



STORMWATER
Pollution Prevention
SAN JOAQUIN COUNTY

San Joaquin County
Storm Water Management
Program
Construction Activities

**SMALL SITE
STORM WATER
MANAGEMENT PLAN**

July, 2010

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STORMWATER POLLUTION PREVENTION PROGRAM

BACKGROUND

The Federal Clean Water Act includes requirements for certain cities, counties and urbanized areas to establish programs to reduce pollutants in stormwater runoff and to prohibit non stormwater runoff into a storm drainage system or any water body.

As a result of these requirements, San Joaquin County was required to obtain a Municipal National Pollutant Discharge Elimination System (NPDES) permit for the urbanized areas near the City of Stockton.

The County NPDES permit requires that the County establish a program to minimize stormwater pollution from all activities including any construction activities. State regulations require that any construction project in the State that disturbs over 1 acre of land file for coverage under the State General Construction Permit. Projects less than 1 acre that are part of a larger development also require coverage. Any permitted projects within the County NPDES permit area are regulated by the County.

Information on filing for coverage under the State General Construction Permit is available online at http://www.swrcb.ca.gov/water_issues/programs/stormwater/ and <http://www.swrcb.ca.gov/rwqcb5/> or by contacting Dan Radulescu at (916) 464-4736 (dradulescu@waterboards.ca.gov) Information on the required Stormwater Pollution Prevention Plan is available at the County Public Works Department, or from the State resources above.

This guide is provided to assist developers of small construction projects in complying with the requirements of the State NPDES permit. Implementation of the recommended measures does not ensure compliance with federal, state, and local laws, regulations and ordinances. The burden of compliance rests solely with the owner and developer of each project.

CONSTRUCTION POLLUTION PREVENTION

Construction projects are a major source of potential pollution of our streams, sloughs, and the Delta. Many Californians enjoy the benefits of the State's waterways including fishing, swimming and boating. The waters also provide a habitat for many species of wildlife and plants. Many people also rely on the state waterways for drinking water, industrial water supplies and irrigation. By practicing Best Management Practices (BMPs) during construction you can minimize the impact your project has on the beneficial uses of our waterways.

Most BMPs consist of simple measures that prevent potential pollutants from entering the County storm drainage system or waterways near the construction site. Good housekeeping, common sense, and inexpensive structural controls will significantly reduce the impact of your project on the environment. Installation and proper maintenance of the structural BMPs and an organized construction site will help in preventing violations of storm water laws and regulations.

EROSION CONTROL

Soil erosion and resulting sedimentation are a leading cause of water quality problems in the Delta. Although erosion has long been associated with farming activities, it is also a major concern at construction sites, if the disturbed land is left unprotected. Every phase of a construction project has the potential of contributing significant quantities of sediment-laden runoff. Therefore, as a site is developed, all who are associated with the project must do their part to control erosion. Sediment is a common component of stormwater, and can be a pollutant. Sediment can be detrimental to aquatic life (primary producers, benthic invertebrates, and fish) by interfering with photosynthesis, respiration, growth, reproduction, and oxygen exchange in water bodies. Sediment can transport other pollutants that are attached to it including nutrients, trace metals, and hydrocarbons. Sediment is the primary component of total suspended solids (TSS), a common water quality analytical parameter.

PRIMARY CONCERNS RELATED TO EROSION AND SEDIMENTATION

- **Water quality.** Sediment is a major pollutant of surface water in the state of California. It impacts water quality by degrading the habitat of aquatic life (primary producers, benthic invertebrates, and fish), by decreasing recreational value, and by promoting the growth of nuisance weeds and algae.
- **Local costs.** Sediment that finds its way into streets, storm sewers, and ditches results in additional maintenance costs for local government.
- **Flooding.** Sediment accumulation in streams, lakes, and rivers reduces their capacity, which can result in increased flooding.
- **Property values.** Sediment deposits not only impair water quality but also damage property, thus reducing its use and value.

PRINCIPLES FOR CONTROLLING BUILDING SITE EROSION AND SEDIMENTATION

Erosion control is important on any building site regardless of its size. Usually, the principles and methods for controlling erosion and reducing off-site sedimentation are relatively simple and inexpensive. Here are four basics to be followed when developing a building site.

- **Evaluate the site.** Inventory and evaluate the resources on the lot before building. Location of structures should be based, in large part, on the lot's natural features. Identify trees that you want to save and vegetation that will remain during construction. Also identify areas where you want to limit construction traffic. Wherever possible, preserve existing vegetation to help control erosion and off-site sedimentation.
- **Select and install erosion/sediment control practices.** Determine the specific practices needed, and install them before clearing the site. The more commonly used practices are: vegetative filter strips, silt fence, gravel drives, and runoff inlet protection.
- **Develop a maintenance practice program.** Maintenance of all practices is essential for them to function properly. They should be inspected twice a week and after each rainfall event. When a problem is identified, repair the practice immediately. Also, any sediment that is tracked onto the

street should be scraped and deposited in a stable area. *Do not flush sediment from the street with water.*

- **Revegetate the site.** Do so as soon as possible. A well-maintained lot has a higher sale potential.

BUILDING LOT DRAINAGE

The best time to provide for adequate lot drainage is before construction begins. With proper planning, most drainage problems can be avoided. And that's important because correcting a problem after it occurs is usually much more difficult and costly. Here's what it takes to ensure good lot surface and subsurface drainage.

- Minimize drainage to hard paved surfaces to allow water to infiltrate into the soil and to trap sediments within the vegetated areas.
- Position the structure a minimum of 18 inches above street level.
- Divert stormwater runoff away from the structure by grading the lawn to provide at least 6 inches of vertical fall in the first 10 feet of horizontal distance.
- Construct side and rear yard swales to take surface water away from the structure. (*See attached drawing*)
- Avoid filling in existing drainage channels and roadside ditches, since that could result in wetness problems on someone else's property and/or damage to adjacent road surfaces. Any work in the road right of way or a drainage channel requires an Encroachment Permit and is subject to inspection and approval by the County Department of Public Works.

STEP BY STEP POLLUTION PREVENTION

STEP 1. EVALUATE THE SITE

Before construction, evaluate the entire site, marking for protection any important trees and associated rooting zones, unique areas to be preserved, on-site septic system absorption fields, and vegetation suitable for filter strips, especially in perimeter areas.

Identify Vegetation To Be Saved.

- Select and identify the trees, shrubs, and other vegetation that you want to save (*see “Vegetative Filter Strips” under Step 2 below*).

Protect Trees and Sensitive Areas.

- To prevent root damage, do not grade, burn, place soil piles, or park vehicles near trees or in areas marked for preservation.
- Place plastic mesh or snow fence barriers around the tree’s dripline to protect the area below their branches.
- Place a physical barrier, such as plastic fencing, around the area designated for a septic system absorption field (if applicable).

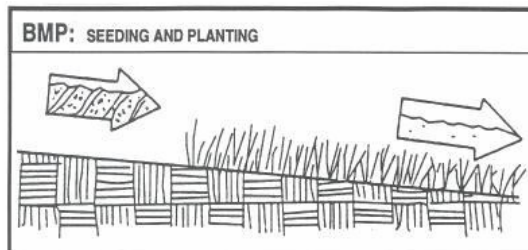
STEP 2. INSTALL PERIMETER EROSION AND SEDIMENT CONTROLS

Identify the areas where sediment-laden runoff could leave the construction site, and install perimeter controls to minimize the potential for off-site sedimentation. It’s important that perimeter controls are in place before any other earth-moving activities begin.

Protect Down-Slope Areas.

With Vegetative Filter Strips

- On slopes of less than 6 percent, preserve a 10- to 30-foot wide vegetative buffer strip around the perimeter of the property, and use it as a filter strip for trapping sediment
- Do not mow filter strip vegetation shorter than 4 inches.



