



City of Paso Robles
COMMUNITY DEVELOPMENT

SUBJECT: STORMWATER MANAGEMENT AND REQUIREMENTS ON DEVELOPER
AND SINGLE FAMILY GRADING PERMITS - CONSTRUCTION BMPs

PURPOSE:

To provide guidelines for addressing stormwater management on developer and single-family grading permits and other construction activities with potential to pollute stormwater. These guidelines apply to all types of soil disturbance projects that are regulated by the City Grading ordinance. In addition to these measures, projects that are over one acre in disturbed area have responsibilities directly to the State Regional Water Quality Control Board.

BACKGROUND:

The National Pollutant Discharge Elimination System (NPDES) is the portion of the Federal Clean Water Act that applies to protection of receiving waters. As regulatory agency, the San Luis Obispo County Regional Water Quality Control Board (RWQCB), permits and enforces conditions for activities shown on City Grading Plans. Grading activities must also comply with City of Paso Robles Municipal Stormwater Permit requirements, including those for material and waste control, erosion control, and sediment control on construction sites.

Construction-related materials, wastes, spills, and residues must be retained on site to eliminate any increase in transport from the site to streets, drainage, receiving waters, and adjacent properties by wind or runoff due to development. To ensure no pollutant discharge occurs, City permittees must implement Best Management Practices (BMPs) to the maximum extent practicable.

INSTRUCTIONS:

Community Development staff will review all permit applications and apply conditions related to grading, erosion control, stormwater best management practices, and discharges from the site appropriate to the type of activities proposed. These conditions shall be consistent with applicable City grading, stormwater, land clearing, and leach field ordinances. These conditions shall also be consistent with the City of Paso Robles Stormwater Management Program Best Management Practices Manual (or other guidance prepared for use on land development projects). City permits for sites subject to a state-issued NPDES General Permit for Construction Activities shall include a condition requiring compliance with that NPDES permit.

Minimum performance standards to control pollution from any operations falling under a City permit are:

- Installation and maintenance of BMPs to prevent all construction pollutants from contacting storm water and with the intent of keeping all products of erosion from moving off site into receiving waters.

- No discharges of pollutants from the site (including sediment) from the site (only clear water discharge will be allowed).

Every permittee is responsible and required to meet these performance standards and to certify selected BMPs will be installed, monitored, maintained or revised as appropriate to ensure effectiveness. BMPs must be installed in accordance with industry recommended standards (Caltrans or California Stormwater BMP handbooks, etc.).

At a minimum, the City requires that the BMPs listed below are installed and maintained for all grading projects. Depending on project scope and potential associated discharges, additional BMPs may be needed. It is the property owner's responsibility to implement a plan to address all potential non-stormwater discharges. If the project proponent desires to use a BMP not listed herein, approval from the City is required before installation.

PROCEDURE:

Erosion Control

The Property Owner must implement the following minimum Physical Stabilization BMPs or Vegetation Stabilization BMPs, or both, to prevent erosion from exposed slopes. All slopes and disturbed flat areas must be stabilized and protected, including areas disturbed by clearing operations. *[The City will not accept: tracking, mulch, wood chips, hydroseeding without watering, jute matting or jute netting as a means to protect exposed slopes from erosion, but such measures may be used to protect disturbed soil areas that are flat and level (less than 5% slope).]*

1. Physical Stabilization through use of geotextiles, mats, fiber rolls, Bonded Fiber Matrix or other material approved by the City for stabilizing slopes, or
2. Vegetation Stabilization using hydroseed or acceptable landscaping may be used only May 1 to August 15. Vegetation proposed to stabilize slopes must be installed by August 15, watered, and established prior to October 1. The property owner shall show on the plan a contingency physical BMP to be installed by October 1 if hydroseed establishment does not occur by that date. If landscaping is proposed, erosion control measures must also be used while landscaping is being established. Established vegetation shall have a subsurface mat of intertwined mature roots with a uniform vegetative coverage of 70 percent of the natural vegetative coverage or more on all disturbed areas.
3. All manufactured slopes and cleared slopes of 3 to 1 (horizontal to vertical) and steeper are to be protected with a BMP approved by the City of Paso Robles, as described in number 1 and 2 above. Cleared slopes flatter than 3 to 1 must still be protected from erosion using either an approved BMP or by using hydromulch with a Guar binder. Flat areas of less than 5% (like building pads, parking area, leach fields) shall have 100% protection using geotextiles, mats, or other material approved by the City for stabilizing slopes, or using tracking and soil stabilizers/binders, temporary seeding, mulch/wood chips, or jute matting. The City may reduce this requirement for flat areas and the below requirement, provided full sediment control is provided through constructed and maintained desiltation basins at all project discharge points.
4. Areas of graded pads that have active structure construction underway may be protected by rolled plastic as part of a weather-triggered action plan until the structure's roof has been

completed. The remainder of the pad area must continue to be protected using erosion control measures identified above.

5. Unpaved roads are exempt from the 100% protection requirement but shall have appropriate BMPs installed such as gravel bag chevrons.

