

## SILT FENCE SYSTEMS

SCDOT Designation: SC-M-815-2 (7/18)

### 1.0 Silt Fence Systems

This Supplemental Specification replaces Sections 815.2.5 and 815.4.6, *Silt Fences*, Section 815.2.12, *Steel Posts*, and Sections 815.5 and 815.6 for silt fence in the *South Carolina Department of Transportation Standard Specifications for Highway Construction*, 2007 Edition.

#### 1.1 Description

Silt fence systems are used as a temporary perimeter control around sites where there will be soil disturbance due to construction activities. Silt fence systems consist of filter fabric stretched across posts. The lower edge of the fence is vertically trenched into the ground and covered by compacted backfill.

#### 1.2 Materials

Provide material for silt fence systems complying with the requirements specified herein, on the Plans, on details, or as approved by the Resident Construction Engineer (RCE).

##### 1.2.1 Geotextile Filter Fabric and Steel Post System

This silt fence system is composed of geotextile filter fabric and steel posts.

##### 1.2.1.1 Steel Posts

Furnish steel posts meeting the following minimum physical requirements:

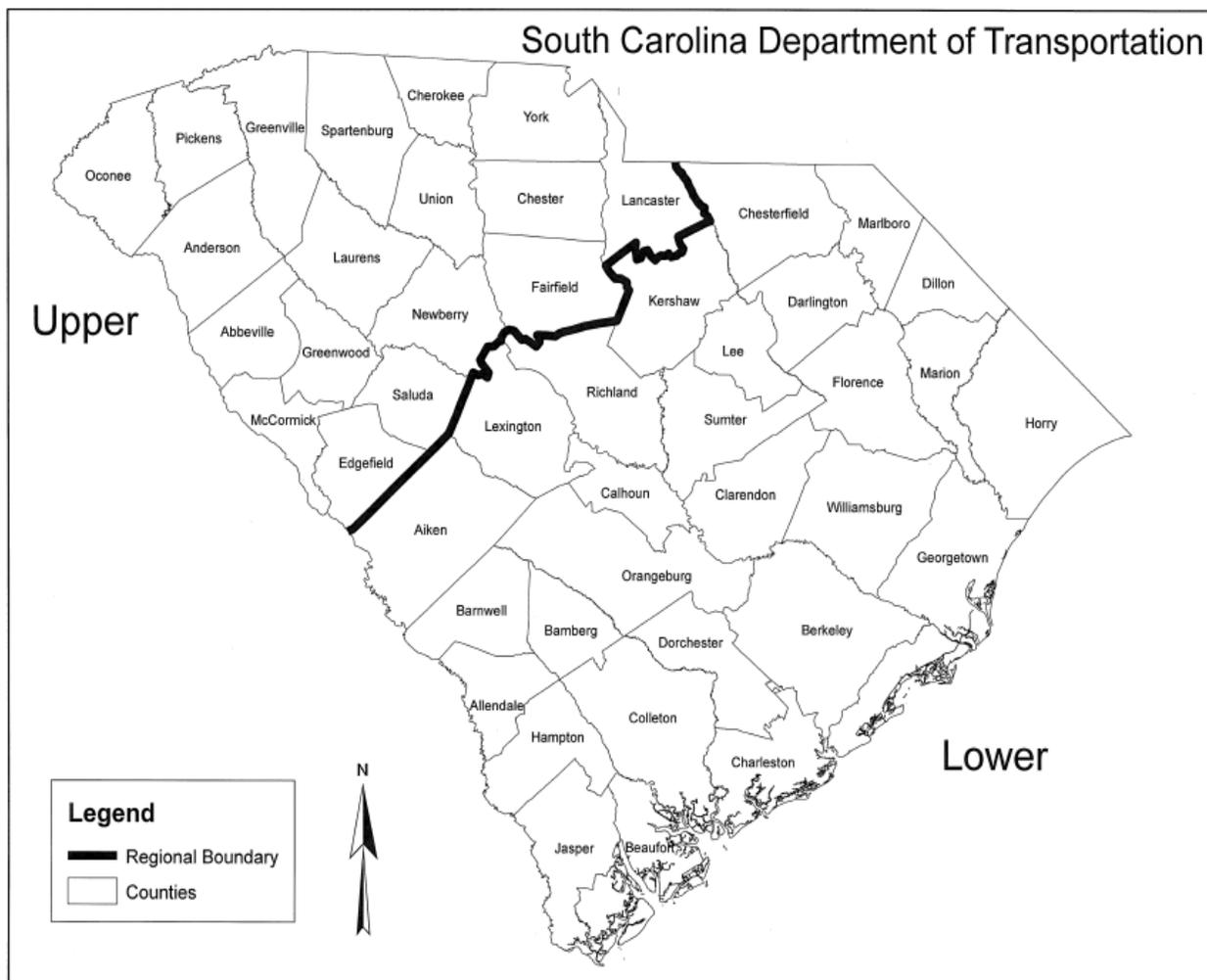
- Minimum length of 5 feet.
- Composed of high strength steel with minimum yield strength of 50,000 psi.
- Standard “T” section with a nominal face width of 1.38 inches and nominal “T” length of 1.48 inches.
- Weighs 1.25 pounds per foot ( $\pm 8\%$ ).
- Painted with a water based baked enamel paint.
- Has a soil stabilization plate made of 15-gauge steel with a minimum cross section area of 17 square inches attached for the Lower State.

