

APPENDIX 8.14A

**Draft Construction Drainage, Erosion, and
Sediment Control / Stormwater Pollution
Prevention Plan**

APPENDIX 8.14A

Draft Construction Drainage, Erosion, and Sediment Control / Stormwater Pollution Prevention Plan

Five hard copies of Appendix 8.14A, Draft Construction Drainage, Erosion, and Sediment Control/ Stormwater Pollution Prevention Plan were submitted to the California Energy Commission. Additional copies will be provided upon request.

Appendix 8.14A
Administrative Draft

AES Highgrove Project

**Construction Drainage, Erosion,
and Sediment Control/
Stormwater Pollution
Prevention Plan**

Prepared for
AES Highgrove, LLC

May 2006

CH2MHILL
2485 Natomas Park Drive
Sacramento, California 95833

Contents

Section	Page
1.0 Introduction.....	1-1
1.1 Objectives.....	1-1
1.2 Project Overview	1-1
1.3 Implementation Schedule	1-2
1.4 Plan Availability	1-4
2.0 Site Description	2-1
2.1 Site Description and Project Activity.....	2-1
2.1.1 Offsite Linear Descriptions and Project Activity	2-1
2.2 Vegetation and Soils.....	2-2
2.2.1 Agricultural Use on and around the Proposed Highgrove Project Site	2-3
2.2.2 Agricultural Use along the Highgrove Project Features.....	2-3
2.2.3 Soil Types within the Study Area and Prime Farmlands.....	2-4
2.3 Hydrology	2-12
2.4 Estimated Total Disturbed Area.....	2-12
2.5 Existing Drainage	2-12
2.5.1 Highgrove Project Site Area	2-12
2.5.2 Linear Construction Areas.....	2-13
2.6 Proposed Drainage.....	2-13
2.6.1 Highgrove Project Areas	2-13
2.6.2 Highgrove Project Linear Construction Areas.....	2-14
2.7 Construction and Maintenance Access Road	2-14
2.8 Earthwork.....	2-14
2.8.1 Highgrove Project Site Earthwork.....	2-14
2.8.2 Highgrove Project Linear Construction.....	2-14
2.9 Potential Pollutant Sources	2-15
3.0 Erosion Control Plan.....	3-1
3.1 Best Management Practices.....	3-1
3.2 General Erosion and Sediment Control Measures.....	3-1
3.2.1 Access Road, Entrance and Parking, Staging and Laydown Areas....	3-2
3.2.2 Site Grading	3-3
3.2.3 Foundations	3-3
3.2.4 Site Stabilization and Demobilization.....	3-4
3.3 Other Controls	3-4
3.3.1 Hazardous Materials	3-4
3.3.2 Solid and Hazardous Wastes.....	3-4
3.3.3 Potential Contaminated Soil.....	3-5
3.3.4 Groundwater Controls	3-6

3.3.5	Offsite Vehicle Tracking.....	3-6
3.3.6	Dust Suppression and Control.....	3-6
4.0	Training.....	4-1
5.0	Maintenance, Inspection, and Repair.....	5-1
5.1	Maintenance.....	5-1
5.2	Inspections and Record Keeping.....	5-1
6.0	Sampling and Analysis Program.....	6-1
6.1	Sampling and Analysis Plan for Sediment.....	6-1
6.2	Sampling and Analysis Plan for Non-Visible Pollutants.....	6-1
6.2.1	Scope of Monitoring Activities.....	6-1
6.2.2	Monitoring Strategy.....	6-2
6.2.3	Monitoring Preparation.....	6-3
6.2.4	Analytical Constituents.....	6-3
6.2.5	Sample Collection and Handling.....	6-4
6.2.6	Sample Analysis.....	6-6
6.2.7	Quality Assurance/Quality Control.....	6-7
6.2.8	Data Management and Reporting.....	6-7
6.2.9	Data Evaluation.....	6-7
6.2.10	Change of Conditions.....	6-7
7.0	Non-Stormwater Management.....	7-1
7.1	General.....	7-1
7.2	Inventory for Pollution Prevention Plan.....	7-1
7.3	Hazardous Materials Management Plan.....	7-1
7.4	Prevention of Non-Stormwater Discharges.....	7-2
7.4.1	Good Housekeeping.....	7-2
7.4.2	Product Specific Practices.....	7-3
7.4.3	Spill Prevention Practices.....	7-3
7.4.4	Isolation of Potentially Hazardous Materials.....	7-4
8.0	Waste Management and Disposal.....	8-1
9.0	Annual Review and Certification.....	9-1
10.0	SWPPP Administration.....	10-1
11.0	Contractors/Subcontractors.....	11-1
12.0	SWPPP Certification by Contractor.....	12-1
13.0	SWPPP Certification by Preparer.....	13-1
14.0	Notice of Intent.....	14-1

15.0 References 15-1

Appendices

- A Notice of Intent
- B Stormwater Calculations
- C Detailed Description of CALTRANS BMPs
- D Contractor Certification
- E Authorized Contractors
- F Authorized Inspectors
- G SWPPP Inspection Form
- H SWPPP Amendments
- I Relevant Permits

