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DIVISION 31 - EARTHWORK

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10/06

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## SECTION 31 32 11

## SOIL SURFACE EROSION CONTROL

10/06

## PART 1 GENERAL

## 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

## ASTM INTERNATIONAL (ASTM)

ASTM D 1560	(2005e1) Resistance to Deformation and Cohesion of Bituminous Mixtures by Means of Hveem Apparatus
ASTM D 2028	(1997; R 2004) Cutback Asphalt (Rapid-Curing Type)
ASTM D 2844	(2007) Resistance R-Value and Expansion Pressure of Compacted Soils
ASTM D 3787	(2007) Bursting Strength of Textiles - Constant-Rate-of-Traversal (CRT), Ball Burst Test
ASTM D 4533	(2004) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(1991; R 2003) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4972	(2001; R 2007) pH of Soils
ASTM D 5268	(2007) Topsoil Used for Landscaping Purposes
ASTM D 5852	(2000; R 2007) Standard Test Method for Erodibility Determination of Soil in the Field or in the Laboratory by the Jet Index Method
ASTM D 6629	(2001; R 2007) Selection of Methods for Estimating Soil Loss by Erosion
ASTM D 977	(2005) Emulsified Asphalt

## U.S. DEPARTMENT OF AGRICULTURE (USDA)

AMS Seed Act	(1940; R 1988; R 1998) Federal Seed Act
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## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control

approval. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Work sequence schedule; G  
Erosion control plan; G

SD-02 Shop Drawings

Layout  
Obstructions Below Ground  
Erosion Control

Scale drawings defining areas to receive recommended materials as required by federal, state or local regulations.

Seed Establishment Period

Calendar time period for the seed establishment period. When there is more than one seed establishment period, the boundaries of the seeded area covered for each period shall be described.

Maintenance Record

Record of maintenance work performed, of measurements and findings for product failure, recommendations for repair, and products replaced.

SD-03 Product Data

SD-04 Samples

Materials

- a. Standard mulch; 2 pounds.

SD-06 Test Reports

Geosynthetic Binders  
Erosion Control Blankets

Certified reports of inspections and laboratory tests, prepared by an independent testing agency, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used and compliance with recognized test standards shall be described.

Sand  
Gravel

Sieve test results. Sand shall be uniformly graded.

SD-07 Certificates

Mulch

Prior to delivery of materials, certificates of compliance attesting that materials meet the specified requirements.

Certified copies of the material certificates shall include the following.

For items listed in this section:

- a. Certification of recycled content or,
- b. Statement of recycled content.
- c. Certification of origin including the name, address and telephone number of manufacturer.

#### Geosynthetic Binders Synthetic Soil Binders

Certification for binders showing EPA registered uses, toxicity levels, and application hazards.

#### Installer's Qualification

The installer's company name and address; training and experience and or certification.

Individual component and assembled unit structural integrity test; creep tolerance; deflection tolerance; and vertical load test results. Life-cycle durability.

#### Seed

Classification, botanical name, common name, percent pure live seed, minimum percent germination and hard seed, maximum percent weed seed content, and date tested.

#### Asphalt Adhesive

Composition.

#### Wood By-Products

Composition, source, and particle size. Products shall be free from toxic chemicals or hazardous material.

Certification stating that wood components were obtained from managed forests.

#### SD-10 Operation and Maintenance Data

##### Maintenance Instructions

Instruction for year-round care of installed material. The Contractor shall include manufacturer supplied spare parts.

#### SD-11 Closeout Submittals

\*4

~~Mulch Control Netting and Filter Fabric~~; (LEED)

Aggregate; (LEED)

LEED documentation relative to recycled content credit in

accordance with LEED Reference Guide. Include in LEED Documentation Notebook.

### 1.3 DESCRIPTION OF WORK

The work consists of furnishing and installing temporary and permanent soil surface erosion control materials to prevent the pollution of air, water, and land, including fine grading, blanketing, stapling, mulching, vegetative measures, structural measures, and miscellaneous related work, within project limits and in areas outside the project limits where the soil surface is disturbed from work under this contract at the designated locations. This work includes all necessary materials, labor, supervision and equipment for installation of a complete system. Coordinate this section with the requirements of Section 31 00 00 EARTHWORK and Section 32 92 23 SODDING.

### 1.4 DELIVERY, INSPECTION, STORAGE, AND HANDLING

Store materials in designated areas and as recommended by the manufacturer protected from the elements, direct exposure, and damage. Do not drop containers from trucks. Material shall be free of defects that would void required performance or warranty. Deliver geosynthetic binders and synthetic soil binders in the manufacturer's original sealed containers and stored in a secure area.

- a. Seed shall be inspected upon arrival at the jobsite for conformity to species and quality. Seed that is wet, moldy, or bears a test date five months or older, shall be rejected.

### 1.5 SUBSTITUTIONS

Substitutions will not be allowed without written request and approval from the Contracting Officer.

### 1.6 QUALITY ASSURANCE

#### 1.6.1 Installer's Qualification

The installer shall be certified by the manufacturer for training and experience installing the material.

