

Chapter 4 - BEST MANAGEMENT PRACTICE STANDARDS

SILT FENCE (Temporary Practice)

Definition

A temporary sediment barrier consisting of a filter fabric stretched across and attached to supporting posts and entrenched. There are two types. The Silt Fence is a temporary linear filter barrier constructed of synthetic filter fabric, posts, and, depending upon the strength of the fabric used, wire fence for support. The Filter Barrier is constructed of stakes and burlap or synthetic filter fabric.

Purposes

To intercept and detain small amounts of sediment from disturbed areas during construction operations in order to prevent sediment from leaving the site. To decrease the velocity of sheet flows and low-to-moderate level channel floods.

Conditions When Practice Applies

Below disturbed areas where erosion would occur in the form of sheet and rill erosion.

Where the size of the drainage area is no more than 1/4 acre per 100 feet of silt fence length; the maximum slope length behind the barrier is 100 feet, and the maximum gradient behind the barrier is 50 percent (2.1).

In minor swales or ditch lines where the maximum contributing drainage area is no greater than 2 acres.

Under no circumstances should silt fences be constructed in live streams or in swales or ditch lines where flows are likely to exceed 1 cubic foot per second (cfs). See Design Criteria for further clarification.

Planning Considerations

Laboratory work has shown that silt fences can trap a much higher percentage of suspended sediments than can straw bales. Silt fences may be preferable to straw barriers in many cases. While the failure rate of silt fences is lower than that of straw barriers, there have been instances in which silt fences were improperly installed. The installation methods outlined here can improve performance.

Filter barriers are inexpensive structures composed of burlap or standard weight synthetic filter fabric stapled to wooden stakes. Flow rates through burlap filter barriers are slightly slower and filtering efficiency is significantly higher than for straw bale barriers.

FLOW RATES AND FILTERING EFFICIENCIES OF
VARIOUS SEDIMENT FILTER MATERIALS

<u>Material</u>	<u>Flow Rate (gal./sq. ft./min.)</u>	<u>Filter Efficiency (%)</u>
Straw	5.6	67
Burlap (10 oz. fabric)	2.4	84
Synthetic Fabric	0.3 (Avg.)	97 (Avg.)

Silt fences composed of a wire support fence and an attached synthetic filter fabric slow the flow rate significantly but have a higher filtering efficiency than burlap. Both woven and non-woven synthetic fabrics are commercially available. The woven fabrics generally display higher strength than the non-woven fabrics. When tested under acid and alkaline water conditions, most of the woven fabrics increase in strength. There is a variety of reactions among the non-woven fabrics. The same is true of testing under extensive ultraviolet radiation. Permeability rates vary regardless of fabric type. While all of the fabrics demonstrate very high filtering efficiencies for sandy sediments, there is considerable variation among both woven and non-woven fabrics when filtering the finer silt and clay particles. Therefore, it is recommended that woven fabrics be used exclusively and non-woven fabric should not be considered.

Design Criteria

No formal design is required.

Filter barriers shall have an expected usable life of 3 months. They are applicable in ditch lines, around drop inlets, and at temporary locations where continuous construction changes the earth contour and runoff characteristics and where low or moderate flows (not exceeding 1 cfs) are expected.

Silt fences, because they have a much lower permeability than burlap filter barriers, have their applicability limited to situations in which only sheet or overland flows are expected. They normally cannot filter the volumes of water generated by channel flows, and many of the fabrics do not have sufficient structural strength to support the weight of water ponded behind the fence line. Their expected usable life is 6 months.

Plans and Specifications

Plans for constructing and installing the silt fence shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve the intended purpose.

Specifications for installing the silt fence shall use or be in conformance with the following. Any variation from these specifications shall be approved by an engineer.

Chapter 4 - BEST MANAGEMENT PRACTICE STANDARDS

1 Materials

Synthetic filter fabric shall be a pervious sheet of propylene, nylon, polyester or ethylene yarn and shall be certified by the manufacturer or supplier as conforming to the following requirements:

<u>PHYSICAL PROPERTY</u>	<u>REQUIREMENTS</u>
Filtering Efficiency	75% (minimum)
Tensile Strength at 20% (max.) Elongation	Extra Strength- 50 lbs./lin. in. (minimum) Standard Strength- 30 lbs./lin. in. (minimum)
Flow Rate	0.3 gal./sq. ft./min. (minimum)

Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life.

