



**SPECIAL PROVISIONS
FOR
BIOSWALE COMPLETE**

**Scott County
STP-U-1827(672)--70-82**

**Effective Date
May 16, 2017**

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

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Bioswales
 - 1. Excavation and Grading for bioswale
 - 2. Aggregate Base Course
 - 3. Modified Soil
 - 4. Subdrain Pipe
 - 5. Clean-outs
 - 5. Native plantings
 - 5. Hardwood Mulch
 - 6. Plant Establishment and Warranty

1.2 DESCRIPTION OF WORK

- A. Construct bioswale for treatment of stormwater runoff
 - 1. Work includes furnishing all labor, materials, tools, equipment, transportation, protection, and supervision necessary and required to construct the bioswales in accordance with the contract documents, including installation, protection, guarantee and replacement of native grasses and forbs. Work also includes the mixing of sand and compost mechanically offsite to the specifications for the modified soil, as well as all excavation, grading and testing associated with the construction of the bioswale.

1.3 REFERENCES

- A. These special provisions compliment the bioswale design portion of the Iowa Stormwater Management Manual in Chapter 2, Section 2E-5.

- B. Sections of the following documents, as referenced within these special provisions, are hereby made a part of these special provisions:
 - 1. American Society for Testing and Materials (ASTM) standards.
 - 2. American Association of State Highway and Transportation Officials (AAASHTO) Standard Specifications for Transportation Materials and Methods of Sampling and Testing.

1.4 QUALITY ASSURANCE

- A. General: Ship materials with certificates of inspection required by governing authorities. Comply with regulations applicable to landscape materials. Obtain any necessary permits for this work and pay any fees required for permits.
- B. Perform work in accordance with applicable requirements of the Standard Specifications and all local and state codes and ordinances.
- C. Testing Agency Qualifications: An independent, state-operated, or university-operated laboratory; experienced in soil science, soil testing, and plant nutrition; with the experience and capability to conduct the testing indicated; and that specializes in types of tests to be performed.
- D. Analysis and Standards: Package standard products with manufacturer certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.
- E. Substitutions: If specified materials are not obtainable, submit proof of non-availability, together with proposal for use of equivalent material in compliance with Standard Specifications.
- F. Source Quality Control: Ship plant materials with certificates of inspection required by governing authorities. Comply with regulations applicable to landscape materials. Obtain any necessary permits for this work and pay any fees required for permits.

1.5 SUBMITTALS

- A. Source List
 - 1. Sand
 - 2. Organic matter
 - 3. Plant Material
 - a. List of all nurseries that will supply plants, along with a list of the plants they will provide and the address and phone number of the nursery.
 - i. List shall include botanical name and common name of plant, quantities, and sizes.
- B. Material Data and Product Information
 - 1. Sand
 - 2. Organic matter
 - 3. Plants
 - a. Prior to end of warranty period, submit Maintenance Instructions. Maintenance Instructions shall be typewritten instructions recommending procedures for maintenance of plantings, including watering, insect and disease control, etc.

- C. Certifications
 - 1. Compost Manufacturer:
 - a. Proof that manufacturer is certified by the USCC and is in good standing.
 - i. Verification of current participation in the STA Program can be achieved by logging onto the USCC website at www.compostingcouncil.org
 - b. A Letter from the Manufacturer of the compost, certifying that:
 - c. They are fully permitted and are operating in compliance with Iowa State Regulations for the production and distribution of compost, including certification that the product being provided has met all requirements for pathogen destruction.
 - d. That they can supply a consistent supply of the material in the volume required.
 - e. That they will provide verification of the volumes shipped or delivered for the project.
 - f. That their compost complies with the requirements set forth under Standard Specification Number 4169.
 - 2. Plant Supplier:
 - a. Submit copy of current certification that the Supplier is an Iowa Department of Agriculture and Land Stewardship Certified Nursery Dealer or Grower prior to starting work.
 - b. Certificates of inspection as required by governmental authorities.

1.6 DELIVERY, SHIPPING AND HANDLING

- A. General:
 - 1. Deliver only materials that fully conform to these specifications or for which submittals have been approved for use by Engineer.
 - 2. Thoroughly clean stockpile and delivery areas in compliance with the pollution prevention plan and as directed by Engineer.
 - 3. Protect all materials from environmental and climatic conditions and deterioration during delivery, and while stored at site.
- B. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with state and Federal laws if applicable.
- C. Bulk Materials:
 - 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 - 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 - 3. Do not move or handle materials when they are wet or frozen.
 - 4. Accompany each delivery of soil amendments with appropriate certificates.
- D. Pre-planting: Plants shall be brought to the site the day they are to be installed: deliver plants after preparations for planting have been completed, and install immediately.
 - 1. Provide protective covering of plants during shipping and delivery.
 - 2. Do not drop plants during delivery and handling.
 - 3. Handle plants by container.
 - 4. All plants shall be watered thoroughly and allowed to drain prior to planting.
 - 5. Leave plants in their containers until each is planted. Plants shall not be removed from the containers and laid out on the bed where sun and wind will damage the roots prior to planting.
 - 6. Any dead or damaged plant parts shall be removed from the plants upon planting. If the amount to be removed is more than 10% of the plant, then replace the plant.