Sediment Control

1. Protection of the grading site perimeter, all environmentally sensitive areas and all watercourses and at all operational internal inlets to the storm drain system at all times; through use of filtration devices, silt fencing, straw fiber-rolls, gravel bag barriers, and gravel inlet filters; and
2. Capture of sediment and dust through the use of storm-drain inlet protection and construction road stabilization.

Offsite Sediment Control

Elimination of off-site sediment tracking through use of stabilized construction entrances/exits.

Velocity Reduction

Velocity reduction of all runoff leaving the site, and onsite runoff that could cause erosion, through appropriate outlet protection. Velocity reduction BMPs shall be designed and constructed for the precipitation intensity from the 10-year, 6-hour rain event.

Materials Management

Waste handling and materials storage areas shall be designated with identification of waste handling methods. Methods for handling: Solid waste, Sanitary waste, Concrete waste, Hazardous waste shall be shown. Material storage methods proposed, including storage of emergency BMP materials, shall be shown.

Structural BMP Sizing

If a project chooses to rely on desiltation basins for treatment purposes, at a minimum all desiltation basins shall be designed by a registered civil engineer and be sized to either:

- Have at least a capacity equivalent to 3,600 cubic feet of storage per acre drained, or
- Be designed using the standard equation: $A_s = 1.2Q/V_s$. A_s is the minimum surface area for trapping soil particles of a certain size; V_s is the settling velocity of the design particle size chosen; Q is the discharge rate measured in cubic feet per second; for the 10-year, 6-hour rain event and A is the area draining into the sediment basin in acres. The design particle size shall be the smallest soil grain size determined by wet sieve analysis, or the fine silt sized (0.01mm) particle, and the V_s used shall be 100 percent of the calculated settling velocity.

The length of any basin, as measured from inlet to outlet, shall be more than twice the width whenever practical; the depth must not be less than three feet nor greater than five feet for safety reasons and maximum efficiency. The basin(s) shall be located on the site where it can be maintained on a year-round basis, have a means for dewatering within seven calendar days following a storm event. Basins should be fenced if safety (worker or public) is a concern, and shall be maintained at least once before the start of the rainy season (October 1) and as needed to retain a minimum of two feet of capacity at all times.

Plan Notes

The following notes shall apply to all grading permits.

1. During the rainy season the amount of exposed soil allowed at one time shall not exceed that which can be adequately protected by the property owner in the event of a rainstorm. A weather-triggered BMP action plan and 125% of all supplies needed to implement the plan shall be retained on the job site in a manner that allows full deployment and complete installation in 48 hours. All other BMPs shall be deployed on an on-going basis.
2. The active disturbed area shall not exceed 50 acres at any given time without demonstrating to the City Engineer's satisfaction that adequate erosion and sediment control can be maintained. Any disturbed area that is not actively graded for 10 days must be fully protected from erosion. Until adequate long-term protections are installed, all disturbed area shall be included when calculating the active disturbed area. All erosion control measures shall remain installed and maintained during any inactive period.
3. The property owner is obligated to insure compliance with all applicable stormwater regulations at all times. The BMPs that have been incorporated into this plan shall be implemented and maintained to effectively prevent the potentially negative impacts of this project's construction activities on stormwater quality. The maintenance of the BMPs is the permittee's responsibility, and failure to properly install or maintain the BMPs may result in enforcement action by the City of Paso Robles or others. If installed BMPs fail, they must be repaired or replaced with an acceptable alternate as soon as safe to do so.
4. *On projects greater than one acre;* A Notice of Intent (NOI) has been filed with the State Water Resources Control Board (SWRCB) and a Stormwater Pollution Prevention Plan (SWPPP) has been prepared for all operations associated with these plans. The permittee shall keep a copy of the SWPPP on site and available for review by City.

Grading Inspection for Best Management Practices

Building Division staff in addition to all normal inspections for grading operations will perform the following inspection tasks:

Initial BMP Inspection

This inspection shall occur after the area to be graded is brushed or cleared, but prior to the start of grading operations. The following stormwater items are required to pass this inspection:

1. Perimeter Sediment Control BMPs and Offsite Sediment Control BMPs shall be installed as per the approved grading plan.
2. For weather-triggered actions plans, 125% of all needed BMP materials shall be stored onsite to allow full deployment and installation within 48 hours or less.
3. Required fencing installed along or around any environmentally sensitive areas.

Ongoing and Rough Grade Inspections

The following stormwater items are required to pass inspections:

1. All items from the initial BMP inspection shall be in place.

2. Erosion Control BMPs shall be installed as soon as the finished slopes and flat areas are complete, or when slopes and flat areas have not been actively graded for ten (10) workdays. From May 1 to August 15 vegetation stabilization (only) may be installed. If vegetation stabilization is used, a slope irrigation system shall be in place and operable. From August 15 to May 1, if the vegetation is not established, additional physical or hydraulic erosion control BMPs are also required.
3. Flat area protection may be waived if site discharges through a desiltation basin(s).
4. No rills or gullies larger than 3" wide or deep shall be allowed, and must be repaired as soon as it is safe to do so.
5. All BMPs shall be maintained in proper working condition.
6. The SWPPP or Site Erosion Control Plan shall reflect current site conditions and deployment of BMPs.
7. No pollutant discharges into stormwater conveyances or receiving waters.

