

SECTION 806—WATER COURSE AND SLOPE EROSION PROTECTION

806.1 DESCRIPTION—This work is furnishing, placement and maintenance of soil erosion control material of the type indicated.

806.2 MATERIAL—From a manufacturer listed in Bulletin 15 and meeting the following requirements:

(a) Erosion Control Mats (ECM) and Mulch Blankets (ECB).

1. Erosion Control Mat. Undyed, flexible, non-treated biodegradable heavy jute, coconut coir, photodegradable polypropylene multifilament and tape yarn or other yarns woven into a dimensionally stable uniform open plain weave mesh meeting the following physical properties:

- Organic yarns. Mesh with approximately 15 mm (0.6 inch) to 25 mm (1-inch) square openings and having a mass (weight) not less than 470 g/m² (14 ounces per square yard) or
- Synthetic fibers. Mesh with nominal 4 mm (0.15 inch) x 4 mm (0.15 inch) or 2.5 mm (0.10 inch) x 3 mm (0.12 inch) (minimum average roll values) openings and having a mass (weight) not less than 55 g/m² (1.75 ounces per square yard).

2. Erosion Control Mulch Blanket. One of the following:

2.a Organic Mulch Material. A machine produced mat of organic, biodegradable mulch material such as straw, curled wood cellulose, coconut fiber, or combinations of material evenly distributed and attached on one side of a photodegradable polypropylene mesh with high strength threads meeting the following physical properties:

- Minimum mass (weight) of 270 g/m² (8 ounces per square yard), and
- Approximately 3 mm (0.125 inch) to 15 mm (0.6 inch) thick.

2.b Reprocessed Wood Fiber. A flexible, non-woven, biodegradable water absorbing mat of mechanically defibrated wood fibers and synthetic fibers with a photodegradable polypropylene netting laminated to one side of the mat and meeting the following physical properties:

- Mass (Weight) 215 g/m² to 270 g/m² (6.4 to 7.9 ounces per square yard)
- Mat Thickness 2.6 mm (0.105 inch), minimum

3. High Velocity Erosion Control Mulch Blanket. Section 806.2(a)2.a except mulch material is evenly distributed between two layers of photodegradable polypropylene mesh.

(b) Turf Reinforcement Mat (TRM). A machine produced, three dimensional, matrix web of mechanically or melt bonded monofilaments or fibers processed to form a strong, entangled, and dimensionally stable rolled erosion control product. Matrix manufactured to have sufficient thickness, resiliency and void space to fill with soil to provide erosion protection while facilitating vegetative establishment. Matrix can be supplemented with polyethylene or polyolefin fibers, or degradable natural organic coconut fibers, stitched between biaxially oriented process synthetic netting with synthetic or natural threads. Matrix components, other than coconut fiber, stabilized against ultraviolet degradation, and meeting the following physical properties:

- Matrix Bonding Either polymer matrix welding; thermal or polymer matrix fusion; or fibers positioned between two high strength biaxially oriented mesh nets bound securely together by parallel stitching with polyolefin, polypropylene, nylon or polyester threads.

- Matrix Fibers Polyolefin, polypropylene, or natural coconut fiber
- Mat Thickness 13 mm (1/2 inch), Average Nominal Thickness (ASTM D 6525)
- Tensile Strength 1.75 kN/m x 1.4 kN/m* (10 x 8 pounds force per inch*) (ASTM D 4595), or
1.36 kN/m x 0.79 kN/m* (7.8 x 4.5 pounds force per inch*) (ASTM D 5035)
- Ultraviolet Stability 80% tensile strength retained (ASTM D 4355)

* Minimum Average Roll Value

(c) Erosion Control and Revegetation Mat (ECRM). One of the following:

1. Type A. A flexible, machine produced, UV stabilized, three dimensional matrix web of mechanically or melt bonded nylon or polymer netting, monofilaments or fibers that are entangled to form a strong and dimensionally stable rolled erosion control product. Matrix to provide sufficient thickness to cover the ground and provide erosion protection while facilitating vegetation establishment and meeting the following physical properties:

