

# STANDARD SPECIFICATIONS

for the

## IMPLEMENTATION OF EROSION CONTROL

City of La Crosse, Wisconsin

### **I. SCOPE OF WORK:**

This work shall consist of the furnishing and installation or construction of erosion control mats, fences, screens, blankets and bale checks or dikes and other erosion control devices as required by these specifications.

The Contractor shall be responsible for erosion control. The Contractor shall take precautions to prevent ANY erosion or siltation to lands adjoining the construction site.

Erosion Mat shall consist of furnishing and placing a layer of open weave jute fabric or wood fiber blanket or fiber glass roving and asphalt as required by these specifications.

The methods utilized shall conform to Chapter 3 of the Wisconsin Construction Site Best Management Practice Handbook, (WCSBMPH).

When the kind of mat is not specified in the contract, either jute fabric, wood fiber blanket or fiberglass roving shall be furnished by and at the option of the contractor.

Erosion Bales shall consist of furnishing and placing bales of straw, hay or other suitable baled material to form checks, or dikes to control erosion as indicated in the WCSBMPH.

Silt Fence shall consist of furnishing, erecting, maintaining and removing a geotextile fabric fence and suitable support structure for retention of silt as indicated in the WCSBMPH.

Cleaning Sediment Basins shall consist of the excavation and disposal of sediment from sediment basins. It is the contractor's responsibility to find a disposal site for this material. Disposal of materials in lowlands/wetlands is prohibited by the Department of Natural Resources.

Erosion Control shall consist of the work and operations necessary for the movement of personnel, equipment and materials to the project site to permit construction of erosion control items as required by these specifications.

### **II. MATERIALS:**

**2.1 Jute Fabric.** The material intended for use for erosion mat shall be a woven fabric of a uniform open weave of single jute yarn. The jute yarn shall be of loosely twisted construction having an average twist of not less than one and one-half turns per inch. The average size of the warp and weft yarns shall be approximately the same. The woven fabric shall be furnished in rolled strips. The width of the strips shall be 48 inches, plus or minus one inch. The full width of the strip shall have 78 warp ends, plus or minus one. The fabric shall have 41 weft yarns, plus or minus two, per linear yard of length. The weight of the fabric measured under average atmospheric conditions shall be 92 pounds per 100 square yards, plus or minus ten percent. The fabric shall be non-toxic to vegetation.

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**2.2 Wood Fiber Blanket.** The material intended for use for erosion mat shall be a uniform web of interlocking wood excelsior fibers, with a net backing on one side. The wood from which the blanket is produced shall have been properly cured to achieve adequately curled and barbed fibers. The blanket shall be of uniform thickness with the wood fibers evenly distributed over the entire area of the blanket. The blanket shall be furnished in rolled strips. The width of the strips shall be 48 inches. Plus or minus one inch. The weight of the blanket measured under average atmospheric conditions shall be 78 pounds per 80 square yards, plus or minus ten percent. The net backing shall have a mesh size not exceeding 1-1/2 by 3 inches and may be woven from twisted paper, cotton cord, a biodegradable plastic or other approved material. The blanket shall be non-toxic to vegetation.

**2.3 Fiber Glass Roving.** The material shall be formed from continuous fibers drawn from molten glass, coated with a chrome-complex sizing compound, collected into strands and lightly bound together into roving without the use of clay, starch, or like deleterious substances. The roving shall be wound into a cylindrical package approximately one foot high in such a manner that the roving can be continuously fed from the center of the package through an ejector driven by compressed air and expanded into a mat of glass fibers on the soil surface. The material shall contain no petroleum solvents or other agents known to be toxic to plant or animal life.

The fiber glass roving shall conform to the following requirements:

<u>Property</u>	<u>Limits</u>
Strands/Rove.....	56-64
Fibers/Strand.....	184-234
Fibers Diameter, in (Trade Designation-G).....	0.00035-0.0004
Yards/lb. Of Rove.....	210-230
Organic Content, percent max.....	0.75

**2.4 Asphalt.** Asphaltic material used for anchoring fiber glass roving shall be an asphalt emulsion conforming to the requirements for Type SS-1 of the Specification for Emulsified Asphalt. AASHTO Designation: M 140.