Final Grade Inspection

The following stormwater items are required to pass this inspection:

1. All BMPs shall be in place and in proper working condition.
2. No rills or gullies larger than 3" wide or deep shall be present.
3. Vegetation shall be established on all manufactured slopes greater than 3 feet in height and slopes less than 3 feet must be protected through either vegetation or other approved erosion control BMP. Special cases where lack of vegetation establishment is the sole reason occupancy is being withheld are to be presented to the DPW Manager responsible for inspection activities.
4. Flat areas shall be protected by either vegetation or other approved BMP unless site discharges through a desiltation basin(s).
5. No pollutant discharges into stormwater conveyances or receiving waters.

ADVISORY

Owners of property where soil-disturbing activities occur have other responsibilities to the State Water Resources Control Board in addition to those identified in these guidelines. Examples of these include, but are not limited to:

- Submittal of a Notice Of Intent (NOI) to the State, preparation of a Storm Water Pollution Prevention Plan (SWPPP), continuing updating of the SWPPP to keep it functional and current, and preparation of an annual compliance certification on sites where the disturbed area exceeds 1 acre.
- Responsibility for prestorm, poststorm, and storm event BMP inspections by qualified person(s) to ensure full compliance with the state permit and implementation of all elements of the SWPPP

- Sampling and analysis program (under specific conditions) for sedimentation, siltation, turbidity, or pollutants not visually detectable, which could cause or contribute to an exceedance of water quality objectives in the receiving water.
- Additional record keeping, pollutant identification, reporting, and maintenance/repair responsibilities

APPROVED BY:

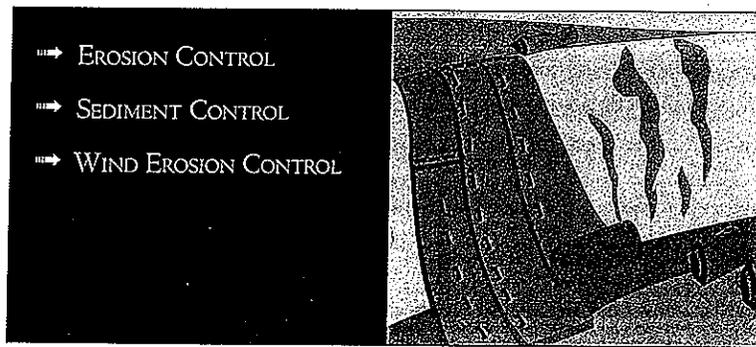


JOHN L. FALKENSTIEN, P.E., City Engineer

SUNSET:

EFFECTIVE DATE: October 13, 2006

EROSION CONTROL BLANKETS AND GEOTEXTILES



- EROSION CONTROL
- SEDIMENT CONTROL
- WIND EROSION CONTROL

Purpose:

Erosion control blankets or mats are biodegradable or synthetic blankets that are used for temporary or permanent stabilization of disturbed soils at construction sites. Erosion control blankets and mats protect disturbed soil from rain and surface runoff impact, increase infiltration, decrease soil compaction and crusting, protect seeds from impact and predators, and moderate soil temperature to enhance the growth of vegetation.

Application:

- Slopes and disturbed soils where mulch must be anchored and other methods such as crimping or tackifying are not feasible or adequate.
- Steep slopes, generally steeper than 3:1.
- Slopes where erosion hazard is high.
- Critical slopes adjacent to sensitive areas such as streams, wetlands, or other highly valued resources.
- Disturbed soils where plants are slow to develop protective cover.
- Channels with flows from 0.6 m/s (2 fps) to 1.2m/s (4 fps).
- Channels intended to be vegetated and where the design flow velocity exceeds the permissible velocity.

Limitations:

- ✦ While blankets and mats are easy to install, are biodegradable, and effective in reducing erosion and enhancing vegetative growth, they are typically more expensive than other erosion control measures due to high material and labor costs.

- ✦ Rolled blankets are not suitable for rocky sites or areas where final vegetation will be mowed. Proper site preparation, including proper soil compaction, are necessary to ensure adequate contact of the blanket/matting with the soil.
- ✦ Plastic sheeting is easily vandalized, easily torn, not degradable, and should be disposed of at a landfill. Plastic results in 100% runoff, increasing the potential for serious erosion problems in downgradient areas receiving increased flows. Plastic use should be limited to covering stock piles, or very small graded areas as a temporary measure and for short periods of time.

Installation:

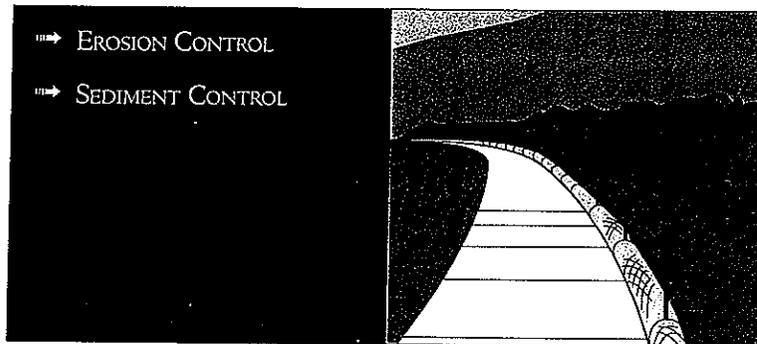
Follow manufacturer's recommendations for installation. In general these will be as follows:

