**Section 6100 - Erosion and Sediment Control**

# Contents

## SECTION 6100 GENERAL REQUIREMENTS

### 6101 Summary

This section describes general requirements to prevent or minimize the pollution of rivers, streams, lakes, and wetlands caused by runoff from the construction zone. Such pollution includes sediment that may migrate offsite through the action of wind, water, or traffic, as well as chemical spills or other refuse from the site.

### 6102 Contractor's Responsibility

The Contractor shall take measures to prevent or minimize the transport of sediment or pollutants from the project limits or into bodies of water that are intended for protection, in accordance with the plans, the requirements of applicable permits and regulations, and best available management practices.

### 6103 Compliance with NPDES Permits

The Owner will obtain a National Pollutant Discharge Elimination System (NPDES) permit and other similar local water pollution control permits as required. Where such permits are required, the Owner will provide the Contractor with a Stormwater Pollution Prevention Plan (SWPPP) which has been prepared by the Engineer or other qualified professional. The Contractor shall comply with all requirements of such permits and the SWPPP, and shall enforce compliance with such requirements by all Subcontractors. The Contractor shall complete the required certification forms for coverage under the relevant permit and shall notify all Subcontractors in writing of the requirements of the SWPPP, obligate them under contract to comply, and enforce compliance during the work.

### 6104 Projects Not Requiring a Permit

If neither NPDES permit nor other local water pollution control permits are required for a project, the Engineer may waive certain documentation and record-keeping provisions of this specification. The Contractor is required to comply with all other provisions in this specification and is required to install such measures for erosion and pollution control as may be called for in the plan or ordered by the Engineer.

## 6105 Stormwater Pollution Prevention Plan (SWPPP)

The Stormwater Pollution Prevention Plan (SWPPP) outlines methods and controls to be used to prevent stormwater pollution from the construction activities. The SWPPP will generally consist of the following elements: (a) a site description; (b) a site map or plan sheets showing areas of soil disturbance, an outline of areas which will not be disturbed, and a drainage area map; (c) plan sheets, tables, or other schedules detailing the location of major structural and non-structural controls and areas where stabilization practices are expected to occur; (d) a description of erosion and sediment controls to be used; (e) a description of any permanent stormwater management features which are incorporated into the project; (f) a description of other controls related to waste disposal practices; (g) a description of the timing, during the construction, of when the measures will be implemented and removed; and (h) a description of maintenance procedures for control measures identified in the plan.

Where multiple agencies have jurisdiction over erosion and sediment control, the SWPPP will be prepared to satisfy the requirements of each. The use of the term “Stormwater Pollution Prevention Plan” or “SWPPP” is not intended to limit its content to the provisions of any single permit program or jurisdiction, and this specification shall have the same meaning regardless of whether the applicable plans are referred to as a “SWPPP,” “erosion control plan,” “erosion and sediment control plan,” “temporary water pollution control plan,” or other equivalent term.

All elements of the project bid documents relating to erosion and pollution control are considered part of the SWPPP, either by direct inclusion or by reference, including plan sheets, specifications, special provisions, quantity tabulations, bid sheets, and contract documents. A copy of all NPDES and other water pollution related permits and permit applications are also part of the SWPPP. This specification is an integral part of the SWPPP.

## 6106 Contractor Amendments to the SWPPP

Prior to beginning work, the Contractor shall review the SWPPP in detail and provide the Engineer with written recommendations for amendments to improve the effectiveness of the SWPPP or to bring it into better alignment with the Contractor's intended method of operations. The Contractor shall also advise the Engineer of any omissions or deficiencies they find in the SWPPP. During the progress of the job, the Contractor shall continue to monitor the effectiveness and performance of the control measures used and propose additional amendments as needed. No amendment shall be incorporated unless approved by the Engineer, and a log of such amendments shall

be made by the Contractor. When required by the permit or state law, such amendments shall be developed and prepared under the supervision of a qualified professional as defined in said permit or law. A copy of the SWPPP and all amendments shall be retained by the Contractor onsite and ready for inspection without notice.

## 6107 Contractor Schedule

In addition, the Contractor shall also provide the Engineer with a detailed schedule of their work prior to beginning, which shall include information on the expected timing, duration, and sequencing of erosion and sediment control measures and overall job completion and phasing. Once approved, such schedule shall become a part of the SWPPP, and changes to the schedule shall require amendment to the SWPPP.

## 6108 Alternate Methods or Materials

The Contractor may propose alternative methods or materials for any of the specific erosion and sediment controls given in the SWPPP, provided that such methods provide equal or improved measures of control, as determined by the Engineer. The Contractor shall submit any documentation required by the Engineer to evaluate the alternative. If agreed to by the Engineer (and subject to state or other permitting approval if applicable), payment for such alternate method shall be handled in accordance with the applicable provisions of the Contract for changes in work.

## 6109 Superintendent Training Required

The Contractor’s resident superintendent shall have no less than 8 hours of formal training on erosion and sediment control within the last 24 months. Such training shall include the principles of erosion and sediment control, technical information on typical and/or innovative controls, and the contents of these specifications and related Standard

Drawings and Design Criteria. The training shall be taught primarily by a registered professional engineer or other professional who is considered by the applicable regulatory agencies to be qualified to prepare a SWPPP. Documentation of training shall be submitted to the Engineer upon request, prior to beginning work.

## 6110 Duration of Contractor's Responsibility

The Contractor is responsible for water pollution control and permit compliance from the issuance of Notice to Proceed until final completion of the work and during any subsequent maintenance bond period. The notice of termination will not be submitted by the Owner until all permit requirements are met, which includes the requirement that final stabilization be achieved on 100% of the site. Vegetation shall achieve a density of at least 70% of full turf to be considered acceptable as final stabilization.

## 6111 Installation of Controls

The Contractor shall obey all requirements for chemical and waste controls specified in Section 6130. Contractor shall provide all specific erosion and sediment controls required by the SWPPP in accordance with the requirements of Section 6105 and 6106. If the SWPPP calls out items or controls not included in this specification, refer to the project special provisions and plans for requirements. Controls shall be installed prior to disturbance in an area, unless otherwise indicated in the plans.

