PRECONSTRUCTION EROSION AND SEDIMENT CONTROL METHODS

PURPOSE

The following section describes specific erosion control methods that are applicable to many stream alteration projects. Depending on the nature of the project, these methods may be used to limit excessive sedimentation to natural streams and adjacent riparian areas. These methods are intended to be implemented prior to initiation of a stream alteration project.

SILT FENCING

Description

A silt fence is a temporary barrier consisting of a geotextile (filter fabric material) supported by poles or stakes. The fence acts to intercept sediment from disturbed areas while allowing water to pass and enter adjacent waterways.

Applications

Silt fencing can be an effective, low-cost erosion control method in areas adjacent to and along banks of natural streams. They are particularly useful for projects that involve considerable disturbance of soils (new construction, grading, etc.) on gently sloping ground. Silt fencing installed around the perimeter of the disturbed area will prevent excessive sedimentation to adjacent water bodies and acts as a visual barrier between the work site and adjacent channel and riparian areas that are to be left undisturbed. Silt fencing is generally not effective in areas of localized or concentrated flow such as in channels or larger rivulets.

Design

The basic components of a silt fence consist of a geotextile material supported by steel or wooden posts or stakes. Geotextiles come in several different grades, which should be selected based upon site conditions.

Heavy-duty geotextile should be selected when projects occur on steep slopes, highly erodible or unstable soils, or where high surface runoff is anticipated. In most cases, steel posts must be used to support heavy-duty geotextile.

Light-duty or preassembled geotextile is appropriate for gentle slopes on stable soils. This is the most common type of silt fencing geotextile used in the state. Light-duty geotextile may be reinforced with wire mesh to increase effectiveness, stability, and life span.

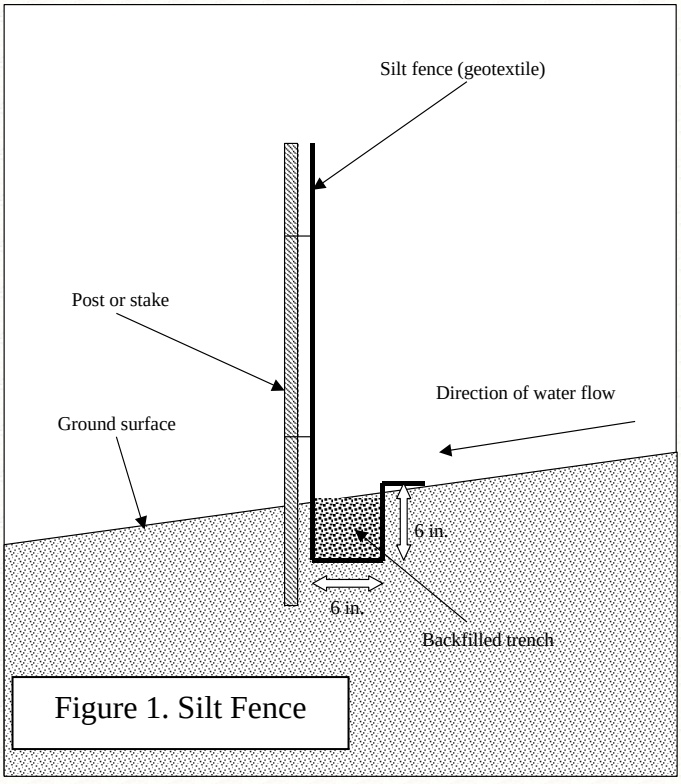

Figure 1. Silt Fence

Installation

Geotextile should be installed in a continuous fashion (single role) as to minimize gaps in which sediment can pass. Overlap should occur only at locations of posts or stakes.

Stakes or posts used to support the geotextile should be at least 4 feet in length and set approximately 1.5 feet deep. Posts should be located no more than 6 feet apart if wire mesh reinforcement is not used and no more than 10 feet if reinforced.

A 6-inch by 6-inch trench should be excavated on the upslope side of the silt fence. The bottom end of the geotextile should be firmly embedded within this trench to prevent seepage (See Figure 1). After installation of the geotextile the trench should be backfilled and compacted.

Inspection and Maintenance

Silt fencing should be inspected on a weekly basis and after precipitation events to ensure effectiveness. Inspections should ensure that no gaps exist between ground surface and geotextile, geotextile and stakes are firmly embedded into ground, and the geotextile is free from tears or other damage.

If the silt fencing is damaged repairs should be implemented immediately. Any scour occurring on the downslope side of the silt fence should be filled and compacted.

Silt fencing should remain in place until the disturbed area has been revegetated or otherwise fully stabilized.

Sources

USEPA.
http://cfpub.epa.gov/npdes/stormwater/menuofbmps/site_30.cfm
Metropolitan Water Council.
http://www.metrocouncil.org/environment/Watershed/BMP/manual.htm

TEMPORARY DIVERSIONS

Description

Temporary stream diversions are used to keep flowing water away from work being conducted within stream channels.

Application

Temporary diversions are applicable and often necessary when working in perennial streams to reduce excessive sedimentation and turbidity. They should be used when installing utility lines across channels, construction or repair of bridge abutments, and particularly if wet cement is being used in the project.

Design

Numerous temporary diversion methods may be used depending on the nature of the project, site limitations, and characteristics of the channel being altered. Two methods are presented below and are applicable to many stream alteration activities.

The **Dam and Flume Method** utilizes a large steel or plastic culvert in association with a flow control dike (e.g. sand bags) in the streambed to create an area within the channel without flow (See Figure 2). Spoil and topsoil associated with instream work are stockpiled outside of sensitive riparian areas and protected with sediment barriers (e.g. silt fencing) to minimize sedimentation to the channel.

