MINOR STORM WATER MANAGEMENT PLAN

FOR

TPM 20908
ENVIRONMENTAL LOG NO. 05-02-003
APN 123 - 300 - 06

PREPARED FOR

The Pauline M. Catherine Trust
Jeanette Catherine Nave & Glenn J. Stuart [Co - Trustees]
1471 Solar Drive
Monterey Park, CA 91754

PREPARED BY

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June 12, 2005

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Robert Sukup
6/12/05

STORMWATER MANAGEMENT PLAN (SWMP) FOR MINOR PROJECTS

The County of San Diego Watershed Protection, Storm Water Management, and Discharge Control Ordinance (WPO) (Ordinance No. 9424) requires all applications for a permit or approval associated with a Land Disturbance Activity must be accompanied by a Storm Water Management Plan (SWMP) (section 67.804.f). The purpose of the SWMP is to describe how the project will minimize the short and long-term impacts on receiving water quality.

The WPO does not set a minimum size or type of project requiring a SWMP. The following types of projects/permits are generally not significant contributors to pollution loading after construction is complete:

> Construction Right of Way Permits, Encroachment Permits, Minor Excavation Permits, Variances, Boundary Adjustments, Minor Use Permits for Cellular Facilities, and Residential Tentative Parcel Maps.

As such, these projects may not require post construction Best Management Practices (BMPs) that require long-term maintenance. This form is to be submitted for these types of projects to fulfill the SWMP requirement of the WPO (section 67.804.f). It is a living document that can be modified at any time even after construction is complete. Changes to the SWMP are documented on the attached Addendum sheet.

Please be aware that completion of this form does not remove the applicant's responsibility from addressing BMPs during construction. If it is determined during the review process that the project has the potential to significantly impact water quality after construction, then a more detailed SWMP will be required that addresses post-construction BMPs.

Please describe the proposed project.

Project Name: NAVE TENTATIVE PARCEL MAP

Permit Number:

Project Details: SUBDIVIDE 10.3 ACRES THAT HAS 2 EXISTING "HOUSES" & BARN INTO 4 LOTS

Project Location: FALLBROOK, CA

Assessors Parcel No.: 123-300-06

Address: 4318 PALOMAR DRIVE

Hydrologic Unit*: SAN LUIS REY

Hydrologic Subarea**: BONSALL 903.12

Any previous stormwater action: NO

* Hydrologic Unit and Area may be determined from the maps found at the following link: http://www.projectcleanwater.org/html/ws_map.html

** Hydrologic Subarea may be determined from the maps found at the following links: http://www.stormwater.water-programs.com/Webctswpfinal/Indexfinal.htm; http://endeavor.des.ucdavis.edu/wqsid/wblist.asp?region_pkey=9

Unique Site Features: (Check all that apply.)

Project is in a river, creek, or lake.

Directly discharges to a river, creek, or lake.

Project is 200 feet from a river, creek, or lake.

Runoff will directly discharge into a storm drain.

✓ There are no unique site features.

Individual designated as stormwater protection contact for the permit.

Name: JEANETTE CATHERINE NAVE

Address: 1471 SOLAR DRIVE

City, State, ZIP: MONTEREY PARK, CA 91754

Phone Number: 323-262-7617

Cellular Phone Number: _____

Fax Number: _____

A. CONSTRUCTION PHASE

1. Potential Pollutant Sources During Construction: (Check all that apply.)

✓ There will be soil-disturbing activities that will result in exposed soil areas. This includes minor grading and trenching.

✓ There will be asphalt paving including patching.

✓ There will be slurries from mortar mixing, coring, or PCC saw cutting and placement.

✓ There will be solid wastes from PCC demolition and removal, wall construction, or form work.

✓ There might be stockpiling (soil, compost, asphalt concrete, solid waste) for over 24 hours.

There will be dewatering operations.

✓ There will be temporary on-site storage of construction materials, including mortar mix, raw landscaping and soil stabilization materials, treated lumber, rebar, and plated metal fencing materials.

✓ There might be trash generated from the project.

This project will involve activities that are not considered to generate pollutants. Includes placement of temporary signs (i.e. elections, events).

SEE ATTACHED MAP & ATTACHMENTS

2. List the construction BMPs that may be used: (Check all that apply.)

The BMPs selected are those that will be implemented during construction of the project. The applicant is responsible for the placement and maintenance of the BMPs selected. Attach descriptions of the BMPs and their application (available at the DPW counter) as Attachment A.

- ✓ Silt Fence
- Fiber Rolls
- Street Sweeping and Vacuuming
- Storm Drain Inlet Protection
- ✓ Stockpile Management
- ✓ Solid Waste Management
- ✓ Stabilized Construction Entrance/Exit
- Dewatering Operations
- Vehicle and Equipment Maintenance
- Desilting Basin
- ✓ Gravel Bag Berm
- ✓ Sandbag Barrier
- ✓ Material Delivery and Storage
- Spill Prevention and Control
- ✓ Concrete Waste Management
- Water Conservation Practices
- Paving and Grinding Operations

Any minor slopes created incidental to construction and not subject to a major or minor grading permit shall be protected by covering with plastic or tarp prior to a rain event, and shall have vegetative cover reestablished within 180 days of completion of the slope and prior to final building approval.

No BMPs needed. Activities are not considered to generate pollutants.

B. POST-CONSTRUCTION PHASE

ATTENTION: THIS PROJECT MAY BE EXEMPT FROM POST CONSTRUCTION BMP REQUIREMENTS IF ONE OR MORE OF THE FOLLOWING THREE STATEMENTS APPLY. (Check all that apply.)

My project is not located within the County Urban Area as defined by the map that is in Appendix B of the County Watershed Protection, Stormwater Management and Discharge Control Ordinance (map on file with the Clerk of the Board as document number 0768626), AND my project will not route stormwater run-off into or through an underground conveyance other than a road-crossing culvert. I have attached project plans that show the location of this project, and that demonstrate that stormwater run-off will be carried above ground only, except at road crossings.

IF YOU CHECKED OFF THE STATEMENT ABOVE, SKIP TO ITEM D. OTHERWISE COMPLETE ALL REMAINING SECTIONS.

My project is physically complete or substantially complete, and the prior work on the project has all been done pursuant to or as required by a valid County permit or approval. The permit or approval I am seeking is not related to the construction of any stormwater management device, and will not be followed by any additional construction that will increase the impervious surface of this project or change the post-construction uses of the project area. I have attached photographs showing the current state of construction in the areas of the project to which this application for a permit or approval applies.

My project has no potential to add pollutants to stormwater after construction is complete, AND will not affect the flow rate or velocity of stormwater run off after construction is complete. I have attached project plans that demonstrate that the project will not significantly increase impervious surfaces in the project area and will not add any impervious surfaces that are directly connected to the stormwater conveyance system. These plans also show the anticipated post-construction use of the project area. **I understand that this application will not be exempt from the requirement to submit a post-construction stormwater management plan if County staff conclude that these post-construction uses of the project area have the potential to add pollutants to stormwater after construction is complete. I acknowledge that at such time that staff makes this determination, I shall be notified and required to submit the appropriate post-construction SWMP.**

List the post-construction BMPs that will be used: (Check all that apply.) SEE ATTACHED MAP

✓ There will be permanent landscaping as part of this project. The property owner will maintain the landscaping.

✓ Asphalt concrete will be placed over the disturbed areas designated as roadway or parking lots.

PCC will be placed over the disturbed areas designated as either roadway, parking lots or building pads.

Rock slope protection will be placed along channel banks.

✓ Outlet Protection/velocity dissipation devices will be placed at storm drain outfalls to reduce the velocity of the flow.

This project will result in a reduction of the amount of asphalt concrete or PCC within the project.

✓ Either asphalt concrete, PCC or porous pavement will be placed over a dirt driveway.

C. MINISTERIAL PERMITS (Per Part G.8 of Ordinance No. 9426)
Please complete this section C if the proposed project is a discretionary permit subject to future ministerial permits, be aware that additional requirements may have to be fulfilled in order to satisfy the requirements of the WPO.

Provide information for the following steps to determine the impervious area for this project:

A. Total size of construction area 10.3 Ac (Acres or ft^2 whichever is appropriate.)

B. Total impervious area (including roof tops) before construction .20 Ac (Acres or ft^2)

C. Total impervious area (including roof tops) after construction .43 Ac (Acres or ft^2)

Percent impervious before construction: B/A = 1.96 %

Percent impervious after construction: C/A = 4.22 %

For proposals that increase impervious surface, a detailed drawing showing drainage from these surfaces being directed to flat vegetated areas not less that 15 feet wide in the

direction of runoff flow. A detailed drawing of the proposed activity showing that it will not occupy any of the areas currently used for surface drainage flow, filtering, or infiltration.

New walkways, trails, and alleys and other low-traffic areas shall be constructed with permeable surfaces, such as pervious concrete, porous asphalt, unit pavers, or granular materials that allow infiltration.

If the proposed project is subject to future ministerial permits, please be aware that additional requirements may have to be fulfilled in order to satisfy the requirements of the WPO.

D. ATTACHMENTS

1. Please Attach a Project Map or Plan.

2. If applicable, construction BMPs from Caltrans Storm Water Quality Handbooks Construction Site Best Management Practices Manual, November 2000. Available at the DPW Counter, 5201 Ruffin Road, Suite B, San Diego, CA 92123 or on the Internet at http://www.dot.ca.gov/hq/construc/stormwater/CSBMPM_303_Final.pdf