## 6112 Maintenance

The Contractor shall maintain the integrity of the temporary erosion and sediment control devices as long as they are in required and in place. Devices not functioning properly shall be corrected or replaced. Accumulated sediments shall be removed promptly as detailed in Section 6163.

## 6113 Removal

Control measures shall be completely removed from the site when they are no longer needed, unless they are approved by the Engineer to remain in place for permanent stabilization or biodegradation (i.e. erosion control blankets).

## 6114 Inspections

The Contractor shall inspect the construction site within twenty-four hours of the end of a storm which results in precipitation of 0.5 inches or greater, during both active and inactive phases. In addition, regular inspections shall be made weekly during active

phases of construction. During inactive phases (such as winter when construction activity has temporarily ceased), an inspection of the site condition shall be made no less than once every 14 days. All installed practices shall be checked for proper installation, operation, and maintenance. Locations where stormwater runoff leaves the site shall be inspected for evidence of erosion or sediment deposition. Deficiencies shall be noted in a report of the inspection and corrected within seven calendar days of the inspection.

A report of each inspection is to be made within 24 hours of the inspection and shall contain the following minimum information: inspector's name, date of inspection, observations relative to the effectiveness of the practices, actions taken or necessary to correct deficiencies, a listing of areas where construction operations have permanently or temporarily stopped, observations at stormwater discharge locations, and any other item required of an inspection by the applicable permits The inspection report shall be signed by the person performing the inspection. Site inspection reports shall be maintained onsite with the SWPPP or the SWPPP shall contain written documentation of the off-site records storage location.

## 6115 Records

The Contractor shall maintain all permit required records during the job and shall transmit all necessary records to the Engineer at the completion of the work, including all Contractor and Subcontractor certifications and site inspection

records, as well as other records requested by the Engineer.

## 6116 Site Access for Inspections

The Contractor shall allow authorized representatives of federal, state, or local agencies having jurisdiction of this permit, upon presentation of proper credentials, to enter the site where construction activities are located, to obtain samples of any discharge water, to have access to and copy at reasonable times, any records which shall be kept, and to inspect any facilities or equipment.

## 6117 Maximum Areas of Disturbance at One Time

The surface area of erodible earth material exposed by site operations shall be limited by the Engineer according to the Contractor's capability and progress in keeping with the approved schedule. Existing vegetation shall be preserved or retained as long as practical and the time period for soil areas to be without permanent surface or vegetative cover shall be minimized. The maximum surface area of erodible earth exposed at one time shall not exceed ten (10) acres unless approved in writing by the Engineer or otherwise provided for in the plans. The Contractor shall pay close attention to the grading and disturbance limits indicated on the plan or authorized by the Engineer.

## 6118 Measures Where Construction has Ceased

Soil stabilizing erosion control measures as detailed in Sections 6140 shall be implemented within 14 calendar days after construction activities have temporarily or permanently ceased on any portion of the site. Exceptions to this requirement are as follows: (a) if implementation of erosion controls is precluded by snow cover, such measures shall be taken as soon as practical after snowmelt, or (b) a waiver to this requirement is justified and approved by the Engineer in writing, in which case a specific deadline for installing erosion controls shall be established.

## 6119 Duration Limits for Select Activities

For certain items of work, the plans or standard sequences may contain specific time limits for the maximum duration of exposure, typically stated as “Item A construction shall have a maximum exposure time of X days.” Where such limits are specified, the time shall be measured from the date in which stabilized ground cover is first disturbed in the work area until the specified construction is complete and permanent or temporary stabilization shown on the Plans is applied. Contractor shall be responsible for documenting the elapsed time on all such work, typically by noting the time in their inspection logs, taking time-stamped photographs, and/or by marking the area with a wooden stake documenting beginning and ending dates. The Engineer may grant extensions of time requested by the Contractor when justified and suitable interim stabilization measures are provided.

## 6120 Construction near Rivers, Streams, and Waterbodies

Construction operations in or near rivers, streams, and other water impoundments shall be restricted to those areas essential for construction. Unless otherwise provided for in the plans, a minimum 50 feet buffer of undisturbed vegetation shall be maintained between construction operations and defined drainage courses. Where such buffers are not provided, work shall not be initiated until all materials and equipment necessary to complete the work are on site and such operations shall be completed as quickly as possible once the work has begun. When no longer required, all falsework, pilings, temporary crossings, and other obstructions shall be promptly removed. Stream crossings shall be limited to those detailed in the plans or as approved by the Engineer.

## 6121 Culverts, Ditches and Storm Sewers

Construction of major elements of the proposed storm sewer or other drainage systems shall be coordinated to minimize the duration of time over which stormwater would run through temporary, erodible channels. Unless otherwise indicated on the plans, construction of the major elements of this system shall be among the first activities on the project. Once begun, construction shall proceed expeditiously to completion, including placement of all final headwalls, end structures, rip-rap and other end treatments. Temporary or permanent ditches which are graded on the project shall either be stabilized or have temporary sediment controls installed within seven (7) days of their grading.

## SECTION 6130 CHEMICAL AND WASTE CONTROLS

### 6131 Summary

This section describes specific requirements to control non-sediment related pollutant discharges from chemicals and wastes from the site, including requirements for chemical handling, spill prevention, spill response, and waste disposal.

### 6132 Solid, Liquid, and Hazardous Wastes

All trash shall be placed in dumpsters or trash barrels provided by the Contractor and accumulated trash shall be hauled offsite and properly disposed. Floating debris found in any waterbody on or immediately adjacent to construction shall be removed immediately, regardless of source. Hazardous wastes shall be stored, transported offsite, and disposed of properly.

### 6133 Sanitary Wastes

Sanitary facilities shall be made available and their use enforced by the Contractor.