The **Dam and Pump Method** is very similar to the dam and flume method excepting the use of a pump rather than a culvert to carry flow past the work area (Figure 3). A second dam located upstream from the return flow may be necessary to prevent backwater from entering the work area. This method is most applicable on streams with minimal flow.

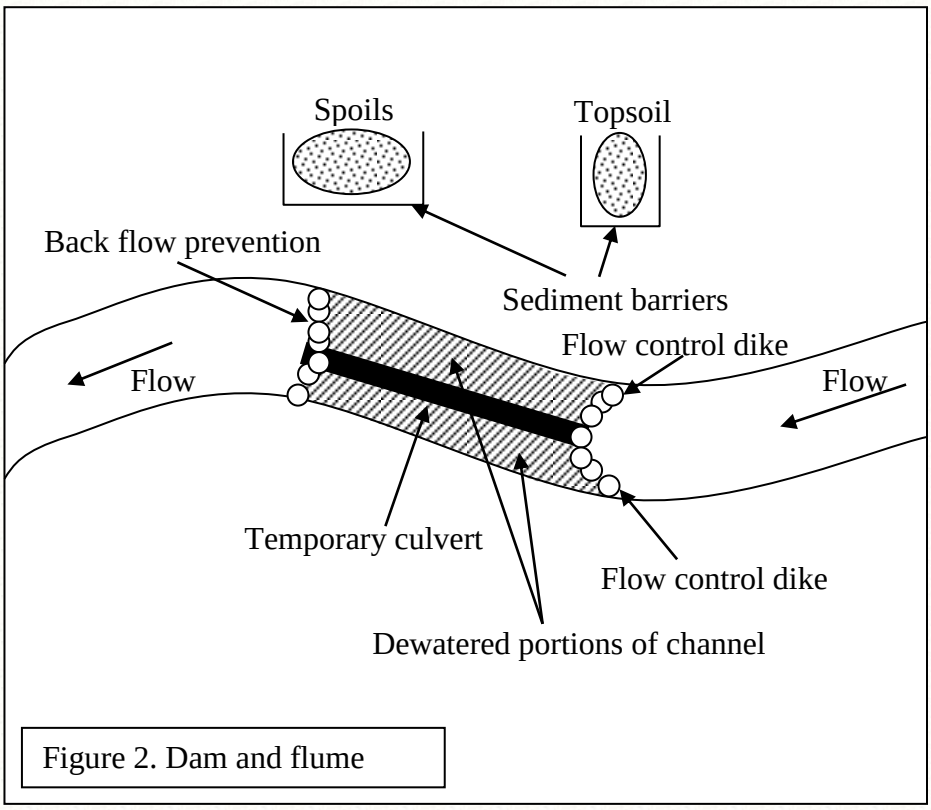

Figure 2. Dam and flume

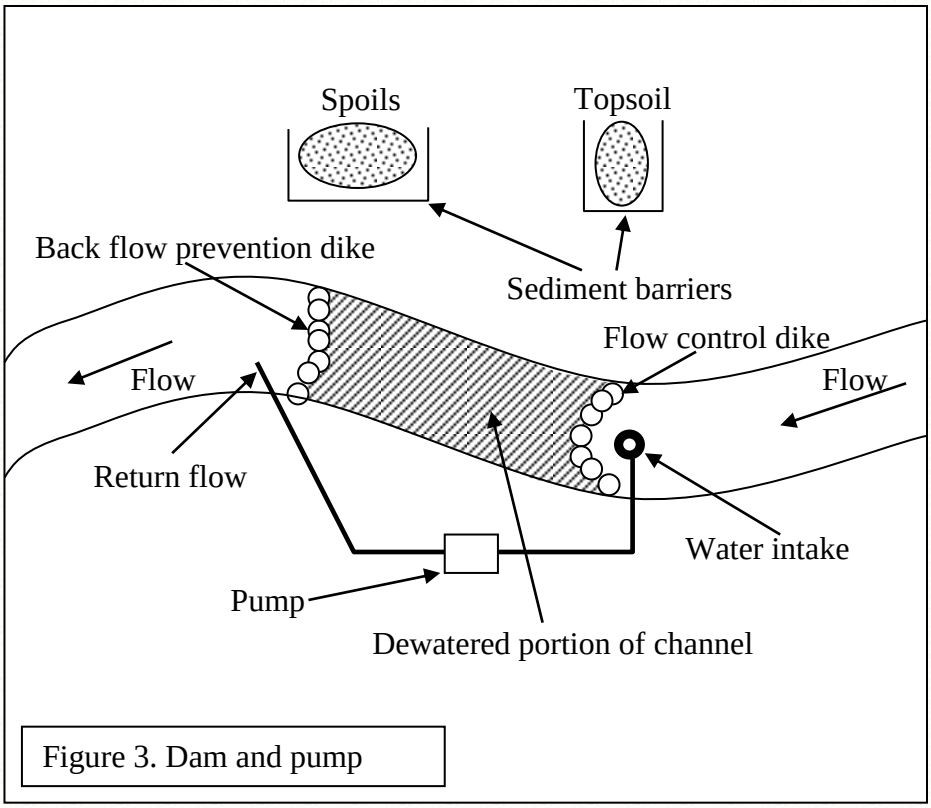

Figure 3. Dam and pump

Installation

Temporary culverts and dams should be installed on the upstream side of the work area first. Dams should not be constructed so high as to cause inundation damage to upstream properties. Temporary riprap may need to be installed on the outlet of the culvert or pump return to prevent scour to the streambed and banks. Culverts and pumps should be sized to accommodate 10-year flood events.

Removal

Following completion of instream work the bed and banks must be returned to their pre-alteration configuration. Temporary dams should be removed gradually from the top down to prevent excessively high flows within the recently disturbed channel.