- Matrix Bonding Either polymer welding, thermal, or polymer fusion; or synthetic fibers positioned between two high strength biaxially oriented nets bound securely together by parallel stitching with polyolefin, polypropylene, nylon or polyester threads.
- Mat Thickness 3 mm (0.125 inch), Average Nominal Thickness (ASTM D 6525)
- Tensile Strength 1.59 kN/m x 0.86 kN/m* (9.1 x 4.9 pounds force per inch*) (ASTM D 4595), or
1.45 kN/m x 0.70 kN/m* (8.3 x 4 pounds force per inch*) (ASTM D 5035)
- Ultraviolet Stability 80% tensile strength retained (ASTM D 4355)

* Minimum Average Roll Value

2. Type B. A flexible, randomly oriented polyvinylchloride monofilaments bonded together to form a stable three dimensional entangled, porous matrix resistant to natural soil and groundwater chemical degradation. Matrix to provide sufficient thickness and ground cover to provide erosion protection while facilitating vegetative establishment and meeting the following physical properties:

- Mat Thickness 2.5 mm (0.10 inches), Average Nominal Thickness (ASTM D 5199)
- Mass (Weight) Per Unit Area 800 g/m²* (24 ounces per square yard*) (ASTM D 5261)
- Wide Width
Tensile Strength 2.1 kN/m x 0.70 kN/m* (12 x 4 pounds force per inch*) (ASTM D 4595 or ASTM D 3776)
- Ultraviolet Stability 85% tensile strength retained (ASTM D 4355)

* Minimum Average Roll Value

(d) Anchoring Devices.

1. Staples. 4.0 mm (No. 8 gage) steel wire, bent U-shaped or square top with a throat width of 25 mm (1 inch) to 50 mm (2 inches), with an effective minimum driving depth of 200 mm (8 inches).

2. Metal Pin. Carbon Steel pin, 5 mm (3/16-inch) shank diameter, 460 mm (18-inch) length with attached 38 mm (1½-inch) minimum outside diameter steel washer head.

3. Wood Stakes. Sound, rough sawn, approved hardwood 25 mm (1-inch) x 100 mm (4-inch) nominal stake tapered to a point throughout, with a minimum length of 450 mm (18 inches).

4. Substitutes. Other anchoring devices as recommended by the mat manufacturer may be submitted for review and approval.

(e) Seeding and Soil Supplements. [Section 804](#)**(f) Mulch for Seeded Areas.** [Section 805](#)**(g) Certification.** [Section 106.03\(b\)3](#)

(h) Fiber Roving System. A nontoxic, photodegradable material applied as a long continuous strand of fibrillated, fine denier yarn which is blown onto the soil surface and then adhered to the ground surface with an application of approved tackifier material, and meeting the following typical requirements:

1. Fiber Roving.

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|-----------------------|---|
| • Material Type | UV stabilized |
| • Mass of Strand | 360 denier
(ASTM D 1907) |
| • Tensile Strength | 15.6 N
(ASTM D 2256) |
| • Elongation at Break | 15.5%
(ASTM D 2256) |
| • UV Stability | 80% Strength retained (after 500 hrs) (ASTM D 4355) |
| • Strands per Rove | 20 to 28 |

2. Tackifier. Anionic emulsified asphalt, AASHTO grade SS-1 (E-6A) with a furol viscosity at 25 °C (77F) less than 50 seconds, and meeting the requirements of Bulletin 25. Obtain material from a producer listed in Bulletin 15.

3. Wood Stakes. [Section 806.2\(d\)](#)**806.3 CONSTRUCTION—****(a) Erosion Control Mats and Mulch Blankets.**

1. General. Place erosion control materials after slope, swale or channel has been final graded and dressed to define flow area and designated soil supplements, seed and mulch, when indicated, have been applied. Install erosion control materials to conform to shape of soil surface.

Unroll, place and anchor mat evenly and smoothly without stretching to ensure contact with mulch surface at all points. Use appropriate anchoring devices and follow installation directions of the mat manufacturer. If staples are used, drive flush with soil surface.

2. Erosion Control Mulch Blanket and High Velocity Erosion Control Mulch Blanket. Install blanket having mesh on only one side with mesh side on top. Mulch application normally associated with seeding operation is not required for installation of erosion control blankets.