Burlap shall be 10 ounces per square yard fabric.

Posts for silt fences shall be either 4-inch diameter wood or 1.33 pounds per linear foot steel with a minimum length of 5 feet. Steel posts shall have projections for fastening wire to them.

Stakes for filter barriers shall be 1" x 2" wood (preferred) or equivalent metal with a minimum length of 3 feet.

Wire fence reinforcement for silt fences using standard strength filter cloth shall be a minimum of 36 inches in height, a minimum of 14 gauge and shall have a maximum mesh spacing of 6 inches.

2. Filter Barrier

This sediment barrier may be constructed using burlap or standard strength synthetic filter fabric. It is designed for low or moderate flows not exceeding 1 cfs.

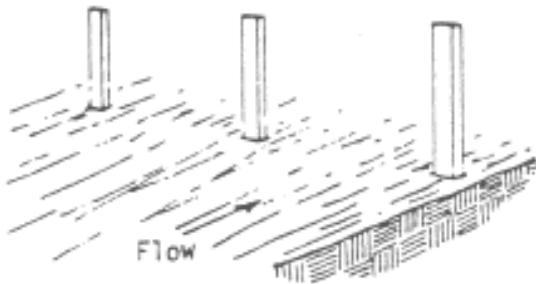
The height of a filter barrier shall be a minimum of 15 inches and shall not exceed 18 inches.

Burlap or standard strength synthetic filter fabric shall be purchased in a continuous roll and cut to the length of the barrier to avoid the use of joints.

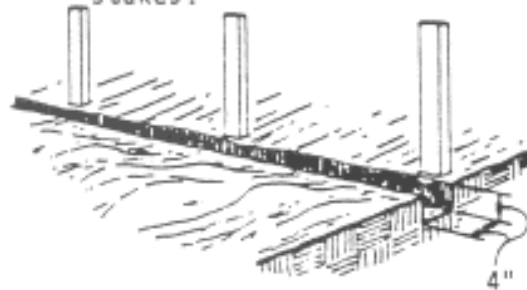
The stakes shall be spaced a maximum of 3 feet apart at the barrier location and driven securely into the ground (minimum of 8 inches).

A trench shall be excavated approximately 4 inches wide and 4 inches deep along the line of stakes and upslope from the barrier.

1. Set the stakes.



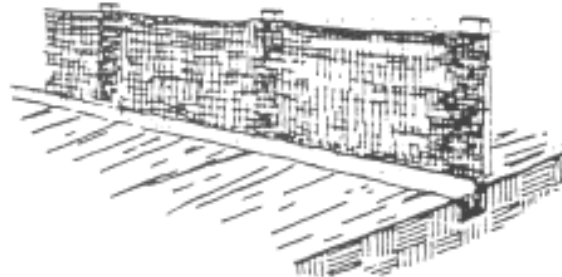
2. Excavate a 4"x4" trench upslope along the line of stakes.



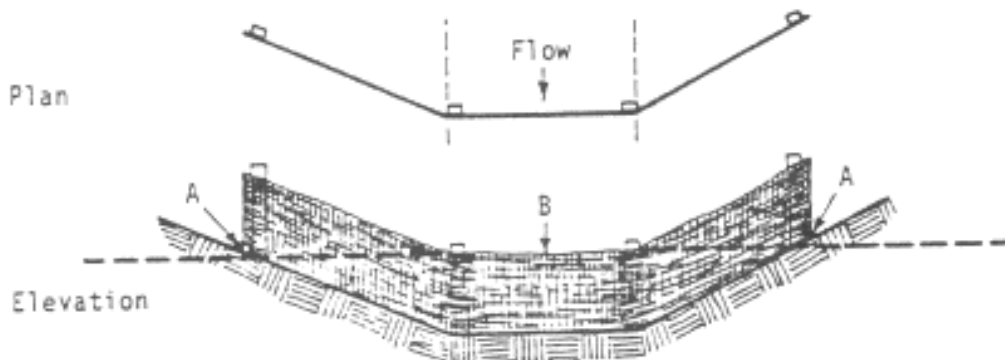
3. Staple filter material to stakes and extend it into the trench.