- ⇒ Begin at the top of the slope and anchor the blanket in a 150 mm (6 in) deep by 150 mm (6 in) wide trench. Backfill trench and tamp earth firmly.
- ⇒ Unroll blanket downslope in the direction of water flow, not horizontally.
- ⇒ Overlap the edges of adjacent parallel rolls 50mm (2 in) to 75 mm (3 in) and staple every 1 m (3 ft).
- ⇒ When blankets must be spliced, place blankets end over end (shingle style) with 150 mm (6 in) overlap. Staple through overlapped areas, approximately 300 mm (12 in) apart.
- ⇒ Lay blankets loosely and maintain direct contact with the soil—do not stretch.
- ⇒ Staple blankets sufficiently to ensure that materials will maintain direct contact with soil.

*Inspection and
Maintenance:*

- ⇒ Inspect all blankets and mats after installation and periodically throughout the course of construction.
- ⇒ Inspect blankets and mats before and after significant rain events for erosion and undermining. Repair failures immediately.
- ⇒ If washout or breakages occur, re-install or re-anchor materials only after repairing damage to the slope or channel (rills, gullies etc.).

F I B E R R O L L S



Purpose:

Fiber rolls (sediment logs or wattles), composed of bio-degradable fibers stuffed in a photo-degradable open weave netting, are designed to reduce sediment runoff from disturbed soils into the storm drain system or watercourses. Fiber rolls are porous and allow water to filter through fibers and trap sediment, increase filtration rates, slow runoff and reduce sheet and rill erosion. Wattles also create a favorable environment for plant establishment.

Application:

- Along the face of exposed and erodible slopes to shorten slope length
- At grade breaks where slopes transition to a steeper slope
- In drainage swales to slow flows
- Along streambanks to assist stabilization and revegetation

Inspection and Maintenance:

- Follow manufacturer's recommendations for installation. In general, these will be as follows:
- ⇨ Fine grade the subgrade by hand dressing where necessary to remove local deviations and to remove larger stones or debris that will inhibit intimate contact of the fiber roll with the subgrade.
 - ⇨ Prior to roll installation, contour a concave key trench 50 to 100 mm (2 to 4 inches) deep along the proposed installation route.
 - ⇨ Soil excavated in trenching should be placed on the uphill or flow side of the roll to prevent water from undercutting the roll.
 - ⇨ Place fiber rolls into the key trench and stake on both sides of the roll within 6 feet of each end and then 3-5 feet with 1" x 2" stakes or as suggested by manufacturer.
 - ⇨ Stakes are typically driven in on alternating sides of the roll. When more than one fiber roll is placed in a row, the rolls should be abutted securely to one another to provide a tight joint, not overlapped.

Limitations:

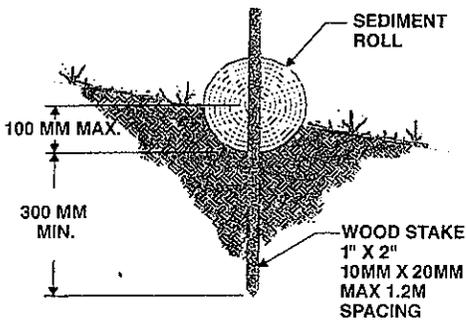
- Designed for low surface flows not to exceed 1 cfs for small areas.
- Designed for short slopes or slopes flatter than 3:1.
- Primary purpose is not sediment control, although do provide some sediment removal.

Inspection and

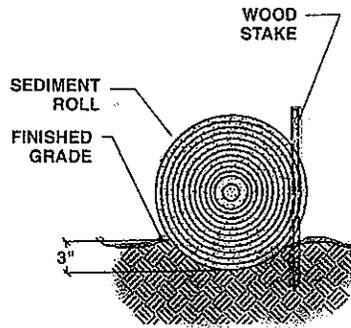
- ➡ Repair or replace split, torn, unraveling or slumping fiber rolls.

Maintenance:

- ➡ Inspect fiber rolls when rain is forecast, following rain events and at least daily during prolonged rainfall. Perform required maintenance.
- ➡ In most cases, fiber rolls do not require removal and can be abandoned in place. If not excessively soiled, rolls may be removed, replaced and reused.