With Fiber Rolls

- Use fiber rolls along the perimeter of a flat lot, or in a terrace pattern on a lot with a significant slope to trap sediment. *(See attached drawing in Appendix)*

With Silt Fences

- Use silt fences along the perimeter of the lot's downslope side(s) to trap sediment. *(See attached drawing in Appendix)* Can only be used when there is no concentration of water flowing to the barrier and soil conditions allow proper keying of the skirt (i.e. no large stones near the surface)

Install Gravel Drive.

- To keep vehicles from tracking mud onto roadways, make this the only lot access. The gravel drive can later serve as a base for a concrete or asphalt driveway. *(See attached drawing in Appendix)*

Protect Storm Sewer Inlets.

- Protect nearby storm sewer curb inlets with stone-filled or gravel-filled geotextile bags or equivalent measures before disturbing soil. *(See attached drawing)*
- Protect on-site storm sewer drop inlets with silt fence material, straw bales, or equivalent measures before disturbing soil.

STEP 3. PREPARE THE SITE FOR CONSTRUCTION

Prepare the site for construction and for installation of utilities. Make sure all contractors (especially the excavating contractor) are aware of areas to be protected.

Salvage and Stockpile the Topsoil/subsoil.

- Remove topsoil (typically the upper 4 to 6 inches of soil material) and stockpile.
- Remove subsoil and stockpile separately from the topsoil.
- Locate the stockpiles away from any downslope street, driveway, stream, lake, wetland, ditch, or drainage way.
- Immediately after stockpiling, temporary-seed the stockpiles with annual rye or winter wheat and/or place sediment barriers around the perimeter of the piles.

STEP 4. BUILD THE STRUCTURE(S) AND INSTALL THE UTILITIES

Construct the home and install the utilities; also install the sewage disposal system and drill the water well (if applicable). See the CONSTRUCTION MATERIALS AND HOUSEKEEPING section for control of pollutants during construction.

STEP 5. MAINTAIN THE CONTROL PRACTICES

Maintain all erosion and sediment control practices until construction is completed and the lot is stabilized.

- Inspect the control practices a minimum of twice a week and after each storm event, making any needed repairs immediately. Concrete washouts need to be inspected daily.
- Toward the end of each work day, sweep or scrape up any soil tracked onto roadways. *Do not flush area with water.*
- By the end of the next work day after a storm event, clean up any soil washed off-site.

STEP 6. RE-VEGETATE THE BUILDING SITE

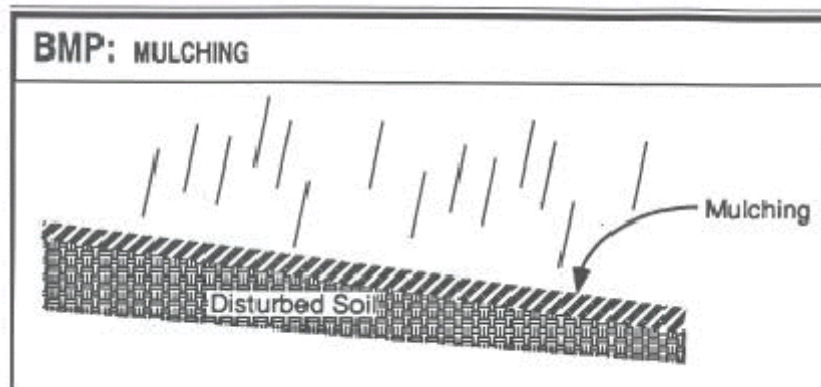
Immediately after all outside construction activities are completed, stabilize the lot with sod, seed, and/or mulch. **Pollutant Control Approach:** Control of fertilizer and pesticide applications, soil erosion, and site debris to prevent contamination of stormwater. Use pesticides only as a last resort. If pesticides/herbicides are used they must be carefully applied in accordance with label instructions on U.S. Environmental Protection Agency (EPA) registered materials. Maintain appropriate vegetation, with proper fertilizer application where practicable, to control erosion and the discharge of stormwater pollutants. Where practicable grow plant species appropriate for the site, or adjust the soil properties of the subject site to grow desired plant species.

Redistribute the Stockpiled Subsoil and Topsoil.

- Spread the stockpiled subsoil to rough grade.
- Spread the stockpiled topsoil to a depth of 4 to 6 inches over rough-graded areas.
- Fertilize and lime according to soil test results or recommendations of a seed supplier or a professional landscaping contractor.

Mulch Newly Seeded Areas.

- Spread straw mulch on newly seeded areas, using 1½ to 2 bales of straw per 1,000 square feet.
- On flat or gently sloping land, anchor the mulch by crimping it 2 to 4 inches into the soil. On steep slopes, anchor the mulch with netting or binding agents. An alternative to anchored mulch would be the use of erosion control blankets.



STEP 7. REMOVE REMAINING TEMPORARY CONTROL MEASURES

Once the sod and/or vegetation is well established, remove any remaining temporary erosion and sediment control practices, such as:

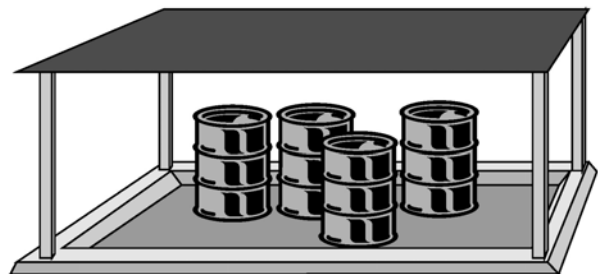
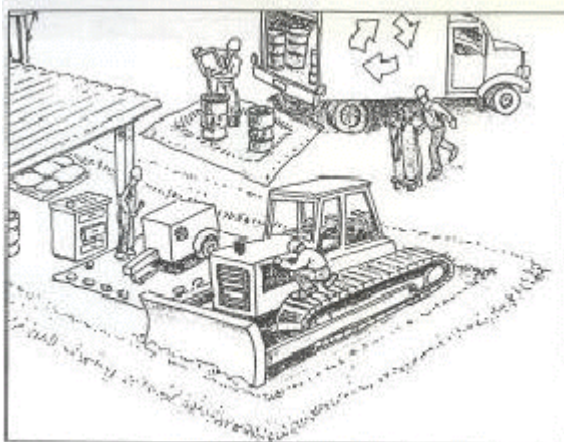
- Down spout extenders. (Or shorten to outlet onto the vegetated areas, allowing for maximum infiltration).
- Storm sewer inlet protection measures.

CONSTRUCTION MATERIALS AND HOUSEKEEPING

Improper storage, use or disposal of construction materials may cause pollutants or sediment to enter the storm drainage system or waterways. As the property owner or prime contractor you may be responsible for the action of employees, tradesmen, and subcontractors who cause, by direct action or neglect, a violation of federal, state or local law. By following good housekeeping and disposal practices during the construction process you not only prevent pollution and avoid possible penalties, you also conserve materials and may reduce your total costs.

CONCRETE AND MASONRY

- Store dry and wet materials under cover and away from drainage areas.
- DO NOT wash out concrete trucks or mortar mixers into storm drains, streets, ditches or waterways.
- Provide a wash out area such as a temporary pit or bermed area. Break up concrete before it fully sets and then properly dispose of the material.