### 6134 Leak Prevention

All equipment used onsite shall be free of leaks, receive regular preventative maintenance, and be inspected daily to reduce chance of leakage. No fueling, servicing, maintenance, or repair of equipment shall be done within 50 feet of a stream, drainage way, lake, storm sewer manhole or other water body. Onsite fuel tanks shall be in good condition, free of leaks or drips, painted brightly for visibility, and monitored daily. All fuel tanks, including mobile trailers, shall be protected by a secondary containment system or earthen berm sized to contain 110% of the full tank volume.

### 6135 Concrete Washout

Concrete wash or rinse water from concrete mixing equipment, tools and/or ready-mix trucks, tools, etc., shall not be discharged into or be allowed to run directly into any

existing water body or storm inlet. One or more locations for concrete wash out shall be designated on site and installed in accordance with the Standard Drawings.

## 6136 Chemical Handling and Storage

Chemicals or materials capable of causing pollution shall only be stored onsite in their original container. Materials stored outside shall be in closed and sealed water-proof containers and located outside of drainage ways or areas subject to flooding. Manufacturer's data regarding proper use and storage, potential impacts to the environment if released, spill response, and federally-defined reportable quantities for spill reporting shall be maintained by the field superintendent onsite at all times. Locks and other means to prevent or reduce vandalism shall be used.

## 6137 Herbicides, Pesticides and Fertilizers

Herbicides, pesticides and fertilizers used as part of the work shall be applied only in accordance with manufacturer recommendations. Direct spray into water bodies is prohibited. Such chemicals shall not be used if rain is forecast within 24 hours, unless they are approved for wet weather application.

## 6138 Spill Clean-up and Management

If it is safe to do so, Contractor shall stop the source of any spills or leaks and shall contain spills immediately with an appropriate device, earthen berm, sawdust, sand, kitty litter, rags or other absorbents. Manufacturer recommendations shall be followed. Leaks from broken hoses shall be immediately contained with hose clamps, plugs, or drained into leak-proof containers. Contractor shall have the tools, equipment, and supplies necessary for spill response onsite at all times and ready for immediate use. Contractor personnel shall be trained to properly respond immediately to a leak or spill. All spills shall be cleaned up and disposed of in accordance with applicable federal, state, and local regulations. Local hazardous materials response units shall be called if assistance is needed in stopping or containing the spill.

## 6139 Spill Reporting

All spills in excess of reportable quantities shall be reported to the appropriate federal, state, and local agencies within 24 hours of their occurrence. The Contractor shall maintain a listing of all such agencies onsite within the SWPPP and in easy reference for onsite personnel. Spills that pose an immediate threat to public safety or contamination of a water body shall be reported immediately to designated first response authorities. A current listing of applicable phone numbers for the jurisdiction shall be placed at the front of the SWPPP and posted conspicuously on the jobsite.

## SECTION 6140 EROSION CONTROLS

6140 Referenced Standards

The following standards are referenced directly in this section. The latest version of these standards shall be used.

**APWA, Kansas City Metropolitan Chapter (KC-APWA):**

Standard Drawings, Division III of Standard Specifications and Design Criteria

**Erosion Control Technology Council (ECTC):**

Standard Specification for Rolled Erosion Control Products (RECPs).

**Kansas Department of Transportation (KDOT):**

Standard Specifications for State Road & Bridge Construction, 2015 Edition or later including all latest errata and adopted Special Provisions, as well as associated Standard Drawings.

**Texas Department of Transportation (TxDOT):**

Approved Products List (APL) for Erosion Control. Based on testing and standards cited in the report

“TXDOT / TTI Hydraulics, Sedimentation and Erosion Control Laboratory:

Field Performance Testing of Selected Erosion Control Products”.

**US Composting Council (USCC):**

STA – Seal of Testing Assurance Program; and TMECC - Test Methods for the Examination of Composting and Compost. Information available online at www.compostingcouncil.org.

## 6141 Summary

This section describes specific requirements for installation and maintenance of temporary measures to stabilize onsite soils and prevent erosion during construction.

## 6142 Materials

Materials used for erosion controls shall meet the requirements of the following subsections. Unless otherwise specified herein, the Contractor shall submit, for each material used, a certification prepared by the manufacturer which states that the materials meet all the requirements of this specification. The manufacturer shall also provide supporting documentation and testing results to validate this certification, if requested by the Engineer.

Manufacturer's instructions for installation of materials (when applicable) shall be available onsite whenever work is occurring and a copy shall be submitted to the Engineer upon request.

## 6143 Permanent Seeding and Sodding

Final stabilization with vegetation by either permanent seeding or sodding is the most effective form of erosion control and shall be achieved as early in the construction process as possible.

A. Materials, Construction Requirements and Maintenance: Permanent seeding or sodding shall be provided as specified in Section 7200 of these Standard Specifications. Contractor shall schedule work so that permanent seeding is conducted as early as practical in the construction process. Multiple mobilizations of seeding or sodding operations shall be expected.

B. Out-of-Season Special Provision: The Engineer may request that permanent seeding be conducted anytime between April 16 and August 14 and/or that sodding be conducted anytime between June 1 and September 15, even though such dates are outside the standard seasons established in Section 7200. If agreed to by the Contractor, then the Contractor shall conduct such seeding or sodding and shall be responsible for the establishment of a vigorous and healthy seed or sod cover. The Contractor will be paid, however, for all watering necessary during the period that falls outside the standard season.

6144 Temporary Seeding

Interim stabilization with annual vegetation to provide temporary cover to minimize erosion. This item only covers seeding installed by conventional drilling.

A. Materials: Seed and equipment used for temporary seeding shall meet all the criteria given for permanent seeding in Section 2400 of these Standard Specifications. Fertilizer is not required.

Mulch used for temporary seeding shall meet the same requirements as “mulch cover” in subsection 6145. Mulch is required unless erosion control blankets are being used instead.