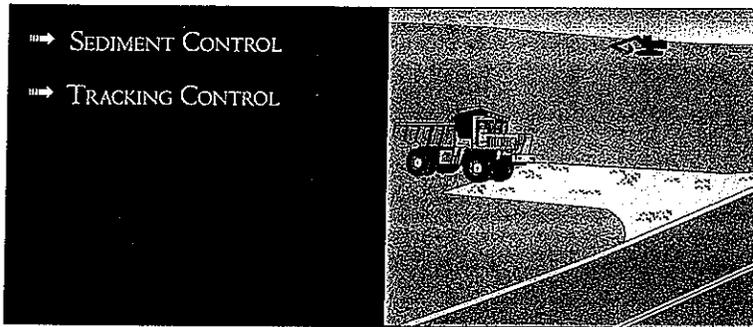


**ENTRENCHMENT DETAIL
IN SLOPE AREA**

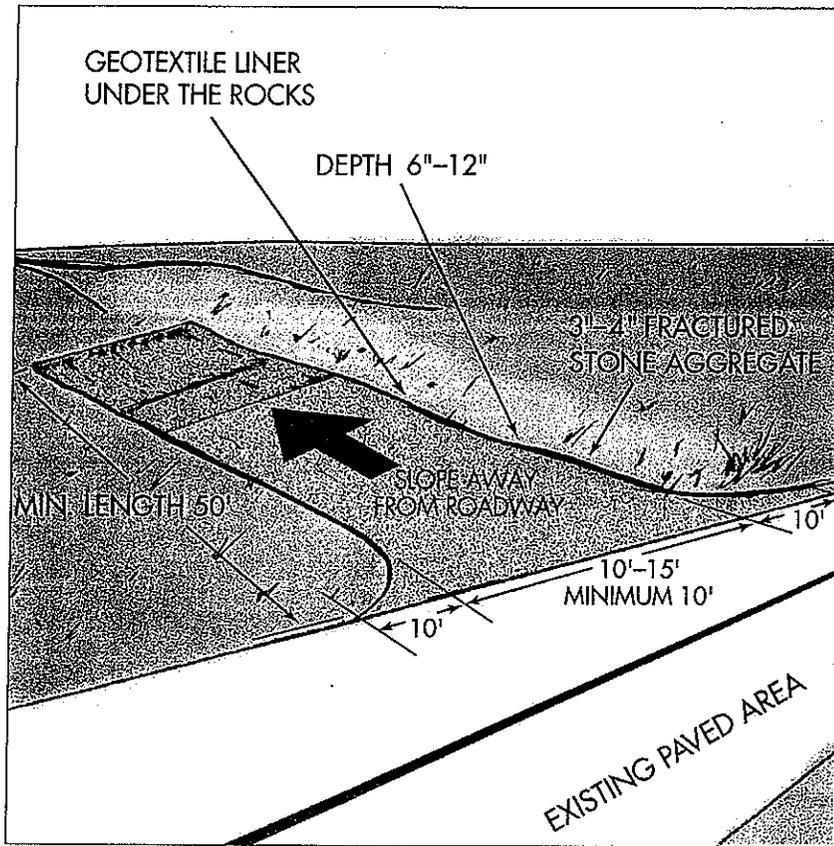


**ENTRENCHMENT DETAIL
IN FLAT AREA**

STABILIZED CONSTRUCTION ENTRANCE

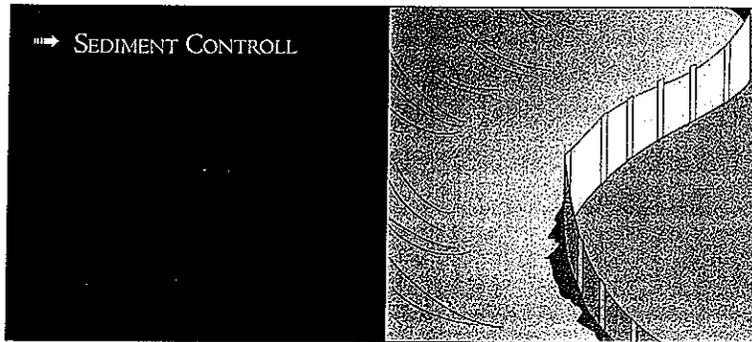


- Purpose:* Stabilizing the point of ingress/egress is an effective means of minimizing the tracking of mud and dirt onto public roads by construction vehicles.
- Application:*
- On sites where tracking onto public roads is a potential problem.
 - Site conditions will dictate design and need.
- Installation*
- ⇨ Properly grade entrance to prevent runoff from construction site. Entrance elevation should be lower than street.
- Guidelines:*
- ⇨ Route runoff from stabilized entrance through a sediment trapping device before water is discharged.
 - ⇨ Design stabilized entrance to support the heaviest vehicles which will use it.
 - ⇨ Select entrance stabilization (aggregate, asphaltic concrete, concrete) based on longevity, required performance, and site conditions.
 - ⇨ If aggregate is selected, place a 200 mm (8 inch thick) course of aggregate over the geotextile fabric or a thickness of aggregate recommended by a soils engineer.
- Inspection and Maintenance:*
- ➔ Inspect routinely for damage and repair as needed.
 - ➔ Require that all employees, subcontractors, and suppliers utilize the stabilized construction entrance.
 - ➔ Service sediment trapping devices regularly.



length—minimum 50'
width—minimum 10'-15'
(should be flared at the existing road to provide turning radius)
depth—6" to 12"

S I L T F E N C I N G



Purpose: A silt fence is a temporary barrier of permeable fabric designed to intercept and slow the flow of sediment laden sheet flow runoff. Silt fencing ponds runoff, allows sediment to settle, and releases filtered water slowly.

Application:

- Along the perimeter of the site.
- Along streams and channels (*NOT across streams and channels*).
- Below the toe of exposed and erodible slopes.
- Downslope of exposed soil areas.
- Around temporary soil stockpiles.