Source: Stormwater Management Manual for Western Washington

PAINTS, SEALERS AND SOLVENTS

- Properly store all materials to prevent damage to containers or accidental spills
- Consider using recycled paints and materials
- Properly store and dispose of waste materials and containers, recycle when appropriate
- DO NOT wash any waste or spill into storm drains, streets, ditches or waterways

- Apply paints, finishes, and coatings carefully to reduce misuse and over spray. Use ground or drop cloths underneath outdoor painting, scraping, sandblasting work, and properly clean and temporarily store collected debris daily.
- Do not conduct spraying, blasting, or sanding activities over open water or where wind may blow paint into water.
- Wipe up spills with rags and other absorbent materials immediately. Do not hose down the area to a storm drain or receiving water or conveyance ditch to receiving water.
- On marine dock areas sweep rather than hose down debris. Collect any hose water generated and convey to appropriate treatment and disposal.
- Use a storm drain cover, filter fabric, or similarly effective runoff control device if dust, grit, washwater, or other pollutants may escape the work area and enter a catch basin. The containment device(s) must be in place at the beginning of the workday. Collect contaminated runoff and solids and properly dispose of such wastes before removing the containment device(s) at the end of the workday.
- Use a ground cloth, pail, drum, drip pan, tarpaulin, or other protective device for activities such as paint mixing and tool cleaning outside or where spills can contaminate stormwater.
- Properly dispose of all wastes and prevent all uncontrolled releases to the air, ground or water.
- Clean brushes and tools covered with non-water-based paints, finishes, or other materials in a manner that allows collection of used solvents (e.g., paint thinner, turpentine, xylol, etc.) for recycling or proper disposal.
- Store toxic materials under cover (tarp, etc.) during precipitation events and when not in use to prevent contact with stormwater.

Applicable Structural Source Control BMPs: Enclose and/or contain all work while using a spray gun or conducting sand blasting and in compliance with applicable air pollution control, OSHA, and WISHA requirements. Do not conduct outside spraying, grit blasting, or sanding activities during windy conditions which render containment ineffective.

Recommended Additional Operational BMPs:

- Clean paintbrushes and tools covered with water-based paints in sinks connected to sanitary sewers or in portable containers that can be dumped into a sanitary sewer drain.
- Recycle paint, paint thinner, solvents, pressure washwater, and any other recyclable materials.
- Use efficient spray equipment such as electrostatic, air-atomized, high volume/low pressure, or gravity feed spray equipment.
- Purchase recycled paints, paint thinner, solvents, and other products if feasible.

(<http://www.ci.blackdiamond.wa.us/Depts/PubWorks/Docs/Volume%204.pdf>)

ADHESIVES AND CAULK

- Properly store all materials to prevent damage to containers or accidental spills
- Check container for proper disposal of residue and empty containers

SOLID WASTE

- Provide suitable, water tight, covered containers for small waste items to prevent trash from being blown or flushed from the site.
- Neatly stack large waste items or place in water tight dumpster if waste can leach from the material.
- Clean site daily.
- Provide separate water tight storage for hazardous materials (may require secondary containment).
- Dispose of all materials in accordance with applicable laws and regulations.
- Call the County Solid Waste Hotline at 1-(800) 449-4840 for more information.

HOUSEKEEPING

- Secure any potential pollutants or hazardous materials to prevent accidental spills, upsets or vandalism. Common materials which may pose a hazard include: pesticides, herbicides, fertilizers, detergents, petroleum products, paints and solvents, and other materials such as adhesives and curing agents.
- Use less hazardous materials when possible.
- Keeping the construction site neat, clean, and organized not only prevents pollution, but reduces injury and increases worker productivity.
- Plan ahead for material delivery by providing the necessary storage facility or area. Remember to clean any mud or dirt that is tracked into areas where it could enter the storm drain or a waterway.

SPILLS

- Be prepared - Have a shovel, rags, gloves, absorbent material and a water tight container available
- Clean spilled non hazardous materials by sweeping or absorbing with rags or absorbents. DO NOT hose material away or bury material.
- Cleanup hazardous material only if you have the proper knowledge and safety equipment. Contain spills with sand berms or absorbents. Remember if the material is hazardous, then it must be disposed of in the proper manner.
- For any major spill or spills of toxic materials, call the Fire Department or 911.



RESOURCES AND REFERENCE

Every building site is unique and poses its own restraints and potential pollution and erosion hazards. In many instances, additional or alternative methods are necessary if your lot is:

- Adjacent to a creek, lake, or wetland.
- Has slopes in excess of 6 percent.
- Receives runoff from adjacent areas.

The California Stormwater Quality Association (formerly the California Stormwater Task Force) has produced a Best Management Practices Handbook for Construction Activities that is available for purchase on their website.

<http://www.cabmphandbooks.org>

There are also engineers and other consultants that can prepare a pollution prevention and erosion control plan for your particular project conditions.

State and Federal regulations and local information is available on the Internet at:

<http://www.swrcb.ca.gov>

http://www.waterboards.ca.gov/water_issues/programs/stormwater/

<http://www.waterboards.ca.gov/centralvalley/>

<http://cfpub1.epa.gov/npdes/>

http://www.epa.gov/enviro/index_java.html

<http://www.sjcleanwater.org>

<http://www.pca.state.mn.us/>

<http://www.dot.ca.gov/hq/construc/stormwater/factsheets.htm>

TELEPHONE NUMBERS

County Stormwater	- Office	(209) 468-3000
	- HOTLINE	(209) 468-3055

City of Stockton Stormwater	- Office	(209) 937-8791
	- Spills	(209) 973-8341

County Solid Waste Hotline at	1-(800) 449-4840
County Office of Emergency services	(209) 468-3962
County Environmental Health	(209) 468-3420

IN AN EMERGENCY CALL 911

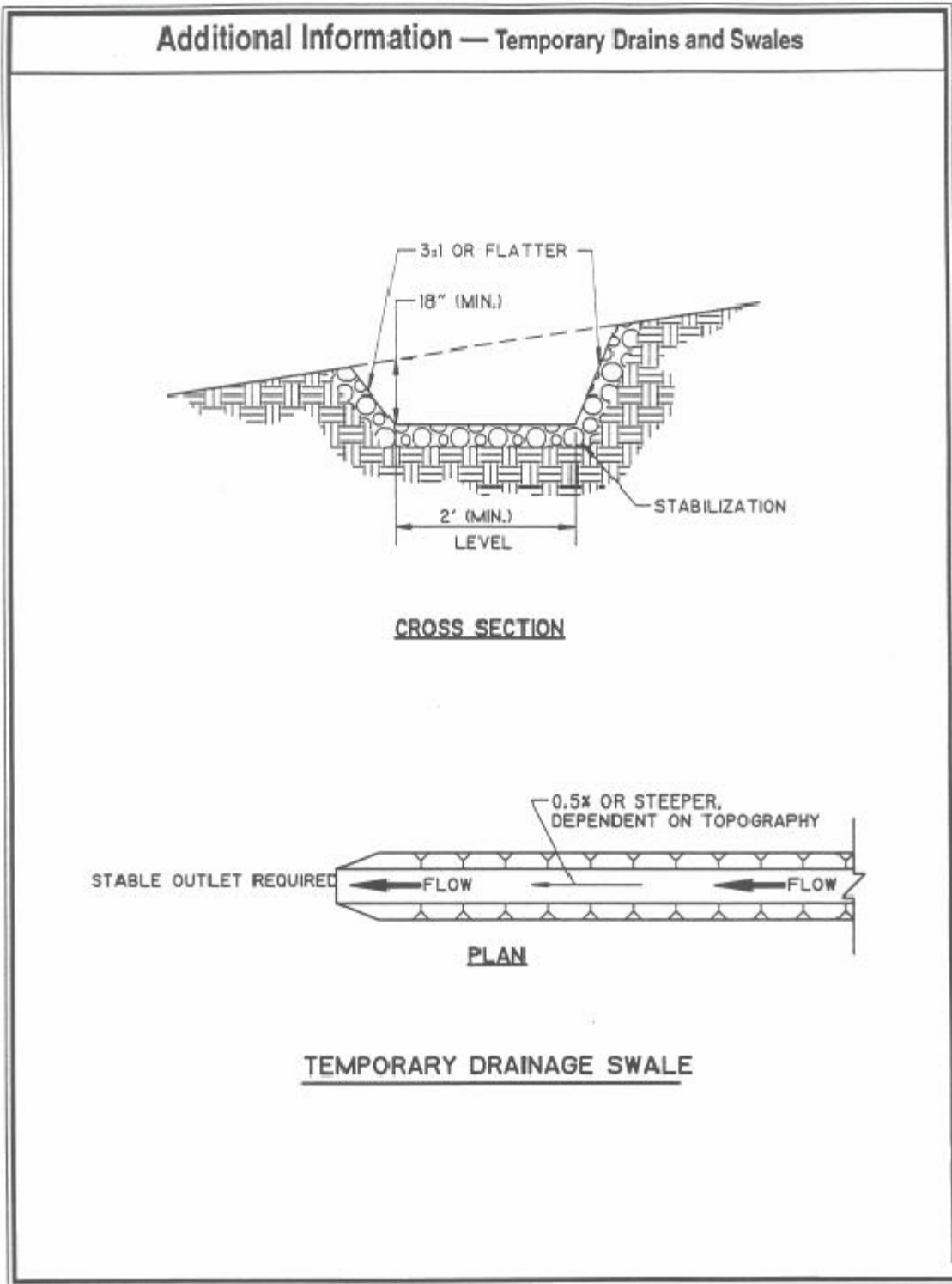
SMALL SITE **STORM WATER** **MANAGEMENT PLAN**