**2.5 Staples.** Staples for anchoring the erosion mat in place shall be U-shaped, made of No. 11 gage or larger diameter steel wire, or other approved material, have a width of one to two inches, and a length of not less than six inches for firm soils and not less than 12 inches for loose soils.

**2.6 Bales.** Bales shall be straw, hay or other approved material, in good condition, of a size approved by the engineer.

**2.7 Stakes.** Stakes shall be wood or metal of a size approved by the engineer.

**2.8 Silt Fence.**

**A. Geotextile Fabric.** The geotextile fabric shall consist of either woven or nonwoven polyester, polypropylene, stabilized nylon, polyethylene or polyvinylidene chloride with the following requirements: All fabric shall have the minimum strength values in the weakest principal direction. Nonwoven fabric may be needle-punched, heat bonded, resin-bonded or combination thereof.

<u>Test</u>	<u>Method</u>	<u>VALUE</u>	
		<u>Silty Soils (4)</u>	<u>Sandy Soils (5)</u>
Grab Tensile strength (lb)	ASTM D-1682 (2)	100	100
Mullen Burst strength (psi)	ASTM D-3786	200	200
Equivalent Opening Size U.S. Standard Sieve	CW-02215-77 Corps of Engineers	50-140	20-50
Water Flow Rate (gal/min/sq.ft. at 50 MM Constant head)	ASTM D-4491 (3)	10	10
Ultra Violet Radiation Stability (%)	ASTM D-4355	90	90

- (1) All numerical values represent minimum average roll values (i.e., the average of test results on any roll in a lot should meet or exceed the minimum values in the table).
- (2) ASTM D-1682, Grab Test, Method 16, using a 4-inch x 8-inch sample, 3-inch gauge length, clamped in a 1-inch x 2-inch long grip, tested at a strain rate of 12 inch/min.
- (3) Water Flow Rate in gal/min/sq. ft. shall be determined by multiplying Permittivity in 1/sec as determined by ASTM D-4491 by a conversion factor of 74.
- (4) Silty Soil: more than 15 percent by weight passing No. 200 sieve.
- (5) Sandy Soil: less than 15 percent by weight passing No. 200 sieve.

Each analysis shall be based on the portion of a total sample passing the No. 4 sieve.

The geotextile fabric shall be insect, rodent, mildew and rot resistant.

The geotextile fabric shall be furnished in a wrapping which will protect the fabric from ultraviolet radiation and from abrasion due to shipping and hauling. The geotextile is to be kept dry until installed.

The Contractor shall furnish the engineer at the time of delivery of the geotextile fabric a manufacturer's Certificate of Compliance that the geotextile fabric as furnished meets the above requirements.

**B. Fence Support System.** The fence support system shall comply with the WCSBMPH as indicated in Chapter 3, Section B.

### III. CONSTRUCTION METHODS

**3.1 General.** The Contractor shall deliver Erosion Mat, Erosion Bales or Silt Fences, as the case may be, to the project site prior to starting any construction operations, unless otherwise directed by the engineer. The remaining amount required to fit actual site conditions, determined in consultation with the engineer, shall be delivered in sufficient time to permit installation as provided hereinafter for the specific material.

#### **3.2 Erosion Mat.**

**A. General.** The erosion mat shall be placed on all areas of concentrated flow immediately after seeding operations have been completed. Areas of concentrated flow shall include ditches, diversion, channels and slopes greater than 20%. The opinion of the Engineer shall be final in determining locations and extent of areas requiring Erosion Material. All stones or clods over 1-1/2 inches in diameter and all roots, sticks or other foreign material which would interfere with the mat bearing completely on the soil or sod shall be removed prior to placing the mat.

Any small stones or clods which prevent contact of the mats with the soil shall be pressed in the soil with a small lawn-type roller or by other effective means. The mat shall have its lateral edges so impressed in the soil as to permit runoff water to flow over it.

Any seeded areas damaged or destroyed during erosion mat placing operations shall be reseeded as specified for the original seeding.

All surplus excavation or materials, and all stones, clods or other foreign material removed in the preparation of the seeded soil or sodded surface for replacing the mat, shall be disposed of by the Contractor.

Following the placing of the mat, water shall be uniformly applied to the area sufficiently to moisten the seedbed to a depth of two inches and in a manner to preclude washing or erosion.

The Contractor shall maintain the erosion mat and make satisfactory repairs of any areas damaged by erosion, traffic, fires or their causes until acceptance of the work.