Application Guidelines:

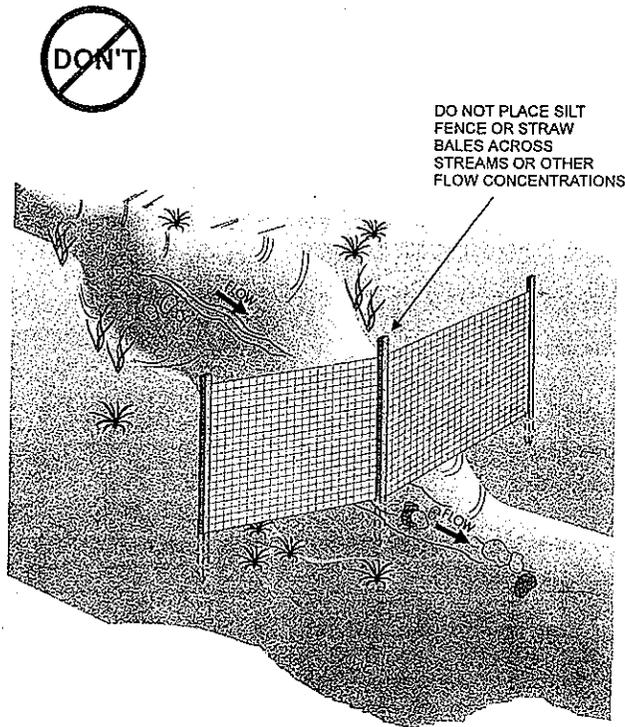
- Must be constructed along a level contour or will result in the creation of rills and gullies and consequent failure.
- Limit tributary drainage area upstream of the silt fence to less than 0.3 ha/100m (0.25 ac/100 ft) of fence.
- Limit the length of slope draining to any point along the silt fence to 30m (100 ft) or less.
- Limit length of any single run of fence to 150m (500 ft).
- Turn the last 6 feet of fence up slope in "J" or "L" shapes to allow for ponding. Silt fencing must pond runoff to be effective.
- Fence segments should not be connected.
- Limit to locations suitable for temporary ponding or deposition of sediment.

Limitations:

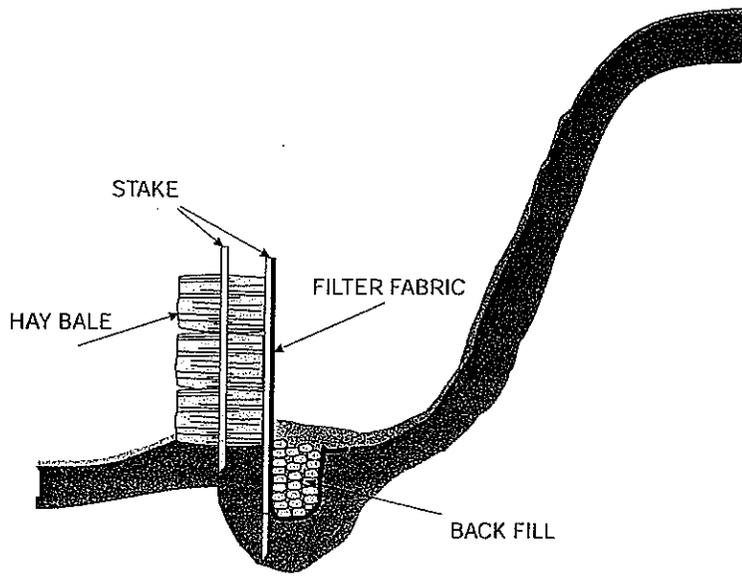
- ⚠ Do not use in streams, channels, or anywhere flow is concentrated.
- ⚠ Do not use silt fence to divert flow.
- ⚠ Do not use silt fence on slopes.

*Inspection and
Maintenance:*

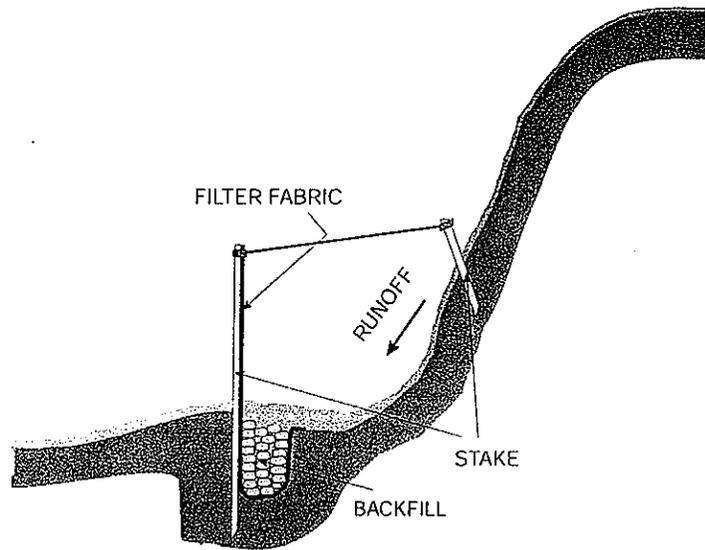
- ➔ Inspect when rain is forecast, and following rainfall events.
- ➔ Remove sediment when accumulations reach one-third fence height.
- ➔ Repair undercut silt fences, and repair or replace all split, torn, slumping, or weathered fabric.
- ➔ Remove silt fence when no longer needed.