APPENDIX

SAMPLE BEST MANAGEMENT PRACTICES

For more Best Management Practices visit the CALTRANS website at <http://www.dot.ca.gov/hq/construc/stormwater/factsheets.htm>.

TEMPORARY DRAINS AND SWALES



STORM DRAIN INLET PROTECTION

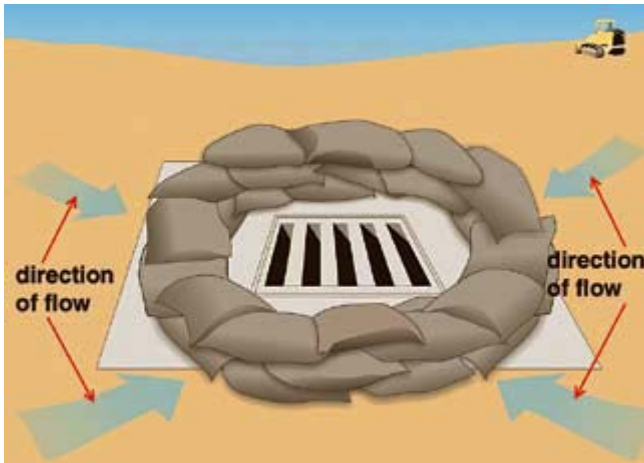


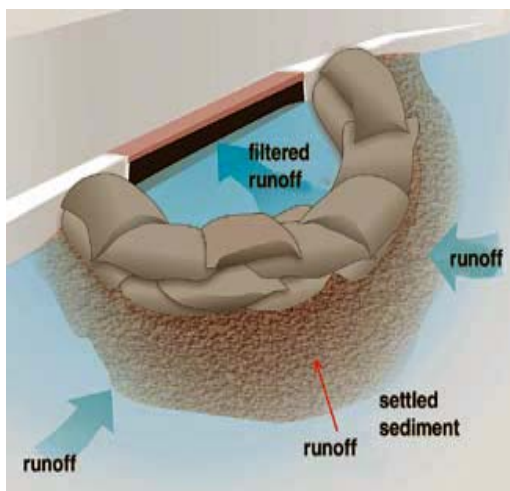
Figure 1. Sand or gravel bags can be used to filter stormwater runoff before entering a catch basin. Commercial products are also available that fit in front of or inside the catch basin.

Storm drain inlet protection prevents sediment from entering a storm drain by surrounding or covering the inlet with a filtering material. This allows sediment-laden runoff to pond and settle before entering the storm drain. Several types of filters are commonly used for inlet protection: silt fence, sand bags or block and gravel. The type of filter used will depend on inlet type (curb inlet, drop inlet), slope, and amount of flow. Many different commercial inlet filters are also available. Some commercial inlet filters are placed in front of or on top of an inlet, others are placed inside the inlet and under the grate.



Figure 2. Sand or gravel bags used to protect a drop inlet.

- All storm drain inlets must be protected by appropriate BMPs during construction until all sources with potential for discharging to the inlet have been stabilized.
- All sediment control BMPs must be inspected to ensure integrity and effectiveness. All nonfunctional BMPs must be repaired, replaced, or supplemented with functional BMPs.

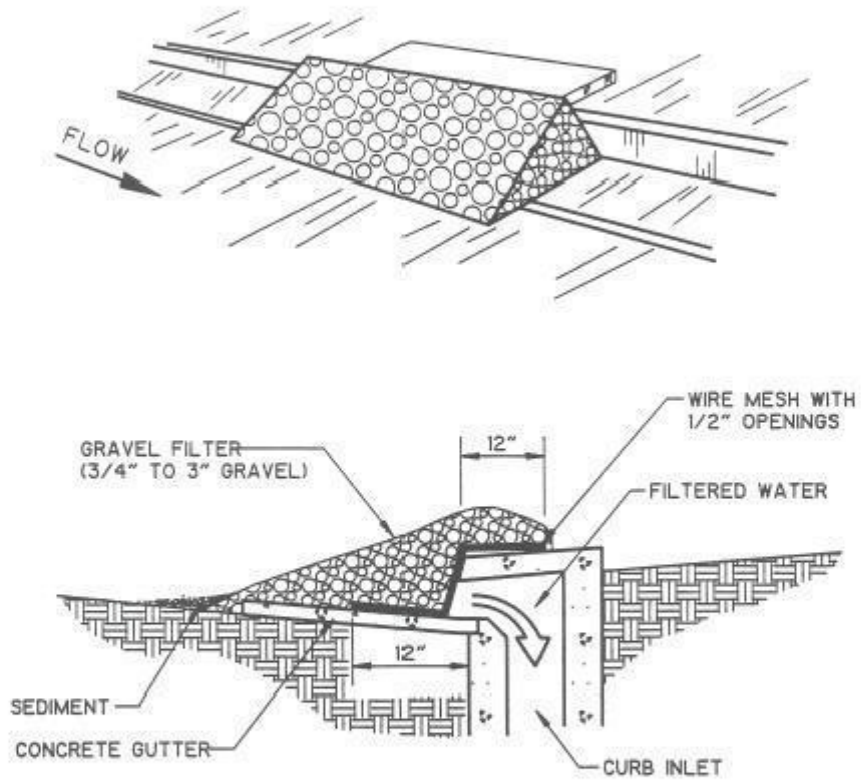


- Inlet protection is a secondary BMP. Make sure that erosion controls or additional sediment controls are also in place.
- The inlet protection must not block the storm drain or cause flooding.
- Inlet protection must be in place immediately after storm drains are installed (or before land disturbance activities begin in an area with existing storm drains).
- Sediment accumulation must be removed after each storm event if it impedes flow through the filter.
- Make sure there are not any “gaps” allowing unfiltered stormwater to enter the inlet.

Figure 3. Silt fence can also be used to protect a drop inlet.