1.7 PLANTING RESTRICTIONS

- A. Planting dates for the native grasses and forbs: April 15 to May 30; September 1 thru October 1.
- B. Weather Restrictions: Planting may be conducted under unseasonable conditions, except in weather below 32 °F or above 90 °F. No variance from plant establishment, plant warranty or other requirements will be given for plants installed outside the specified period.

1.8 UTILITY VERIFICATION

- A. Contact Iowa One Call (811 OR 1-800-292-8989) and the local utility companies for verification of the location of all underground utility lines in the area of the work. The Contractor shall be responsible for all damages resulting from neglect or failure to comply with this requirement.

1.9 SCHEDULING AND CONFLICTS

- A. Comply with the requirements of the contract documents and the following:
 - 1. Contractor shall be responsible for coordinating work under this section with other trades and disciplines impacting this work.
 - 2. Contractor shall be responsible for protecting the bioswale bed.
- B. Provide a minimum 3 day notice to Engineer prior to planting.

1.10 PLANT ESTABLISHMENT & WARRANTY

- A. Establishment Period: The establishment period begins when the last plant of the initial installation is planted and incidental work related to the plantings is complete, as determined and documented by Engineer. The establishment period is for 60 consecutive growing season days. The growing season for the establishment period on this project is considered to begin on April 15 and conclude on October 1. If the establishment period will go beyond October 1, then the remaining days required to meet the 60 day establishment period will begin on April 15th of the following year.
 - 1. Contractor shall provide all maintenance required to ensure that the plants become established and are in a healthy and thriving condition at the end of the establishment period. Maintenance includes weeding.
- B. Warranty: The warranty begins when the establishment period ends and the installation of replacements has been completed and found acceptable to the Engineer and documented. The documented date is the start of the Warranty period which shall run for 1 year. At the end of the warranty period, all dead, dying, or otherwise unhealthy plants, as determined by the Engineer, shall be replaced.

Part 2 PRODUCTS

2.1 SUBDRAIN 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

2.2 AGGREGATE SUBBASE

- A. 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)
- B. Provide a 2 inch layer of porous backfill directly above aggregate subgrade complying with Section 4115 of the Standard Specifications, Gradation 29.

2.3 SUBDRAIN

- A. 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.

2.4 MODIFIED SOIL

- A. Compost: Provide compost complying with the requirements for mulch for pneumatic seeding in Standard Specification Number 4169.
 - 1. Compost shall be certified through the U.S. Composting Council's (USCC) Seal of Testing Assurance (STA) Program.
- B. Sand: Provide clean sand complying with Section 4110 of the Standard Specifications, Gradation No. 1.
- C. 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 sand and compost materials to provide a mixture of 75 to 90% washed concrete sand, 0 to 10% approved organic compost, 0 to 25% soil with a soil texture that includes A-horizon characteristics, and meets specifications.

2.5 PLANTS

- A. General: Comply with Section 4170 of the Standard Specifications and the following:
 - 1. Ensure plant materials meet the minimum requirements of size and grade as stated in the latest edition of the American Standard for Nursery Stock, ANSI Z60.1.
 - 2. Provide plants true to name and tagged legibly as to name according to nursery standards of practice as recommended by the American Nursery and Landscape Association.
 - 3. Plants larger than notes specified in the plant list with corresponding root system may be used upon approval of the Engineer, without additional cost to project.
 - 4. Tagging: Labels shall be a waterproof tag bearing legible designation of common name and full scientific name.
- B. Plant Material Quality:
 - 1. Provide a uniform, well-shaped, healthy, vigorous stock, densely foliated and free of disease, pests, eggs, larvae, and defects such as injuries, abrasions, and disfigurement. All plants shall be of specimen quality.
 - 2. Provide nursery grown plants grown in the same climatic zone as the project.
 - 3. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.
 - 4. No loose root systems in the container, root-bound, or circling of the root system will be accepted.
 - 5. Plant size: As specified in drawings.

2.6 WOOD MULCH

- A. Provide shredded hardwood mulch complying with the following:
1. Double shredded with a size range of 1/4 to 1/2 inch diameter and a maximum length of 4 inches.
 2. Color shall be natural brown (green or freshly shredded mulch is unacceptable).
 3. Mulch shall be dry (excessively wet or in a decomposed condition is unacceptable)
 4. Free of weeds, weed seed, chaff, diseases, dirt, leaves, twigs, dust, toxic substances and any other foreign material.