(b) Turf Reinforcement Mat.

1. Site Preparation. Prepare final graded and dressed soil surfaces to receive permanent seeding in accordance with [Section 804.3](#). Soil surfaces to be free of rocks or other obstructions which would prevent mat from lying in direct contact with soil.

2. Mat Installation. Unroll, place and anchor mat evenly and smoothly without stretching to conform to shape of and be in uniform contact with soil surface. Use appropriate anchoring devices and follow installation directions of mat manufacturer. Drive staples or anchoring pins flush with soil surface.

3. Seeding. After mat installation, broadcast designated seed formula mixture into mat matrix in accordance with [Section 804.3](#).

4. Topsoil Placement. After seeding, uniformly place 13 mm (1/2-inch) to 20 mm (3/4-inch) of approved topsoil on mat. Work soil into mat voids to completely fill mat matrix flush with top of mat. Remove excess topsoil.

5. Mulching. Mulch area with designated mulch in accordance with [Section 805.3](#).

(c) Erosion Control and Revegetation Mat.

1. Site Preparation. Prepare final graded and dressed soil surfaces to receive permanent seeding in accordance with [Section 804.3](#). Soil surfaces to be free of rocks or other obstructions which would prevent mat from lying in direct contact with soil.

2. Seeding. Place designated seed formula mixture in accordance with [Section 804.3](#). Mulch application normally associated with seeding operation is not required for installation of mats.

3. Mat Installation. Unroll, place and anchor mat evenly and smoothly without stretching. Use appropriate anchoring devices and follow installation directions of mat manufacturer. Drive staples or anchoring pins flush with soil surface.

(d) Maintenance. Properly maintain designated erosion control fabrics until entire project has been accepted. If a protected slope, swale or other soil surface failure occurs after satisfactory installation of work, redress affected soil areas and reinstall protection material as specified for original treatment unless directed otherwise.

(e) Fiber Roving System.

1. General. Prepare seedbed, apply seed, and soil amendments in accordance with [Section 804.3](#). Construct anchor trenches, check slots, or place wood stakes as specified. Apply fiber roving through an ejector with compressed air as recommended by the manufacturer. Do not apply fiber roving during wet or cool weather conditions, when rainfall is anticipated within one hour of application, or when wind is greater than 32 km/h (20 mph).

2. Channels and Swales. Construct a 150 mm (6-inch) to 300 mm (12-inch) deep anchor trench/check slot at the upslope end of the installation. For areas of moderate runoff, construct 150 mm (6-inch) to 300 mm (12-inch) deep check slots at approximately 8 m (25-foot) intervals along the channel. As an alternative to check slots, install a row of wood stakes across the channel on 300 mm (12-inch) centers, protruding 75 mm (3 inches) to 100 mm (4 inches) above the soil surface, and at approximately 8 m (25-foot) intervals. Apply fiber roving at an approximate rate of 190 g/m² (0.35 lb/sy) to form a mat of polypropylene. Backfill, compact, and reseed soil in anchor trenches and check slots.

3. Tackifier. Apply approved tackifier material. Overspray tackifier at the specified rate of 1.3 L/m² (0.35 gal/sy) using spraying pressure recommended by manufacturer. Spray entire polypropylene mat area. Allow one hour for tackifier to dry. Do not apply during rainfall or if rain is anticipated within the specified one hour drying time necessary to cure the material.

806.4 MEASUREMENT AND PAYMENT—

(a) Erosion Control Mat. Square Meter (Square Yard)

(b) Erosion Control Mulch Blanket. Square Meter (Square Yard)

(c) High-Velocity Erosion Control Mulch Blanket. Square Meter (Square Yard)

(d) Turf Reinforcement Mat. Square Meter (Square Yard)

(e) Erosion Control and Revegetation Mat. Square Meter (Square Yard)

(f) Seeding and Soil Supplements. [Section 804.4](#) for the type indicated.

(g) Mulch. [Section 805.4](#) for the type indicated.

Reinstallation of protection material on failed soil surfaces will be paid for at the contract unit price in addition to the original installation work.

(h) Fiber Roving System. Square Meter (Square Yard)