



NOTES TO THE DESIGNER

Erosion & Sediment Control Narrative

January 15, 2019

General Information

Several states that we regularly work in have recently re-issued their NPDES permits. With their re-issuance, they have made several changes that we will need to comply with in order to obtain coverage under these permits.

Provide an Erosion & Sediment Control (ESC) plan sheet for the entire project limits. (M Sheets)

On the ESC plans, show a "Limits of Disturbance" (LOD) line that encompasses the proposed work and perimeter control BMP's. There is a Microstation "LOD" linestyle available for this use.

Show existing AND proposed contours on the ESC plans.

Show the USDA soil map on the ESC plan sheets.

Maintenance and Inspection Procedures

- **Edit the list of BMPs (silt fence, filter bags, straw wattle, etc) to include ONLY the erosion & sediment control measures being used on the project. Contact Environment for maintenance and inspection procedures for BMP's not listed.**
- **Silt fence: Inspect for buildup of excess sediment, under cutting, sags, and other failures. If the fabric becomes damaged, repair or replace as necessary. Remove sediment from behind the silt fence when it becomes 0.5 feet deep at the fence.**

Silt Fence Design

How does silt fence work to reduce the amount of sediment leaving a site?

Silt fence allows sediment to settle out of the sheet-flow runoff by ponding water and also provides limited filtering of larger soil particles.

3 Components of Silt Fence Design

1. Determine the direction of the slope.

Silt fence should be placed parallel to the contour / perpendicular to the slope. If silt fence is placed off the contour it will act as a diversion.

2. Determine the steepness of the slope.

The maximum slope perpendicular to the silt fence line should be 2H:1V.

3. Determine the drainage area (the drainage area of a silt fence is the area perpendicular to the fence).

The drainage area should not exceed 1/4 acre per 100 feet of silt fence.

Additional Notes

Design the silt fence with a "smile" or J-hook shape to create a storage area and to prevent the water from running around the ends of the silt fence.

Avoid long runs of silt fence, smaller segments are preferable.

Place beyond the toe of the slope to increase the ponding effect.

Do not use in streams, channels, drain inlets, or anywhere flow is concentrated.

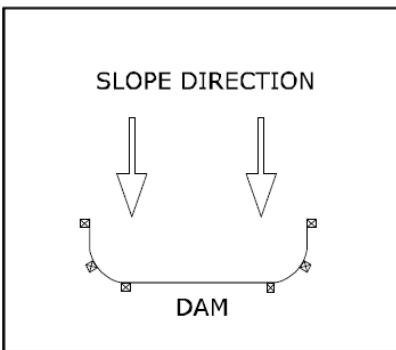
Do not lay out "perimeter control" silt fence along property lines; all sediment laden runoff will concentrate and overwhelm the system.

The distance of sheet flow to the silt fence should not exceed 100 feet.

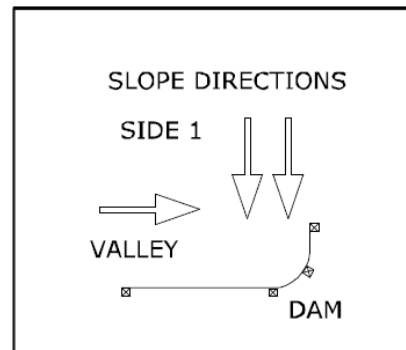
Land Slope to Flow Length	
Land Slope	Maximum Sheet Flow Distance to Fence
3% - 5%	100-ft.
5% - 10%	75-ft.
10% - 20%	50-ft.
20% - 50%	25-ft.

Silt Fence Design Examples

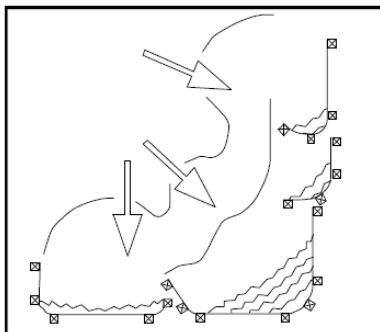
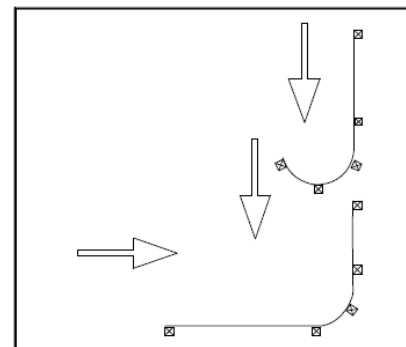
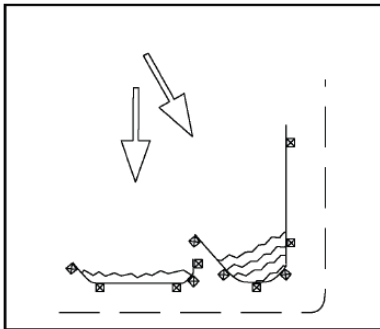
Placement on One Slope