2.7 WATER

- A. Supply potable water for consolidating the modified soil layer and for watering plants during the establishment period. In lieu of potable water, supply clean, clear water, free of harmful contaminants, from a source approved by the Engineer.

PART 3 EXECUTION

3.1 PRE-INSTALLATION PROTECTION

- A. Complete upland grading, utility installation, and other earth disturbing operations prior to excavating for the bio-swale.
- B. Construct pre-treatment practices as specified in the contract documents.
- C. Prior to installing the bio-swale, install erosion and sediment control practices upstream to protect the bioswale from sediment in stormwater runoff.
- D. All plants may be inspected by the Engineer prior to planting. Plants may be inspected and approved at the place of growth or at the project site by the Engineer for compliance with the specifications for quality, size, and variety. Such approval does not waive the right to inspect and reject any plant after it has been delivered to the project site and/or installed.

3.2 PROTECTION

Protect paving, sidewalks, utilities, and sod during construction operations; repair or replace any items damaged by construction operations at no cost to Contracting Authority.

3.3 BIOSWALE INSTALLATION

- A. Complete rough grading activities to excavate the bioswale area to the length, width, and depth specified in the contract documents. Do not compact the bioswale subgrade and do not operate heavy machinery on the subgrade. Construction and grading of the bioswale shall be done using low ground-contact pressure equipment, or by excavators and/or backhoes operating adjacent to it.
- B. Excavate across the bottom of the bioswale for placement of the aggregate subbase layer as specified in the contract documents.
- C. Verify that the bottom of the bioswale trench is clear of debris or other material and remains at the proper subgrade elevations to allow for placement of aggregate subbase.
- D. Place the first 3 inches of aggregate subbase evenly over the bottom of the bioswale area.

- E. Install the subdrain at the elevation specified in the contract documents. Install cleanouts at locations specified in the contract documents.
- F. Place remaining aggregate subbase layer to the elevation specified in the contract documents.
- G. Place 2 inches of porous backfill on top of aggregate subbase.
- H. Place modified 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 modified soil layers during placement. Overfill area with modified soil by 5% of the specified depth to allow for natural settlement.
- I. Avoid over compaction by allowing time for natural settlement. If the project schedule does not allow for natural settlement of soil then compact the filter soil matrix by soaking as described below:
 - 1. Apply water to uniformly saturate surface by spraying or sprinkling
 - 2. Ensure entire bioswale area is saturated
 - 3. Add modified soil as required to restore settled surface to finished elevation.
- J. Roughen surface of side slopes that are 4 (H):1(V) or steeper to reduce potential for rill erosion along equipment tracks.
- K. Perform stabilization measures and install native plants as specified in the contract documents.
- L. Install side slope erosion and sediment control measures as specified in the contract documents.
- M. Uniformly grade and rake the top of the modified soil layer to a flat, smooth, uniform surface.
- N. Plant specified native grasses and forbs in the modified soil.
 - 1. Prior to planting, the Engineer will inspect the site. Any unsatisfactory conditions shall be corrected prior to planting. No weeds shall be present in the beds at planting time.
 - i. Set out and space plants as indicated on Drawings; maintain in even rows with triangular spacing; make minor adjustments as required. Obtain approval of Engineer prior to excavation.
 - 1. Make field adjustments in plant locations where underground or overhead obstruction is encountered, or where changes have been made as approved by the Engineer.
 - 2. Plant in accordance with suppliers written recommendations. Planting shall be done by experienced employees under the supervision of a qualified supervisor.
- O. Place a 2 inch layer of hardwood mulch uniformly over area filled with modified soil in accordance with contract documents. Do not damage plants during placement of mulch.
- P. 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 bioswale. Address any such erosion or sedimentation should it occur, until final acceptance.
- Q. Do not store materials or operate heavy equipment within or near the footprint of the bioswale practice after installation has been completed.