The following seed mixtures and planting rates shall be used:

1. Type "TR" Seed: This mixture will normally be used when temporary seeding is conducted between February 15 and May 31, or between September 1 and October 31. The seed mixture will be as follows:

| Kind of Seed | Minimum Pure Live Seed (%) | Rate of Pure Live Seed (lbs per Acre) |
|---|---|---|
| Annual Rye Grass | 83 | 90 |

2. Type "TM" Seed: This mixture will normally be used when temporary seeding requires heat tolerance, typically for planting anytime between May 1 and August 15. (Volunteer millet is aesthetically objectionable in turf grass lawns; therefore, some jurisdictions may restrict use of this mix. Confirm local requirements before use.) The seed mixture will be as follows:

| Kind of Seed | Minimum Pure Live Seed (%) | Rate of Pure Live Seed (lbs per Acre) |
|---|---|---|
| Millet | 77 | 65 |

3. Type "TW" Seed: This mixture will normally be used when temporary seeding requires cold tolerance, typically for planting anytime between September 15 and November 30. The seed mixture will be as follows:

| Kind of Seed | Minimum Pure Live Seed (%) | Rate of Pure Live Seed (lbs per Acre) |
|---|---|---|
| Winter Wheat | 83 | 120 |

B. Construction Requirements: Preparation, planting and all other construction requirements for temporary seeding shall be as specified for permanent seeding in Section 2400, except as modified herein. Temporary seeding shall be drilled (see 6146 for hydraulic application of temporary seed). Prior to application, the soil shall be tilled to a depth of at least 2 inches and gullies, depressions, and large clods eliminated. Roller compaction of the seedbed is not required. Within 24 hours of seeding, mulch or erosion control blankets shall be applied. When mulch is used, it shall be applied in accordance with the same requirements given for “Mulch Cover” in subsection 6145. When erosion control blankets are used, they shall be installed in accordance with the requirements in subsection 6148. The Contractor shall initially water all areas of temporary seeding at least one-quarter inch as soon as the mulch is laid. Additional watering may be necessary for plant germination and adequate growth to provide cover. Contractor shall schedule work so as to provide temporary seeding as early as practical in the construction process. Contractor shall maintain a readiness to perform temporary seeding frequently during the progress of the project. No more than 7 calendar days shall elapse between the Engineer’s request for temporary seeding and its application. Multiple mobilizations to seed areas as construction progresses shall be expected.

C. Maintenance: Mulch shall be replaced or repaired as needed during germination and early growth. Bare spots shall be patched, by hand seeding if necessary. Vehicle and personnel traffic shall be minimized in areas seeded.

## 6145 Mulch Cover

Mulch applied without seeding to protect the soil surface from raindrop impact and reduce wind erosion and dust. Mulch Cover (without seed) is generally used when ground cover is required and temporary or permanent seeding is not feasible.

A. Materials: Mulch shall be vegetative type only, consisting of cereal straw from stalks of oats, rye, wheat or barley and shall be free of prohibited and noxious weed seeds.

B. Construction: Prior to applying mulch, the soil shall be tilled to a depth of 2 inches to eliminate hard crust and allow rainwater intercepted by mulch to infiltrate the soil. Gullies, depressions, and large clods shall be eliminated.

Mulch shall be applied at the rate of 1.5 tons/acre (3,000 lbs/acre) and be anchored into the soil a minimum depth of 3 inches by use of a heavy disc harrow, set nearly straight, or a similar approved tool. Discs of the anchoring tool shall be set approximately 9 inches apart. Anchoring shall be accomplished by not more than two passes of the tool. If approved by the Engineer, a tackifier may be applied to the mulch to anchor it instead of using the disc harrow.

C. Maintenance: Mulch cover shall be replaced or repaired as needed. Bare spots shall be filled in, by hand if necessary. Vehicle and personnel traffic shall be minimized in areas mulched.

6146 Hydrocover (Standard)

Hydraulic application of a standardized mixture of fiber mulch, tackifier, and temporary seed to provide temporary cover.

A. Materials:

1. Fiber Mulch: Fiber mulch shall be a manufactured, pre-packaged, biodegradable material. The material supplied shall be meet the requirements of ECTC's Standard Specification for Hydraulic Erosion Control Products (HECPs) (version 2.4 dated April 2, 2014) for Type 3 products, having a functional longevity of 3 months, a maximum uninterrupted slope length of 50 feet, and applied to a slope that is flatter than 3:1. In addition, the material shall also be listed on the TxDOT Approved Products List for Erosion Control under the category "Mulches 4:1 or Flatter Slopes" and specified for use on "Clay or Tighter Soils".

2. Tackifier: Shall be food-grade hydrolyzed guar gum powder or alternate material as specified by the manufacturer. It shall be mixed with the cellulose fibers based on the manufacturer's recommendations.

3. Water: Shall be clean, potable water mixed at a rate suitable for the equipment being used and as recommended by the manufacturer.

4. Seed: Shall be Type TR, TM or TW seed as specified in Section 6103.5 and appropriate for the season. Seed shall be mixed to provide no less than the seeding rate per acre given in that section.

5. Fertilizer: Not required unless specified by the Engineer

B. Construction Requirements: The fiber mulch shall be added to the hydraulic seeder along with proportionate amounts of seed, tackifier, and water in accordance with the manufacturer's recommendation.

It shall be applied to make a uniform coverage of the soil surface. Prior to application, the soil shall be tilled to a depth of at least 2 inches and smoothed to eliminate gullies, depressions, or large clods. The Standard Mix Hydrocover mix shall not be used on any slope steeper than 4:1. Contact the engineer for alternate specifications to be used on steeper slopes if there is a discrepancy.

Hydrocover shall be applied at a minimum rate of 2,000 pounds dry weight of fiber per acre (0.41 pounds per square yard), unless otherwise specified by the manufacturer. Once applied, the area shall be allowed to dry and vehicle and personnel traffic shall be kept off the stabilized area. Water shall be applied as needed for seed germination and plant growth. The hydrocover operation shall be accomplished with hydraulic sprayers suitable for spreading and projecting the mixture and fitted with the appropriate nozzle tips. Sprayers shall be mechanically mixed or jet agitated.

Contractor shall maintain a readiness to provide hydrocover frequently during the progress of the project. No more than 7 calendar days may elapse between the Engineer's request for hydrocover and its application. Multiple mobilizations of hydrocover operations shall be expected.

