost complying with Article 4169.08 of the Standard Specifications
      - Finely chipped bark (⅜ inch diameter or less)
      - Finely shredded, partially decomposed mulch
      - Peat and sphagnum peat moss
   b. Other organic material provided it has no detrimental chemical compounds, does not have high nutrient content that would increase nutrient loading in leachate, will increase the water holding capacity of the soil media and will enhance the ability of the media to capture and hold pollutants to facilitate breakdown is also acceptable. Compost type and source shall be submitted to the Engineer for approval prior to use.

2. **Sand:** Provide clean sand complying with Section 4110 of the Standard Specifications, Gradation No. 1.

3. **Soil:** Provide soil taken from the top 6 inches of the A-horizon, have a dark brown to black color, have a granular structure and clay content less than 25% verified with a ribbon test that yields no more than 1 inch.

4. **Mixture:** The texture of the modified soil mixture will be loamy sand or sandy loam according to the USDA Soil Classification system, soil textural triangle. A laboratory analysis for particle size or a simplified dispersal method for sand content only can also be used to verify soil texture. Thoroughly blend organic materials, sand and soil to provide a mixture with up to 10% suitable organic material, 75% to 90% sand and up to 25% soil by volume.

G. Mulch, Hardwood.
Per Section 4170 of the Standard Specifications.

H. Water.
Supply potable water for consolidating the amended soil layer. In lieu of potable water, supply clean, clear water, free of harmful contaminates, from a source approved by the Engineer.

154060.03 CONSTRUCTION.

A. Pre-Installation Protection.

1. Complete upland grading, utility installation, and other earth disturbing operations prior to excavating for the Bioretention cell.

2. Construct pre-treatment practices as specified in the contract documents.

3. Prior to installing the Bioretention cell, install erosion and sediment control practices upstream to protect the Bioretention cell from sediment in stormwater runoff.

B. Bioretention Cell Installation.

1. Complete rough grading activities to excavate the Bioretention cell area to the length, width, and depth specified in the contract documents. Do not compact the Bioretention cell subgrade and do not operate heavy machinery on the subgrade.

2. Perform topsoil re-spread, fine grading operations, and seedbed preparation as specified in the contract documents.

3. Excavate the trench for the subdrain as specified in the contract documents.

4. Excavate across the bottom of the Bioretention cell for placement of the amended soil layer as

specified in the contract documents.

5. Verify that the bottom of the subdrain trench is clear of debris or other material and remains at the proper subgrade elevation to allow for subdrain installation.

6. If nonwoven geotextile fabric is specified in the contract documents, install over the bottom of the trench and up the sides of the excavated area with enough materials to overlap 18 inches over the top of the aggregate. Overlap adjacent strips of fabric a minimum of 6 inches.

7. Place the first 2 inches of the aggregate subbase evenly over the bottom of the subdrain trench. Do not operate machinery directly on the excavated subgrade of the amended soil layer during aggregate subbase or subdrain installation.

8. Install subdrain at the elevation specified in the contract documents. Install cleanouts at locations specified in the contract documents.

9. Place remaining aggregate subbase layer to the elevation specified in the contract documents.

10. If a choker aggregate layer is specified in the contract documents, install over stone aggregate subbase layer to the depth specified.

11. Install check dams as specified in the contract documents. Protect subdrain and aggregate subbase layers during check dam construction. Do not operate heavy machinery directly on subgrade of the amended soil layers during check dam installation.

12. Place amended soil in 8 to 12 inch lifts to the elevation specified in the contract documents. Do not operate heavy machinery directly on the subgrade of the amended soil layers during placement. Overfill area with amended soil by 5% of the specified depth to allow for natural settlement.

13. Avoid over compaction by allowing time for natural settlement. If the project schedule does not allow for natural settlement of soil and the contract documents require compaction by soaking, compact the filter soil matrix by soaking as described below:
    a. Apply water to uniformly saturate surface by spraying or sprinkling.
    b. Ensure entire Bioretention cell is saturated.
    c. Add amended soil as required to restore settled surface to finished elevation.

14. Roughen surface of side slopes that are 4(H):1(V) or steeper to reduce potential for rill erosion along equipment tracks.

15. Perform stabilization measures to protect the installed bioretention cell soil media. Install landscaping (seed, sod, native plants, trees, shrubs, etc.) as specified in the contract documents.

16. Install side slope erosion and sediment control measures as specified in the contract documents.

17. Uniformly grade and rake the top of the amended soil layer to a flat, smooth, uniform surface.

18. When specified in the contract documents, place a 3 inch layer of hardwood mulch over area filled with amended soil. Do not place hardwood mulch over seeded areas. If the contract documents specify plants for the surface of the amended soil, install prior to placing mulch.

19. Ensure good housekeeping measures are taken throughout construction, until final acceptance of improvements by owner, to prevent erosion and sedimentation that could reduce the effectiveness of the Bioretention cell. Address any such erosion or sedimentation should it occur, until final acceptance.

20. Do not store materials or operate heavy equipment within or near the footprint of the Bioretention cell practice after installation has been completed.

154060.04 MEASUREMENT AND PAYMENT.

A. Class 10, Class 12, or Class 13 Excavation: Per Section 2102 of the Standard Specifications.

B. Choker Aggregate.

1. **Measurement:** Measurement will be the plan quantity in cubic yards, without final field measurement. The plan quantity will be based upon the proposed excavated area to be filled with choker aggregate, in place. Adjustments may be made to the plan quantities if agreed to by both the Engineer and the Contractor.

2. **Payment:** Payment will be made at the unit price per cubic yard of choker aggregate.

3. **Includes:** Unit price includes, but is not limited to, furnishing, hauling, placing, and grading choker aggregate.

C. Filter Aggregate.

1. **Measurement:** Measurement will be the plan quantity in cubic yards, without final field measurement. The plan quantity will be based upon the proposed excavated area to be filled with filter aggregate, in place. Adjustments may be made to the plan quantities if agreed to by both the Engineer and the Contractor.

2. **Payment:** Payment will be made at the unit price per cubic yard of filter aggregate.

3. **Includes:** Unit price includes, but is not limited to, furnishing, hauling, placing, and grading filter aggregate.

D. Subdrain: Per Section 2502 of the Standard Specifications.

E. Subdrain Cleanout: Incidental to Subdrain installation.

F. Nonwoven Geotextile Fabric: Per Section 2507 of the Standard Specifications.

G. Amended Soils.

1. **Measurement:** Measurement will be the plan quantity in cubic yards, without final field measurement. The plan quantity will be based upon the proposed excavated area to be filled with amended soil, plus an additional 5% to account for anticipated shrinkage. Adjustments may be made to the plan quantities if agreed to by both the Engineer and the Contractor.

2. **Payment:** Payment will be made at the unit price per cubic yard of amended soil.

3. **Includes:** Unit price includes, but is not limited to, furnishing, hauling, blending, and placing amended soil. If compaction by soaking is specified for amended soil, unit price includes supplying and applying water to compact the material.

H. Mulch, Hardwood: Per Section 2610 of the Standard Specifications.

I. Surface Roughening: Incidental to Bioretention cell construction.