APPLICANT'S CERTIFICATION OF SWMP

I certify under a penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

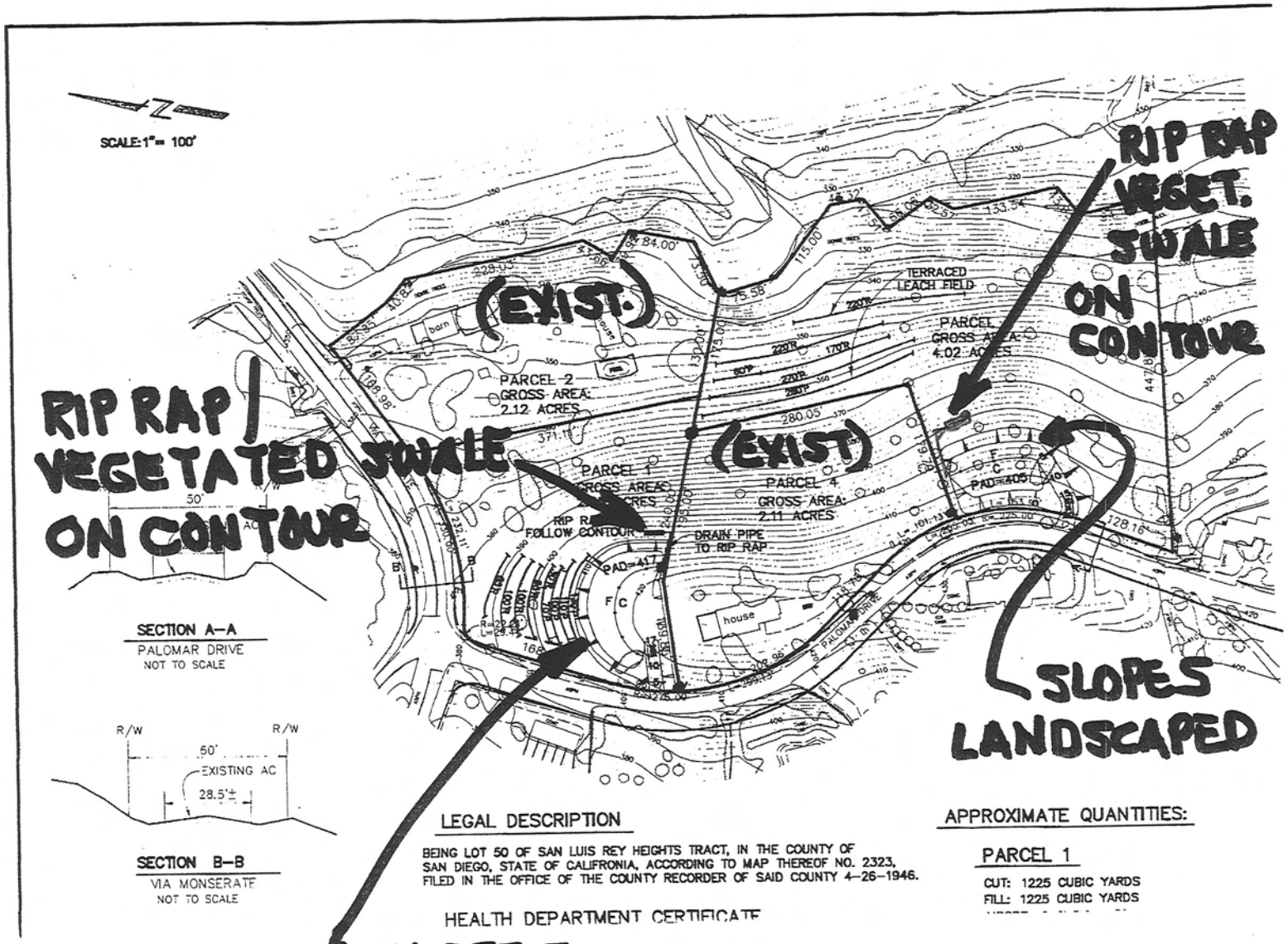
Robert O Sukup — 6/12/05

Signature — Date

ROBERT O. SUKUP (CIVIL ENG) — 760-720-0098

Name and Title — Telephone Number

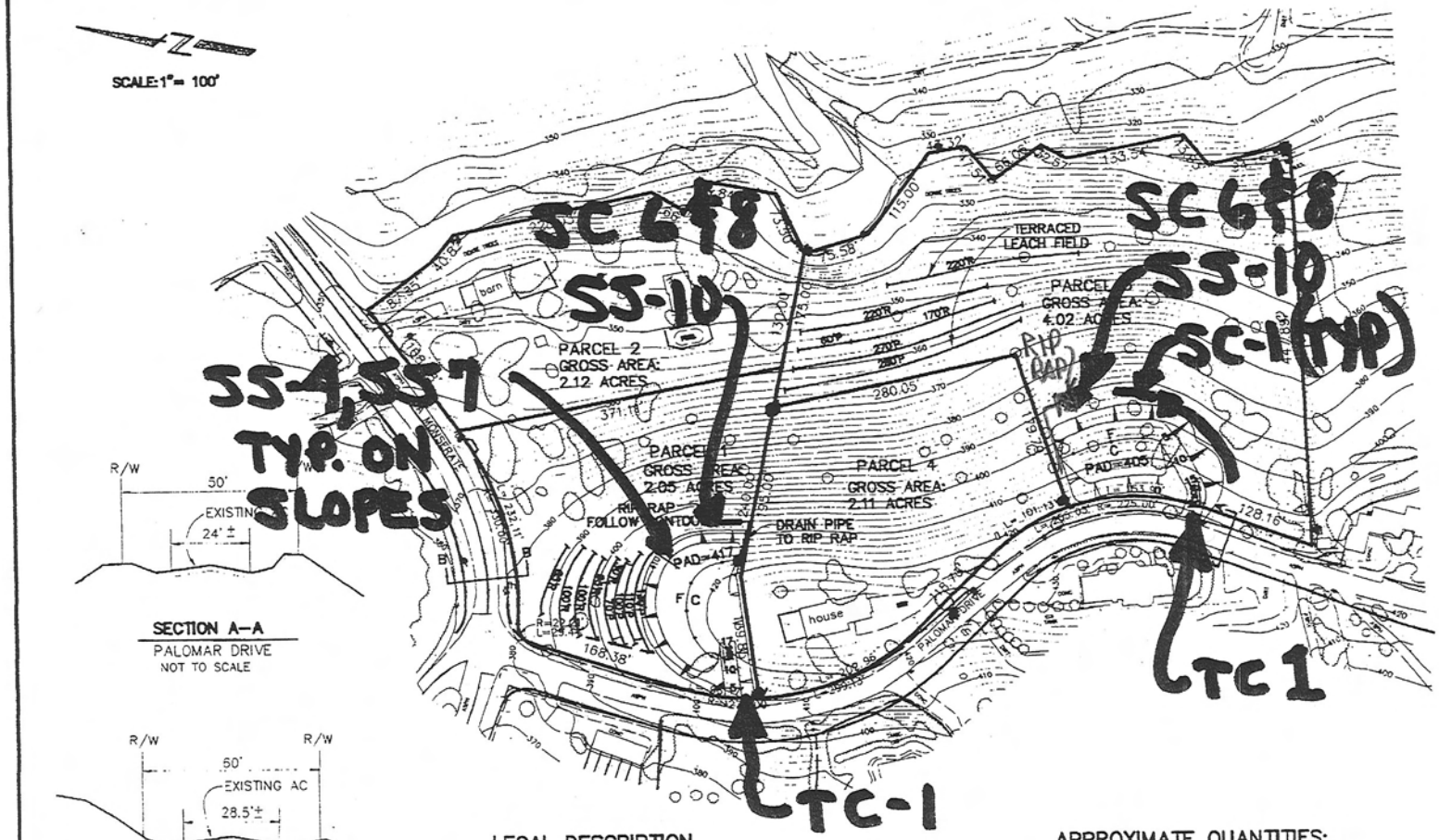
TPM 20908
POST CONSTRUCTION BMP's



TPM 20908
CONSTRUCTION BMP's
(SEE ATTACHED DETAILS)

TYPICAL LOT BMP's

WM-1
WM-5
WM-6
WM-8
WM-9



LEGAL DESCRIPTION

BEING LOT 50 OF SAN LUIS REY HEIGHTS TRACT, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFRONIA, ACCORDING TO MAP THEREOF NO. 2323, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY 4–26–1946.

HEALTH DEPARTMENT CERTIFICATE

APPROXIMATE QUANTITIES:

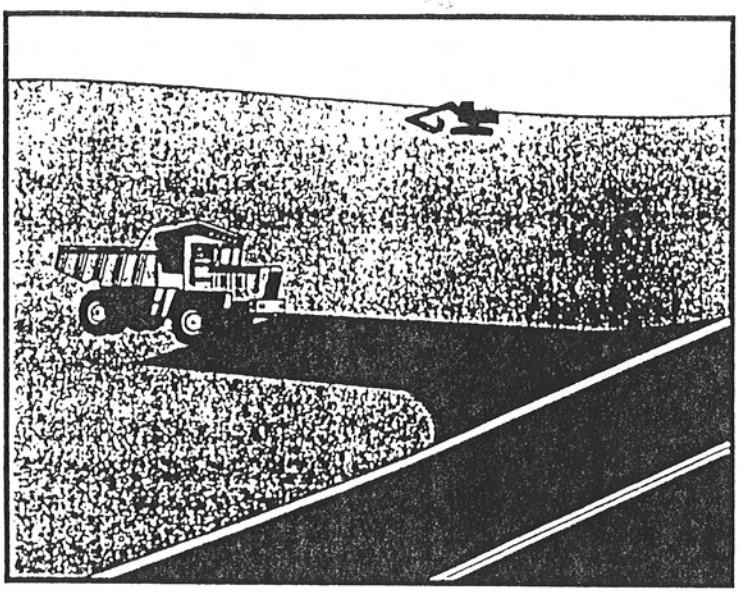
PARCEL 1

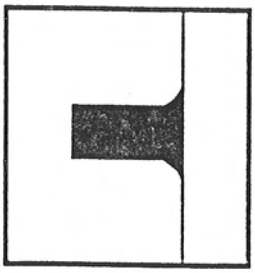
CUT: 1225 CUBIC YARDS
FILL: 1225 CUBIC YARDS

ATTACHMENTS

Stabilized Construction Entrance/Exit

TC-1





BMP Objectives

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

Definition and Purpose

A stabilized construction access is a defined point of entrance/exit to a construction site that is stabilized to reduce the tracking of mud and dirt onto public roads by construction vehicles.

Appropriate Applications

- Use at construction sites:
  - where dirt or mud is tracked onto public roads
  - adjacent to water bodies
  - where poor soils are encountered
  - where dust is a problem during dry weather conditions.
- This BMP may be implemented on a project-by-project basis in addition to other BMPs when determined necessary and feasible by the Resident Engineer (RE).

Limitations

- Site conditions will dictate design and need.

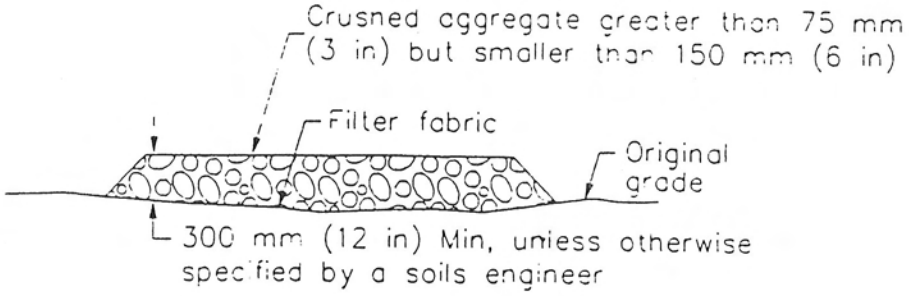
Standards and Specifications

- Limit the points of entrance/exit to the construction site.
- Limit speed of vehicles to control dust.
- Properly grade each construction entrance/exit to prevent runoff from leaving the construction site.
- Route runoff from stabilized entrances/exits through a sediment-trapping device before discharge.

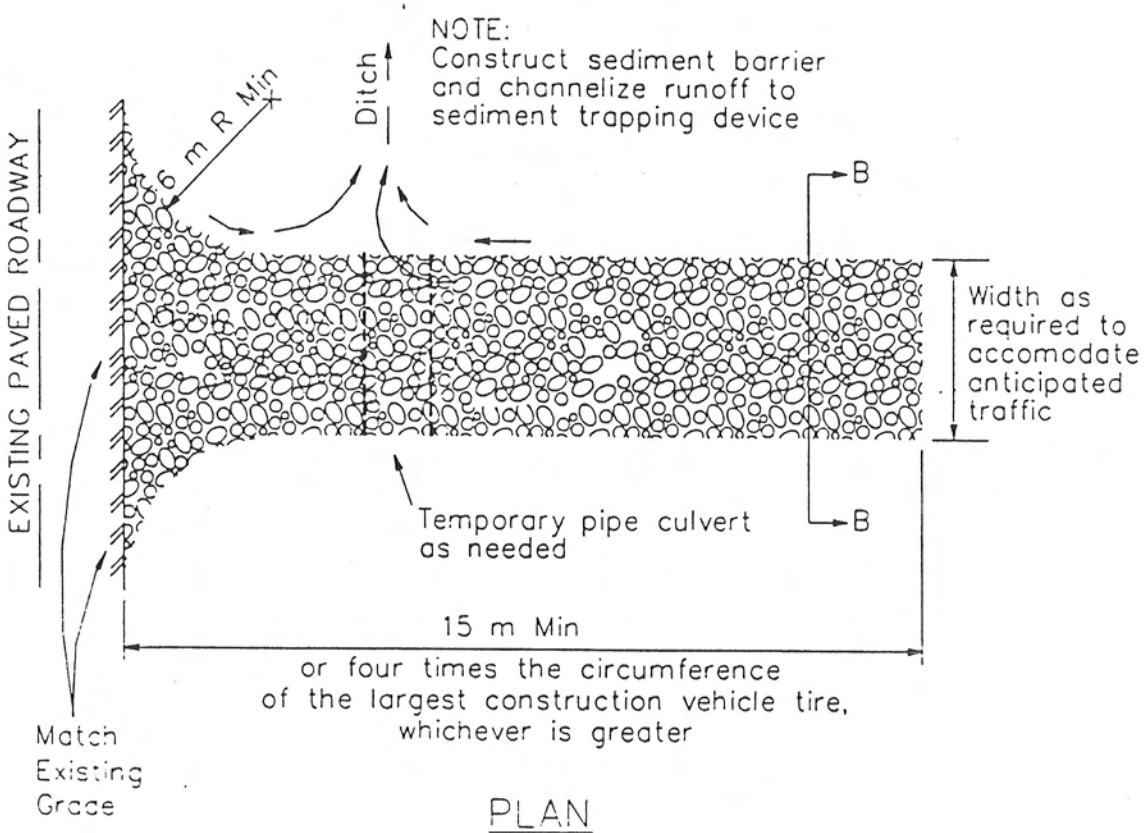
- Design stabilized entrance/exit to support heaviest vehicles and equipment that will use it.
- Select construction access stabilization (aggregate, asphaltic concrete, concrete) based on longevity, required performance, and site conditions. The use of asphalt concrete (AC) grindings for stabilized construction access/roadway is not allowed.
- Use of constructed or constructed/manufactured steel plates with ribs for entrance/exit access is allowed with written approval of the RE.
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 300 mm (12 in) depth, or place aggregate to a depth recommended by a geotechnical engineer. A crushed aggregate greater than 75 mm (3 inches) but smaller than 150 mm (6 inches) shall be used.
- Designate combination or single purpose entrances and exits to the construction site. Require all employees, subcontractors and others to use them.
- Require that all employees, subcontractors, and suppliers utilize the stabilized construction access.

Maintenance and Inspection

- Inspect routinely for damage and assess effectiveness of the BMP. Repair if access is clogged with sediment or as directed by the RE.
- Keep all temporary roadway ditches clear.

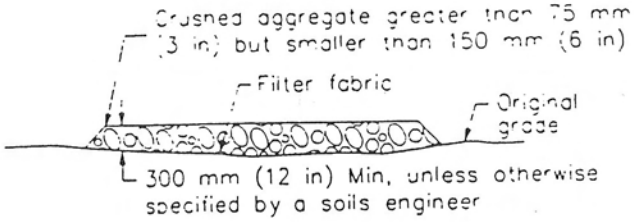


SECTION B–B
NTS

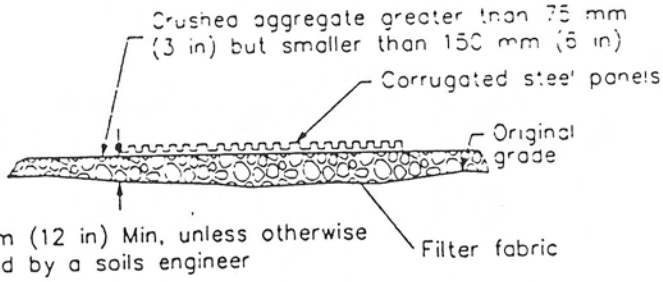


PLAN
NTS

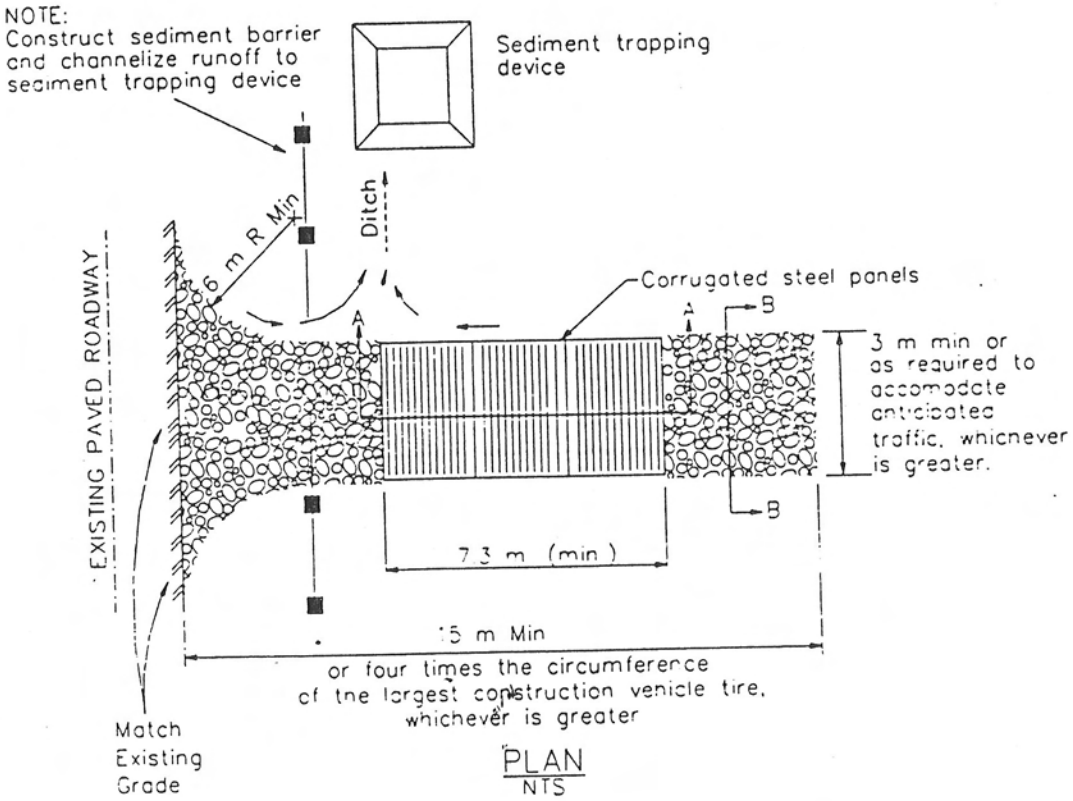
Stabilized Construction Entrance/Exit (Type 1)



SECTION B–B
NTS



SECTION A–A
NOT TO SCALE

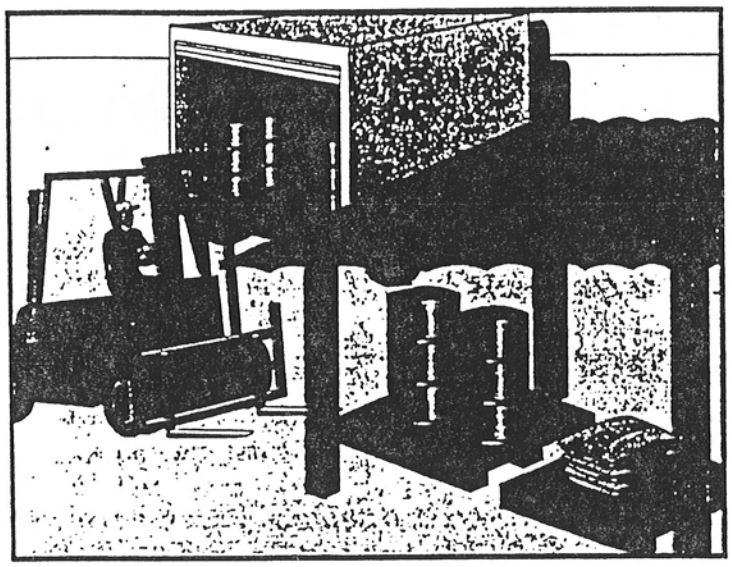


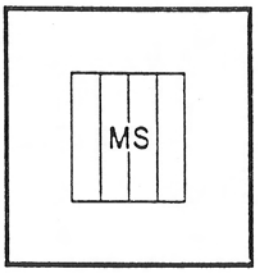
PLAN
NTS

Stabilized Construction Entrance/Exit (Type 2)

Material Delivery and Storage

WM-1





BMP Objectives

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

Definition and Purpose

Procedures and practices for the proper handling and storage of materials in a manner that minimizes or eliminates the discharge of these materials to the storm drain system or to watercourses.

