Temporary Earth Diversion Berms

Source: Clackamas County, 2000

BENEFITS

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

Description: A diversion berm is a constructed practice intended to divert off-site flow away from disturbed areas (or areas to be disturbed) to prevent erosion or to direct sediment-laden runoff to sediment control practices such as sediment traps or basins for treatment. Typically constructed from compacted earth.

Typical Uses: Diversion berms are used to intercept surface flows and divert runoff away from disturbed areas and environmentally sensitive areas such as wetlands and waterways. Diversion berms can be constructed along slopes to reduce the slope length, intercepting and carrying runoff to a stable outlet point or sediment control structure.

Advantages:

- Reduces the volume of flow across disturbed areas, thereby reducing the potential for erosion.
- Breaks up the concentration of water on long slopes.
- Maintaining a separation between clean water and sediment-laden water allows sediment basins and traps to function more efficiently.
- Easily constructed with equipment found on most construction sites.

Limitations:

- High flow velocities can erode the diversion structure.
- Diversion structures must be stabilized immediately after installation, necessitating careful planning to ensure vegetation will establish.
- Equipment operators may drive over berms, damaging the practice.

Longevity: One year or longer if properly stabilized

SUDAS Specifications: Refer to Section 9040, 3.11

A. Description/Uses

Diversion Berms are used to temporarily divert water around an area that is under construction or is being stabilized. Specific applications include perimeter control, diversion away from disturbed slopes, and diversion of sediment-laden water to treatment facilities.

As a perimeter control, temporary berms may be constructed above large, disturbed areas to divert upstream run-on around the site. This serves several purposes. First, the amount of runoff flowing over the disturbed area is reduced, reducing the erosion potential. Secondly, clean water can be separated from sediment-laden water and can be passed through or around the site. Sediment-laden water can be directed to a sediment trap or basin for treatment. Separating the upstream runoff from the sediment-laden water allows the designer to reduce the required size of the sediment removal structure, and allows the structure to work more efficiently.

On long slopes, diversion berms can be constructed at regular intervals to trap and divert sheet flow before it concentrates and causes rill and gully erosion.

B. Design Considerations

Diversion structures should be designed to carry peak flows from the 2 year, 24 hour storm.

The depth of the diversion should be based upon the design capacity, plus an additional 4 inches of freeboard. The minimum depth provided should be 18 inches. This may be provided solely by a berm or developed with a combination of berm and swale. The shape of the diversion may be parabolic, trapezoidal, or V-shaped, with side slopes of 2:1 or flatter.

The minimum slope of the diversion structure should be sufficient to carry the design flow. The maximum slope of the diversion is limited by the permissible velocities of flows within the structure, as shown in Table 7E-8.01. Since any existing vegetation will likely be destroyed during construction of the diversion structure, the bare surface situation should be considered for most applications or the practice should be stabilized immediately with seed and mulch, sod, RECP, or other means.

1. **Materials:** Soil diversion berms can typically be constructed during mass-grading operations by shaping and compacting on-site soils into a trapezoidal ridge. Soils used for diversion berms should be free of roots, large rocks, and vegetation, and not have a sand content of more than 70 percent. On-site topsoil could be stockpiled as a diversion berm until it is required elsewhere on the site.

2. **General Guidelines:**

    a. Diversion berms should be trapezoidal with a bottom width of five to seven feet, a minimum height of 2 feet, and side slopes of 2:1.

    b. When possible, diversion 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 a greater storage area for sediment.

    c. Diversion berms should not be used in areas of concentrated flows such as ditches, swales, or around pipe outlets.

3. Slope Control:

a. When installed on slopes, diversion 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 diversion 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, especially if surface vegetation is in poor condition or has been removed.

Table 7E-8.01: Maximum Longitudinal Slope for Diversion Berm

Soil Type	Permissible Slope			
	Surface Vegetation			
	Bare	***Poor***	***Fair***	***Good***
Sand, silt, sandy loam, and silty, loam	0.3%	0.75%	1.5%	4%
Sandy clay, loam, and sandy clay, loam	0.5%	1.5%	4%	7.5%
Clay	0.75%	3.0%	6%	10%

Source: Adapted from Smoot, 1999

C. Application

Diversion berms should be used around the perimeter of sites to prevent run-on of off-site flows over disturbed ground. In addition, diversion berms may be used on-site to direct sediment-laden water to sediment removal practices.

D. Maintenance

Surface erosion should be repaired and the surface stabilized. If concentrated flows are bypassing or breaching the berm, it should be enlarged or augmented with additional erosion and sediment control practices.

E. Time of Year

When diversion structures are constructed during times when vegetation cannot be established to stabilize the surface, alternative stabilization methods such as sodding or matting may be required.

F. Regional Location

As mentioned above, the allowable velocity within the diversion structure is based on the soil characteristics of the site. Silty and sandy soils are more prone to erosion than clay soils. However, with the proper design and stabilization methods, diversion structures may be used in all appropriate locations.