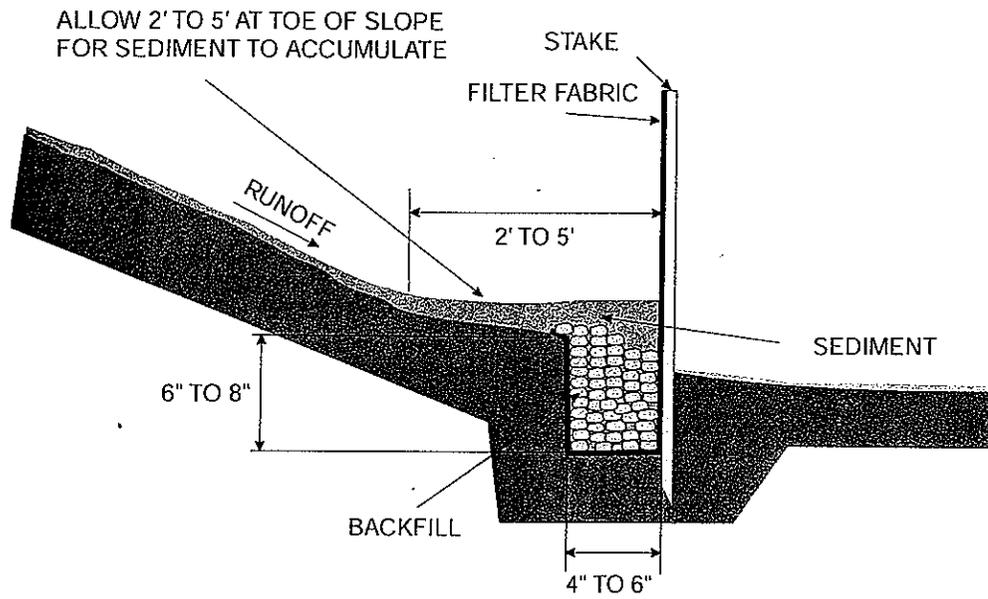
SILT FENCING PLACED ACROSS STREAMS OR OTHER FLOW CONCENTRATIONS IS INEFFECTIVE IN PONDING WATER AND LEADS TO UNDERCUTTING, GULLY FORMATION, AND FENCE FAILURE.



STRENGTHENING



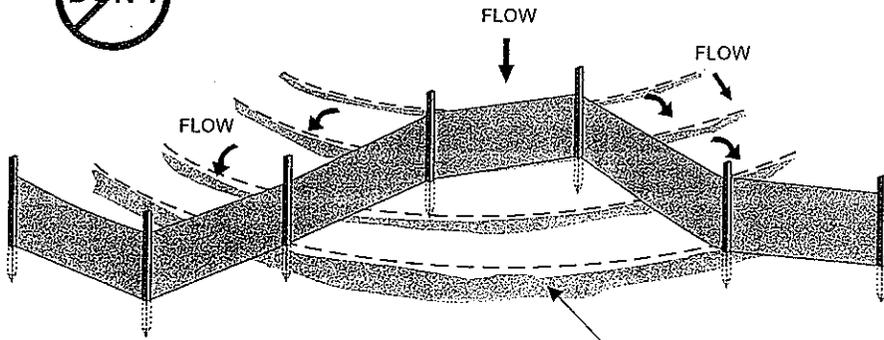
ANCHORING



RECOMMENDED INSTALLATION OF SILT FENCE

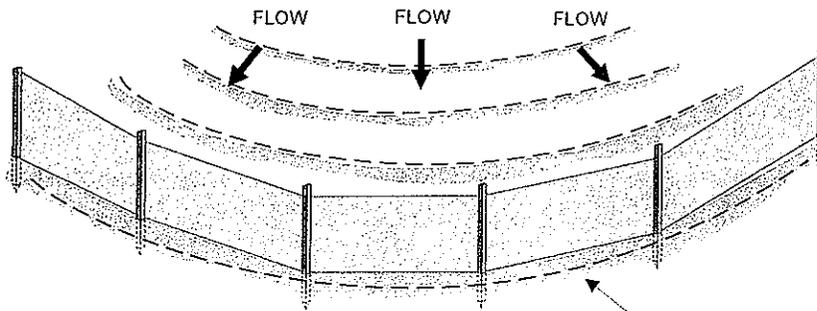
KEY IN FILTER FABRIC A MINIMUM OF 6" BELOW THE GROUND SURFACE AND 6" ACROSS, THEN BACKFILL WITH DIRT OR GRAVEL.