Appropriate Applications

These procedures are implemented at all construction sites with delivery and storage of the following:

- Soil
- Pesticides and herbicides
- Fertilizers
- Detergents
- Plaster
- Petroleum products such as fuel, oil, and grease
- Asphalt and concrete components
- Hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Concrete compounds
- Other materials that may be detrimental if released to the environment

Limitations

- Space limitation may preclude indoor storage.
- Storage sheds must meet building & fire code requirements.

Standards and Specifications

General

- Train employees and subcontractors on the proper material delivery and storage practices.
- Temporary storage area shall be located away from vehicular traffic.
- Material Safety Data Sheets (MSDS) shall be supplied to the Resident Engineer (RE) for all materials stored.

Material Storage Areas and Practices

Liquids, petroleum products, and substances listed in 40 CFR Parts 110, 117, or 302 shall be handled in conformance with the following provisions:

- Storage, preparation, and mixing shall be accomplished in temporary containment facilities. Each temporary containment facility shall provide a spill containment volume equal to 1.5 times the volume of all containers therein and shall be impervious to the materials contained therein for a minimum contact time of 72 hours.
- Sufficient separation shall be provided between stored containers to allow for spill cleanup and emergency response access.
- Incompatible materials, such as chlorine and ammonia, shall not be stored in the same temporary containment facility.
- To provide protection from wind and rain, throughout the rainy season, temporary containment facilities shall be covered during non-working days and prior to rain events.
- Temporary containment facilities shall be maintained free of accumulated rainwater and spills.
- Materials shall be stored in their original containers and the original product labels shall be maintained in place in a legible condition. Damaged or otherwise illegible labels shall be replaced immediately.
- Liquid materials, petroleum products, and substances listed in 40 CFR Parts 110, 117 or 302 shall be stored in approved containers and drums shall not be overfilled. Containers shall be placed in temporary containment facilities for storage.
- Bagged and boxed materials shall be stored on pallets and shall not be allowed to accumulate on the ground. To provide protection from wind and rain, throughout the rainy season, bagged and boxed materials shall be covered during non-working days and prior to rain events.

- Stockpiles shall be protected in accordance with BMP WM-3, "Stockpile Management".
- Minimize the material inventory stored on-site (e.g., only a few days supply).
- Store materials indoors within existing structures or sheds when available.
- Have proper storage instructions posted at all times in an open and conspicuous location.
- Do not store hazardous chemicals, drums, or bagged materials directly on the ground. Place these items on a pallet and when possible, under cover in secondary containment.
- Keep hazardous chemicals well labeled and in their original containers.
- Keep ample supply of appropriate spill clean up material near storage areas.
- Also see BMP WM-6, "Hazardous Waste Management", for storing of hazardous materials.

Material Delivery Practices

- Keep an accurate, up-to-date inventory of material delivered and stored on-site.
- Employees trained in emergency spill clean-up procedures shall be present when dangerous materials or liquid chemicals are unloaded.

Spill Clean-up

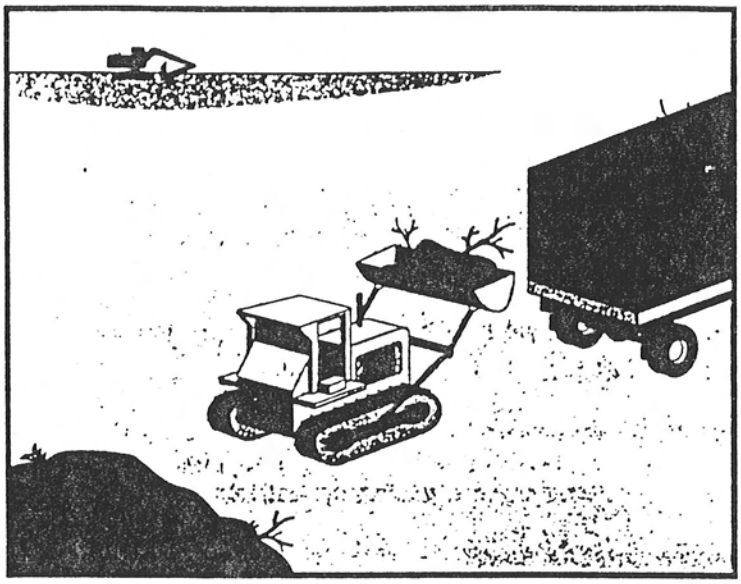
- Contain and clean up any spill immediately.
- If significant residual materials remain on the ground after construction is complete, properly remove and dispose any hazardous materials or contaminated soil.
- See BMP WM-4, "Spill Prevention and Control", for spills of chemicals and/or hazardous materials.

Maintenance and Inspection

- Storage areas shall be kept clean, well organized, and equipped with ample clean-up supplies as appropriate for the materials being stored.
- Perimeter controls, containment structures, covers, and liners shall be repaired or replaced as needed to maintain proper function.
- Inspect storage areas before and after rainfall events, and at least weekly during other times.

Solid Waste Management

WM-5



SWM

BMP Objectives

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

Definition and Purpose

These are procedures and practices to minimize or eliminate the discharge of pollutants to the drainage system or to watercourses as a result of the creation, stockpiling, and removal of construction site wastes.

Appropriate Applications

Solid waste management practices are implemented on all construction projects that generate solid wastes.

Solid wastes include but are not limited to:

- Construction wastes including brick, mortar, timber, steel and metal scraps, pipe and electrical cuttings, non-hazardous equipment parts, styrofoam and other materials used to transport and package construction materials.
- Highway planting wastes, including vegetative material, plant containers, and packaging materials.
- Litter, including food containers, beverage cans, coffee cups, paper bags, plastic wrappers, and smoking materials, including litter generated by the public.

Limitations

Temporary stockpiling of certain construction wastes may not necessitate stringent drainage related controls during the non-rainy season or in desert areas with low rainfall.

Standards and Specifications

Education

- The Contractor's Water Pollution Control Manager (WPCM) shall oversee and enforce proper solid waste procedures and practices.

- Instruct employees and subcontractors on identification of solid waste and hazardous waste.
- Educate employees and subcontractors on solid waste storage and disposal procedures.
- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).
- Require that employees and subcontractors follow solid waste handling and storage procedures.
- Prohibit littering by employees, subcontractors, and visitors.
- Wherever possible, minimize production of solid waste materials.

Collection, Storage, and Disposal

- Littering on the project site shall be prohibited.
- To prevent clogging of the storm drainage system litter and debris removal from drainage grates, trash racks, and ditch lines shall be a priority.
- Trash receptacles shall be provided in the Contractor's yard, field trailer areas, and at locations where workers congregate for lunch and break periods.
- Litter from work areas within the construction limits of the project site shall be collected and placed in water tight dumpsters at least weekly regardless of whether the litter was generated by the Contractor, the public, or others. Collected litter and debris shall not be placed in or next to drain inlets, storm water drainage systems or watercourses.
- Dumpsters of sufficient size and number shall be provided to contain the solid waste generated by the project.
- Full dumpsters shall be removed from the project site and the contents shall be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13 of the Standard Specifications.
- Litter stored in collection areas and containers shall be handled and disposed of by trash hauling contractors.
- Materials that are disposed of or temporarily stockpiled outside the highway right-of-way but are visible from the Highway, shall be in a neat and orderly fashion to the satisfaction of the Resident Engineer (RE).
- Storm water run-on shall be prevented from contacting stored solid waste through the use of berms, dikes, or other temporary diversion structures or

through the use of measures to elevate waste form site surfaces.

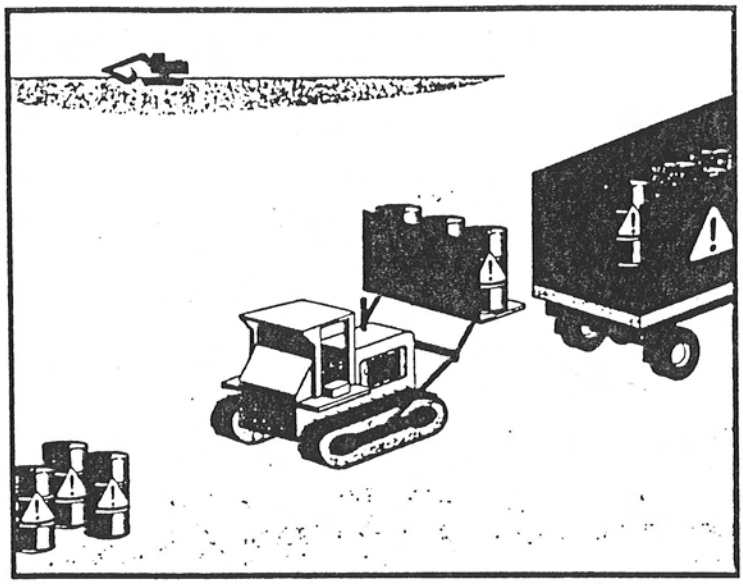
- Solid waste storage areas shall be located at least 15m from drainage facilities and watercourses and shall not be located in areas prone to flooding or ponding.
- Except during fair weather, construction and highway planting waste not stored in watertight dumpsters shall be protected from wind and rain by securely covering the waste with tarps or plastic sheeting or protected in conformance with the applicable Disturbed Soil Area protection.
- Dumpster washout on the project site is not allowed
- Notify trash hauling contractors that only watertight dumpsters are acceptable for use on-site.
- Plan for additional containers during the demolition phase of construction.
- Plan for more frequent pickup during the demolition phase of construction.
- Designate on-site waste storage areas and obtain approval of the RE.
- Segregate potentially hazardous waste from non-hazardous construction site waste.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Dispose of non-hazardous waste in accordance with Standard Specification 7-1.13, Disposal of Material Outside the Highway right-of-way.
- For disposal of hazardous waste, see BMP WM-6, "Hazardous Waste Management". Have hazardous waste hauled to an appropriate disposal and/or recycling facility.
- Salvage or recycle useful vegetation debris, packaging and/or surplus building materials when practical. For example, trees and shrubs from land clearing can be used as a brush barrier, or converted into wood chips, then used as mulch on graded areas. Wood pallets, cardboard boxes, and construction scraps can also be recycled.

Maintenance and Inspection

- The WPCM shall monitor on-site solid waste storage and disposal procedures.
- Police site for litter and debris.

Hazardous Waste Management

WM-6



BMP Objectives

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

Definition and Purpose

These are procedures and practices to minimize or eliminate the discharge of pollutants from construction site hazardous waste to the storm drain system or to watercourses.

Appropriate Applications

- This best management practice (BMP) applies to all construction projects.
- Hazardous waste management practices are implemented on construction projects that generate waste from the use of:
  - Petroleum Products,
  - Concrete Curing Compounds,
  - Palliatives,
  - Septic Wastes,
  - Stains,
  - Wood Preservatives,
  - Asphalt Products,
  - Pesticides,
  - Acids,
  - Paints,
  - Solvents,
  - Roofing Tar, or
  - Any materials deemed a hazardous waste in California, Title 22 Division 4.5, or listed in 40 CFR Parts 110, 117, 261, or 302.

Limitations

- Nothing in this BMP relieves the Contractor from responsibility for compliance with federal, state, and local laws regarding storage, handling, transportation, and disposal of hazardous wastes.
- This BMP does not cover aerially deposited lead (ADL) soils. For ADL soils refer to BMP WM-7, Contaminated Soil Management, and the project Special Provisions.

Standards and Specifications

Education

- Educate employees and subcontractors on hazardous waste storage and disposal procedures.
- Educate employees and subcontractors on potential dangers to humans and the environment from hazardous wastes.
- Instruct employees and subcontractors on safety procedures for common construction site hazardous wastes.
- Instruct employees and subcontractors in identification of hazardous and solid waste.
- Hold regular meetings to discuss and reinforce hazardous waste management procedures (incorporate into regular safety meetings).
- The Contractor's Water Pollution Control Manager (WPCM) shall oversee and enforce proper hazardous waste management procedures and practices.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.

Storage Procedures

- Wastes shall be stored in sealed containers constructed of a suitable material and shall be labeled as required by Title 22 CCR, Division 4.5 and 49 CFR Parts 172,173, 178, and 179.
- All hazardous waste shall be stored, transported, and disposed as required in Title 22 CCR, Division 4.5 and 49 CFR 261-263.
- Waste containers shall be stored in temporary containment facilities that shall comply with the following requirements:
  - Temporary containment facility shall provide a spill containment volume equal to 1.5 times the volume of all containers.
  - Temporary containment facility shall be impervious to the materials contained for a minimum contact time of 72 hours.
  - Temporary containment facilities shall be maintained free of accumulated rainwater and spills.
  - Sufficient separation shall be provided between stored containers to allow for spill cleanup and emergency response access.
  - Incompatible materials, such as chlorine and ammonia, shall not be stored in the same temporary containment facility.

- Throughout the rainy season, temporary containment facilities shall be covered during non-working days, prior to rain events.

- Drums shall not be overfilled and wastes shall not be mixed.
- Paint brushes and equipment for water and oil based paints shall be cleaned within a contained area and shall not be allowed to contaminate site soils, watercourses or drainage systems. Waste paints, thinners, solvents, residues, and sludges that cannot be recycled or reused shall be disposed of as hazardous waste. When thoroughly dry, latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths shall be disposed of as solid waste.
- Ensure that adequate hazardous waste storage volume is available.
- Ensure that hazardous waste collection containers are conveniently located.
- Designate hazardous waste storage areas on site away from storm drains or watercourses and away from moving vehicles and equipment to prevent accidental spills.
- Minimize production or generation of hazardous materials and hazardous waste on the job site.
- Use containment berms in fueling and maintenance areas and where the potential for spills is high.
- Segregate potentially hazardous waste from non-hazardous construction site debris.
- Keep liquid or semi-liquid hazardous waste in appropriate containers (closed drums or similar) and under cover.
- Clearly label all hazardous waste containers with the waste being stored and the date of accumulation.
- Place hazardous waste containers in secondary containment.
- Do not allow potentially hazardous waste materials to accumulate on the ground.
- Unless watertight, containers of dry waste shall be stored on pallets.
- Do not mix wastes.

