Filter Berms

Source: Minnesota Stormwater Manual

BENEFITS

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

Description: A filter berm is a windrow-shaped ~~(triangular)~~ structure ~~with a specified~~ constructed of 'filter material'; typically constructed from ~~wood chips (~~slash mulch~~)~~ generated during site clearing and grubbing. ~~that normally is a blend of composted materials or other~~ organic products~~,~~ used to slow flow velocity, capture and degrade chemical pollutants, and trap sediment.

Typical Uses: Perimeter control, slope length reduction, ~~flow diversion for small drainage areas~~, environmentally sensitive areas such as wetlands and waterways, at the edge of gravel parking lots, and general areas under construction.

Advantages:

- Maintains a separation between clean off-site water and sediment-laden water allowing sediment basins and traps to function more efficiently.
- Easily constructed and maintained with equipment found on most construction sites.
- Less likely to obstruct wildlife movement and migration ~~then~~ than other practices.
- Does not always need to be removed, thereby eliminating removal and disposal costs.
- Can be installed year-round in difficult soil conditions such as frozen or wet ground, on hard compacted soils, near pavements, and in wooded areas.

Limitations:

- Not suitable for areas of concentrated water flow or below culvert outlet aprons.
- ~~Availability of suitable filter materials may be limited.~~
- Equipment operators may drive over berms, damaging the practice~~product~~.

Longevity: Six months

SUDAS Specifications: Refer to Section~~s~~ 9040, 2.21 and 3.06

Commented [REL[2R1]: Benefits - sediment control - fill in L and M. Flow diversion should be L.

Commented [SK3R1]: Round 3 Revisions:

- Corrected the "Benefits" for Sediment Control & Flow Diversion
- Updated guidelines to allow smaller filter berms on residential lots and for smaller drainage areas.
- Described potential use as ditch checks for small drainage areas.
- Added slash mulch to the specifications

Commented [SK4]: Need local picture of slash mulch berm.

A. Description/Uses

A filter berm typically consists of a windrow ~~three-dimensional matrix of biologically active stable composted organic material with various sized particles formed in a continuous windrow fashion (triangular)~~ slash mulch that diverts flow or ~~slows and~~ slows and filters water to capture sediment~~, and degrade pollutants.~~ Its natural permeability allows water to seep through it while capturing sediment ~~in its pore space and~~ behind its mass, slowing water velocity and absorbing water pollutants~~,~~ such as ~~hydrocarbons,~~ nutrients~~, and bacteria~~.

B. Design Considerations

~~1.~~ **Materials:** ~~The key to achieving the proper balance between sediment removal and flow-through rate is using a filter material with the proper particle size. Filter material with a high percentage of fine particles will clog and create a barrier to flow. This will cause water to pond and the pressure may cause the installation to fail. Alternatively, filter material with particles that are too large will allow runoff to pass through the barrier with little or no resistance, eliminating the velocity reduction and sediment trapping benefits of the barrier. Refer to SUDAS Specifications Section 9040 for proper filter material size.~~Filter berms are typically constructed from slash mulch generated from on-site clearing and grubbing operations or may be imported from off-site.

1. ~~2.~~ General Guidelines:

a. Typical ~~F~~filter berms should be trapezoidal with a bottom width of five to seven feet and a minimum height of 2 feet~~, and side slopes of 2:1~~. For small drainage areas and individual residential lots, more compact filter berms with a bottom width of three to five feet and a minimum height of 18 inches may be used.~~maintain a 2:1 base to height ratio to ensure berm stability, with a minimum berm size of 1 foot high by 2 feet wide.~~

b. When possible, filter berms should be placed away from the toe of a slope on the flattest area possible to allow concentrated flow to dissipate into sheet flow and to provide greater storage area for sediment.

c. Filter berms should typically not be used in areas of concentrated flows such as ditches, swales, or around pipe outlets; however, filter berms may be appropriate as ditch checks for very small drainage areas.

2. Slope Control:

a. When installed on slopes, filter berms should be installed along the contour of the slope, perpendicular to sheet flow, with the ends turned up to prevent flows from bypassing the berm.

~~b. Where filter berms are installed to re-route flow to other areas, and water is intended to flow along the toe of the berm, erosion protection may be required. Filter berms must be stabilized with vegetation or erosion control blankets if anticipated flow velocities may cause erosion. Refer to Table 7E-8.01.~~

c. The upland drainage area slope should not exceed 10 percent. On steep slopes (>6%) and/or long slopes (>50-75 feet), multiple berms should be placed at regular intervals down the slope.

Commented [REL[5]: Not very feasible in small, residential lots - maybe 3-5 feet?

One for general construction sites and one for individual lots? (Use 5-7 feet for general construction site and 3-5 feet for individual). Could use "typical" and explain reasoning behind guidance. Also explain use in ditches.

Commented [SK6]: This table is from MN Stormwater Manual. Proposing to replace this with slopes that generate the velocities indicated in the table.

d. A common location to place filter berms for sediment control is at the toe of a slope. When used for this application, the berm should be located as far away from the toe of the slope as practical to ensure that a large storage volume is available for runoff and sediment.

~~**3. Diversion:** When utilized for diversion, check dams constructed of fiber rolls, silt fence, or other practices should be constructed at regular intervals to control flow velocities along the toe of the berm.~~

~~The beginning and end of the installation should point slightly up the slope, creating a "J" shape at each end to contain runoff and prevent it from flowing around the ends of the berm. Allowable slope length for compost filter berms is dependent upon the grade of the slope as shown in Table 7E-3.01. For slopes that receive runoff from above, a filter berm should be placed at the top of the slope to control the velocity of the flow running onto the slope, and to spread the runoff out into sheet flow. On steep or excessively long slopes a number of filter berms may be placed at regular intervals down the slope.~~

~~**4. Sediment Control:** Filter berms remove sediment both by filtering, and by ponding water behind them. When used for sediment control, filter berms should be located to maximize the storage volume created behind the berm.~~

~~A common location to place filter berms for sediment control is at the toe of a slope. When used for this application, the berm should be located as far away from the toe of the slope as practical to ensure that a large storage volume is available for runoff and sediment.~~

C. Application

~~Compost~ When utilized for slope control, filter berms should be spaced according to Table 7E-3.01.

Table 7E-3.01: Maximum Filter Berm Spacing*

Slope	Maximum Spacing (feet)	~~Filter Compost Berm Size Height x Width (feet)~~
0% to 2%	100~~25~~	~~1 x 2~~2 ~~x 5~~
2% to 5%	40~~75~~	~~1 x 2~~2 ~~x 5~~
5% to 10%	20~~50~~	~~1 x 2~~2 ~~x 5~~
*For typical filter berms with a 2-foot height		

~~As mentioned previously, the material properties of the filter material are a significant factor in the performance of the berm. The wood chip product typically used as a filter material may not be readily available in all areas. This may limit the utilization of filter berms as an economical sediment control option in some areas.~~

D. Maintenance

Surface erosion should be repaired and the surface stabilized. Accumulated sediment should be removed~~, or a new berm installed,~~ when it reaches approximately one-half of the berm height. If concentrated flows are bypassing or breaching the berm, it must be expanded, enlarged, or augmented with additional erosion and sediment control practices. Additional filter material should be added as required to maintain the dimensions of the berm. Any damage should be repaired immediately.

Commented [REL[7]: Clarify that we're talking about larger construction sites here

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