4. Backfill and compact the excavated soil.



CONSTRUCTION OF A FILTER BARRIER



Points A should be higher than point B
PROPER PLACEMENT OF A FILTER BARRIER IN A DRAINAGE WAY

The filter material shall be stapled to the wooden stakes, and 8 inches of the fabric shall be extended into the trench. Heavy duty wire staples at least 1/2-inch long shall be used. Filter material shall not be stapled to existing trees.

The trench shall be backfilled and the soil compacted over the filter material.

If a filter barrier is to be constructed across a ditch line or swale, the barrier shall be of sufficient length to eliminate end flow, and the plan configuration shall resemble an arc or horseshoe with the ends oriented upslope.

Filter barriers shall be removed when they have served their useful purpose, but not before the upslope area has been permanently stabilized.

3. Silt Fence

This sediment barrier utilizes standard strength or extra strength synthetic filter fabrics. It is designed for situations in which only sheet or overland flows are expected.

The height of a silt fence shall not exceed 36 inches (higher fences may impound volumes of water sufficient to cause failure of the structure).

The filter fabric shall be purchased in a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are necessary, filter cloth shall be spliced together only at a support post, with a minimum 6-inch overlap, and securely sealed.

Posts shall be spaced a maximum of 10 feet apart at the barrier location and driven securely into the ground (minimum of 12 inches). When extra strength fabric is used without the wire support fence, post spacing shall not exceed 6 feet.

A trench shall be excavated approximately 4 inches wide and 4 inches deep along the line of posts and upslope from the barrier.

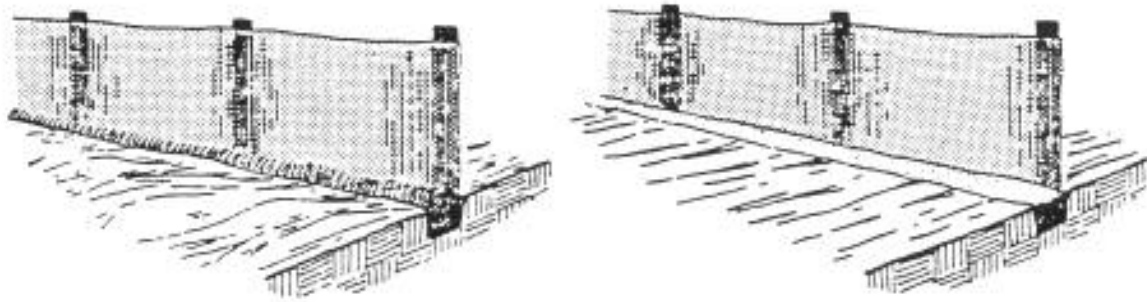
When standard strength filter fabric is used, a wire mesh support fence shall be fastened securely to the upslope side of the posts using heavy duty wire staples at least 1 inch long, tie wires or hog rings. The wire shall extend into the trench a minimum of 2 inches and shall not extend more than 36 inches above the original ground surface.

The standard strength filter fabric shall be stapled or wired to the fence, and 8 inches of the fabric shall be extended into the trench. The fabric shall not extend more than 36 inches above the original ground surface.

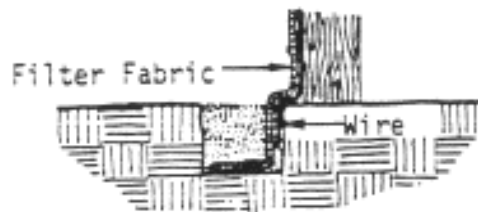
When extra strength filter fabric and closer post spacing are used, the wire mesh support fence may be eliminated. In such cases the filter fabric is stapled or wired directly to the posts.

1. Set posts and excavate a 4"x4" trench upslope along the line of posts.
2. Staple wire fencing to the posts.
3. Attach the filter fabric to the wire fence and extend it into the trench.
4. Backfill and compact the excavated soil.

CONSTRUCTION OF A SILT FENCE



Extension of fabric and wire into the trench.



The trench shall be backfilled and the soil compacted over the filter fabric.

Silt fences shall be removed when they have served their useful purpose, but not before the upslope area has been permanently stabilized.

4. Maintenance

Silt fences and filter barriers shall be inspected immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs shall be made immediately.

Should the fabric on a silt fence or filter barrier decompose or become ineffective prior to the end of the expected usable life and the barrier still be necessary, the fabric shall be replaced promptly.

Sediment deposits should be removed after each storm event. They must be removed when deposits reach approximately one-half the height of the barrier.

Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required shall be dressed to conform with the existing grade, prepared and seeded.