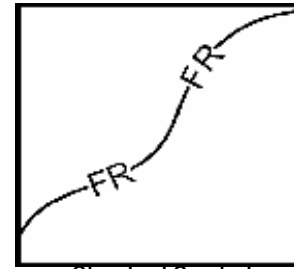
(MPCA Stormwater Construction Inspection Guide <http://www.pca.state.mn.us/publications/wq-strm2-10.pdf>)

Additional Information — Storm Drain Inlet Protection



GRAVEL AND WIRE MESH FILTER FOR CURB INLET

FIBER ROLLS



Standard Symbol

BMP Objectives

- Soil Stabilization
- Sediment Control
- Tracking Control
- Wind Erosion Control
- Non-Storm Water Management
- Materials and Waste Management

- Definition and Purpose** A fiber roll consists of wood excelsior, rice or wheat straw, or coconut fibers that is rolled or bound into a tight tubular roll and placed on the toe and face of slopes to intercept runoff, reduce its flow velocity, release the runoff as sheet flow and provide removal of sediment from the runoff. Fiber rolls may also be used for inlet protection and as check dams under certain situations.
- Appropriate Applications**
- This BMP may be implemented on a project-by-project basis with other BMPs when determined necessary and feasible by the RE.
 - Along the toe, top, face, and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.
 - Below the toe of exposed and erodible slopes.
 - Down-slope of exposed soil areas.
 - Around temporary stockpiles.
 - Along the perimeter of a project.
- Limitations**
- Runoff and erosion may occur if fiber roll is not adequately trenched in.
 - Fiber rolls at the toe of slopes greater than 1:5 may require the use of 500 mm (20" diameter) or installations achieving the same protection (i.e., stacked smaller diameter fiber rolls, etc.).
 - Fiber rolls may be used for drainage inlet protection if they can be properly

anchored.

- Difficult to move once saturated.
- Fiber rolls could be transported by high flows if not properly staked and trenched in.
- Fiber rolls have limited sediment capture zone.
- Do not use fiber rolls on slopes subject to creep, slumping, or landslide.

Standards and Specifications

Fiber Roll Materials

- Fiber rolls shall be either:
 - (1) Prefabricated rolls.
 - (2) Rolled tubes of erosion control blanket.

Assembly of Field Rolled Fiber Roll

- Roll length of erosion control blanket into a tube of minimum 200 mm (8 in) diameter.
- Bind roll at each end and every 1.2 m (4 ft) along length of roll with jute-type twine.

Installation

- Slope inclination of 1:4 or flatter: fiber rolls shall be placed on slopes 6.0 m apart.
- Slope inclination of 1:4 to 1:2: fiber rolls shall be placed on slopes 4.5 m apart.
- Slope inclination 1:2 or greater: fiber rolls shall be placed on slopes 3.0 m apart.
- Stake fiber rolls into a 50 to 100 mm (2 to 4 in) trench.
- Drive stakes at the end of each fiber roll and spaced 600 mm (2 ft) apart if Type 2 installation is used (refer to Page 4). Otherwise, space stakes 1.2 m (4 ft) maximum on center if installed as shown on Pages 5 and 6.
- Use wood stakes with a nominal classification of 19 by 19 mm (3/4 by 3/4 in), and minimum length of 600 mm (24 in).
- If more than one fiber roll is placed in a row, the rolls shall be overlapped;

not abutted.

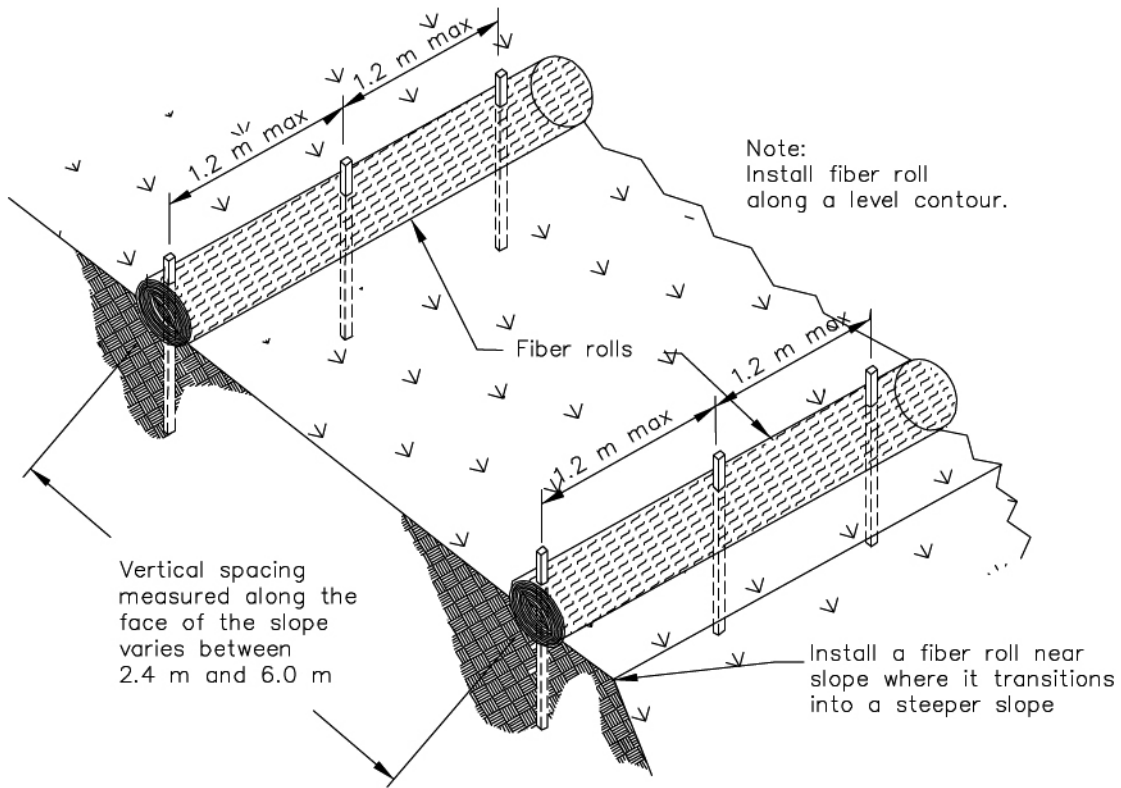
Removal

- Fiber rolls are typically left in place.
- If fiber rolls are removed, collect and dispose of sediment accumulation, and fill and compact holes, trenches, depressions or any other ground disturbance to blend with adjacent ground.

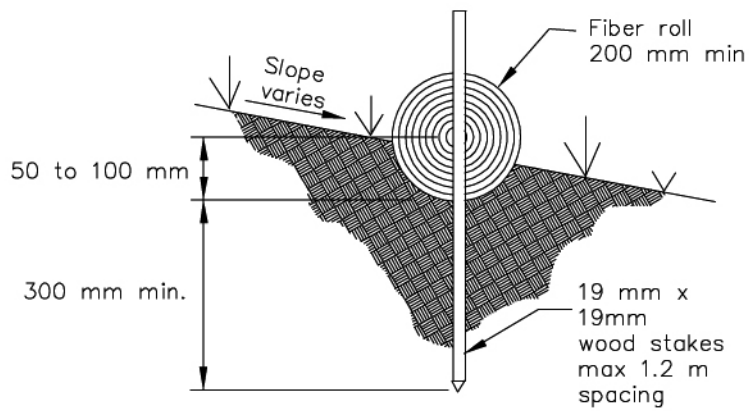
**Maintenance and
Inspection**

- Repair or replace split, torn, unraveling, or slumping fiber rolls.
- Inspect fiber rolls when rain is forecast.
- Inspect fiber rolls following rainfall events and at least daily during prolonged rainfall.
- Maintain fiber rolls to provide an adequate sediment holding capacity. Sediment shall be removed when the sediment accumulation reaches three quarters (3/4) of the barrier height and disposed of correctly.