**B. Jute fabric and Wood Fiber.** The matting strips shall be rolled on or laid in the direction of the flow. The mat shall be spread evenly, smoothly, in a natural position without stretching and with all parts bearing on the soil. When wood fiber blanket is used, the blanket shall be placed with the netting on top. Adjacent strips shall overlap at least four inches. Strip ends shall overlap at least ten inches. All overlaps shall be made with the upgrade section on top.

The upgrade end of each strip of fabric or blanket shall be buried at least six inches in a vertical slot cut in the soil and the soil pressed firmly against the embedded fabric or blanket.

The mat shall be anchored in place with vertical driven staples, driven until their tops are flush with the soil. Staples shall be spaced at three-foot centers along mat edges and be alternately spaced at three-foot centers throughout the center. Staples shall be at ten-inch centers at end of junction slots.

C. Fiber Glass Roving. The fiber glass roving shall be spread uniformly over the designated area to form a random mat of continuous glass fibers at the rate of 0.25 to 0.35 pound per square yard. The fiber glass roving shall be anchored to the ground with asphaltic material applied uniformly over the glass fibers at a rate of 0.25 to 0.35 gallon per square yard. The upgrade end of the roving shall be buried to a depth of one foot to prevent undermining.

The fiber glass roving shall be expanded and applied to the designated area using a pneumatic ejector capable of applying fiber glass roving at the rate of two pounds per minute or approximately eight square yards per minute. The pneumatic ejector shall be driven by an air compressor capable of supplying 40 cubic feet per minute of air at 80 to 100 pounds per square inch pressure. An approved distributor with suitable hoses and spray attachments shall be used to apply the asphalt or other approved material.

### **3.3 Erosion Bales.**

The bales shall be placed end to end across ditches or at other areas requiring erosion control as detailed in (WCSBMPH). The bales shall be placed immediately after shaping of the ditches or slopes is completed. Bales should be placed at right angles to the direction of flow and shall be embedded and securely anchored with stakes as shown on details in (WCSBMPH). Sumps shall be excavated upstream from the dikes as directed by the engineer. Erosion bales shall be removed, as determined by the engineer, after the slopes and ditches have been stabilized and turf developed to the extent that future erosion is unlikely. The bales may be used as mulch or shall otherwise be satisfactorily disposed of. The ditch shall be reshaped, sumps and trenches filled, excess eroded material disposed of and the area topsoiled, fertilized and seeded as required.

### **3.4 Silt Fence.**

A. Installation and Removal. The silt fence shall be erected prior to starting any construction operation, which might cause any sedimentation or siltation at the site of the proposed silt fence.

The silt fence shall, when possible, be constructed in an arc or horseshoe shape with its ends pointing up slope. The silt fence shall be constructed to the dimensions and in accordance with the details shown in (WCSBMPH). Silt fences shall be removed, as determined by the engineer, after the slopes and ditches have been stabilized and turf developed to the extent that future erosion is unlikely. Materials remaining after removal shall become the property of the contractor and shall be disposed of off site.

B. Inspection and Maintenance. The contractor shall inspect all silt fences immediately after each rainfall and at least daily during prolonged rainfall. Any deficiencies shall be immediately corrected by the Contractor. In addition, the Contractor shall make a daily review of the location for silt fences and filter barriers in areas where construction activity changes the earth contour and drainage runoff to ensure that the silt fences are properly located for effectiveness. Where deficiencies exist, additional silt fences shall be installed as approved or directed by the engineer.

Sediment deposits shall be removed when the deposit reaches approximately one half of the volume capacity of the silt fence as determined by the engineer and disposed of as directed by the engineer. Any sediment deposits remaining in place after the silt fence is no longer required should be dressed to conform with the existing grade and the area topsoiled, fertilized and seeded as required.

**3.5 Cleaning Sediment Basins.**

Sediment basins shall be cleaned at such times when in the judgement of the engineer, the sediment has accumulated to the extent that the effectiveness of the sediment basin has been impaired.

The surplus material shall be disposed of at the Contractor's disposal site.

**4.0 Erosion Control – Basis of Payment.**

This item shall be paid for at the contract lump sum price for "EROSION CONTROL", which price shall include all labor, materials and equipment to complete the work as specified and to the satisfaction of the Engineer.