DON'T



SILT FENCE NOT ON CONTOUR RESULTS IN FLOW DIVERSION AND CONCENTRATION

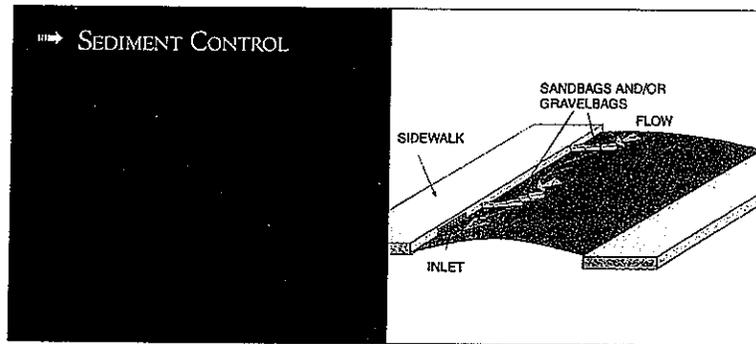
DO



ALIGN SILT FENCE ALONG CONTOURS

SILT FENCE

SAND / GRAVEL BAG BARRIER



Purpose: A temporary berm of stacked sand or gravel bags, installed along a level contour to detain sediment-laden runoff from disturbed areas, retains the sediment, and releases the water as sheet flow. Sand bags can also be used as check dams in small ditches, but only if the ditch has been lined to prevent erosion.

Application:

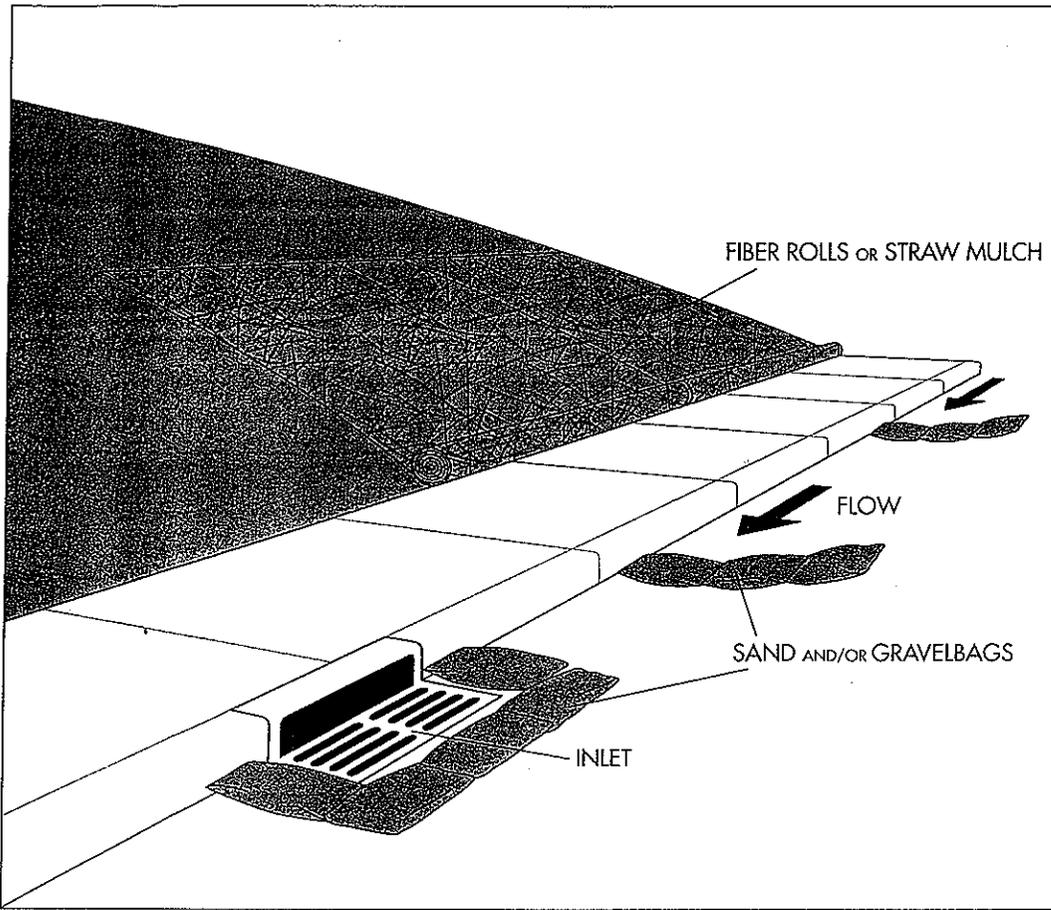
- Along the perimeter of the site.
- Across channels to serve as a barrier for utility trenches or to provide a temporary channel crossing for construction equipment.
- Parallel to roadways to keep sediment off paved areas.
- To divert or direct flow or to create a temporary sediment basin.
- When extended construction period limits the use of either silt fence or straw bale barriers.
- When site conditions or construction sequencing require adjustments or relocation of the barrier to meet changing field conditions and needs during construction.

Limitations:

- ⚠ Limit the drainage area upstream of the barriers to 2 ha (5 ac).
- ⚠ Installation can be labor intensive.
- ⚠ Should not be used to detain concentrated flows.
- ⚠ Gravel bags preferable to sand bags near storm drain inlets.

Inspection and Maintenance:

- ➡ Inspect before and after significant storm events
- ➡ Remove accumulated sediment when one-third barrier height.
- ➡ Repair washouts and other damage as needed.
- ➡ Remove barrier when no longer needed.



SAND OR GRAVEL BAGS (PREFERRED) USED IN ROADWAYS SERVE TO DIVERT FLOW, SLOW FLOW VELOCITY, AND POND AND FILTER RUNOFF.