Disposal Procedures

- Waste shall be disposed of outside the highway right-of-way within 90 days of being generated, or as directed by the Resident Engineer (RE).
- To minimize on-site storage, full containers of waste shall be disposed of outside the highway right-of-way at least weekly. In no case shall hazardous waste storage exceed requirements in Title 22 CCR, section 66262.34.
- Waste shall be disposed of by a licensed hazardous waste transporter at an authorized and licensed disposal facility or recycling facility utilizing properly completed Uniform Waste Manifest forms. In no case shall hazardous waste storage exceed requirements in Title 22 CCR, section 66262.34.
- A Caltrans certified laboratory shall sample waste to determine the appropriate disposal facility.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for solid waste construction debris.
- Properly dispose of rainwater in secondary containment that may have mixed with hazardous waste.
- Recycle any useful material such as used oil or water-based paint when practical.
- Attention is directed to "Hazardous Material", "Contaminated Material", and "Aerially Deposited Lead" of the contract documents regarding the handling and disposal of hazardous materials.

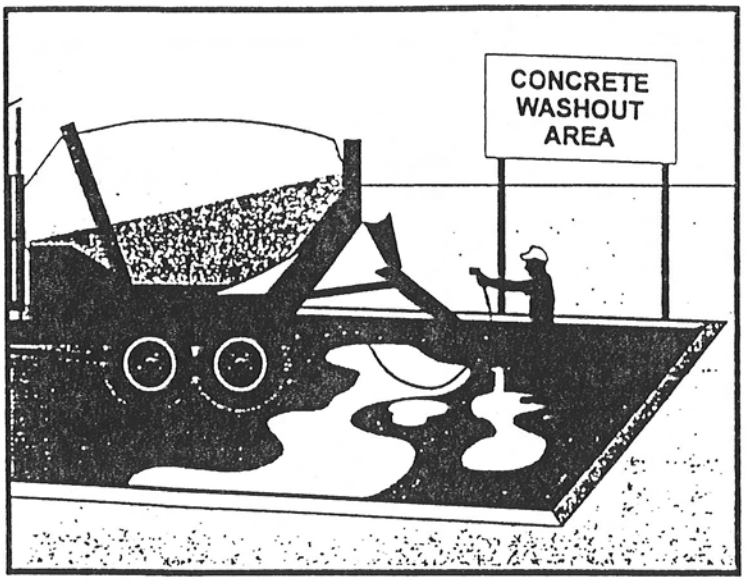
Maintenance and Inspection

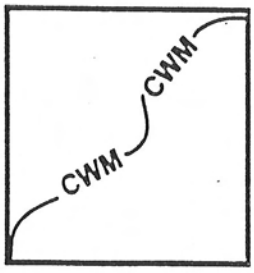
- The WPCM shall monitor on-site hazardous waste storage and disposal procedures.
- Waste storage areas shall be kept clean, well organized, and equipped with ample clean-up supplies as appropriate for the materials being stored.
- Storage areas shall be inspected in conformance with the provisions in the contract documents.
- Perimeter controls, containment structures, covers, and liners shall be repaired or replaced as needed to maintain proper function.
- Hazardous spills shall be cleaned up and reported in conformance with the applicable Material Safety Data Sheet (MSDS) and the instructions posted at the project site.

- The National Response Center, at (800) 424-8802, shall be notified of spills of Federal reportable quantities in conformance with the requirements in 40 CFR parts 110, 117, and 302.
- Copy of Bill of Laden and disposal receipts shall be provided to the RE.

Concrete Waste Management

WM-8





BMP Objectives

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

Definition and Purpose

These are procedures and practices that are implemented to minimize or eliminate the discharge of concrete waste materials to the storm drain system or to watercourses.

Appropriate Applications

- Concrete waste management practices are implemented on construction projects where concrete is used as a construction material or where concrete dust and debris result form demolition activities.
- Where slurries containing portland cement concrete (PCC) or asphalt concrete (AC) are generated, such as from sawcutting, coring, grinding, grooving, and hydro-concrete demolition.
- Where concrete trucks and other concrete-coated equipment are washed on site, when approved by the Resident Engineer (RE). See also NS-8, Vehicle and Equipment Cleaning.
- Where mortar-mixing stations exist.

Limitations

None identified.

Standards and Specifications

Education

- Educate employees, subcontractors, and suppliers on the concrete waste management techniques described herein.
- The Contractor's Water Pollution Control Manager (WPCM) shall oversee and enforce concrete waste management procedures.

Concrete Slurry Wastes

- PCC and AC waste shall not be allowed to enter storm drains or watercourses.
- PCC and AC waste shall be collected and disposed of outside the highway right-of-way in conformance with section 7-1.13 of Standard Specifications or placed in a temporary concrete washout facility.
- Disposal of hardened PCC and AC waste shall be in conformance with Section 15-3.02 of the Standard Specifications.
- A sign shall be installed adjacent to each temporary concrete washout facility to inform concrete equipment operators to utilize the proper facilities.
- Below grade concrete washout facilities are typical. Above grade facilities are used if excavation is not practical.
- Do not allow slurry residue from wet coring or saw-cutting AC or PCC to enter storm drains or receiving waters by:
  - Placing temporary berms or sandbags around coring or saw-cutting locations to capture and contain slurry runoff.
  - Placing straw bales, sandbags, or gravel dams around inlets to prevent slurry from entering storm drains.
- Vacuum slurry residue and dispose in a temporary pit (as described in Site Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures below) and allow slurry to dry. Dispose of dry slurry residue in accordance with BMP WM-5, "Solid Waste Management", or, for on-site disposal, in accordance with Standard Specification 15-3.02, Removal Methods.
- Collect residue from grooving and grinding operations in accordance with Standard Specifications Section 42-1.02 and 42-2.02, "Construction."

On-site Temporary Concrete Washout Facility, Transit Truck Washout Procedures

- Temporary concrete washout facilities shall be located a minimum of 15 m (50 ft) from storm drain inlets, open drainage facilities, and watercourses, unless determined unfeasible by the RE. Each facility shall be located away from construction traffic or access areas to prevent disturbance or tracking.
- A sign shall be installed adjacent to each washout facility to inform concrete equipment operators to utilize the proper facilities. The sign shall be

installed as shown on the plans and in conformance with the provisions in Section 56-2, "Roadside Signs", of the Standard Specifications.

- Temporary concrete washout facilities shall be constructed above grade or below grade at the option of the Contractor. Temporary concrete washout facilities shall be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations.

- Temporary washout facilities shall have a temporary pit or bermed areas of sufficient volume to completely contain all liquid and waste concrete materials generated during washout procedures.

- Perform washout of concrete trucks in designated areas only.

- Once concrete wastes are washed into the designated area and allowed to harden, the concrete shall be broken up, removed, and disposed of per BMP WM-5, "Solid Waste Management", and in conformance with the provisions in Section 15-3.02, "Removal Methods", of the Standard Specifications. Dispose of hardened concrete on a regular basis.

- Temporary Concrete Washout Facility (Type Above Grade)
  - Temporary concrete washout facility (type above grade) shall be constructed as shown on the plans, with a recommended minimum length and minimum width of 3m, but with sufficient quantity and volume to contain all liquid and concrete waste generated by washout operations. The length and width of a facility may be increased, at the Contractor's expense, upon approval of the RE.
  - Straw bales, wood stakes, and sandbag materials shall conform to the provisions in BMP SC-9, "Straw Bale Barrier".
  - Plastic lining material shall be a minimum of 60 mil polyethylene sheeting and shall be freeof holes, tears or other defects that compromise the impermeability of the material.
  - Portable delineators shall conform to the provisions in Section 12-3.04, "Portable Delineators", of the Standard Specifications. The delineator bases shall be cemented to the pavement in the same manner as provided for cementing pavement markers to pavement in Section 85-1.06, "Placement", of the Standard Specifications. Portable delineators shall be applied only to a clean, dry surface.

- Temporary Concrete Washout Facility (Type Below Grade)
  - Temporary concrete washout facility (type below grade) shall be constructed as shown on the plans, with a recommended minimum

length and minimum width of 3m (10 ft). The quantity and volume shall be sufficient to contain all liquid and concrete waste generated by washout operations. The length and width of a facility may be increased, at the Contractor's expense, upon approval of the RE. Lath and flagging shall be commercial type.

Removal of Temporary Concrete Washout Facilities

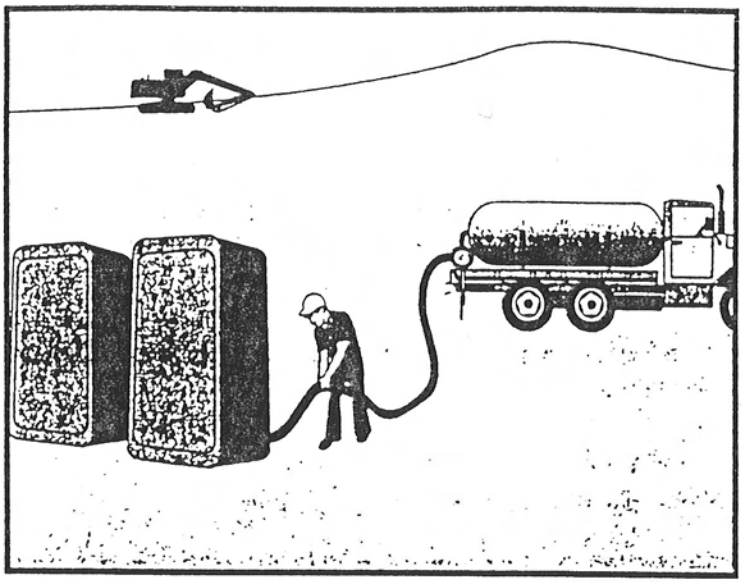
- When temporary concrete washout facilities are no longer required for the work, as determined by the RE, the hardened concrete shall be removed and disposed of in conformance with the provisions in Section 15-3.02 of the Standard Specifications. Materials used to construct temporary concrete washout facilities shall become the property of the Contractor, shall be removed from the site of the work, and shall be disposed of outside the highway right-of-way in conformance with the provisions in Section 7-1.13 of the Standard Specifications.
- Holes, depressions or other ground disturbance caused by the removal of the temporary concrete washout facilities shall be backfilled and repaired in conformance with the provisions in Section 15-1.02, "Preservation of Property," of the Standard Specifications.

Maintenance and Inspection

- The Contractor's Water Pollution Control Manager (WPCM) shall monitor on site concrete waste storage and disposal procedures at least weekly.
- The WPCM shall monitor concrete working tasks, such as saw cutting, coring, grinding and grooving at least weekly to ensure proper methods are employed.
- Temporary concrete washout facilities shall be maintained to provide adequate holding capacity with a minimum freeboard of 100mm for above grade facilities and 300mm for below grade facilities. Maintaining temporary concrete washout facilities shall include removing and disposing of hardened concrete and returning the facilities to a functional condition. Hardened concrete materials shall be removed and disposed of in conformance with the provisions in Section 15-3.02, "Removal Methods," of the Standard Specifications.
- Existing facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is 75% full.

Sanitary/Septic Waste Management

WM-9



SS

BMP Objectives

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

Definition and Purpose

Procedures and practices to minimize or eliminate the discharge of construction site sanitary/septic waste materials to the storm drain system or to watercourses.

Appropriate Applications

Sanitary/septic waste management practices are implemented on all construction sites that use temporary or portable sanitary/septic waste systems.

Limitations

Not applicable.

Standards and Specifications

Education

- Educate employees, subcontractors, and suppliers on sanitary/septic waste storage and disposal procedures.
- Educate employees, subcontractors, and suppliers of potential dangers to humans and the environment from sanitary/septic wastes.
- Instruct employees, subcontractors, and suppliers in identification of sanitary/septic waste.
- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.

Storage and Disposal Procedures

- Temporary sanitary facilities shall be located away from drainage facilities, watercourses, and from traffic circulation. When subjected to high winds or risk of high winds, as determined by the Resident Engineer (RE), temporary

sanitary facilities shall be secured to prevent overturning.

- Wastewater shall not be discharged or buried within the highway right-of-way.
- Sanitary and septic systems that discharge directly into sanitary sewer systems, where permissible, shall comply with the local health agency, (county, and sewer district requirements.
- If using an on site disposal system, such as a septic system, comply wit local health agency requirements.
- Properly connect temporary sanitary facilities that discharge to the sanit sewer system to avoid illicit discharges.
- Ensure that sanitary/septic facilities are maintained in good working ord by a licensed service.
- Use only reputable, licensed sanitary/septic waste haulers.

Maintenance and Inspection

- The Contractor's Water Pollution Control Manager (WPCM) shall monitc on site sanitary/septic waste storage and disposal procedures at least weekly.

- Blankets and mats are generally not suitable for excessively rocky sites, or areas where the final vegetation will be mowed (since staples and netting can catch in mowers).
- Blankets and mats must be removed and disposed of prior to application of permanent soil stabilization measures.
- Plastic sheeting is easily vandalized, easily torn, photodegradable, and must be disposed of at a landfill.
- Plastic results in 100 percent runoff, which may cause serious erosion problems in the areas receiving the increased flow.
- The use of plastic shall be limited to covering stockpiles, or very small graded areas for short periods of time (such as through one imminent storm event), until alternative measures, such as seeding and mulching, may be installed.

Standards and Specifications

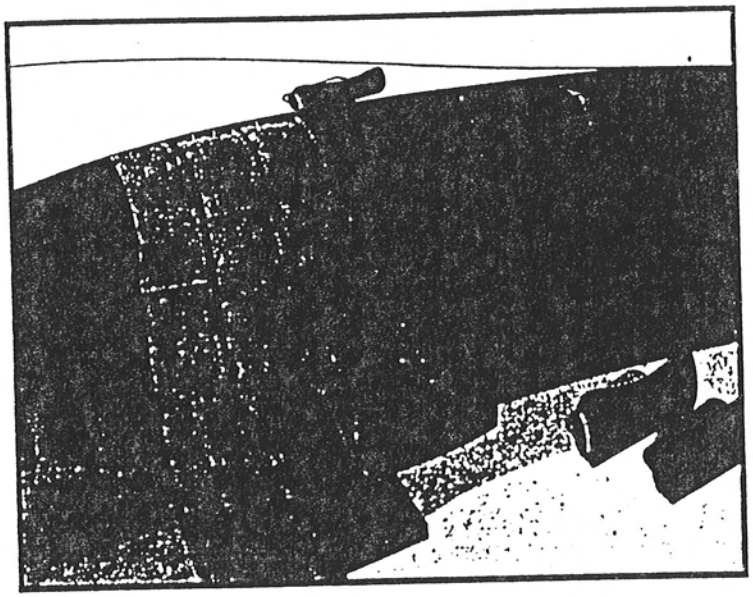
Material Selection

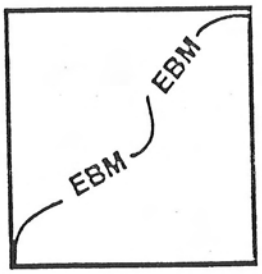
There are many types of erosion control blankets and mats, and selection of the appropriate type should be based on the specific type of application and site conditions. Selection(s) made by the Contractor must be approved by the Resident Engineer (RE). The following criteria shall be considered in selection of the appropriate material:

- Cost
  - Material cost
  - Preparation cost
  - Installation cost
  - Add-ons
- Effectiveness
  - Reduction of erosion
  - Reduction of flow velocity
  - Reduction of runoff
- Acceptability
  - Environmental compatibility
  - Institutional/regulatory acceptability
  - Visual impact

Geotextiles, Plastic Covers and Erosion Control Blankets/Mats

SS-7





BMP Objectives

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

Definition and Purpose

This Best Management Practice (BMP) involves the placement of geotextiles, plastic covers, or erosion control blankets/mats to stabilize disturbed soil areas and protect soils from erosion by wind or water. This is one of five temporary soil stabilization alternatives to consider.