C. Maintenance: Areas which are disturbed by construction shall be patched with additional application of slurry at the next available mobilization of equipment at no additional cost. Small areas of poor coverage may be stabilized through erosion control blankets, mulch for cover, straw wattle protection or other measures, at no additional cost.

## 6147 Hydrocover (Specialty Mix)

Hydraulic application of specialized mixtures of fiber mulch, tackifiers, seed and other additives to provide temporary cover. Such specialized mixtures may provide for steeper slopes, more robust protection, longer durability, or enhanced vegetative growth, as compared to the Standard Mix.

A. Materials: When specialty mixtures are used, the particular mix design and ingredient requirements shall be given in the plans or special provisions. Such specialty mixtures may include additives for improved seed germination, mixtures of special polymer tackifiers and heavier rates of cellulose fiber or other crosslinking organic fibers to produce a more continuous cover (i.e. “Bonded Fiber Matrix”), or mixtures that contain polyacrylamides that chemically stabilize the underlying soils (i.e. “Stabilized Fiber Matrix”). Seed and additives shall conform to the requirements of standard hydrocover, except as modified in the plans, special provisions or by the manufacturer’s recommendations for the specialty mix.

B. Construction and Maintenance Requirements: All construction and maintenance requirements shall be the same as for standard hydrocover, except as modified by the plans or the manufacturer’s recommendation for the specialty mix. Equipment for specialty mixes shall conform to manufacturer’s recommendations.

## 6148 Erosion Control Blankets (including Turf Reinforcing Mats)

Blankets or mats of natural, synthetic, or composite materials that can be rolled onto bare earth and anchored in place to provide temporary or permanent cover and/or to stabilize bare earth or channels subject to overland or concentrated surface flow. This item of work includes the use of Turf Reinforcing Mats.

A. Materials: Erosion control blankets of the class and type specified in the contract shall be a “Rolled Erosion Control Product” as defined by the ECTC Standard Specification. Further, the material shall be listed in the current TxDOT Approved Products List for Erosion Control. Blankets are categorized by expected use and application, as follows:

Class 1: For use as Cover and Slope Protection from overland flow:

Type A: On slopes 1:3 or flatter with clay soils.

Type B: On slopes 1:3 or flatter with sandy soils.

Type C: On slopes steeper than 1:3 with clay soils.

Type D: On slopes steeper than 1:3 with sandy soils.

Class 2: For use as Flexible Channel Liner under concentrated flow:

Type E. For shear stresses below 2 lb/sq. ft.

Type F. For shear stresses below 4 lb/sq. ft.

Type G. For shear stresses below 6 lbs/sq. ft.

Type H. For shear stresses below 8 lb/ sq. ft.

Materials supplied for Type A, B, C, D, E and F blankets shall have a minimum expected longevity of 12 months, unless otherwise stated on the plans or approved by the Engineer. Materials supplied for Type G and H shall have a longevity of greater than 5 years. Materials for Type H shall be 100% synthetic. Expected longevity shall be evaluated based on the manufacturer's data.

**Construction Requirements**: The Contractor shall install erosion control blankets in the locations shown in the plans and in accordance with the Standard Drawings and manufacturer's recommendations.

B. Maintenance: Maintain blankets in accordance with the Standard Drawings and manufacturer's recommendations.

6149 Compost Cover

Organic compost applied with or without seeding to protect the soil surface from raindrop impact, absorb stormwater, facilitate vegetation growth and reduce wind erosion and dust.

A. Materials: (Note: The material requirements in this subsection do not apply for compost filter berms and compost filter socks, and are described more fully in Sections 6169 and 6170)

All compost shall be mature, sanitized, well-composted organic matter free of identifiable feedstock constituents and offensive odors. Compost shall have been produced by the aerobic decomposition of organic material. Organic material sources may include leaves and yard trimmings, paper fiber, wood, bark, biosolids, food scraps, composted manures, or combinations of these products. Biosolids compost shall comply with the Standards for Class A biosolids outlined in 40 Code of Federal Regulations (CFR) Part 503. The compost shall be free of any refuse, contaminants, and any material toxic to plant growth. Compost must not be derived from mixed municipal solid waste. Compost shall comply with all applicable state and federal regulations regarding production and distribution.

All compost material supplied shall be certified through one of the following programs:

1. The USCC STA Program through a certified supplier, and wherein all testing procedures follow the USCC TMECC manual.

2. The KDOT Specification found at Section 2105 for Soil Compost Materials, wherein all testing procedures are in accordance with the requirement listed there.

Before delivering of the compost, the suppler shall provide a copy of the lab analysis and certifications as outlined for the applicable program. The supplier shall also document the feedstocks and sources used in the compost to be supplied.

B. Construction: Prior to applying compost, the soil shall be tilled to a depth of 2 inches to eliminate hard crust and allow rainwater intercepted by the compost cover to infiltrate into the soil. Gullies, depressions, and large clods shall be eliminated.

Compost shall be applied to a depth of 1.5 to 2 inches when alone or 1 to 1.5 inches when used in conjunction with seeding operations. Compost shall be uniformly applied using an approved spreader unit, which may include mechanical or pneumatic (blower) devices. Compost shall extend at least 3 feet beyond the shoulder of any slope to

ensure that runoff does not flow under the cover. Once applied, the compost shall be thoroughly watered to improve settling.

C. Maintenance: Compost shall be replaced or repaired as needed. Bare spots shall be filled in, by hand if necessary. Vehicle and personnel traffic shall be minimized in areas covered.

## 6150 Surface Roughening

Any rough graded slope that is not yet ready for seeding or other treatment and which will not be disturbed by ongoing construction for a period of 7 days or more shall be roughened by grooving, tracking, disking, or ripping it with a disc, tiller, spring harrow or other suitable implement. Such grooves shall be located traverse to the slope face and shall not be less than 3 inches deep nor spaced more than 15 inches apart. The requirement to roughen slopes by tracking or grooving shall apply to all slopes steeper than 6:1 horizontal to vertical. No measurement or payment shall be made for this item, but it shall be subsidiary to the earthwork.