Placement on Two Slopes



Placement for Perimeter Control



- **Stabilized construction exit:** Inspect every 7 calendar days and after a storm event of 0.5 inch or greater. If vehicles passing through stabilized exit continue to track sediment onto adjacent roadways, replenish stone or replace it completely. Immediately sweep any sediment on roadway.
- **Floating turbidity curtain:** Inspect daily and repair if necessary. Remove any floating construction or natural debris immediately to prevent damage. If necessary, remove sediment deposited behind the curtain by hand prior to removal. Remove curtain by carefully pulling it toward the construction site to minimize the release of attached sediment.
- **On-site concrete washout structure:** Inspect for damage regularly. Immediately repair any damage to ensure that no materials leave the washout area. Remove concrete materials and dispose of the offsite.
- **Filter bags:** Check filter bags daily during dewatering operations for punctures, tears or other damage and for capacity. Immediately cease pumping and replace damaged filter bags, or bags that have reached their rated capacity.
- **Fiber roll:** Inspect weekly and after each runoff event. Removal sediment deposits from the fiber roll when it reaches half the height of the device. Replace damaged fiber roll within 24 hours of inspection.
- **Rolled erosion control product:** Inspect matting after every significant rainfall (0.5 inch or greater) event for damage and erosion beneath the matting. Replacement of matting may be necessary if damaged by equipment. Check staples and stakes to make sure they are securely in the ground.
- **Inlet protection:** Inspect to ensure that inlet protection remains firmly in place and is not damaged or clogged. Clean clogged inlet protection or replace clogged or damaged inlet protection as necessary.
- **Temporary earth berm:** Inspect after every rainfall event and at least once every 14 days, regardless of storm events. Remove accumulated debris and maintain positive drainage. Ensure that runoff is diverted at the outlet of the earth berm as designed. Keep earth dike and point of discharge free of erosion. Do not allow vehicular or construction traffic to travel across or near the earth berm.

Supplemental Guidance

Mississippi

- If a sediment basin is a project BMP, is it equipped with an outlet structure that discharges only from the surface of the basin.
- The SWPPP must require **vegetative practices to begin within 7 days when a disturbed area will be left for 14 days.**

Supplemental Guidance

Tennessee

Tennessee Erosion and Sediment Control/Stormwater Requirements

- No more than 50 acres may be disturbed at any one time. Projects of more than 50 acres must be phased, and the construction phases must be described. (Unless the areas of disturbance have distinct receiving waters, or are more than 5 miles apart. The Contractor must conduct monthly site assessments.)
- The different stages of construction, and the E&SC measures that will be used during each stage should be shown on multiple plan sheets.
 - For sites disturbing less than 5 acres, at least 2 stages must be identified, and 2 separate ESC plan sheets must be developed.
 - For sites disturbing more than 5 acres, at least 3 stages must be identified, and 3 separate ESC plan sheets must be developed.
- Steep slopes (35% grade or greater) must be stabilized within 7 days. All other areas must be stabilized within 14 days.
- An average buffer width of 30 feet (minimum width of 15 feet) must be maintained for streams and wetlands.
- Temporary sediment basins (treatment for 5-year, 24-hour storm) must be provided for each onsite outfall with a drainage area of a total of 10 or more acres. **Diverted runoff can be omitted from the volume calculation. Equivalent sediment treatment and control measures can be used if sufficiently justified and in accordance with TN Erosion and Sediment Control Handbook.**
- Site assessments must be conducted at each outfall involving drainage totaling 10 or more acres, within a month of construction commencing.
- Twice weekly inspections required. Inspectors must have an active Level I certification.

Requirement Specific to Exceptional Tennessee Waters/Designated Impaired Waters

- An average buffer width of 60 feet (minimum width of 30 feet) must be maintained for streams and wetlands.

- Temporary sediment basins (treatment for 5-year, 24-hour storm) must be provided for each onsite outfall with a drainage area of a total of 5 or more acres. **Diverted runoff can be omitted from the volume calculation. Equivalent sediment treatment and control measures can be used if sufficiently justified and in accordance with TN Erosion and Sediment Control Handbook.**
- Site assessments must be conducted at each outfall involving drainage totaling 5 or more acres, within a month of construction commencing.

The SWPPP must be prepared by a person who has completed TDEC's Erosion Protection and Sediment Control Level II Design course.

SWPPP (Storm Water Pollution Prevention Plan)

Every project with an NPDES permit (over one acre of ground disturbance) needs to have a stand-alone Storm Water Pollution Prevention Plan. The SWPPP is intended to be a stand-alone document, separate from the project plans, that is updated throughout the construction of the project, and remains on-site. A template of the stand-alone SWPPP can be found here: http://www.epa.gov/npdes/pubs/exampleswppp_smallcommercial.pdf

Updates

- 4/16/2013

Typically each state will have a table of runoff coefficients in their stormwater manual.

For example, **Virginia**:

http://www.dcr.virginia.gov/stormwater_management/documents/smhbdraft05.pdf.

Another example is here: <http://water.me.vccs.edu/courses/civ246/table2b.htm>,

North Carolina's table is listed below;

Rational runoff coefficients (ASCE, 1975; Viessman, et al., 1996; and Malcom, 1999)

<u>Description of Surface</u>	<u>Rational Runoff Coefficients, C</u>
Unimproved Areas	0.35
Asphalt	0.95
Concrete	0.95
Brick	0.85
Roofs, inclined	1.00
Roofs, flat	0.90
Lawns, sandy soil, flat (<2%)	0.10
Lawns, sandy soil, average (2-7%)	0.15
Lawns, sandy soil, steep (>7%)	0.20
Lawns, heavy soil, flat (<2%)	0.15
Lawns, heavy soil, average (2-5%)	0.20
Lawns, heavy soil, steep (>7%)	0.30
Wooded areas	0.15

Use your State's specific runoff coefficients, if available.

If none are available in the State's stormwater manual, use the table above or compute manually using the form at;

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