Use steel posts with the addition of a metal soil stabilization plate welded near the bottom in the Lower State. A soil stabilization plate is not required in the Upper State. The Lower State consists of all counties east of and including Aiken, Lexington, Richland, Kershaw, and Chesterfield Counties. The Upper State consists of all counties west of the Lower State, i.e. all the remaining counties (see Figure 1). When the post is driven to the proper depth, the plate will be below the ground level for added stability. Attach soil stabilization plates to the steel posts according to Table 1.

**Table 1: Soil Stabilization Plate Requirements**

Post Length (feet)	Top of Soil Stabilization Plate Relative to Bottom of Steel Post (inches)
5.0 and 5.5	13.0
6.0, 6.5, and 7.0	15.25
8.0	17.5
10.0	19.5

FIGURE 1: UPPER AND LOWER STATE MAP



### 1.2.1.2 Geotextile Filter Fabric

Provide a geotextile filter fabric from the most recent edition of *SCDOT Qualified Product List 34*. Ensure that the filter fabric is composed of fibers consisting of long chain synthetic polymers composed of at least 85% by weight of polyolefins, polyesters, or polyamides. Ensure that the fibers are formed into a network so that the filaments or yarns retain dimensional stability relative to each other. Do not treat or coat the filter fabric with materials which might adversely alter its physical properties after installation. Do not use fabric with defects or flaws that significantly affect its physical and/or filtering properties. Provide a filter fabric with a minimum roll width of 36 inches.

Protect the filter fabric with a suitable wrapping for protection against moisture and extended ultraviolet exposure before placement.

Provide geotextile filter fabric meeting the minimum physical requirements of Table 2.

**Table 2: Minimum Geotextile Filter Fabric Performance and Physical Requirements**

Physical Property*	Test Method	Required Value
Filtering Efficiency Performance	ASTM D 5141 or Equivalent	80% Total Suspended Solids (TSS)
Clean Water Flow Rate	ASTM D 4491	4 gal/min/ft <sup>2</sup> Minimum
Tensile Strength	ASTM D 4632	90 lbs
Ultraviolet Stability (retained strength after 500 hrs of ultraviolet exposure)	ASTM D 4355	70%

\*Unless otherwise indicated, numerical values represent the MARV.

1.2.2 Belted Silt Retention and Wood Post System

This silt fence system is composed of belted silt retention fabric (BSRF) filter fabric and wood posts.

1.2.2.1 Wood Posts

Furnish wood posts meeting the following minimum physical requirements:

- Minimum length of 4 feet.
- Composed of a hardwood such as oak. Pine wood posts are not acceptable.
- Rectangular in shape with a minimum dimension of 1¼ inches by 1¼ inches.
- Has a 2-foot long, 1-inch wide, 3/8-inch thick bonding strip applied to secure the fabric to each wood post.

1.2.2.2 Belted Silt Retention Fabric (BSRF) Filter Fabric

Provide a BSRF fabric that is a spunbond polyester material with a fiberglass scrim or net sandwiched in between the layers. Ensure that the fabric is free of any treatment or coating that might adversely alter its physical properties after installation. Do not treat or coat the filter fabric with materials which might adversely alter its physical properties after installation. Do not use fabric with defects or flaws that significantly affect its physical and/or filtering properties. Provide a filter fabric with a minimum roll width of 36 inches.

Provide a BSRF filter fabric meeting minimum physical requirements of Table 3.