(<http://www.dot.ca.gov/hq/construc/stormwater/SC-05.doc>)

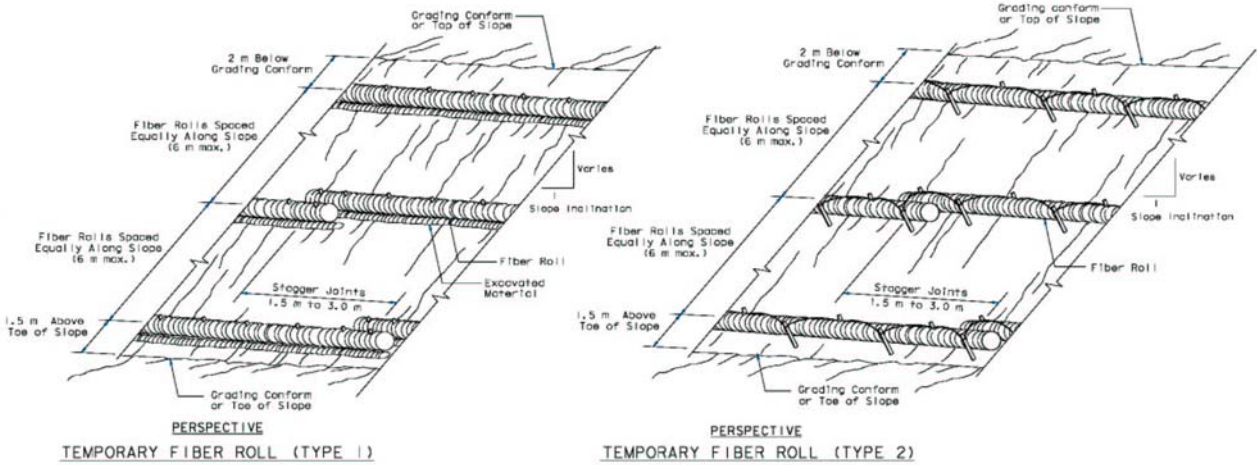
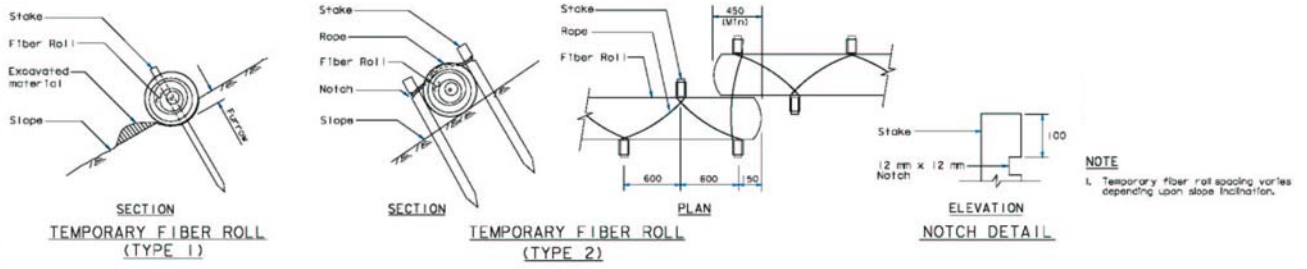


TYPICAL FIBER ROLL INSTALLATION
N.T.S.

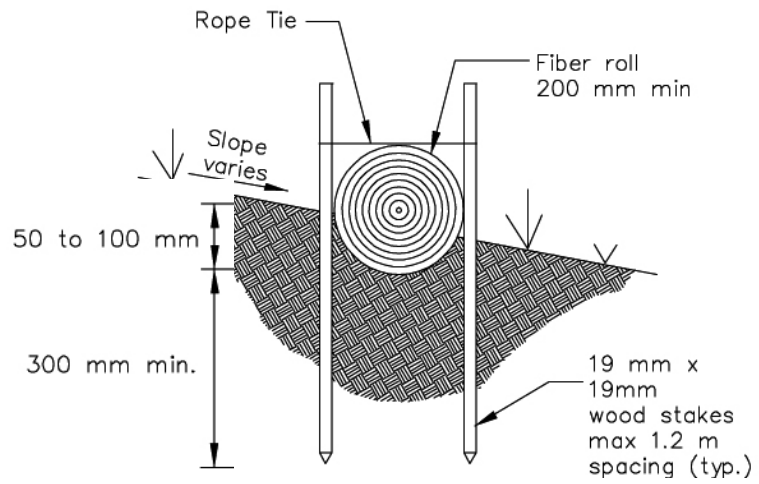
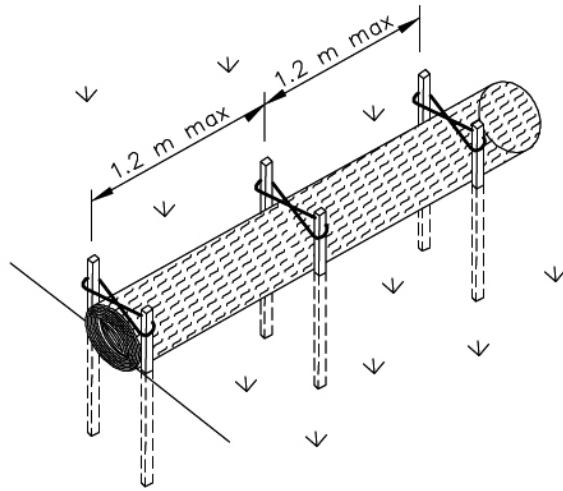


ENTRENCHMENT DETAIL
N.T.S.

Source: <http://www.dot.ca.gov/hq/construc/stormwater/SC-05.doc>



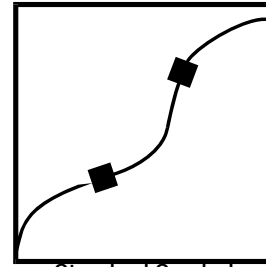
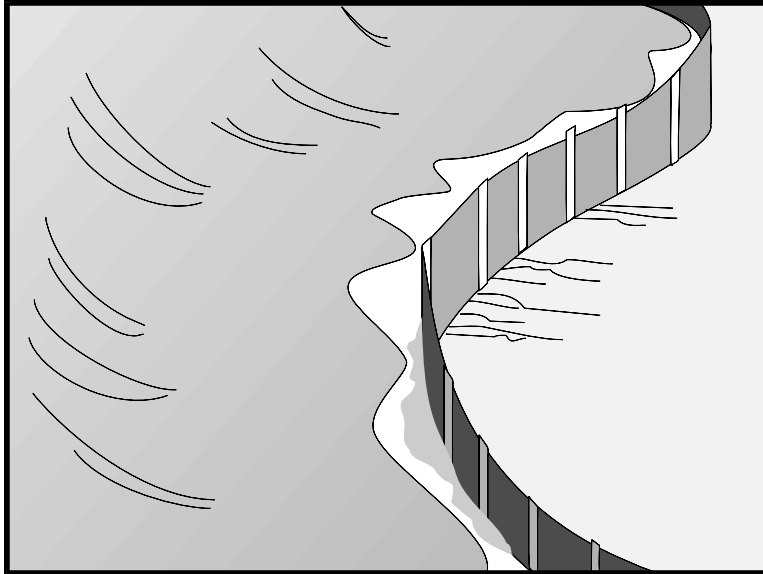
(<http://www.dot.ca.gov/hq/construc/stormwater/SC-05.doc>)



OPTIONAL ENTRENCHMENT DETAIL
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(<http://www.dot.ca.gov/hq/construc/stormwater/SC-05.doc>)

SILT FENCES



Standard Symbol

BMP Objectives

- Soil Stabilization
- Sediment Control
- Tracking Control
- Wind Erosion Control
- Non-Storm Water Management
- Materials and Waste Management

Definition and Purpose A silt fence is a temporary linear sediment barrier of permeable fabric designed to intercept and slow the flow of sediment-laden sheet flow runoff. Silt fences allow sediment to settle from runoff before water leaves the construction site.

Appropriate Applications Silt fences are placed:

- Below the toe of exposed and erodible slopes.
- Down-slope of exposed soil areas.
- Around temporary stockpiles.
- Along streams and channels.
- Along the perimeter of a project.

- Limitations
- Not effective unless trenched and keyed in.
 - Not intended for use as mid-slope protection on slopes greater than 1:4 (V:H).
 - Must be maintained.
 - Must be removed and disposed of.
 - Don't use below slopes subject to creep, slumping, or landslides.
 - Don't use in streams, channels, drain inlets, or anywhere flow is concentrated.
 - Don't use silt fences to divert flow.