## 6151 Dust Control

Contractor shall take effective measures to prevent blowing dust. Adequate moisture content shall be maintained in all exposed soils by application of water or other approved dust suppressant. Areas to be subsequently paved may be treated with asphalt emulsion. When dust produced by operations such as sand blasting, concrete grinding, and sawing of concrete or masonry would create a public nuisance, they shall be performed under a water spray or an alternate construction method shall be used. No measurement or payment shall be made for this item, but it shall be subsidiary to other work.

## SECTION 6160 SEDIMENT CONTROLS AND DIVERSIONS

### 6160 Referenced Standards

The following standards are referenced directly in this section. The latest version of these standards shall be used.

**AASHTO**:

M 288 - Geotextile Specification for Highway Applications

**APWA, Kansas City Metropolitan Chapter (KC-APWA):**

Standard Drawings, Division III of Standard Specifications and Design Criteria

**ASTM**:

D 3786 - Test Method for Hydraulic Bursting Strength of Textile Fabrics – Diaphragm Bursting Strength Tester Method

D 4355 - Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus

**Kansas Department of Transportation (KDOT):**

Standard Specifications for State Road & Bridge Construction, 2015 Edition or later including all latest errata and adopted Special Provisions, as well as associated Standard Drawings.

### 6161 Summary

This section describes specific requirements for installation and maintenance of temporary measures to detain, filter, or cause settlement of sediment from runoff, as well as measures used to temporarily direct or divert runoff onsite or at the site perimeter.

## 6162 Materials

Materials used for sediment controls and diversions shall meet the requirements of the following subsections. Unless otherwise specified herein, the Contractor shall submit a certification prepared by the manufacturer for each material used which states that the materials meet all the requirements of this specification. The manufacturer shall also provide supporting documentation and testing results to validate this certification, if requested by the Engineer.

Manufacturer's instructions for installation of materials (when applicable) will be available onsite whenever work is occurring and a copy shall be submitted to the Engineer upon request.

## 6163 Sediment Removal and Disposal

Removal of accumulated, settled sediment from behind barriers, traps, or within basins.

A. Materials: Not applicable.

B. Construction Requirements: Accumulated sediment shall be removed when it exceeds the volumes specified for any particular measure or would otherwise impede the proper operation of control measures. Sediments removed shall be mixed with other onsite materials and incorporated into project fills, spread loosely across the site, or hauled offsite as necessary. Sediments shall not form an identifiable layer or seam in any fill. Sediments hauled offsite shall be dewatered first or hauled in a water tight truck. Sediments shall be located and compacted in a way which minimizes the likelihood of being resuspended in future rainfalls. Removal shall be by machine or hand work, whichever is most feasible.

C. Maintenance: Not applicable.

## 6164 Silt Fence

A temporary barrier of synthetic fabric embedded in the ground and supported by posts used to divert water or to maintain a trap for settlement.

A. Materials, Construction Requirements and Maintenance: Refer to the Standard Drawings.

## 6165 Straw Bales

Straw bales shall not be used.

## 6166 Rock Ditch Checks

Small temporary stone ditch checks used to form protect ditches with larger flows.

A. Materials: Rock shall be a clean aggregate free of deleterious substances, including earth, chert, cracks, seams, soapstone, shale or other easily disintegrated materials. Rock shall come from a primary run and be screened to remove the easily separated fines. It shall meet the gradation requirements below for the nominal size specified:

2-inch Rock: Fifty percent (50%) by weight of the particles shall be larger than 1.5 inches in diameter and none shall be larger than 4 inches. Total aggregate and fines smaller than ½ inch shall not exceed 2 % by weight.

4-inch Rock: Fifty percent (50%) by weight of the particles shall be larger than 4 inches in diameter and none shall be larger than 9 inches. Total aggregate and fines smaller than 1” shall not exceed 2 % by weight.

6-inch Rock: Fifty percent (50%) by weight of the particles shall be larger than 6 inches in diameter and none shall be larger than 12 inches. Total aggregate and fines smaller than 1” shall not exceed 2 % by weight.

The Engineer may approve modifications to these gradations to accommodate readily available stockpiles from local quarries.

B. Construction Requirements: See Standard Drawings.

C. Maintenance: See Standard Drawings.

## 6167 Synthetic Sediment Barriers

Any one of various proprietary ditch checks, primarily composed of synthetic materials, that can be used instead of the other measures specified herein to control velocities and erosion in ditches or swales.

A. Materials: Materials for any given Type of Synthetic Sediment Barrier shall be as called out in the plans or Standard Drawings. In addition, this category may also include those measures called out as “Synthetic Sediment Barrier” in KDOT Specification Sections 902 and 2114.

B. Construction Requirements: Install Synthetic Sediment Barrier’s in accordance with manufacturer instructions. Pay particular attention to anchoring, protection of channel underneath, and to conditions at the ends to avoid bypassing.

C. Maintenance: Remove silt when it accumulates to 20% of the height of the barrier or when the accumulation prevents the proper operation of the ditch check, whichever is less. If units are damaged or dislodged during the sediment removal process, repair and re-establish continuity.

## 6168 Biodegradable Logs (or Wattles)

Circular tubes of netting filled with straw or other biodegradable fibers and used as a small height barrier for diversion of water or settlement.

A. Materials: Biodegradable logs are manufactured using a variety of filler materials. For this specification, the following two classes of filler are specified:

Class A: Rice or wheat straw fibers Fiber material shall be certified as weed free in accordance with state standards. Fibers shall have an average length greater than 3

inches. Type A wattles shall have a durability in the field of no less than 3 months. Type A wattles shall be specified with dimensions and minimum weights of 9-inch diameter (1.7 lbs./lin ft.); 12-inch diameter (2.5 lbs/lin. ft.) or 20-inch diameter (3.5 lbs/lin. Ft.)