Appropriate Applications

These measures are used when disturbed soils may be particularly difficult to stabilize, including the following situations:

- Steep slopes, generally steeper than 1:3 (V:H).
- Slopes where the erosion hazard is high.
- Slopes and disturbed soils where mulch must be anchored
- Disturbed areas where plants are slow to develop adequate protective cover.
- Channels with flows exceeding 1.0 m/s (3.3 ft/s).
- Channels intended to be vegetated.
- Stockpiles
- Slopes adjacent to water bodies of Environmentally Sensitive Areas (ESAs).

Limitations

- Blankets and mats are more expensive than other erosion control measures, due to labor and material costs. This usually limits their application to areas inaccessible to hydraulic equipment, or where other measures are not applicable, such as channels.

- Vegetation Enhancement
  - Native plant compatibility
  - Moisture retention
  - Temperature modification
  - Open space/coverage

- Installation
  - Durability
  - Longevity
  - Ease of installation
  - Safety

- Operation and Maintenance
  - Maintenance frequency

Geotextiles

- Material shall be a woven polypropylene fabric with minimum thickness of 15 mm, minimum width of 3.7 m and shall have minimum tensile strength of 0.67 kN (warp) 0.36 kN (fill) in conformance with the requirements in ASTM Designation: D 4632. The permittivity of the fabric shall be approximately 0.07 sec^{-1} in conformance with the requirements in ASTM Designation: D4491. The fabric shall have an ultraviolet (UV) stability of 70 percent in conformance with the requirements in ASTM designation: D4355. Geotextile blankets shall be secured in place with wire staples or sandbags and by keying into tops of slopes to prevent infiltration of surface waters under Geotextile.

- Geotextiles may be reused if, in the opinion of the RE, they are suitable for the use intended.

Plastic Covers

- Temporary soil stabilization (Type plastic cover) material shall be polyethylene sheeting and shall have a minimum thickness of 6 mils. Plastic covers shall be anchored by sandbags placed no more than 3 m (10 ft) apart and by keying into the tops of slopes to prevent infiltration of surface waters under the plastic. All seams shall be taped or weighted down their entire length, and there shall be at least a 300 mm (12 in) to 600 mm (24 in) overlap of all seams.

- Plastic covers may be reused if, in the opinion of the RE, they are suitable for the use intended.

Erosion Control Blankets/Mats

- Erosion control blankets/mats shall be either straw, coconut, straw/coconut or Excelsior blanket, in accordance with the project Special Provisions, SSP 07-390.

Site Preparation

- Proper site preparation is essential to ensure complete contact of the blanket or matting with the soil.
- Grade and shape the area of installation.
- Remove all rocks, clods, vegetation or other obstructions so that the installed blankets or mats will have complete, direct contact with the soil.
- Prepare seedbed by loosening 50 mm (2 in) to 75 mm (3 in) of topsoil.

Seeding

Seed the area before blanket installation for erosion control and revegetation. Seeding after mat installation is often specified for turf reinforcement application. When seeding prior to blanket installation, all check slots and other areas disturbed during installation must be re-seeded. Where soil filling is specified, seed the matting and the entire disturbed area after installation and prior to filling the mat with soil.

Anchoring

- U-shaped wire staples, metal geotextile stake pins or triangular wooden stakes can be used to anchor mats and blankets to the ground surface.
- Staples shall be made of 3.05 mm steel wire and shall be U-shaped with 200-mm legs and 50-mm crown. Wire staples shall be minimum of 11 gauge.
- Metal stake pins shall be 5 mm (0.188 in) diameter steel with a 40 mm (1.5 in) steel washer at the head of the pin.
- Wire staples and metal stakes shall be driven flush to the soil surface.
- All anchors shall be 150 mm (6 in) to 450 mm (18 in) long and have sufficient ground penetration to resist pullout. Longer anchors may be required for loose soils.

Installation on Slopes

Always consult the 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.
- Overlap the edges of adjacent parallel rolls 50 mm (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 area, approximately 300 mm (12 in) apart.
- Lay blankets loosely and maintain direct contact with the soil. Do not stretch.
- Staple blankets sufficiently to anchor blanket and maintain contact with the soil. Staples shall be placed down the center and staggered with the staples placed along the edges. Steep slopes, 1:1 (V:H) to 1:2 (V:H), require a minimum of 2 staples/m^2 (2 staples/yd^2). Moderate slopes, 1:2 (V:H) to 1:3 (V:H), require a minimum of 1½ staples/m^2 (1 ½ staples/yd^2), placing 1 staple/m (1 staple/yd) on centers. Gentle slopes require a minimum of 1 staple/m^2 (1 staple/yd^2).

Installation in Channels

Always consult the manufacturer's recommendations for installation. In general, these will be as follows:

- Dig initial anchor trench 300 mm (12 in) deep and 150 mm (6 in) wide across the channel at the lower end of the project area.
- Excavate intermittent check slots, 150 mm (6 in) deep and 150 mm (6 in) wide across the channel at 8 m to 10 m (25 ft to 30 ft) intervals along the channels.
- Cut longitudinal channel anchor slots 100 mm (4 in) deep and 100 mm (4 in) wide along each side of the installation to bury edges of matting, whenever possible extend matting 50 mm (2 in) to 75 mm (3 in) above the crest of the channel side slopes.

- Beginning at the downstream end and in the center of the channel, place the initial end of the first roll in the anchor trench and secure with fastening devices at 300 mm (12 in) intervals. Note: matting will initially be upside down in anchor trench.
- In the same manner, position adjacent rolls in anchor trench, overlapping the preceding roll a minimum of 75 mm (3 in).
- Secure these initial ends of mats with anchors at 300 mm (12 in) intervals, backfill and compact soil.
- Unroll center strip of matting upstream. Stop at next check slot or terminal anchor trench. Unroll adjacent mats upstream in similar fashion, maintaining a 75 mm (3 in) overlap.
- Fold and secure all rolls of matting snugly into all transverse check slots. Lay mat in the bottom of the slot then fold back against itself. Anchor through both layers of mat at 300 mm (12 in) intervals, then backfill and compact soil. Continue rolling all mat widths upstream to the next check slot or terminal anchor trench.
- Alternate method for non-critical installations: Place two rows of anchors on 150 mm (6 in) centers at 8 m (25 ft) to 10 m (30 ft) intervals in lieu of excavated check slots.
- Shingle-lap spliced ends by a minimum of 300 mm (12 in) apart on 300 mm (12 in) intervals.
- Place edges of outside mats in previously excavated longitudinal slots, anchor using prescribed staple pattern, backfill and compact soil.
- Anchor, fill and compact upstream end of mat in a 300 mm (12 in) by 150 mm (6 in) terminal trench.
- Secure mat to ground surface using U-shaped wire staples, geotextile pins, or wooden stakes.
- Seed and fill turf reinforcement matting with soil, if specified.

Soil Filling (if specified for turf reinforcement)

- Always consult the manufacturer's recommendations for installation.
- Do not drive tracked or heavy equipment over mat.

- Avoid any traffic over matting if loose or wet soil conditions exist.
- Use shovels, rakes or brooms for fine grading and touch up.
- Smooth out soil filling; just exposing top netting of mat.

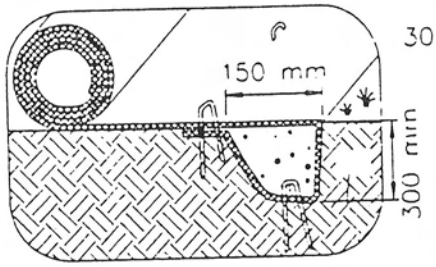
Temporary Soil Stabilization Removal

- When no longer required for the work, temporary soil stabilization shall become the property of the Contractor. Temporary soil stabilization removed from the site of the work shall be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13 of the Standard Specifications.

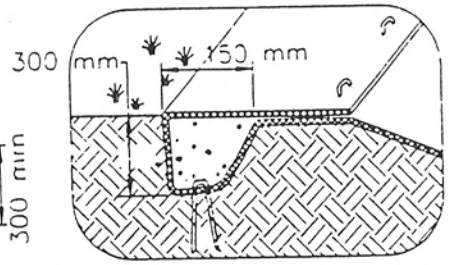
Maintenance and Inspection

Areas treated with temporary soil stabilization shall be inspected as specified in the special provisions. Areas treated with temporary soil stabilization shall be maintained to provide adequate erosion control. Temporary soil stabilization shall be reapplied or replaced on exposed soils when greater than 10 percent of the previously treated area becomes exposed or exhibits visible erosion.

- All blankets and mats shall be inspected periodically after installation.
- Installation shall be inspected after significant rain storms to check for erosion and undermining. Any failures shall be repaired immediately.
- If washout or breakage occurs, re-install the material after repairing the damage to the slope or channel.



INITIAL CHANNEL ANCHOR TRENCH
NTS



TERMINAL SLOPE AND CHANNEL ANCHOR TRENCH
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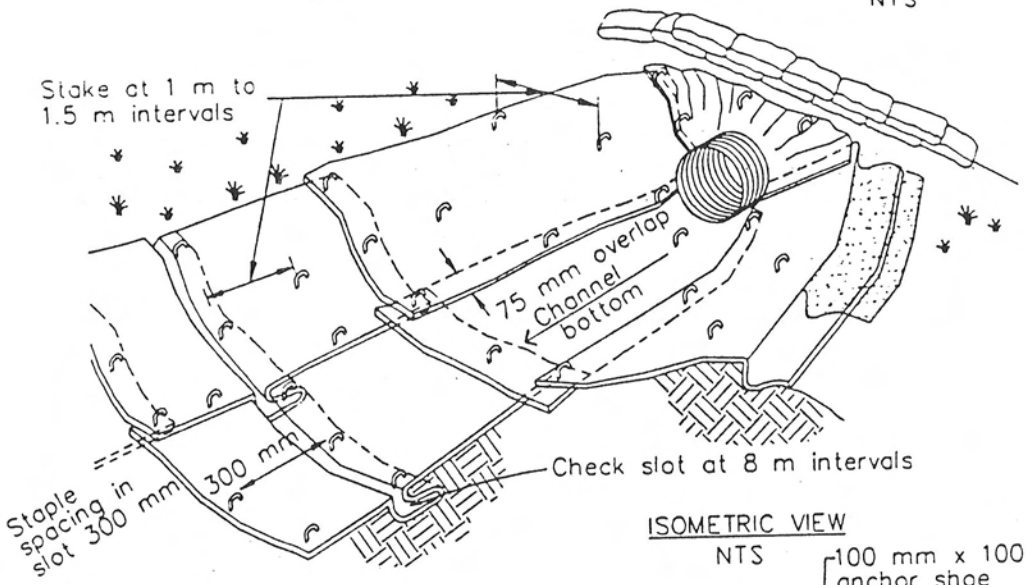
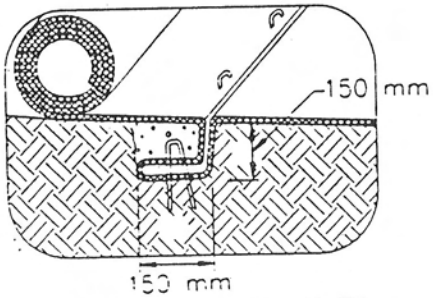
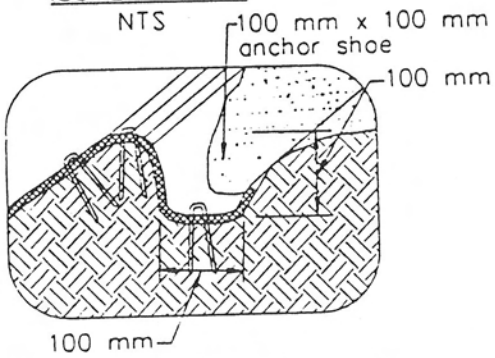


