



**Iowa Department of Transportation**

**SPECIAL PROVISION  
FOR  
BIORETENTION**

**Johnson County  
STP-U-1557(638)--70-52**

**Effective Date  
December 17, 2013**

**THE STANDARD SPECIFICATIONS, SERIES OF 2012, ARE AMENDED BY THE  
FOLLOWING MODIFICATIONS. THESE ARE SPECIAL PROVISIONS AND SHALL PREVAIL  
OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.**

These specifications compliment the bioretention system design portion of the Iowa Stormwater Management Manual in Chapter 2, Section 2E-4.

Sections of the following documents, as referenced within these specifications, are hereby made a part of these specifications:

- The Iowa Department of Transportation Standard Specifications for Highway and Bridge Construction, Series 2012, plus General Supplemental Specifications.
- American Society for Testing and Materials (ASTM) standards.
- American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications for Transportation Materials and Methods of Sampling and Testing.

## **PART 1 - GENERAL**

### **1.01 SECTION INCLUDES**

Bioretention System

### **1.02 DESCRIPTION OF WORK**

Construct bioretention system for storage and treatment of stormwater runoff.

### **1.03 SUBMITTALS**

Comply with the requirements of the contract documents.

### **1.04 SUBSTITUTIONS**

Comply with the requirements of the contract documents.

### **1.05 DELIVERY, STORAGE, AND HANDLING**

Comply with the requirements of the contract documents.

### **1.06 SCHEDULING AND CONFLICTS**

Comply with the requirements of the contract documents.

### **1.07 SPECIAL REQUIREMENTS**

None.

### **1.08 MEASUREMENT AND PAYMENT**

- A. Class 10, Class 12, or Class 13 Excavation: Refer to Article 2101.04 of the Standard Specifications for measurement and payment information for Class 10, Class 12, or Class 13 Excavation.
  
- B. Choker Aggregate:

1. Measurement: Each type of choker aggregate will be measured in tons based upon scale tickets for the material delivered and incorporated into the project.
  2. Payment: Payment will be made at the unit price per ton for each type of choker aggregate furnished and placed.
  3. Includes: Unit price includes, but is not limited to, furnishing, hauling, and placing choker aggregate material.
- C. Aggregate Subbase:
1. Measurement: Each type of aggregate subbase will be measured in tons based upon scale tickets for the material delivered and incorporated into the project.
  2. Payment: Payment will be made at the unit price per ton for each type of aggregate subbase furnished and placed.
  3. Includes: Unit price includes, but is not limited to, furnishing, hauling, and placing aggregate subbase.
- D. Underdrain:
1. Measurement: Measurement will be in linear feet for each type and size of pipe installed. Pipe will be measured from end of pipe to end of pipe along the centerline of pipe, exclusive of outlets. The vertical height of cleanouts and observation wells will be included in the length of pipe measured. Lengths of elbows, tees, wyes and other fittings will be included in length of pipe measured.
  2. Payment: Payment will be made at the unit price per linear foot for each type and size of pipe.
  3. Includes: Unit price includes, but is not limited to, furnishing and placing pipe and pipe fittings.
- E. Underdrain Cleanout:
1. Measurement: Each type and size of underdrain cleanout will be counted.
  2. Payment: Payment will be made at the unit price for each underdrain cleanout.
  3. Includes: Unit price includes, but is not limited to, furnishing and installing pipe, couplings, and fittings.
- F. Nonwoven Geotextile Fabric:
1. Measurement: Measurement will be in square yards for the surface area covered with geotextile fabric. Both horizontal and vertical areas covered with geotextile fabric will be measured.
  2. Payment: Payment will be made at the unit price per square yard of geotextile fabric.
  3. Includes: Unit price includes, but is not limited to, placing and securing geotextile fabric and any overlapped areas.
- G. Modified Soil Layer:
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 modified soil, plus an additional 15 percent 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 modified soil.
  3. Includes: Unit price includes, but is not limited to, furnishing, hauling, blending, and placing modified soil. If compaction by soaking is specified for modified soil, unit price includes supplying and applying water to compact the material.
- H. Hardwood Mulch:

1. Measurement: Measurement will be the plan quantity in cubic yards, without final field measurement. 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 hardwood mulch.
3. Includes: Unit price includes, but is not limited to, supplying, hauling, and placing mulch.