#### 1.6.2 Erosion Potential

Assess potential effects of soil management practices on soil loss in accordance with ASTM D 6629. Assess erodibility of soil with dominant soil structure less than 2.8 to 3.1 inches in accordance with ASTM D 5852.

### 1.7 SCHEDULING

Submit a construction work sequence schedule, with the state or local government approved erosion control plan a minimum of 30 days prior to start of construction. The work schedule shall coordinate the timing of land disturbing activities with the provision of erosion control measures to reduce on-site erosion and off-site sedimentation. Coordinate installation of temporary erosion control features with the construction of permanent erosion control features to assure effective and continuous control of erosion, pollution, and sediment deposition. Include a vegetative plan with planting and seeding dates and fertilizer, lime, and mulching rates. Distribute copies of the work schedule and erosion control

plan to site Contractors. Address the following in the erosion control plan:

- a. Statement of erosion control and stormwater control objectives.
- b. Description of temporary and permanent erosion control, stormwater control, and air pollution control measures to be implemented on site.
- c. Description of the type and frequency of maintenance activities required for the chosen erosion control methods.
- d. Comparison of proposed post-development stormwater runoff conditions with predevelopment conditions.

## PART 2 PRODUCTS

### 2.1 BINDERS

#### 2.1.1 Synthetic Soil Binders

Calcium chloride, or other standard manufacturer's spray on adhesives designed for dust suppression.

#### 2.1.2 Geosynthetic Binders

Geosynthetic binders shall be manufactured in accordance with ASTM D 1560, ASTM D 2844; and shall be referred to as products manufactured for use as modified emulsions for the purpose of erosion control and soil stabilization. Emulsions shall be manufactured from all natural materials and provide a hard durable finish.

### 2.2 MULCH

Mulch shall be free from weeds, mold, and other deleterious materials. Mulch materials shall be native to the region.

#### 2.2.1 Straw

Straw shall be stalks from oats, wheat, rye, barley, or rice, furnished in air-dry condition and with a consistency for placing with commercial mulch-blowing equipment.

#### 2.2.2 Hay

Hay shall be native hay, sudan-grass hay, broomsedge hay, or other herbaceous mowings, furnished in an air-dry condition suitable for placing with commercial mulch-blowing equipment.

#### 2.2.3 Shredded Bark

Locally shredded material shall be treated to retard the growth of mold and fungi.

#### 2.2.4 Wood By-Products

Wood locally chipped or ground bark shall be treated to retard the growth of mold and fungi. Gradation: A maximum 2 inch wide by 4 inch long.

### 2.2.5 Asphalt Adhesive

Asphalt adhesive shall conform to the following: Emulsified asphalt, conforming to [ASTM D 977](#), Grade SS-1; and cutback asphalt, conforming to [ASTM D 2028](#), Designation RC-70.

\*4

### 2.2.6 ~~Mulch Control Netting and Filter Fabric~~

\*4

~~Mulch control netting and filter~~[Filter](#) fabric may be constructed of lightweight recycled plastic, cotton, or paper or organic fiber. The recycled plastic shall be a woven or nonwoven polypropylene, nylon, or polyester containing stabilizers and/or inhibitors to make the fabric resistant to deterioration from UV, and with the following properties:

- a. Minimum grab tensile strength (TF 25 #1/[ASTM D 4632](#)), 180 pounds.
- b. Minimum Puncture (TF 25 #4/[ASTM D 3787](#)), 75 psi in the weakest direction.
- c. Apparent opening sieve size of a minimum 40 and maximum 80 (U.S. Sieve Size).
- d. Minimum Trapezoidal tear strength (TF 25 #2/[ASTM D 4533](#)), 50 pounds.

## 2.3 EROSION CONTROL BLANKETS

### 2.3.1 Seed

#### 2.3.1.1 Seed Classification

State-approved native seed mix of the latest season's crop shall be provided in original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, and inert material. Conform labels to the [AMS Seed Act](#) and applicable state seed laws. Submit the [Seed Establishment Period](#) information as specified in the Submittals paragraph.

#### 2.3.1.2 Quality

Weed seed shall be a maximum 1 percent by weight of the total mixture.

## 2.4 SEDIMENT FENCING

Wood or burlap meeting North Carolina Department of Environmental and Natural Resources Division of Land Resources Erosion and Sediment Control Planning and Design Manual Dated March 2009.

## 2.5 AGGREGATE

Aggregate shall be onsite or offsite material generated from grading and demolition operations, as available. Recycled crushed concrete shall be free of steel, free-draining and graded between a minimum [3/4 inch](#) and a maximum [1.5 inches](#). Crushed rock shall be crushed run between a minimum [3/4 inches](#) and a maximum [1.5 inches](#). Submit sieve test results for both [gravel](#) and [sand](#).

## 2.6 WATER

Unless otherwise directed, water is the responsibility of the Contractor. Water shall be potable or supplied by an existing irrigation system.