**Table 3: Minimum BSRF Filter Fabric Performance and Physical Requirements**

Physical Property*	Test Method	Required Value
Filtering Efficiency Performance	ASTM D 5141 or Equivalent	80% Total Suspended Solids (TSS)
Tensile Strength	ASTM D 4632	90 lbs
Ultraviolet Stability (retained strength after 500 hrs of ultraviolet exposure)	ASTM D 4355	70%

\*Unless otherwise indicated, numerical values represent the MARV.

### 1.3 Construction Requirements

#### 1.3.1 Installation

Construct the silt fence system in accordance with the Plans, *SCDOT Standard Drawing 815-605-00* or latest revision, or as approved by the RCE. Install the silt fence system before major construction in an area is started.

Install the fence perpendicular to the direction of flow at the proper distance from the toe of steep slopes to provide sediment storage and access for maintenance and cleanout.

**Table 4: Silt Fence Installation Dimensions**

Height of Fill (ft)	Fill Slope	Minimum Silt Fence Offset from Toe of Slope (ft)	Minimum Right of Way Offset From Toe of Slope (ft)	Check Length (ft)**
< 6	2:1 to 6:1	2	3	2
6-10	2:1	12*	13*	5
	3:1	7*	8*	4
	4:1	5*	6*	3
	5:1 or 6:1	3	4	3
> 10	2:1	12*	13*	5
	3:1	8*	9*	5
	4:1	6*	7*	4
	5:1 or 6:1	4	5	4

\* These minimum offsets may be reduced when curb and gutter or some other feature reduces the flow of water down the slope. The smaller offsets of each group of height of fill cannot be reduced.

\*\*Silt fence checks will have a maximum length of 5 feet or until they tie back into the slope.

##### 1.3.1.1 Geotextile Filter Fabric and Steel Post System

1. Install steel posts to a minimum depth of 2 feet. Posts should protrude 1 to 2 inches minimum above the fabric, but no more than 3 feet of the post should protrude above the ground. Space steel posts on a maximum of 6-foot centers.
2. Attach fabric to the steel posts using heavy-duty plastic ties that are evenly spaced and placed in a manner to prevent sagging or tearing of the fabric. In all cases, ties should be affixed in no less than 4 places.
3. Install the fabric to a minimum height of 24 inches above the ground. When necessary or as directed by the RCE, the height of the fence above ground may be greater than 24 inches.

In areas where conditions warrant, larger steel posts or reduced post spacing may be required to provide an adequate fence to handle the stress from sediment loading.

In tidal areas, extra silt fence height may be required. The minimum steel post length will be twice the exposed post height. Steel post spacing will remain the same and extra height fabric will be 4, 5, or 6 feet depending upon average tidal change.

When placing fabric by hand, excavate a trench approximately 6 inches wide and 6 inches deep and place 12 inches of geotextile fabric into the 6 inch deep trench, extending the remaining 6 inches towards the upslope side of the trench. Backfill the trench with soil or gravel and compact. Bury 12 inches of fabric into the ground when pneumatically installing silt fence with a slicing method.

Purchase geotextile fabric in continuous rolls and cut to the length of the barrier to avoid joints. When joints are necessary, wrap the fabric together at a support post with both ends fastened to the post, with a 6-inch minimum overlap. A 12-inch minimum overlap is required in tidal areas.

Install silt fence checks every 100 feet at a maximum and at low points.

#### 1.3.1.2 Belted Silt Retention Fabric and Wood Post System

1. Install the wood posts into the ground to a minimum depth of 24 inches while allowing a minimum of 24 inches of BSRF fabric to be left above the ground. Space the wood posts on a maximum of 4-foot centers.
2. Tightly stretch the BSRF fabric along the inside 1¾-inch dimension of the wood post and attach the BSRF fabric to the wood post with a 2-foot long, 1-inch wide, 3/8-inch thick bonding strip with 1½-inch by ½-inch staples. The strip is used to tightly bond the fabric to the support post, preventing tear-down from the top and adds linear support by stabilizing the fabric. Use 4 staples to secure the BSRF fabric to the hardwood post.
3. Install the BSRF fabric at a minimum height of 24 inches above the ground. When necessary, the height of the fabric above ground may be greater than 24 inches.

In tidal areas, extra silt fence height may be required. The minimum wood post length will be twice the exposed post height. Wood post spacing will remain the same and extra height fabric will be 4, 5, or 6 feet depending upon average tidal change.