ISOMETRIC VIEW
NTS



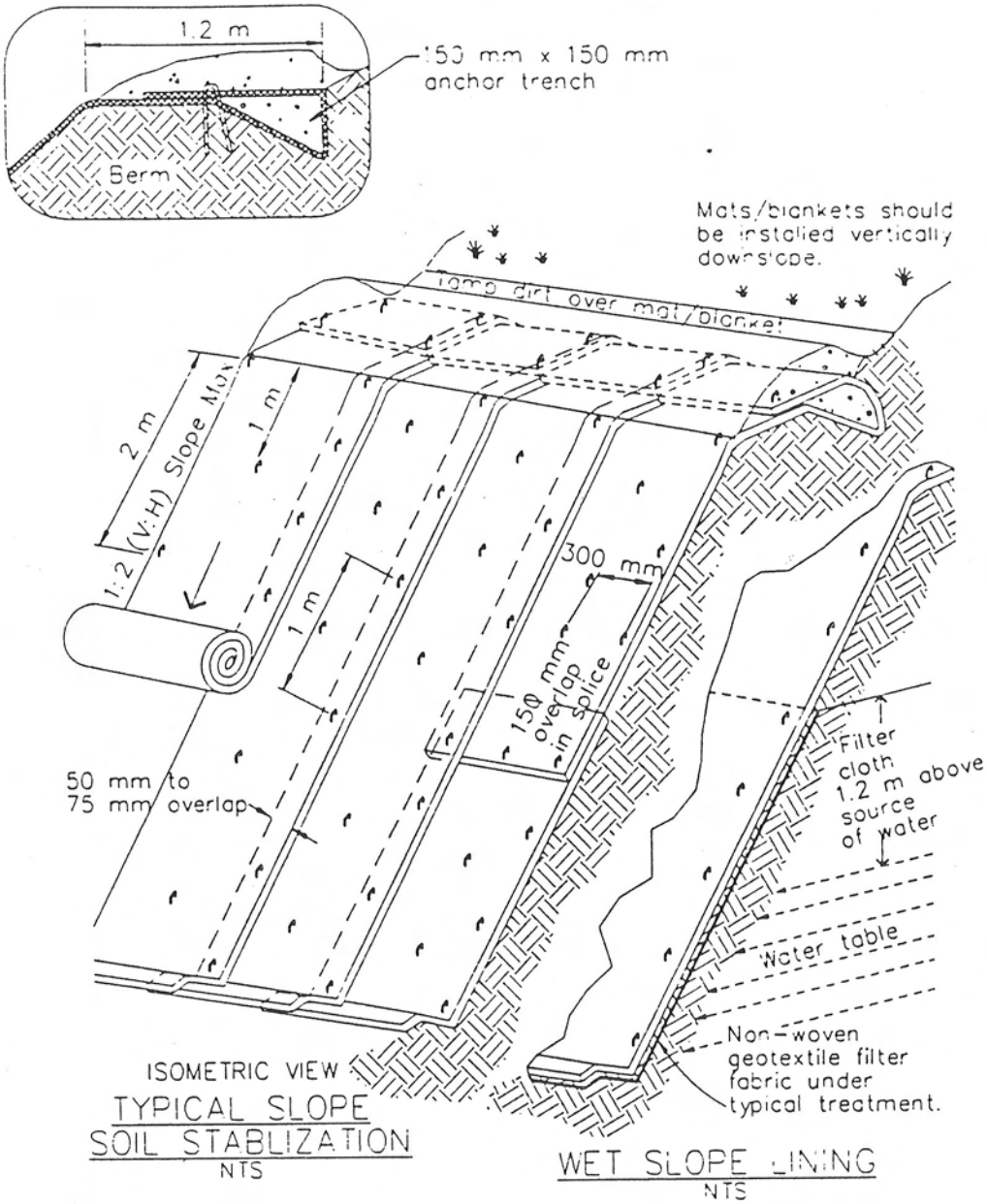
INTERMITTENT CHECK SLOT
NTS



LONGITUDINAL ANCHOR TRENCH
NTS

NOTES:
1. Check slots to be constructed per manufacturers specifications.
2. Staking or stapling layout per manufacturers specifications.
3. Install per manufacturer's recommendations

Geotextiles, Plastic Covers and Erosion Control Blankets/Mats

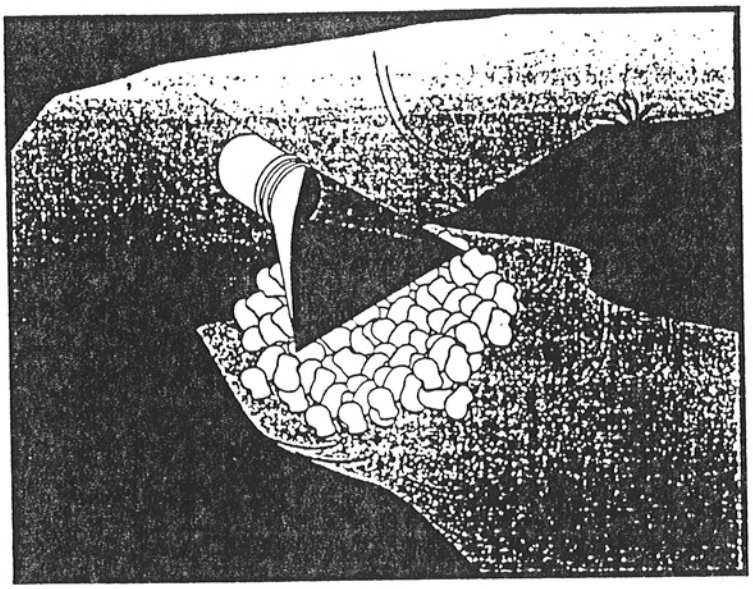


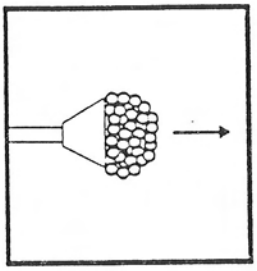
NOTES.

1. Slope surface shall be free of rocks, clods, sticks and grass. Mats/blankets shall have good soil contact.
2. Lay blankets loosely and stake or staple to maintain direct contact with the soil. Do not stretch.
3. Install per manufacturer's recommendations

Outlet Protection/Velocity Dissipation Devices

SS-10





BMP Objectives

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

Definition and Purpose

These devices are placed at pipe outlets to prevent scour and reduce the velocity and/or energy of exiting storm water flows.

Appropriate Applications

- These devices may be used at the following locations:
  - Outlets of pipes, drains, culverts, slope drains, diversion ditches, swales, conduits or channels.
  - Outlets located at the bottom of mild to steep slopes.
  - Discharge outlets that carry continuous flows of water.
  - Outlets subject to short, intense flows of water, such as flash floods.
  - Points where lined conveyances discharge to unlined conveyances.
- This BMP may be implemented on a project-by-project basis with other BMPs when determined necessary and feasible by the Resident Engineer (RE).

Limitations

- Loose rock may have stones washed away during high flows.
- Grouted riprap may break up in areas of freeze and thaw.
- If there is not adequate drainage, and water builds up behind grouted riprap, it may cause the grouted riprap to break up due to the resulting hydrostatic pressure.

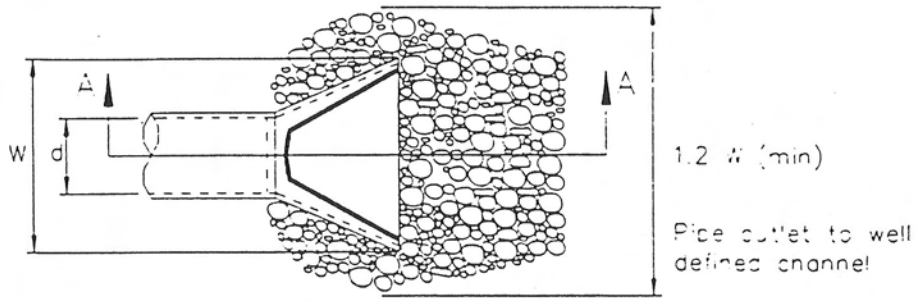
Outlet Protection/Velocity Dissipation Devices

Standards and Specifications

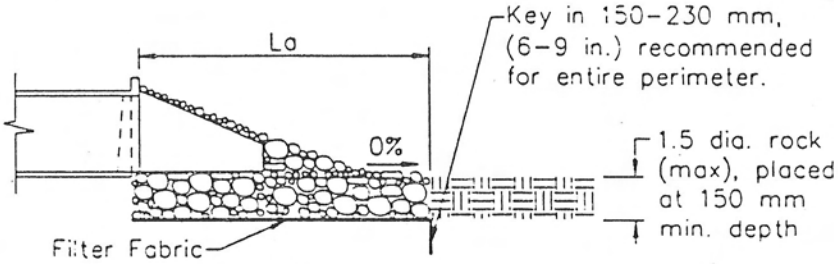
- There are many types of energy dissipater's, with rock being the one that is represented in the attached figure. Please note that this is only one example and the Resident Engineer (RE) may approve any other type of device proposed by the contractor.
- Install riprap, grouted riprap, or concrete apron at selected outlet. Riprap aprons are best suited for temporary use during construction.
- Carefully place riprap to avoid damaging the filter fabric.
- For proper operation of apron:
  - Align apron with receiving stream and keep straight throughout its length. If a curve is needed to fit site conditions, place it in upper section of apron.
  - If size of apron riprap is large, protect underlying filter fabric with a gravel blanket
- Outlets on slopes steeper than 10 percent shall have additional protection.

Maintenance and Inspection

- Inspect temporary measures prior to the rainy season, after rainfall events, and regularly (approximately once per week) during the rainy season.
- Inspect apron for displacement of the riprap and/or damage to the underlying fabric. Repair fabric and replace riprap which has washed away.
- Inspect for scour beneath the riprap and around the outlet. Repair damage to slopes or underlying filter fabric immediately.
- Temporary devices shall be completely removed as soon as the surrounding drainage area has been stabilized, or at the completion of construction.



PLAN VIEW
NTS



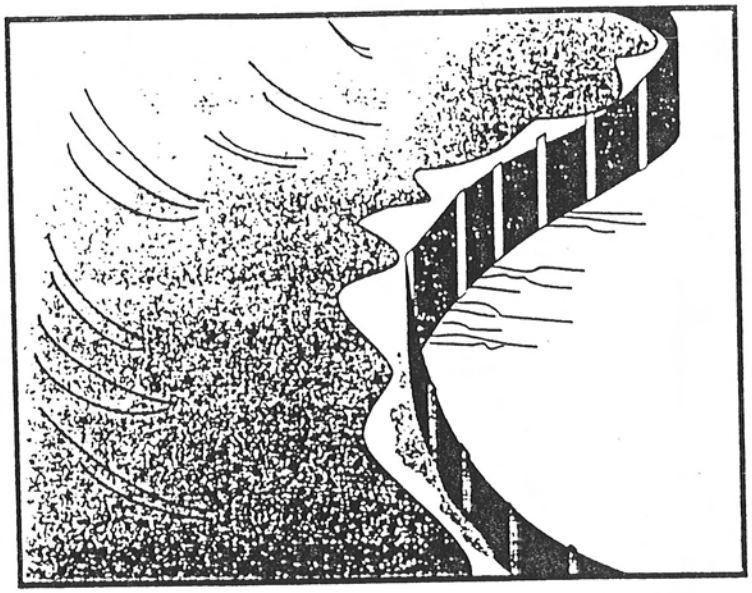
SECTION A-A
NTS

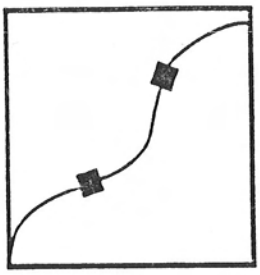
Pipe Diameter mm	Discharge m^3/s	Apron Length, La m	Rip Rap D_{50} Diameter Min mm
300	0.14	3	100
	0.28	4	150
450	0.28	3	150
	0.57	5	200
	0.85	7	300
	1.13	8	400
600	0.85	5	200
	1.13	8	200
	1.42	8	300
	1.70	9	400
For larger or higher flows, consult a Registered Civil Engineer			

Source: USDA – SCS

Silt Fence

SC-1





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.

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.

Standards and Specifications

General

- Don't use below slopes subject to creep, slumping, or landslides.
- Don't use in streams, channels, or anywhere flow is concentrated.
- Don't use silt fences to divert flow.

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 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 Page 5 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 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 s^{-1} and 0.15 s^{-1} in conformance with the requirements in ASTM designation D4491.
- 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.
- Staples used to fasten the fence fabric to the stakes shall be not less than 45 mm long and shall be fabricated from 1.57 mm or heavier wire. The wire used to fasten the tops of the stakes together when joining 2 sections of fence shall be 3.05 mm or heavier wire. Galvanizing of the fastening wire will not be required.

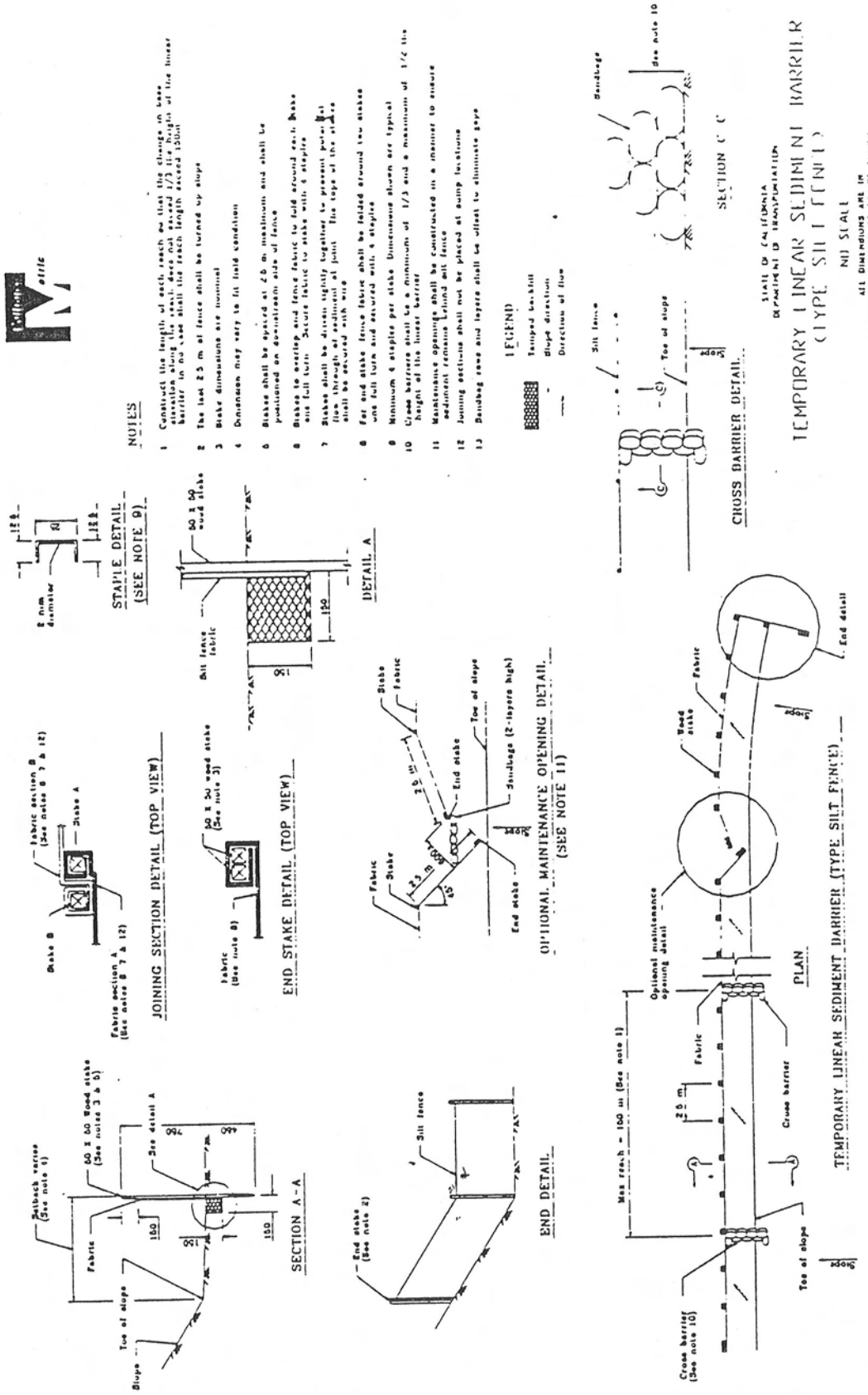
Installation

- Generally, silt fences shall be used in conjunction with soil stabilization source controls up slope to provide effective control.
- 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 from the toe of a slope. Where a silt fence is determined to be not practicable 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 practicable.
- 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.
- Cross barriers shall be a minimum of 1/3 and a maximum of 1/2 the height of the linear barrier.
- Bottom of the silt fence shall be keyed-in.
- Install in accordance with Page 5 of this BMP.

