



7E-12 Vegetative Filter Strip



BENEFITS

	L	M	H
Flow Control	■	□	□
Erosion Control	■	□	□
Sediment Control	■	■	□
Runoff Reduction	■	□	□
Flow Diversion	□	□	□

Description: A filter strip is a natural system that uses plants to treat stormwater runoff. The vegetated filter strip (VFS) serves as a perimeter buffer zone and a last defense between an area needing protection, such as a street or water body (stream, wetland, lake, etc.), and the adjacent property. Its primary purpose is to remove sediment and other pollutants from runoff water by filtration, deposition, infiltration, absorption, and vegetative uptake.

A VFS relies on the use of vegetation to slow runoff velocities and filter out sediment and other pollutants from construction site runoff. There can be a significant reduction in runoff volume for smaller flows that infiltrate pervious soils while contained within the filter strip. Sheet flow must be maintained across the entire filter strip for it to maintain its effectiveness.

Typical Uses: As a sediment control practice, a VFS installed specifically during construction is typically used to prevent sediment from moving into/onto adjacent property. It is intended to keep downstream areas free of sediment.

Advantages:

- Natural measure to remove coarse sediment.
- Reasonably low construction costs.
- Filter strips are a low-maintenance practice, but maintenance increases as sediment volumes increase.
- May be able to utilize existing vegetation as a treatment device.
- Provides an aesthetically pleasing appearance.

Limitations:

- Are not intended to treat concentrated flow.
- The disturbed area draining to the vegetated strip shall have slopes of 6 percent or less.
- Requires more land area than other sediment control practices.

Longevity: Permanent.

SUDAS Specifications: Refer to Section 9010 (Seeding) or 9020 (Sodding)

A. Description/uses

Vegetative Filter Strips (VFS) are densely vegetated strips of land (typically installed with sod-forming grasses) with a uniform slope to maintain sheet flow, which are designed to treat runoff and remove pollutants through vegetative filtering and infiltration during the construction phase. A VFS is located along the length of the downslope edge of the entire disturbed area to treat the runoff

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B. Design considerations

Because of the large area required to provide adequate treatment, filter strips are generally used to treat small drainage areas (less than five acres). However, larger sites which have significant undisturbed vegetation or sufficient area for construction of a VFS may be well suited for accommodating a vegetated filter strip.

The size of the filter strip depends on the drainage area and the filter strip slope. Flow must enter the filter strip as sheet flow and spread out over the width of the strip. It is desirable to keep flow depth across the strip below a ½ inch in order to maintain sheet flow.

A level spreader may be required at the upstream end of the strip to dissipate concentrated flows and ensure sheet flow across the strip. Level spreaders or filter berms should be constructed perpendicular to the slope every 100 feet for slopes less than 5% and every 50 feet for slopes greater than 5% to prevent concentrated flows from forming.

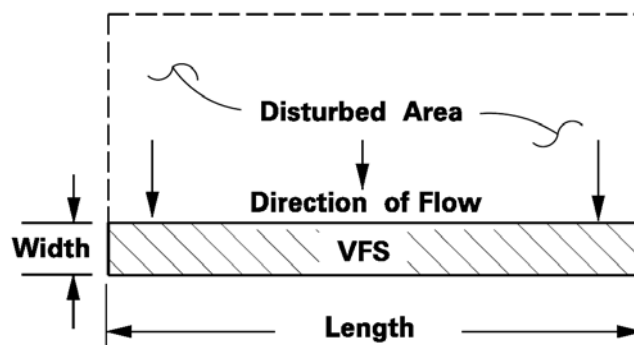
It should be noted that existing vegetation along a channel or drainage way can be used as a VFS. By simply protecting this vegetation during construction, an inexpensive VFS may be created.

C. Application

There are three different approaches to determining the size of a filter strip:

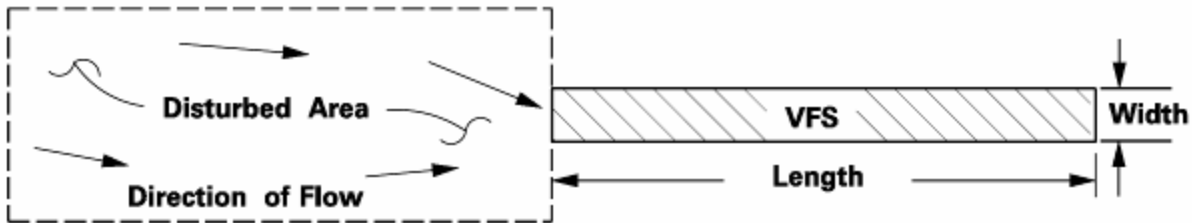
1. Adjacent to the disturbed ground, a VFS with a minimum width of 25 feet is adequate for treating runoff from disturbed areas up to 125 feet in width. For larger disturbed areas, the width of the VFS should be increased by 1 foot for every 5 feet beyond the 125-foot limit.

Figure 1: Vegetated filter strip adjacent to disturbed area



- When the VFS is not completely adjacent to the site, it should be sized to be a minimum of one-half the area of the disturbed ground (i.e. $\text{Length} \times \text{Width} = \frac{1}{2} \times \text{Disturbed Area}$). The width of the VFS should be sized according to Manning's equation (refer to Chapter 2, to limit the flow depth to a 1/2-inch or less (a minimum of width of 25 feet should be provided).

Figure 2: Vegetated filter strip downstream of disturbed ground



- The VFS may also be designed to provide a 20-minute travel time (contact time) for runoff. According to the EPA, this level of contact time with the vegetation is able to achieve 85% removal of Total Suspended Solids (TSS) (US-EPA, 1980).

D. Maintenance

Vegetated filter strips should be protected from vehicular traffic and construction equipment. The stand of vegetation should be maintained at a minimum height of 3 to 6 inches. Unwanted weeds, brush, and trees should be controlled.

Vegetated filter strips require regular inspection to ensure proper distribution of flows, examine for signs of rill formation, and check for and remove accumulated sediment.