Class B: Excelsior wood fibers, coconut fiber (i.e. coir), jute, or other longer-lasting biodegradable materials. Such materials shall be free of deleterious substances, compacted tightly, and shown to have an in-field durability of 6-months or greater. Class B wattles shall be specified with dimensions 9-inch diameter, 12-inch diameter, or 20-inch diameter.

Containment netting shall be jute or light-weight plastic. The entire wattle unit shall be sufficiently durable to withstand weather, construction, and installation conditions for no less than the life of the filler material (see above), including multiple movements and reinstallations. Wood posts of sufficient strength withstand installation and weather shall be used for anchoring.

B. Construction Requirements: Biodegradable logs shall be located as shown on the plans or directed by the Engineer. Individual units shall be installed in accordance with manufacturer's recommendations and the Standard Drawings.

C. Maintenance: Maintain as called out in the Standard Drawings.

6169 Compost Filter Berm

A berm or dike of compost placed to trap pollutants and filter runoff from small areas of overland flow.

A. Materials: Compost to be used in filter berms shall meet the following requirements:

| Parameter | Range |
|---|---|
| pH | 5.0-8.5 |
| Moisture Content | <60% |
| Organic Matter Content | >25% of dry weight |
| Particle Size | 99% < 2”, 30%-50% < 3/8” |

B. Construction Requirements: Compost filter berms shall be constructed using specially designed pneumatic equipment (blowers) and a berm shaping device, or other equipment as approved by the Engineer. If a blower is used, compost shall be blown directly at the soil surface to help settle, compact and shape the berm. The berm shall be formed in a trapezoidal shape, having a typical dimension of 3 feet wide at the base and 1.5 feet high. Position the berm around designated soil areas and parallel to the contour. The ends of the berm shall be pointed up slope such that the bottom elevation at each end is higher than the top elevation throughout most of the slope, so as to prevent water from flowing around the end of the berms.

C. Maintenance: Berms shall be reshaped and compost added as necessary to maintain their function and dimensions. Breaches in the berm shall be repaired promptly. Compost may be added by hand and tamped in place. Unless otherwise directed by the final landscape plans or by the Engineer, removal of the compost berm shall be made by spreading the compost in a thin layer over adjacent planted areas.

## 6170 Compost Filter Sock

A compost filter encased in a geotextile tube that serves a similar purpose to compost filter berms, particularly in areas with more concentrated overland runoff.

A. Materials: Compost to be used in filter socks shall meet the respective requirements for compost specified in Section 6169 for Filter Berms.

Tubes used for compost filter socks shall be produced from a 5 mil thick continuous HDPE or polypropylene filament, woven into a tubular mesh netting material, with openings in the knitted mesh 1/8 in (3 mm) to 3/8 in (10 mm). Tubes shall have a diameter of either 8, 12, or 18 inches, as specified. The 12-inch tubes are for general use, the 8-inch tubes are typically for flat slopes, and the 18 inch tubes are typically for steep slope protection and minor check dams.

Stakes for securing filter socks shall be hardwood with a 2” by 2” nominal dimension. Steel or other nonbiodegradable stakes shall not be used.

B. Construction Requirements: Compost filter socks shall be constructed on site or delivered to the jobsite. When assembled on site, the sock shall be filled using a

pneumatic blower. The sock shall be formed continuously for the length needed, up to 200 feet long. When multiple socks are needed, the end of one sock shall be pulled over the second to create a “sleeved” overlap. Once overlapped, the second section is filled with compost to create a seamless unit. Once placed, the filter sock will settle into an oval shape. Trenching is not required. Existing soil in the vicinity of the filter sock shall remain undisturbed to the extent practical. The sock shall be anchored by driving stakes through the center of the filter sock at 10 foot intervals, at all sleeved overlaps, and at each end. Where an adjustable section of filter sock is necessary (such as to permit dry weather vehicle access), the stakes may be placed on the downhill side of the sock rather than through it. Filter socks may be seeded.

C. Maintenance: Compost filter socks shall be inspected to ensure the sock material is intact and to determine if runoff is bypassing or undermining the units. Additional filter socks may be stacked as needed. Breaches in the line shall be repaired promptly. Unless otherwise directed by the final landscape plans or by the Engineer, removal of the compost sock shall be made by spreading the compost in a thin layer over adjacent planted areas. The HDPE or polypropylene sock shall be sliced open longitudinally to release the compost and the sock disposed of.

## 6171 Diversion Berms

Earthen berms temporarily graded and compacted to provide a diversion of overland flow. Can be used in conjunction with slope drains at the top of slopes to prevent sheet flow down the slope face.

A. Materials, Construction and Maintenance: Refer to the Standard Drawings.

## 6172 Slope Drain

A flexible tubing or conduit used to convey concentrated water from the top of a slope down to the toe and thereby preventing erosion over the slope face.

A. Materials, Construction and Maintenance: Refer to the Standard Drawings.

## 6173 Inlet Protection

Any one of a variety of devices or procedures used to allow water to enter a stormwater inlet while filtering or temporarily impeding the flow sufficiently to reduce the quantity of sediment carried.

A. Materials: When used, biodegradable logs, compost filter socks, synthetic sediment barriers, silt fence, or rock ditch checks shall meet the material requirements given by other items of this specification. All other material specifications are as shown in the Standard Details or on the plans. Straw wattles are not allowed for curb inlet protection. Unless otherwise restricted in the plans, the Contractor may also use any applicable inlet protection system allowed by KDOT Specification 902 and 2114 and the Standard Drawings or preapproved materials list under the category “Temporary Inlet Sediment Barriers.

B. Construction Requirements: Use the inlet protection systems shown on the plan, as appropriate. Provide the given system in accordance with the Standard Drawings. Alternate inlet protection methods may be approved or specified by the Engineer. The appropriate details for a given inlet will change during the progress of the job and adjustments shall be made as inlet construction progresses. Each inlet shall be protected continuously from initial construction until final stabilization. The ultimate test of acceptability is performance in preventing the migration of sediments through the inlet.