3.4 MAINTENANCE & CLEANING

- A. Plantings: Contractor is responsible as follows:
1. Prior to planting: The Contractor is responsible for the maintenance and watering of the plants from the time they are brought on to the job site until they are planted and accepted at the end of the Establishment period. Plants shall be watered often enough to prevent wilting prior to planting.
 2. Establishment Period: After planting, the plants shall be watered initially to settle the soil, then to prevent wilting and to allow the plants to become established on the site.
 - i. Watering and rainfall shall generally supply a minimum of 1 inch of water per week.
 - ii. The beds shall be kept free of weeds at planting time and shall be maintained weed free by the Contractor until the end of the establishment period.
 3. Warranty Period: Contractor shall make periodic visits to the project site to review plant conditions and maintenance needs.
 - i. Weeding: At minimum, Contractor shall weed the area once per month during the growing season.
 4. General: The following shall be the Contractors responsibility until acceptance at the end of the Warranty Period:
 - i. The Contractor shall checks the beds regularly for soil settling which may expose the roots or otherwise endanger the health of the planting. Should this occur, the Contractor shall correct the settling problem – see E. below.
 5. Newly planted plants may be heaved out of the ground by alternate freeze and thaws. Should this occur, the Contractor shall re-set those affected plants.
- B. Protect bio-swale and adjacent areas and adjacent areas free from contamination.
1. Protect from traffic, erosion and sedimentation
 2. Keep free of trash and debris
 3. Repair and re-establish grades in settled, eroded, and rutted areas to original elevations specified in the contract documents.
- C. Keep adjacent paving and construction area clean and work area in an orderly condition.
1. Keep public streets clean from soil, soil tracking, and debris at all times.
- D. Reconditioning Compacted Areas: Where completed graded areas are disturbed by subsequent construction operations, erosion and adverse weather, scarify surface, re-shape, and compact to required density prior to further construction at no cost to the Contracting Authority.
- E. Settling: Where settling is measurable or observable during general project warranty period, add modified soil, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration at no cost to the Contracting Authority.
- F. Remove surplus materials and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off-site.

3.4 BIOSWALE INITIAL INSPECTION AND ACCEPTANCE

- A. Initial inspection of the bioswale to determine completion of the contract work will be made by the Engineer.
1. Initial inspection will not be conducted unless all items of work as outlined in this Special Provision and the associated drawings have been completed.

2. Submit written notice requesting such inspection at least 5 days prior to anticipated date.
3. The Engineer will inspect the bioswale, including the plants and mulch after initial installation has been completed.
4. After inspection, the Contractor will be notified in writing by the Engineer of initial acceptance of the work inspected, exclusive of the possible replacement of plants subject to guarantee, or if there are any deficiencies of the requirements for completion of the work. Once the plants are replaced and/or deficiencies corrected and approved, then the Establishment period will begin. The Engineer will document the date of the start of the Establishment period.
5. Replacement of dead or rejected plants before initial acceptance shall not be considered a part of the establishment replacement or warranty replacement requirement of this Section.

3.5 PLANT ESTABLISHMENT AND WARRANTY PERIODS AND ACCEPTANCE

- A. Establishment Period: The plant establishment period is 60 growing season days after the installation is accepted by the Engineer. A plant inspection will be made by the Engineer prior to the expiration of the establishment period.
- B. Warranty Period: The plant warranty period begins immediately after the expiration of the 60 day establishment period. Inspection of plants will be made by Engineer at the end of the 1 year warranty period. The warranty period for all other bioswale work is covered under the general warranty specified in the contract documents.
- C. Inspections: The Engineer will conduct all of the specified inspections.
- D. Plant Condition: Ensure all plants are in a live, healthy, and growing condition at the date of acceptance of the installation by the Engineer, at the end of the plant establishment period, and at the end of the warranty period.
- E. Plant Replacement: Replace all plants not found to be in a live, healthy and growing condition during inspection at the end of the 60 day establishment period and again at the end of the 1 year warranty period, all at no additional cost to the Contracting Authority.
- F. Bioswale: The bioswale, with the exception of the plants, shall all be covered under the warranty requirements specified for the project in the contract documents. All deficiencies shall be corrected immediately throughout the warranty period, all at no additional cost to the Contracting Authority.
- G. Make all necessary repairs to grades, lawns, and paving required because of plant replacements or repair of deficiencies in the bioswale. Such repairs shall be done at no extra cost to the Contracting Authority.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. Bio-Swale

1. Measurement: Measurement will be the plan quantity in square feet without final field measurement. The plan quantity is based upon the proposed bioswale length and width shown in the plans. Adjustments may be made to the plan quantities if agreed to by both

the Engineer and the Contractor or if there are approved field change orders that would increase or decrease the square footage of the bioswale. In such cases, the area that was changed, added or deleted would be measured in the field.

2. Payment: Payment will be made at the unit price per square foot of bioswale installed in accordance with the contract documents according to the following schedule:
 - a. 85% upon initial acceptance of work;
 - b. 10% at end of 60 day establishment period, upon installation of replacements and corrections of any deficiencies in the bioswale;
 - c. 5% at end of 1 year warranty period, upon installation of replacements and corrections of any deficiencies in the bioswale.
3. Includes: Unit price includes, but is not limited to, furnishing, hauling, placing and grading aggregate subbase and porous backfill; furnishing and placing subdrain and subdrain cleanout pipe, pipe fittings, couplings and fittings; furnishing, hauling, blending, and placing modified soil; supplying and applying water to compact modified soil; furnishing, hauling, installing, protecting and caring for landscape plantings until final inspection; maintenance of plants during establishment and warranty periods; supplying, hauling, and placing hardwood mulch. Unit price also includes all required testing.