## **PART 2 - PRODUCTS**

### **2.01 UNDERDRAIN CLEANOUT**

- A. Pipe and Fittings: Minimum 6 inch diameter pipe complying with one of the following.
  1. Solid wall PVC pipe complying with ASTM D 1785, Schedule 40.
  2. Solid wall PVC pipe complying with ASTM D 3034, SDR 35.
  3. Corrugated PVC pipe complying with ASTM F 949, with a minimum pipe stiffness of 46 psi.
- B. Cap: Provide PVC cleanout fitting with removable threaded plug.

### **2.02 AGGREGATE SUBBASE**

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).

### **2.03 UNDERDRAIN**

Provide slotted pipe(s) complying with the requirements for Longitudinal Subdrain, Article 4143.01, B of the Standard Specifications. Provide 6 inch diameter pipe unless otherwise specified in the contract documents.

### **2.04 NONWOVEN GEOTEXTILE FABRIC**

Comply with Article 4196.01, B, 2 of the Standard Specifications, requirements for subsurface drainage.

### **2.05 CHOKER AGGREGATE**

**Comply with one of the following:**

1. 1/2 inch aggregate complying with Section 4125 of the Standard Specifications, Gradation No. 20 (AASHTO M 43/ASTM D 448, Size 7).
2. 3/8 inch aggregate complying with Section 4125 of the Standard Specifications, Gradation No. 21 (AASHTO M 43/ASTM D 448, Size 8).

### **2.06 MODIFIED SOIL**

- A. Compost: Provide compost complying with the requirements for pneumatic seeding (urban), Article 4169.08 of the Standard Specifications.
- B. Sand: Provide clean sand complying with Section 4110 of the Standard Specifications, Gradation No. 1.
- C. Mixture: Thoroughly blend sand and compost materials to provide a mixture with 80 percent sand by volume.

**2.07 WOOD MULCH**

Provide shredded, hardwood mulch with a 4 inch maximum length complying with the following:

- A. Free from leaves, twigs, dust, toxic substances, and any other foreign material.

**2.08 WATER**

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

**PART 3 - EXECUTION****3.01 PRE-INSTALLATION PROTECTION**

- A. Complete grading, utility installation, and other earth disturbing operations prior to excavating for the bioretention system.
- B. Prior to installing the bioretention system, install erosion and sediment control practices upstream to protect the bioretention system from sediment in stormwater runoff from disturbed soil.

**3.02 BIORETENTION SYSTEM INSTALLATION**

- A. Excavate bioretention system area to the length, width, and depth specified in the contract documents. Do not compact the bioretention area subgrade and do not operate heavy machinery on the subgrade. Do not operate heavy machinery in the excavated area while placing the modified soil.
- B. Place the first 2 inches of the aggregate subbase evenly over the bottom of the bioretention area.
- C. If underdrain is specified in the contract documents, install slotted pipe at the elevation specified. Install cleanouts at locations specified in the contract documents.
- D. Place remaining aggregate subbase layer to the elevation specified in the contract documents.
- E. If a choker aggregate layer is specified in the contract documents, install over stone aggregate subbase layer to the depth specified.
- F. If nonwoven geotextile fabric is specified in the contract documents, install over the top of the aggregate subbase and up the sides of the excavation. Overlap adjacent strips of fabric a minimum of 6 inches.
- G. Place modified soil in 8 to 12 inch lifts to the elevation specified in the contract documents. Overfill area with modified soil by 15 percent of the specified depth to allow for natural settlement.
- H. 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:
  1. Apply water to uniformly saturate surface by spraying or sprinkling.
  2. Ensure entire bioretention area is saturated.
  3. Add modified soil as required to restore settled surface to finished elevation.

- I. Uniformly grade and rake the top of the modified soil layer to a flat, smooth, uniform surface.
- J. If contract documents specify seeding for the surface of the of bioretention system, install seeding as specified. Mulch seeded areas with bonded fiber matrix or rolled erosion control products as specified in the contract documents.
- J. When specified in the contract documents, place a 3 inch layer of hardwood mulch over area filled with modified soil. Do not place hardwood mulch over seeded areas. If the contract documents specify plants for the surface of the modified soil layer, install prior to placing mulch.
- K. Do not stockpile materials on or near the surface of the completed bioretention cell.
- M. Protect completed bioretention area from heavy machinery and other construction equipment.