When surrounding conditions are such that protection of the inlet would lead to an increased risk of flooding of adjacent structures or produce a hazard to motorists, the barriers shall be adjusted or eliminated to avoid such impacts. In those cases, extra attention shall be paid to minimize the degree of sediment carried in the flow that reaches the inlet.

The general cases of inlet protection and the performance expected from each are as follows:

1. All Inlets at Sump Conditions: Inlets at sump conditions shall remain accessible for flow at all times. Small barriers, depressions and/or filters are used to screen larger sediments and initiate settlement of the water prior to it entering the inlet by creating a ponding zone. Generally, stormwater will enter the inlet via weir flow over the top of the

barrier. Such water is generally the least-sediment laden as it is decanted from the top of the ponded area.

2. Street Inlets on Grade: On-grade inlet shall be converted into a localized sump condition by installing a barrier downstream and around the inlet of sufficient height to produce ponding and prevent bypass, while a barrier, depression, and/or filter in front of the inlet induces settlement of solids. Bypassing of water at the on-grade inlet shall not be allowed and the inlet shall remain open to accept flow without causing excessive flooding.

3. Selected Inlets Closed to Flow: In select locations, the plans may designate certain inlets as “closed to flow.” In those situations, the objective is to provide sufficient blockage of permanent and temporary openings to prevent entry of stormwater into the inlet. Such locations will be clearly indicated on the plans, and the closed condition for flow may be designated for only a portion of the construction period. The Contractor shall notify the Engineer if they believe that the closure of such inlets would result in an increased risk of flooding or downstream erosion, and such concerns shall be resolved before closing an inlet to flow.

C. Maintenance: Sediment shall be removed from each inlet after every rainfall event that exceeds 1/2" or which results in a visible accumulation of sediment. Particular attention shall be paid to prevent blockage of inlets or cases where resuspension of captured sediment is likely. Specific maintenance issues unique to each inlet protection type shall be addressed as outlined in the Standard Drawings.

## 6174 Construction Entrance

A stabilized layer of large aggregate and other features, located in areas of high traffic and at the construction entrance and exit, intended to remove mud and silt embedded in tires, to prevent tracking sediments off the site.

A. Materials, Construction and Maintenance: See Standard Drawings.

## 6175 Sediment Trap

A temporary reservoir and embankment with a stone outlet that is constructed across a drainage way to intercept sediment-laden runoff and provide retention time sufficient to

settle out a majority of solids. Used for smaller watersheds where the engineered outlet works of a sediment basin are not required.

A. Materials: See Standard Drawings.

B. Construction Requirements: See Standard Drawings. The construction of the sediment trap shall be carried out in a manner such that it does not result in sediment problems downstream. The embankment of the sediment trap shall be stabilized with temporary or permanent vegetation immediately after installation.

C. Maintenance: See Standard Drawings.

## 6176 Sediment Basin

A temporary reservoir and embankment with engineered outlet works that is constructed across a drainageway to intercept sediment-laden runoff from large areas and provide retention time sufficient to settle out a majority of solids.

A. Materials: See Standard Drawings.

B. Construction Requirements: See Standard Drawings. Where the plans indicate that a temporary sediment basin is to be converted into a permanent basin, pond, or other stormwater facility, the construction, use, and removal or alterations shall be coordinated to result in a final facility that is operational in the time frame specified in the plans and which causes a minimum amount of disruption to the sitework, downstream channel, or future facility and minimizes the amount of rework needed. The construction of the sediment basin shall be carried out in a manner such that it does not result in sediment problems downstream. The embankment and emergency spillway of the sediment basin shall be stabilized with temporary or permanent vegetation immediately after installation of the basin.

C. Maintenance: See Standard Drawings.

## 6177 Temporary Stream Crossings

A temporary culvert constructed in a creek, river, or stream to allow construction access and crossing.

A. Materials: See Standard Drawings.

B. Construction Requirements: See Standard Drawings. Culvert sizing, number, and orientation shall be as dictated in the plans. Care shall be taken to ensure that the stream crossing does not cause inadvertent flooding of adjacent homes, buildings, or other structures. Concerns about adequacy of culvert sizing shall be brought to the immediate attention of the Engineer and no installation made until such concerns are resolved.

C. Maintenance: See Standard Drawings.

## 6178 Diversion Channels

A temporary channel excavated and stabilized to divert flow from a stream around a culvert or other in-stream structure being constructed, so as to avoid excessive erosion in the construction zone.

A. Materials: See Standard Drawings.

B. Construction Requirements: See Standard Drawings. Diversions of streams shall only be allowed if covered by the plans and approved permits for the project. Such construction, stabilization, and restoration will conform the plans and Standard Drawings. Concerns about adequacy of culvert sizing shall be brought to the immediate attention of the Engineer and no installation made until such concerns are resolved.

C. Maintenance: See Standard Drawings.

## 6179 Turbidity Curtains

Floating barriers of synthetic fabric curtain suspended in the water and held in a vertical position, used in lakes and perennial rivers to slow, contain or direct the flow from disturbed areas allowing solids to settle out before spreading into the surrounding water.

A. Materials: All components shall conform to the requirements given for the specific turbidity curtain system specified in the plans.

B. Construction Requirements: Shall conform to the manufacturer's recommendations for the curtain system specified in the plans, plus such additional requirements as may be listed in the plans. A manufacturer's representative shall be onsite during installation of the system.

C. Maintenance: Anchor lines shall be kept secure and properly positioned. Fabric, cable, and other

appurtenances shall be repaired immediately as needed and in accordance with manufacturer's instructions.

## 6180 Dewatering Filter

A device for filtering sediments from water that is discharged during pumping or dewatering activities.

A. Materials: Dewatering filters shall be constructed of materials as shown on the Standard Plans. Proprietary devices that provide equal or better performance than filters in the Standard Plans may be approved by the Engineer.

B. Construction Requirements: Dewatering filters shall be used whenever sediment-laden effluent is discharged from pumps used during construction for dewatering or other activities. For proprietary devices, the manufacturer's recommendations shall be followed.

C. Maintenance: Filters shall be cleaned or replaced as necessary to maintain filtration capacity.

END OF SECTION