When placing BSRF fabric by hand, excavate a trench approximately 6 inches wide and 6 inches deep and place 12 inches of the BSRF fabric into the 6-inch deep trench, extending the remaining 6 inches towards the upslope side of the trench, backfill the trench with soil or gravel and compact. Bury 12 inches of BSRF fabric into the ground when pneumatically installing silt fence with a slicing method.

Purchase BSRF fabric in continuous rolls and cut to the length of the barrier to avoid joints. When joints are necessary, wrap the fabric together at a support post with both ends fastened to the post, with a 6-inch minimum overlap. A 12-inch minimum overlap is required in tidal areas.

#### 1.3.2 Inspection and Maintenance

Inspect the silt fence system every 7 days. Immediately correct any deficiencies. Check for sediment buildup and fence integrity. Check where runoff has eroded a channel beneath the fence, or where the fence has sagged or collapsed by fence overtopping.

Remove fabric and replace whenever it has deteriorated to such extent that it reduces the effectiveness of the silt fence system. In addition, review daily the location of silt fence systems in area where construction activities have changed the natural contour and drainage runoff to ensure that the silt fence systems are properly located for effectiveness. Install additional silt fence systems as directed by the RCE where deficiencies exist.

Maintain the silt fence system until its capacity has been reached or erosion activity in the area has been stabilized. Remove sediment accumulated along the fence when it reaches approximately one-third the height of the fence, especially if heavy rains are expected. Remove trapped sediment or stabilize on site.

If a silt fence system or portion of fence is located in an area where removing the sediment is not possible, install a second silt fence, if necessary, at the direction of the RCE. In this case, payment for both silt fence systems and portions involved is made at the unit price for silt fence systems.

Remove the silt fence system within 30 days after final stabilization is achieved or after temporary Best Management Practices (BMPs) are no longer needed. Permanently stabilize disturbed areas resulting from silt fence system removal. The fence material remains the property of the contractor and may be used in other locations provided the materials meet the appropriate requirements contained in this Specification and/or on the Plans.

### 1.3.3 Acceptance

The RCE will approve all silt fence system installations.

## 1.4 Measurement

**Silt Fence System** - The quantity of the silt fence system is the length of silt fence system installed and maintained and is measured by the linear foot (LF) of silt fence system in-place, complete and accepted.

**Silt Fence Extra Height** - The quantity of silt fence extra height is the length of extra height silt fence installed and maintained and is measured by the linear foot (LF) in-place, complete and accepted.

**Removal of Silt Retained by Silt Fence System** - The quantity for the removal of silt retained by silt fence system is the length of silt fence system in front of which silt deposit was removed as ordered by the RCE and is measured by the linear foot (LF) along the line of silt fence system, complete and accepted.

**Repair/Replace of Silt Fence System** - The quantity for the repair/replace of silt fence system is the length of silt fence system repaired or replaced because of failure of the silt fence system not the fault of the contractor and is measured by the linear foot (LF) along the line of silt fence system, complete and accepted.

## 1.5 Payment

**Silt Fence System** - Payment for silt fence systems is full compensation for installing silt fence systems as specified or directed and includes furnishing, placing, maintaining, inspecting, removing, and disposing of silt fence systems, providing filter fabric, posts, and ties or staples, and all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.

**Silt Fence Extra Height** - Payment for silt fence extra height is full compensation for installing extra height silt fence as specified or directed and includes furnishing, placing, maintaining, inspecting, removing, and disposing of extra height silt fence, providing filter fabric, posts, and ties or staples, and all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.

**Removal of Silt Retained by Silt Fence Systems** - Payment for removal of silt retained by silt fence systems is full compensation for removing and disposing of sediment deposits accumulated by silt fence systems as specified or directed and includes all material, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications and other terms of the Contract.

**Repair/Replace of Silt Fence System** - Payment for replace/repair silt fence systems is full compensation for repairing or replacing damaged or malfunctioned silt fence systems as specified or directed and includes furnishing or repairing filter fabric, posts, ties or staples, and all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.

**Table 5: Bid Item Number**

<b>Bid Item Number</b>	<b>Description</b>	<b>Units</b>
8153000	Silt Fence System	LF
8153005	Silt Fence Extra Height	LF
8154050	Removal of Silt Retained by Silt Fence Systems	LF
8153090	Replace/Repair Silt Fence System	LF