Maintenance and Inspection

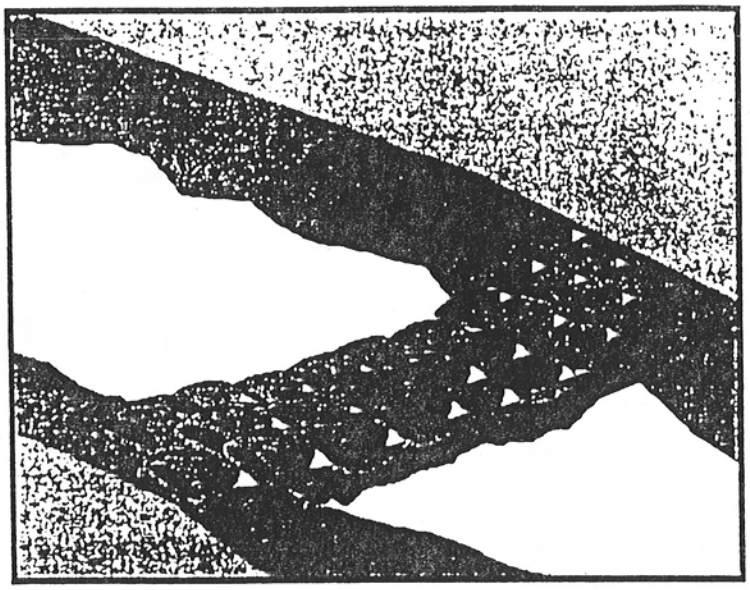
- Repair undercut silt fences.
- Repair or replace split, torn, slumping, or weathered fabric.
- Inspect silt fence when rain is forecast. Perform necessary maintenance, or maintenance required by the Resident Engineer (RE).
- Inspect silt fence following rainfall events. Perform maintenance as necessary,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

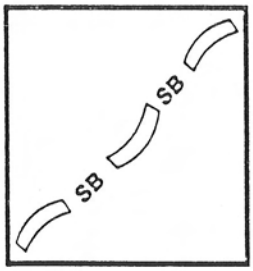
- Holes, depressions or other ground disturbance caused by the removal of the temporary silt fences shall be backfilled and repaired in conformance with the Standard Specifications.
- Remove silt fence when no longer needed or as required by the RE. Fill and compact post holes and anchorage trench, remove sediment accumulation, and grade fence alignment to blend with adjacent ground.


NOTES
1 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 linear barrier in no case shall the reach length exceed 150m
2 The last 2.5 m of fence shall be turned up slope
3 Stake dimensions are nominal
4 Dimensions may vary to fit field condition
5 Stakes shall be spaced at 2.5 m maximum and shall be positioned on downstream side of fence
6 Stakes to overlap and fence fabric to fold around each stake six full turns. Secure fabric to stake with 4 staples
7 Stakes shall be driven tightly together to prevent potential flow through at joint. The tops of the stakes shall be secured with wire
8 For end stake fence fabric shall be folded around two stakes six full turns and secured with 4 staples
9 Minimum 4 staples per stake. Dimensions shown are typical
10 Cross barriers shall be a minimum of 1/3 and a maximum of 1/2 the height of the linear barrier
11 Maintenance opening shall be constructed in a manner to ensure sediment remains behind silt fence
12 Joining sections shall not be placed at sump locations
13 Sandbag rows and layers shall be offset to eliminate gaps
LEGEND
Tamped backfill
Slope direction
Direction of flow
STAPLE DETAIL
(SEE NOTE 9)
DETAIL A
JOINING SECTION DETAIL (TOP VIEW)
END STAKE DETAIL (TOP VIEW)
OPTIONAL MAINTENANCE OPENING DETAIL
(SEE NOTE 11)
CROSS BARRIER DETAIL
SECTION C-C
SECTION A-A
END DETAIL
PLAN
TEMPORARY LINEAR SEDIMENT BARRIER (TYPE SILT FENCE)
TEMPORARY LINEAR SEDIMENT BARRIER
(TYPE SILT FENCE)
NO SCALE
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

Sandbag Barrier

SC-8





BMP Objectives
- ○ Soil Stabilization
- ● Sediment Control
- ○ Tracking Control
- ○ Wind Erosion Control
- ○ Non-Storm Water Management
- ○ Materials and Waste Management

Definition and Purpose

A sandbag barrier is a temporary linear sediment barrier consisting of stacked sandbags, designed to intercept and slow the flow of sediment-laden sheet flow runoff. Sandbag barriers allow sediment to settle from runoff before water leaves the construction site. Sandbags can also be used where flows are moderately concentrated, such as ditches, swales, and storm drain inlets (see BMP SC-10, Storm Drain Inlet Protection) to divert and/or detain flows.

Appropriate Applications

- Along the perimeter of a site.
- Along streams and channels.
- Below the toe of exposed and erodible slopes.
- Down slope of exposed soil areas.
- Around stockpiles.
- Across channels to serve as a barrier for utility trenches or provide a temporary channel crossing for construction equipment, to reduce stream impacts.
- Parallel to a roadway to keep sediment off paved areas.
- At the top of slopes to divert roadway runoff away from disturbed slopes.
- To divert or direct flow or create a temporary sediment basin.
- During construction activities in stream beds when the contributing drainage area is less than 2 ha (5 ac).

- When extended construction period limits the use of either silt fences or straw bale barriers.
- Along the perimeter of vehicle and equipment fueling and maintenance areas or chemical storage areas.
- To capture and detain non-storm water flows until proper cleaning operations occur.
- When site conditions or construction sequencing require adjustments or relocation of the barrier to meet changing field conditions and needs during construction.
- To temporarily close or continue broken, damaged or incomplete curbs.
- This BMP may be implemented on a project-by-project basis in addition to other BMPs when determined necessary and feasible by the Resident Engineer (RE).

Limitations

- Limit the drainage area upstream of the barrier to 2 ha (5 ac).
- Degraded sandbags may rupture when removed, spilling sand.
- Installation can be labor intensive.
- Limited durability for long term projects.
- When used to detain concentrated flows, maintenance requirements increase.

Standards and Specifications

Materials

- Sandbag Material: Sandbag shall be woven polypropylene, polyethylene or polyamide fabric, minimum unit weight 135 g/m^2 (four ounces per square yard), mullen burst strength exceeding 2,070 kPa (300 psi) in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70 percent in conformance with the requirements in ASTM designation D4355. Use of burlap is not acceptable.
- Sandbag Size: Each sand-filled bag shall have a length of 450 mm (18 in), width of 300 mm (12 in), thickness of 75 mm (3 in), and mass of approximately 15 kg (33 lb.). Bag dimensions are nominal, and may vary based on locally available materials. Alternative bag sizes shall be submitted to the Resident Engineer (RE) for approval prior to deployment.
- Fill Material: All sandbag fill material shall be non-cohesive, Class 1 or Class 2 permeable material free from clay and deleterious material, conforming to the provisions in Section 68-1.025 "Permeable Material," of

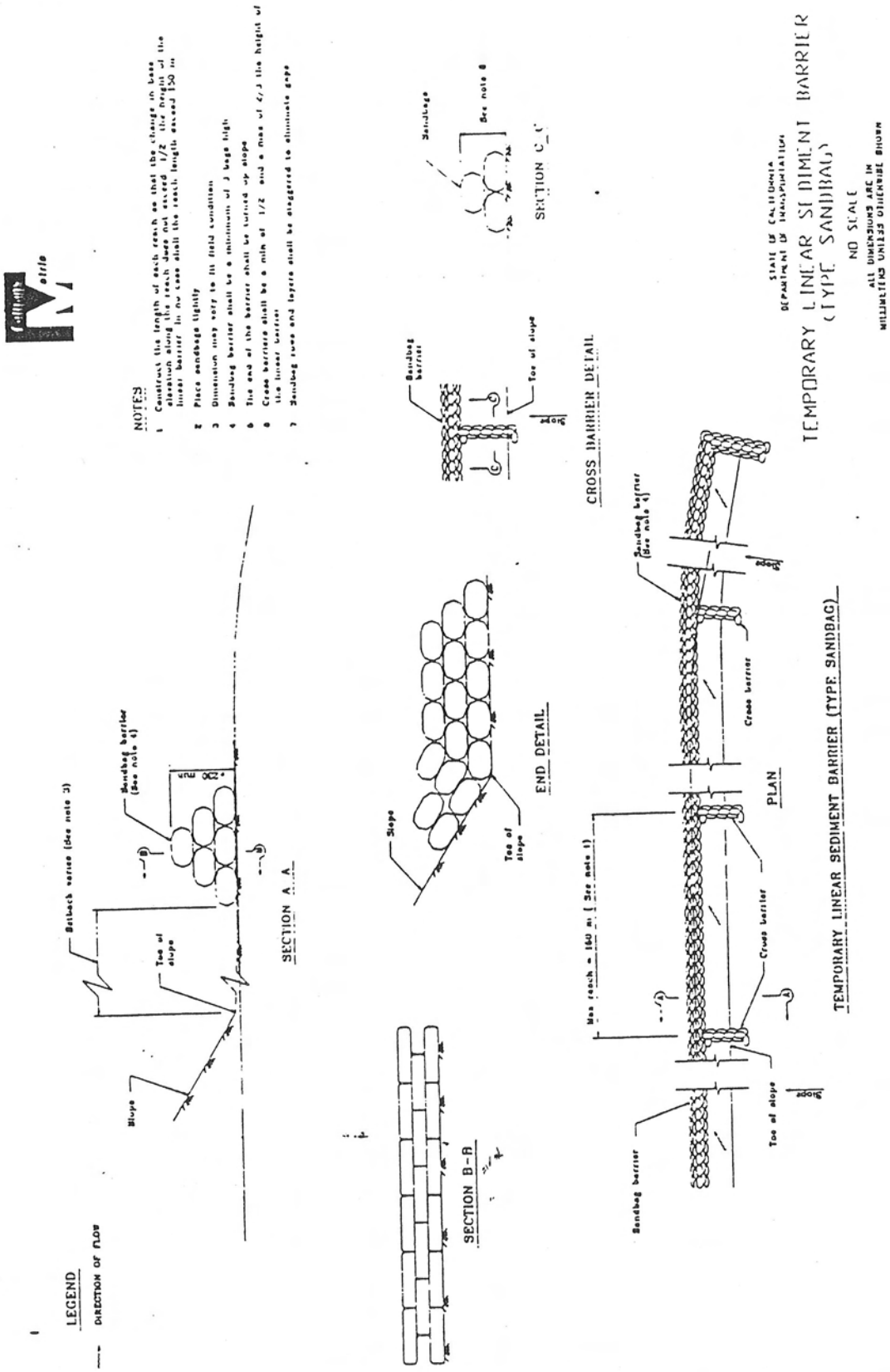
the Standard Specifications. The requirements for the Durability Index and Sand Equivalent do not apply. Fill material is subject to approval by the RE.

Installation

- When used as a linear control for sediment removal:
  - Install along a level contour.
  - Turn ends of sandbag row up slope to prevent flow around the ends.
  - Generally, sandbag barriers shall be used in conjunction with temporary soil stabilization controls up slope to provide effective control.
  - Install as shown in Page 4 of this BMP.
- When used for concentrated flows:
  - Stack sandbags to required height using a pyramid approach as shown in Page 4 of this BMP.
  - Upper rows of sandbags shall overlap joints in lower rows.
- Construct sandbag barriers with a set-back of at least 1m from the toe of a slope. Where it is determined to be not practicable due to specific site conditions, the sandbag barrier may be constructed at the toe of the slope, but shall be constructed as far from the toe of the slope as practicable.

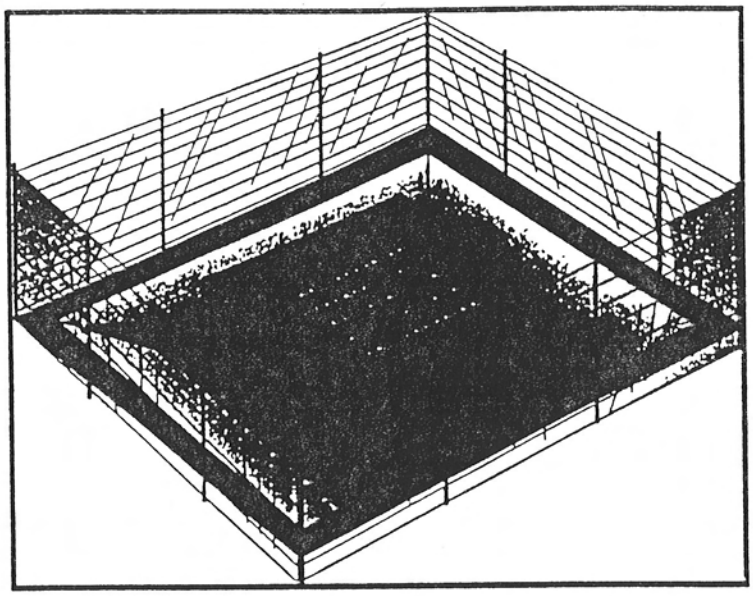
Maintenance and Inspection

- Inspect sandbag barriers before and after each rainfall event, and weekly throughout the rainy season.
- Reshape or replace sandbags as needed, or as directed by the RE.
- Repair washouts or other damages as needed, or as directed by the RE.
- Inspect sandbag barriers for sediment accumulations and remove sediments when accumulation reaches one-third the barrier height. Removed sediment shall be incorporated in the project at locations designated by the RE or disposed of outside the highway right-of-way in conformance with the Standard Specifications.
- Remove sandbags when no longer needed. Remove sediment accumulation, and clean, re-grade, and stabilized the area.


NOTES
1 Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/2 the height of the linear barrier. In no case shall the reach length exceed 150 m
2 Place sandbags tightly
3 Dimension may vary to fit field condition
4 Sandbag barrier shall be a minimum of 3 bags high
5 The end of the barrier shall be turned up slope
6 Cross barriers shall be a min of 1/2 and a max of 2/3 the height of the linear barrier
7 Sandbag rows and layers shall be staggered to eliminate gaps
Sandbags
See note 6
SECTION C-C
Sandbag barrier
Toe of slope
Slope
CROSS BARRIER DETAIL
Setback varies (See note 3)
Sandbag barrier (See note 4)
Toe of slope
Slope
SECTION A-A
Slope
Toe of slope
END DETAIL
SECTION B-B
LEGEND
DIRECTION OF FLOW
Sandbag barrier (See note 4)
Cross barrier
Max reach = 150 m (See note 1)
Cross barrier
Toe of slope
Slope
Sandbag barrier
PLAN
TEMPORARY LINEAR SEDIMENT BARRIER (TYPE SANDBAG)
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
TEMPORARY LINEAR SEDIMENT BARRIER
(TYPE SANDBAG)
NO SCALE
ALL DIMENSIONS ARE IN
MILLIMETERS UNLESS OTHERWISE SHOWN

Storm Drain Inlet Protection

SC-10



BMP Objectives

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

Definition and Purpose

Devices used at storm drain inlets that are subject to runoff from construction activities to detain and/or to filter sediment-laden runoff to allow sediment to settle and/or to filter sediment prior to discharge of storm water into storm water drainage systems or watercourses.