## PART 3 EXECUTION

### 3.1 CONDITIONS

Perform erosion control operations under favorable weather conditions; when excessive moisture, frozen ground or other unsatisfactory conditions prevail, the work shall be stopped as directed. When special conditions warrant a variance to earthwork operations, submit a revised construction schedule for approval. Do not apply erosion control materials in adverse weather conditions which could affect their performance.

#### 3.1.1 Finished Grade

Verify that finished grades are as indicated on the drawings; complete finish grading and compaction in accordance with Section 31 00 00 EARTHWORK prior to the commencement of the work. Verify and mark the location of underground utilities and facilities in the area of the work. Repair damage to underground utilities and facilities at the Contractor's expense.

### 3.2 SITE PREPARATION

#### 3.2.1 Soil Test

Test soil in accordance with ASTM D 5268 and ASTM D 4972 for determining the particle size and mechanical analysis. Sample collection onsite shall be random over the entire site. The test shall determine the soil particle size as compatible for the specified material.

#### 3.2.2 Layout

Erosion control material locations may be adjusted to meet field conditions. When soil tests result in unacceptable particle sizes, a shop drawing shall be submitted indicating the corrective measures.

#### 3.2.3 Protecting Existing Vegetation

When there are established lawns in the work area, the turf shall be covered and/or protected or replaced after construction operations. Identify existing trees, shrubs, plant beds, and landscape features that are to be preserved on site by appropriate tags and barricade with reusable, high-visibility fencing along the dripline. Mitigate damage to existing trees at no additional cost to the Government. Damage shall be assessed by a state certified arborist or other approved professional using the National Arborist Association's tree valuation guideline.

#### 3.2.4 Obstructions Below Ground

When obstructions below ground affect the work, submit shop drawings showing proposed adjustments to placement of erosion control material for approval.

### 3.3 INSTALLATION

Immediately stabilize exposed soil using mulch, and seed. Stabilize areas

for construction access immediately as specified in the paragraph Construction Entrance. Install principal sediment basins and traps before any major site grading takes place. Provide additional sediment traps and sediment fences as grading progresses. Provide inlet and outlet protection at the ends of new drainage systems. Remove temporary erosion control measures at the end of construction and provide permanent seeding.

### 3.3.1 Construction Entrance

Provide as indicated on drawings. Contractor responsible for providing temporary water service for use at the indicated ingress and egress location. Contractor responsible for collecting and disposing of sediment and/or debris removed from vehicles in location indicated by Contracting Officer.

### 3.3.2 Seeding

When seeding is required prior to installing mulch on synthetic grid systems verify that seeding will be completed in accordance with Sections 31 00 00 EARTHWORK.

### 3.3.3 Mulch Installation

Install mulch in the areas indicated. Apply mulch evenly at minimum of 4 inches on depth.

### 3.3.4 Sediment Fencing

Install posts at the spacing indicated on drawings and at an angle between 2 degrees and 20 degrees towards the potential silt load area. Sediment fence height shall be approximately 16 inches. Do not attach filter fabric to existing trees. Secure filter fabric to the post and wire fabric using staples, tie wire, or hog rings. Imbed the filter fabric into the ground as indicated on drawings. Splice filter fabric at support pole using a 6 inches overlap and securely seal.

## 3.4 CLEAN-UP

Dispose of excess material, debris, and waste materials offsite at an approved landfill or recycling center. Clear adjacent paved areas. Immediately upon completion of the installation in an area, protect the area against traffic or other use by erecting barricades and providing signage as required, or as directed.

## 3.5 WATERING SEED

Start watering immediately after installing erosion control blanket type XI (revegetation mat). Apply water to supplement rainfall at a sufficient rate to ensure moist soil conditions to a minimum 1 inch depth. Prevent run-off and puddling. Do no drive watering trucks over turf areas, unless otherwise directed. Prevent watering of other adjacent areas or plant material.

## 3.6 MAINTENANCE RECORD

Furnish a record describing the maintenance work performed, record of measurements and findings for product failure, recommendations for repair, and products replaced.

### 3.6.1 Maintenance

Maintenance shall include eradicating weeds; protecting embankments and ditches from surface erosion; maintaining the performance of the erosion control materials and mulch; protecting installed areas from traffic.

### 3.6.2 Maintenance Instructions

Furnish written instructions containing drawings and other necessary information, describing the care of the installed material; including, when and where maintenance should occur, and the procedures for material replacement.

### 3.6.3 Patching and Replacement

Unless otherwise directed, material shall be placed, seamed or patched as recommended by the manufacturer. Remove material not meeting the required performance as a result of placement, seaming or patching from the site. Replace the unacceptable material at no additional cost to the Government.

### 3.7 SATISFACTORY STAND OF GRASS PLANTS

When erosion control blanket type XI (revegetation mat) is installed, evaluate the grass plants for species and health when the grass plants are a minimum 1 inch high. A satisfactory stand of grass plants from the revegetation mat area shall be a minimum 10 grass plants per square foot. The total bare spots shall not exceed 2 percent of the total revegetation mat area.

-- End of Section --