Standards and Specifications

Design and Layout

- The maximum length of slope draining to any point along the silt fence shall be 61 m (200 ft) or less.
- Slope of area draining to silt fence shall be less than 1:1 (V:H).
- Limit to locations suitable for temporary ponding or deposition of sediment.
- Fabric life span generally limited to between five and eight months. Longer periods may require fabric replacement.
- Silt fences shall not be used in concentrated flow areas.
- Lay out in accordance with Pages 5 and 6 of this BMP.
- For slopes steeper than 1:2 (V:H) and that contain a high number of rocks or large dirt clods that tend to dislodge, it may be necessary to install additional protection immediately adjacent to the bottom of the slope, prior to installing silt fence. Additional protection may be a chain link fence or a cable fence.
- For slopes adjacent to water bodies or Environmentally Sensitive Areas (ESAs), additional temporary soil stabilization BMPs shall be used.

Materials

- Silt fence fabric shall be woven polypropylene with a minimum width of 900 mm (36 inches) and a minimum tensile strength of 0.45-kN. The fabric shall conform to the requirements in ASTM designation D4632 and shall have an integral reinforcement layer. The reinforcement layer shall be a polypropylene, or equivalent, net provided by the manufacturer. The permittivity of the fabric shall be between 0.1 sec^{-1} and 0.15 sec^{-1} in

conformance with the requirements in ASTM designation D4491. Contractor must submit certificate of compliance in accordance with Standard Specifications Section 6-1.07.

- Wood stakes shall be commercial quality lumber of the size and shape shown on the plans. Each stake shall be free from decay, splits or cracks longer than the thickness of the stake or other defects that would weaken the stakes and cause the stakes to be structurally unsuitable.
- Bar reinforcement may be used, and its size shall be equal to a number four (4) or greater. End protection shall be provided for any exposed bar reinforcement.
- Staples used to fasten the fence fabric to the stakes shall be not less than 45 mm (1.75 inches) long and shall be fabricated from 1.57 mm (0.06 inch) or heavier wire. The wire used to fasten the tops of the stakes together when joining two sections of fence shall be 3.05 mm (0.12 inch) or heavier wire. Galvanizing of the fastening wire is not required.

Installation

- Generally, silt fences shall be used in conjunction with soil stabilization source controls up slope to provide effective erosion and sediment control.
- Bottom of the silt fence shall be keyed-in a minimum of 150 mm (12 inches).
- Trenches shall not be excavated wider and deeper than necessary for proper installation of the temporary linear sediment barriers.
- Excavation of the trenches shall be performed immediately before installation of the temporary linear sediment barriers.
- Construct silt fences with a set-back of at least 1m (3 ft) from the toe of a slope. Where a silt fence is determined to be not practical due to specific site conditions, the silt fence may be constructed at the toe of the slope, but shall be constructed as far from the toe of the slope as practical.
- Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the barrier; in no case shall the reach exceed 150 meters (490 ft).
- Cross barriers shall be a minimum of 1/3 and a maximum of 1/2 the height of the linear barrier.
- Install in accordance with Pages 5 and 6 of this BMP.

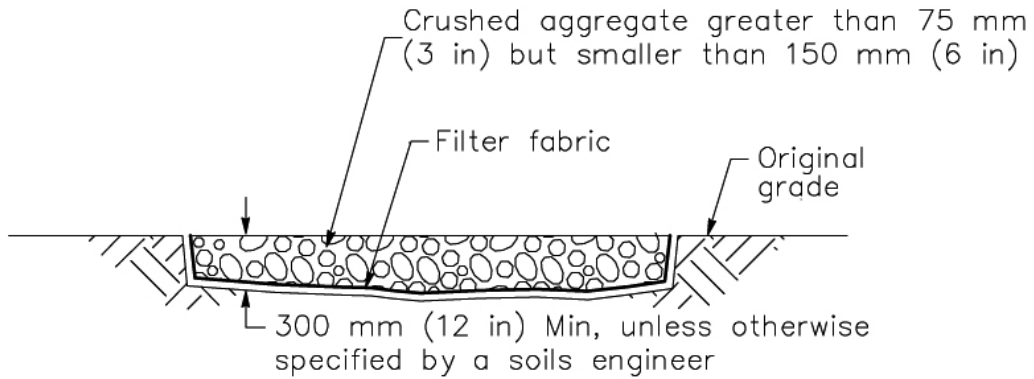
Maintenance and Inspection

- Repair undercut silt fences.
- Repair or replace split, torn, slumping, or weathered fabric.
- Inspect silt fence when rain is forecast. Perform necessary maintenance, or maintenance required by the Resident Engineer (RE).

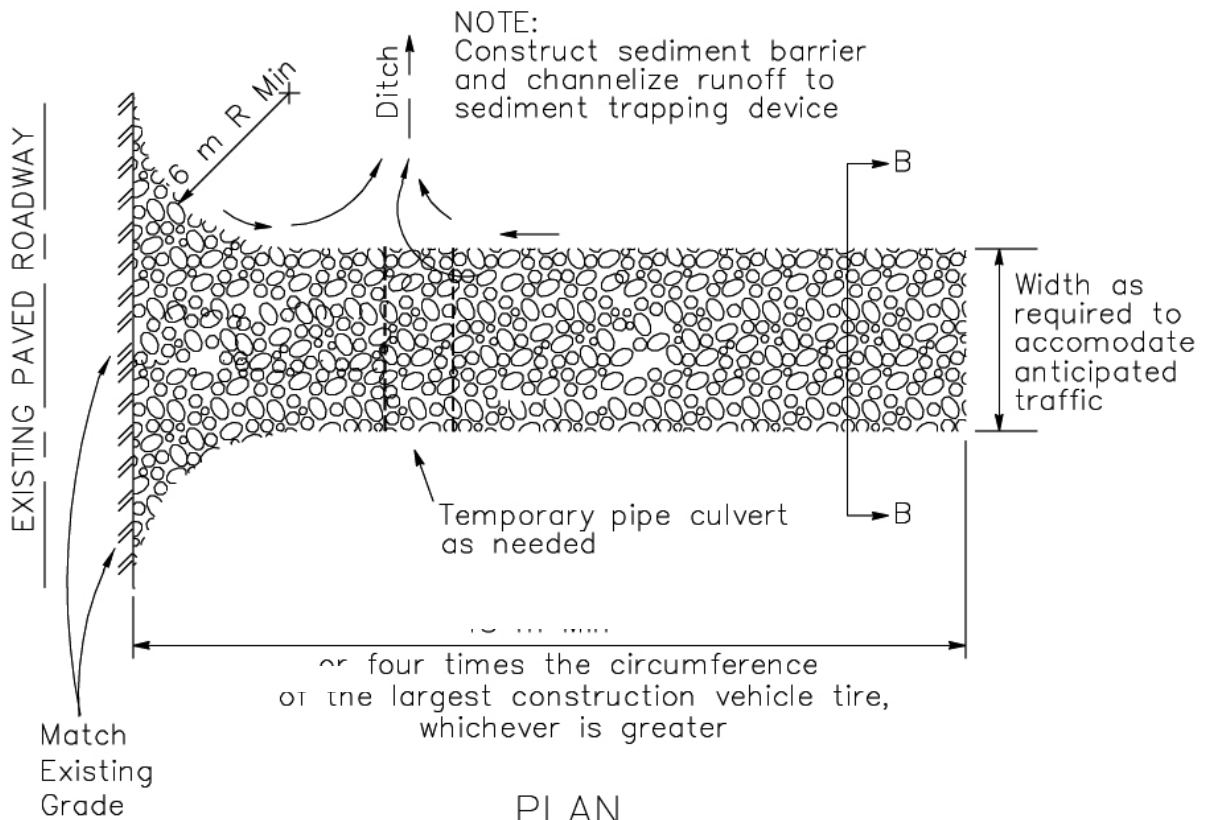
- Inspect silt fence following rainfall events. Perform maintenance as necessary, or as required by the RE.
- Maintain silt fences to provide an adequate sediment holding capacity. Sediment shall be removed when the sediment accumulation reaches one-third (1/3) of the barrier height. Removed sediment shall be incorporated in the project at locations designated by the RE or disposed of outside the right-of-way in conformance with the Standard Specifications.
- Silt fences that are damaged and become unsuitable for the intended purpose, as determined by the RE, shall be removed from the site of work, disposed of outside the highway right-of-way in conformance with the Standard Specifications, and replaced with new silt fence barriers.
- Holes, depressions or other ground disturbance caused by the removal of the temporary silt fences shall be backfilled and repaired in conformance with the Standard Specifications.
- Remove silt fence when no longer needed or as required by the RE. Fill and compact post holes and anchorage trench, remove sediment accumulation, and grade fence alignment to blend with adjacent ground.

