

Silt Fence

Definition

Silt fence is a perimeter sediment control device. Generally, silt fence is constructed of porous woven geotextile fabric attached to wooden posts.

Description and Purpose

Silt fence is a linear fence installed at the edge of earth disturbances. The purpose of silt fence is to protect downslope surface waters and properties by removing suspended solids from runoff prior to leaving the site.

The practice may also be called filter fence.

Pollutant(s) controlled:

- Suspended solids

Treatment Mechanisms:

- Slowing and ponding of runoff water to promote settlement of suspended solids
- Fabric provides some filtration of larger soil particles

Pollution Removal Efficiencies:

- Moderate to good removal of silt and sand particles if properly placed, installed, and maintained
- Poor removal of clay particles

Companion and Alternative BMPs

- Perimeter Sedimentation Controls
- Storm Sewer Inlet Protection

Advantages and Disadvantages

Advantages:

- Relatively inexpensive
- Easy to install
- Readily available

Disadvantages:

- Poor effectiveness on fine sized soil particles such as clay
- May require frequent maintenance
- Effective only for sheet runoff flow, fails in concentrated flow areas due to low permeability
- Limited effectiveness at large, sloping sites

Location

Silt fence should be installed at the downslope edge of disturbed areas, along a line of equal elevation (parallel to contour lines). Place beyond the toe of steeper slopes if possible to increase the "ponding" or settling effect.

Materials

Table 1: Materials and properties for silt fence construction

Woven Geotextile Fabric Width (in)	Min. Hardwood Post Length (in)*	Min. Grab Tensile (lbs) (ASTM D 4632)	Min. Trapezoidal Tear Strength ((lbs) (ASTM D 4533)	Min. Permittivity (sec ⁻¹) (ASTM D 4491)	Max. Apparent Opening Size (mm) (ASTM D 4751)
24	36	100	45	0.1	0.6
36	48	100	45	0.1	0.6

*Hardwood posts shall be a minimum of 1 1/8 inches x 1 1/8 inches thickness

Source: Adapted from Michigan Department of Transportation 2003 Standard Specifications for Construction

Additional materials:

- Metal Staples or nails for attaching lath and fabric to posts
- Hardwood Lath six to eight inches shorter than fabric width

Design Specifications

- Fabric attached to post by stapling or nailing through lath and into hardwood posts, at a minimum of four locations, evenly spaced along lath to prevent fabric tear out.
- six-inch loose bury flap unattached to post at bottom of lath
- Maximum post spacing: ten feet
- Whenever possible, place silt fence in flat areas at least ten feet from the toe of slopes (silt fence is not an appropriate measure for placement on steep slopes)
- Maximum contributing drainage area is 1/2 acre per 100 linear feet of fence

Performance Enhancers

- Wider Fabric and longer posts (i.e. 36-inch fabric and 48-inch posts)
- Heavier posts (i.e. two inches by two inches)
- More frequent post spacing (i.e. 6.5 feet)
- Reinforcing mesh on fabric
- Placing multiple parallel rows may provide a factor of safety

Construction Guidelines

Construction guidelines in consecutive order are:

1. Dig a six-inch trench at equal elevation (parallel to contour lines) at the downslope edge of earth disturbance (avoid placement on steep slopes);
2. Unroll and extend silt fence along trench line. Orient fence such that the posts are down slope of the fabric and lath (i.e. storm water will push the lath and fabric against the post);
3. Turn end post 360 degrees so that fabric surrounds the post;
4. Pound end post into the ground at the downslope edge of the trench until the top of the six-inch bury flap is at ground elevation;
5. Continue to pound in posts consecutively starting with post adjacent to the end already installed. Assure fabric is as taught as possible;
6. Join consecutive rolls by rolling end posts similar to item 3 above. Cross over the end posts or place them side by side and roll them (180 or 360 degrees). Drive the end posts together;
7. Backfill the trench and compact. If possible, leave a compacted ridge of soil along the upslope edge of the fabric.

Acceptable alternate construction methods include:

1. In situations where the bury flap cannot be trenched in, backfill and compact over the bury flap. Note that this method is less effective and more prone to failure;
2. In some cases, it may be advantageous to construct silt fence in the field; i.e. fabric, posts, and lath come separate and must be put together. The same construction guidelines apply;
3. Silt fence installation machines may make the process of installing silt fence easier. The machines "slice" the fabric into the ground, then posts and lath are manually installed.

Monitoring

Silt Fence should be inspected at least weekly, immediately before a forecasted runoff event, and after each runoff event from rain or snowmelt. Look for fabric tears, post failure, undermining, sediment build up, overtopping, side cutting around the silt fence, and areas damaged by construction activities.