Appropriate Applications

- Where ponding will not encroach into highway traffic.
- Where sediment laden surface runoff may enter an inlet.
- Where disturbed drainage areas have not yet been permanently stabilized.
- Where the drainage area is 0.4 ha (1 ac) or less.
- Appropriate during wet and snow-melt seasons.

Limitations

- Use only when ponding will not encroach into highway traffic or onto erodible surfaces and slopes. If safety is a concern, use other methods of temporary protection to prevent sediment-laden storm water and non-storm water discharges to enter the storm drain system.
- Sediment removal may be difficult in high flow conditions or if runoff is heavily sediment laden. If high flow conditions are expected, use other on-site sediment trapping techniques in conjunction with inlet protection.
- Frequent maintenance is required.
- For drainage areas larger than 0.4 ha (1ac), runoff shall be routed to a sediment trapping device designed for larger flows. See BMPs SC-2, "Desilting Basin", and SC-3 "Sediment Traps".

- Filter fabric fence inlet protection appropriate in open areas is subject to sheet flow and for flows not exceeding 0.014 m^3/s (0.5 cfs).
- Sandbag barriers for inlet protection are applicable when sheet flows or concentrated flows exceed 0.014 m^3/s (0.5 cfs), and it is necessary to allow for overtopping to prevent flooding.
- Excavated drop inlet sediment traps are appropriate where relatively heavy flows are expected and overflow capability is needed.

Standards and Specifications

Identify existing and/or planned storm drain inlets that have the potential to receive sediment-laden surface runoff. Determine if storm drain inlet protection is needed, and which method to use.

Methods and Installation

- DI Protection Type 1 - Filter Fabric Fence The filter fabric fence (Type 1) protection is illustrated in Page 4. Similar to constructing a silt fence. See BMP SC-1, "Silt Fence". Do not place filter fabric underneath the inlet grate since the collected sediment may fall into the drain inlet when the fabric is removed or replaced.
- DI Protection Type 2 - Excavated Drop Inlet Sediment Trap The excavated drop inlet sediment trap (Type 2) is illustrated in Page 5. Similar to constructing a temporary silt fence, See BMP SC-1, "Silt Fence". Size excavated trap to provide a minimum storage capacity calculated at the rate of 130 m^3/ha (67 yd^3/ac) of drainage area.
- DI Protection Type 3 - Sandbag Barrier The sandbag barrier (Type 3) is illustrated in Page 6. Flow from a severe storm shall not overtop the curb. In areas of high clay and silts, use filter fabric and gravel as additional filter media. Construct sandbags in accordance with BMP SC-8, "Sandbag Barrier".

Maintenance and Inspection

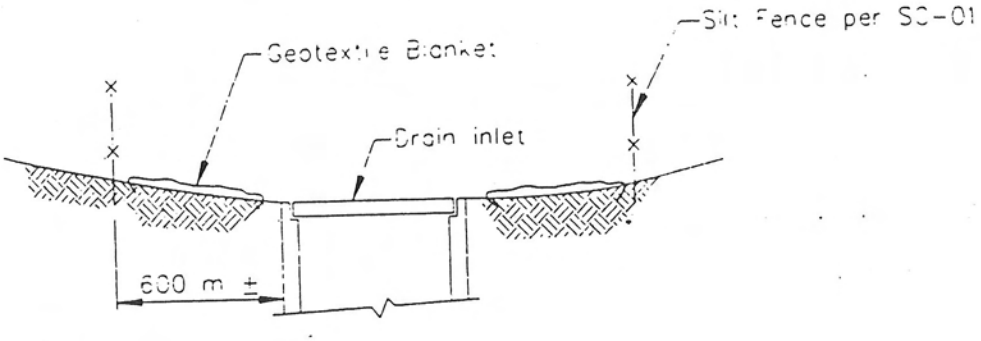
General

- Inspect all inlet protection devices before and after every rainfall event, and weekly during the rest of the rainy season. During extended rainfall events, inspect inlet protection devices at least once every 24 hours.
- Inspect the storm drain inlet after severe storms in the rainy season to check for bypassed material.
- Remove all inlet protection devices within thirty days after the site is stabilized, or when the inlet protection is no longer needed.

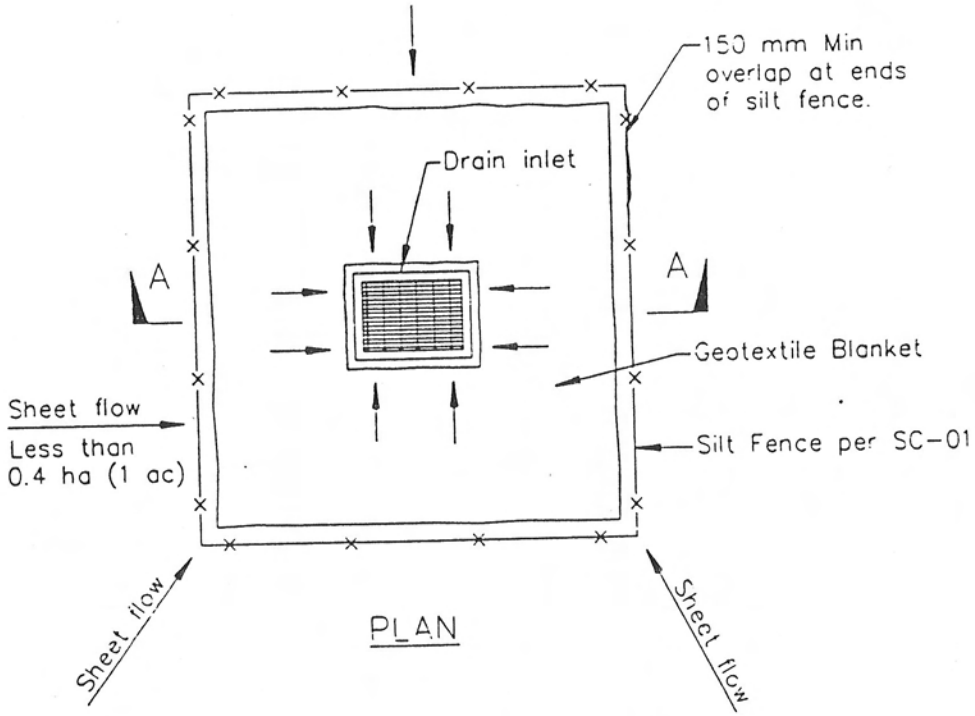
- Bring the disturbed area to final grade and smooth and compact it. Appropriately stabilize all bare areas around the inlet.
- Clean and re-grade area around the inlet and clean the inside of the storm drain inlet as it must be free of sediment and debris at the time of final inspection.

Requirements by Method

- Type 1 - Filter Fabric Fence
  - Make sure the stakes are securely driven in the ground and are in good shape (i.e., not bent, cracked, or splintered, and are reasonably perpendicular to the ground). Replace damaged stakes.
  - Replace or clean the fabric when the fabric becomes clogged with sediment. Make sure the fabric does not have any holes or tears. Repair or replace fabric as needed or as directed by the Resident Engineer (RE).
  - At a minimum, remove the sediment behind the fabric fence when accumulation reaches one-third the height of the fence or barrier height. Removed sediment shall be incorporated in the project at locations designated by the RE or disposed of outside the highway right-of-way in conformance with the Standard Specifications.
- Type 2 - Excavated Drop Inlet Sediment Trap
  - Remove sediment from basin when the volume of the basin has been reduced by one-half.
- Type 3 - Sandbag Barrier
  - Inspect bags for holes, gashes, and snags.
  - Check sandbags for proper arrangement and displacement. Remove the sediment behind the barrier when it reaches one-third the height of the barrier. Removed sediment shall be incorporated in the project at locations designated by the RE or disposed of outside the highway right-of-way in conformance with the Standard Specifications.



SECTION A–A

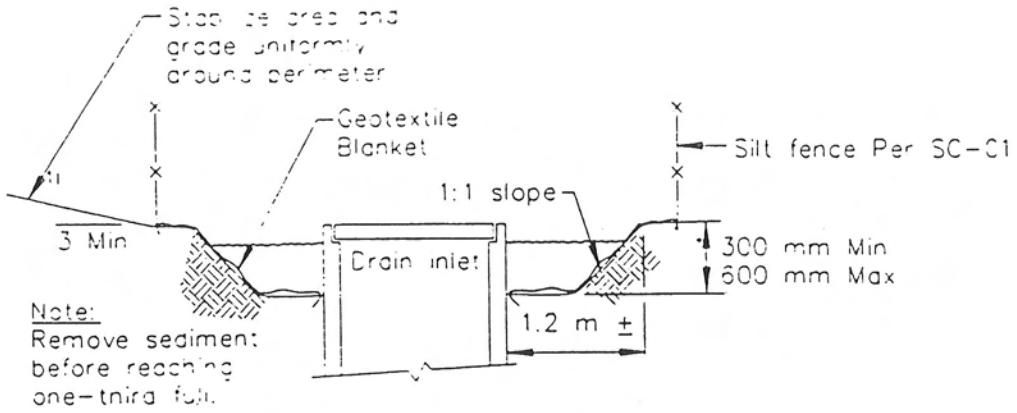


PLAN

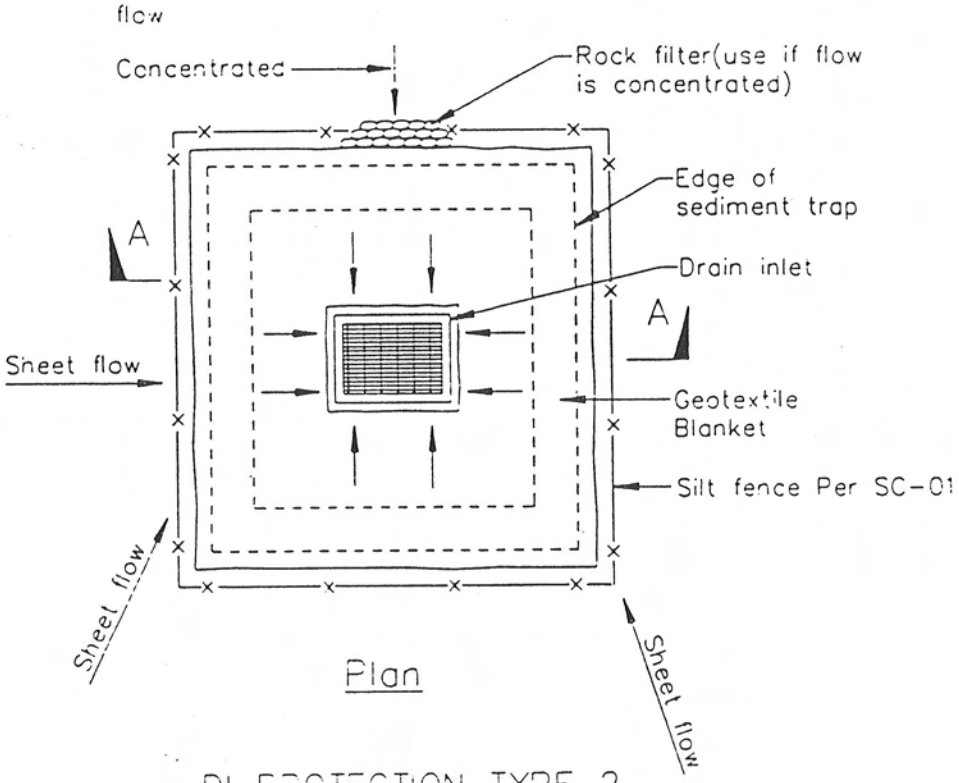
DI PROTECTION TYPE 1
NOT TO SCALE

NOTES:

1. For use in areas where grading has been completed and final soil stabilization and seeding are pending.
2. Not applicable in paved areas.
3. Not applicable with concentrated flows.



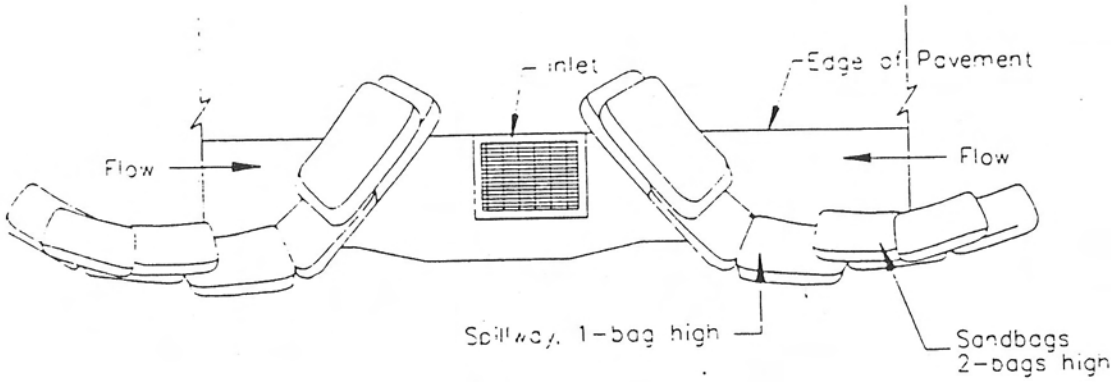
Section A-A



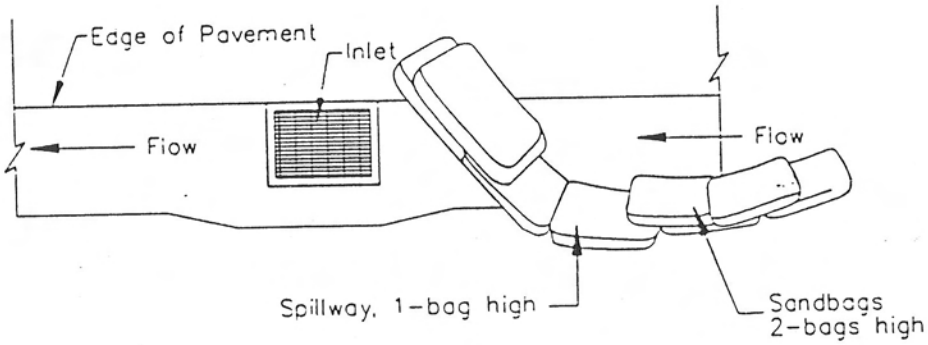
Plan

DI PROTECTION TYPE 2
NOT TO SCALE

Notes
1. For use in cleared and grubbed and in graded areas.
2. Shape basin so that longest inflow area faces longest length of trap.
3. For concentrated flows, shape basin in 2:1 ratio with length oriented towards direction of flow.



TYPICAL PROTECTION FOR INLET ON SUMP



TYPICAL PROTECTION FOR INLET ON GRADE

NOTES:

1. Intended for short-term use.
2. Use to inhibit non-storm water flow
3. Allow for proper maintenance and cleanup.
4. Bags must be removed after adjacent operation is completed
5. Not applicable in areas with high silts and clays without filter fabric.