(<http://www.dot.ca.gov/hq/construc/stormwater/SC-05.doc>)

TEMPORARY CONSTRUCTION SITE ENTRANCE/EXIT



SECTION B-B
NTS



PLAN
NTS

<http://www.dot.ca.gov/hq/construc/stormwater/SC-05.doc>

CONCRETE WASHOUT

Concrete washouts are used to contain concrete and liquids when the chutes of concrete mixers and hoppers of concrete pumps are rinsed out after delivery. The washout facilities consolidate solids for easier disposal and prevent runoff of liquids. The wash water is alkaline and contains high levels of chromium, which can leach into the ground and contaminate groundwater. It can also migrate to a storm drain, which can increase the pH of area waters and harm aquatic life. Solids that are improperly disposed of can clog storm drain pipes and cause flooding. Installing concrete washout facilities not only prevents pollution but also is a matter of good housekeeping at your construction site.

This fact sheet describes the different types of concrete washout facilities that can be used at your site and outlines how they should be sited, designed, and maintained.

Types of Concrete Washout Facilities

Prefabricated washout containers

A growing number of companies offer sturdy, prefabricated concrete washout containers that are delivered to the site. Some services provide the containers alone without providing maintenance and disposal of materials, while other companies offer complete service that includes delivery of containers and regular pickups of solid and liquid waste materials. The prefabricated containers resist damage and protect well against spills and leaks, and the full-service option relieves the site superintendent of the burden of disposing of materials. To prevent leaks on the jobsite, ensure that prefabricated washout containers are watertight. Additionally, some companies offer prefabricated washout containers with ramps to accommodate concrete pump trucks.



Source: US EPA

When selecting a company to handle concrete waste, ensure that they are properly disposing of all materials, and give preference to companies that recycle collected materials.

Self-installed concrete washouts

You can also build your own concrete washout facility, although self-installed structures are much less reliable than prefabricated containers and are prone to leaks. There are many design options for the washout, but they are preferably built below-grade to prevent breaches and reduce the likelihood of runoff. Above-grade structures can also be used if they are sized and constructed correctly and are diligently maintained. One of the most common problems with self-installed concrete washout facilities is that they can leak or be breached as a result of constant use, so you should take care to use quality materials and inspect the facilities on a daily basis.



Source: US EPA

You should size your washouts to handle solids, wash water, and rainfall to prevent overflow. Concrete Washout Systems, Inc., (2006) estimates that 7 gallons of wash water are used to wash one truck chute and 50 gallons are used to wash out the hopper of a concrete pump truck.

For larger sites, a below-grade washout should be at least 10 feet wide and sized to contain all liquid and solid waste you expect to generate in between cleanout periods (CASQA, 2003). Washouts at smaller sites, such as a single-family residential lot, should be sized to accommodate the expected load and can be smaller than 10 feet wide. Include a minimum 12-inch freeboard in the sizing calculations. Line the pit with plastic sheeting of at least 10-mil thickness that has no holes or tears to prevent leaching of liquids into the ground (CASQA, 2003). Concrete wash water should never be placed in a pit that is connected to the storm drain system or that drains to nearby waterways.

At larger sites, build an above-grade washout at least 10 feet wide by 10 feet long and size it to contain all liquid and solid waste you expect to generate in between cleanout periods. Washouts at smaller sites can be smaller according to the expected capacity needed. Include a 4-inch freeboard in the sizing calculations (CASQA, 2003). You can make the structures from staked straw bales or sandbags double- or triple-lined with plastic sheeting of at least 10-mil thickness that has no holes or tears.

Siting

According to CASQA (2003), you should not place concrete washout facilities within 50 feet of storm drains, open ditches, or waterbodies. You should place them in a location that allows convenient access for concrete trucks, preferably near the area where the concrete is being poured. Appropriate gravel or rock should cover paths to concrete washout facilities if the facilities are located on undeveloped property. These areas should be far enough away from other construction traffic to reduce the likelihood of accidental damage and spills. The number of facilities you install should depend on the expected demand for storage capacity. On large sites with extensive concrete work, washouts should be placed in multiple locations for ease of use by concrete truck drivers.

Operation

Inspection

Check all concrete washout facilities daily to determine if they have been filled to 75 percent capacity, which is when materials need to be removed. Both above- and below- ground self-installed washouts should be inspected daily to ensure that plastic linings are intact and sidewalls have not been damaged by construction activities. Prefabricated washout containers should be inspected daily as well to ensure the container is not leaking or nearing 75 percent capacity. Inspectors should also note whether the facilities are being used regularly; if drivers have washed out their chutes or hoppers in other locations, you may need to provide more education, install additional signage, or place additional washouts in more convenient locations.

Material Removal

Concrete washouts are designed to promote evaporation where feasible. However, if stored liquids have not evaporated and the washout is nearing capacity, vacuum and dispose of them in an approved manner - check with the local sanitary sewer authority to determine if there are special disposal requirements for concrete wash water. Remove liquids or cover the structures before predicted rainstorms to prevent overflows. Companies that offer prefabricated and watertight washout containers generally offer a vacuum service to remove the liquid material.

You can remove hardened solids whole or you can break them up first depending on the type of equipment available at your site. You can then reuse the solids onsite or haul them away for recycling - crushed

concrete makes excellent aggregate for roadbeds and other building applications. Check with your local recycling agency to identify opportunities for concrete recycling.

When you remove materials from the concrete washout, build a new structure or, if the previous structure is still intact, inspect the structure for signs of weakening or damage and make any necessary repairs. Line the structure with new plastic that is free of holes or tears and replace signage if necessary. It is very important that new plastic is used after every cleaning because pumps and concrete removal equipment can damage the existing liner.

Education for Concrete Subcontractors

An important factor that dictates the success of concrete washout facilities is whether or not concrete truck drivers use concrete washouts. You need to make them aware of the presence of these facilities. Your site superintendent can educate concrete subcontractors, post signage indicating the location and designated use of these areas, and provide careful oversight to inspect for evidence of improper dumping of concrete waste and wash water. Include requirements in contracts with concrete delivery companies that drivers must use designated concrete washout facilities.

(<http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&Rbutton=detail&bmp=117>)

SAN JOAQUIN COUNTY STORM WATER CONSTRUCTION INSPECTION FORM

This form is used by the San Joaquin County Storm Water Inspector, please use this as a guidance and check off list to ensure that all of the proper BMPs are in place and in proper working condition.

Inspection #:	Date of Inspection :	Time of Inspection:	Inspection Conducted By:	
Weather (Circle all that apply.): Dry Hot Clear Overcast Cold Raining				
<u>BMP</u>	<u>In Place/Okay</u>	<u>Absent</u>	<u>Needs Maintenance</u>	<u>Not Applicable</u>
Straw Wattles				
Filter Bags in Drain Inlets				
Rock Bags in Gutters				
Construction Entrance				
Concrete Washout				
Portable Bathroom Placement				
SWPPP Onsite				
Notes:				
Signature:			Date:	