Maintenance

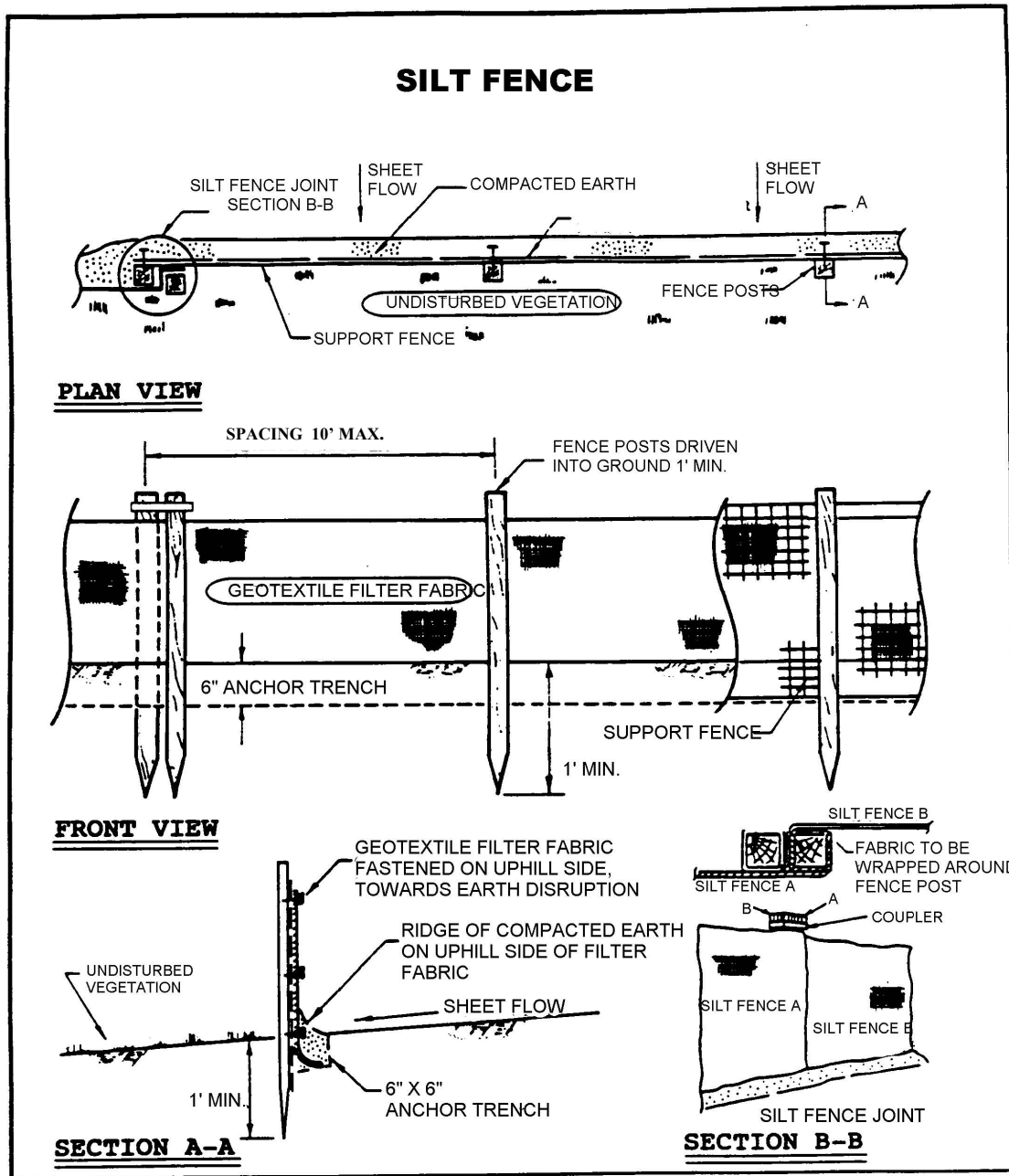
- Fabric tears, post failures, vehicle damage, and/or undermining should be repaired immediately;
- Sediment build up should be removed when it reaches 1/3 to 1/2 the height of the silt fence above ground elevation;
- Overtopping and side cutting are signs that the silt fence is either not appropriately placed or that additional measures are necessary due to site runoff conditions;
- **Remove the silt fence after the site has been stabilized with permanent soil erosion/sedimentation control (SESC) measures.**

References

Michigan Department of Transportation. 2003. Standard Specifications for Construction.

Oakland County, Michigan Water Resources Commissioner. Individual Soil Erosion and Sedimentation Details, SP-2-Silt Fence.

Exhibit 1: Silt fence construction and installation diagram



Source: Adapted from Oakland County (Michigan) Erosion Control Manual