Tables

- 1.3-1 Project Schedule Major Milestones
- 2.2-1 Soil Mapping Unit Descriptions and Characteristics
- 2.3-1 Average Monthly Rainfall near the Proposed Project Site
- 2.5.1-1 Stormwater Runoff Prior to Construction
- 2.6.1-1 Stormwater Runoff Following Construction
- 6.2-1 Potential Non-Visible Pollutants and Water Quality Indicator Constituents
- 6.2-2 Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants

Figures

- 1-1 AES Highgrove Vicinity Map
- 1-2 AES Highgrove Site and Linear Facilities Location Map
- 1-3 AES Highgrove Site Layout
- 1-4 Proposed Drainage Facilities
- 2-1 Plant Elevation Looking West
- 2-2 Conceptual Image of the AES Highgrove Site
- 2-3 Biological Resources Along the Gas Line Route
- 2-4 Soils Map of the AES Highgrove Project Area
- 2-5 Soils Map of the Natural Gas Pipeline
- 2-6 Important Farmlands in the AES Highgrove Project Area
- 3-1 AES Highgrove DESCP – Example Installation Methods
- 3-2 BMP Map – Main Site
- 3-3 BMP Map – Water Line
- 3-4 BMP Map – Gas and Transmission Lines

Introduction

1.1 Objectives

This Stormwater Pollution Prevention Plan¹ (SWPPP) was developed to address the new construction activity associated with the AES Highgrove Project. As required by the State Water Resources Control Board (SWRCB), this SWPPP was developed and will be amended or revised, when necessary, to meet the following objectives:

- Identify all pollutant sources, including sources of sediment, associated with construction activity that may affect the quality of stormwater discharges from the construction site;
- Identify non-stormwater discharges;
- Identify and provide the information necessary to install Best Management Practices (BMPs) to reduce or eliminate pollutants in stormwater discharges and authorized non-stormwater discharges from the construction site during construction; and
- Develop a maintenance schedule for BMPs installed during construction.

1.2 Project Overview

AES is proposing to construct and operate a nominal 300-megawatt (MW) simple-cycle facility consisting of three natural gas-fired turbines and associated equipment in the City of Grand Terrace, San Bernardino County (Figure 1-1, figures are provided at the end of each section). The 9.8-acre project site is located at 12700 Taylor Street, north of the intersection of Taylor and Main streets (Figure 1-2).

The generating facility will consist of three GE Energy LMS100 natural-gas fired combustion turbine generators (CTGs) – each equipped with water injection capability to reduce oxides of nitrogen (NO_x) emissions, a housing on the gas turbine exhaust containing catalysts to further reduce NO_x and carbon monoxide (CO) emissions. Auxiliary equipment will include an inlet air filter house with an evaporative cooler, an intercooler and a 2-cell

¹ In 1972, the Federal Water Pollution Control Act (also referred to as the Clean Water Act [CWA]) was amended to provide that the discharge of pollutants to waters of the United States from any point source is unlawful unless the discharge is in compliance with a National Pollution Discharge Elimination System (NPDES) permit. The 1987 amendments to the CWA added Section 402(p), which established a framework for regulating municipal and industrial stormwater discharges under the NPDES Program. On November 16, 1990, the U.S. Environmental Protection Agency (USEPA) published final regulations that establish stormwater permit application requirements for specified categories of industries. The regulations provide that discharges of stormwater to waters of the United States from construction projects that encompass five (5) or more acres of soil disturbance are effectively prohibited unless the discharge is in compliance with an NPDES Permit. While federal regulations allow two permitting options for stormwater discharges (individual permits and General Permits), the California State Water Resources Control Board elected to adopt only one statewide General Permit that (with few exceptions) apply to all stormwater discharges associated with construction activity, upon submittal of a Notice of Intent to comply, certain fees and a Stormwater Pollution Prevention Plan. The SWPPP must be kept onsite during construction and made available upon request by a representative of the Regional Water Quality Control Board or local agency.

mechanical-draft cooling tower for each gas turbine, natural gas compressors, water storage tanks and associated support equipment.

Associated support equipment will include emission control systems necessary to meet the proposed emission limits at the stack exit. Air emissions from the combustion of natural gas in the CTGs will be controlled using state-of-the-art systems. Emissions that will be controlled include NO_x, reactive organic compounds (ROCs), CO, and particulate matter. To ensure that the systems perform correctly, continuous emissions monitoring systems will be used.

The bulk of the electric power produced by the facility will be transmitted to the power grid via the adjacent Southern California Edison (SCE)-owned 115 kV Highgrove Substation. Approximately 600 feet of new 115-kV overhead transmission line would be necessary for this connection. Natural gas for the facility will be delivered via approximately 7 miles of new, 12-inch-diameter pipeline that will connect to Southern California Gas' (SoCalGas) existing gas transmission line (Line 2001). The natural gas pipeline would extend from the west side of the plant south into Riverside County.

Approximately 737 acre-feet per year (afy) of water for gas turbine water injection, cooling, and other plant process needs will be supplied by an existing onsite well. Cooling water will be cycled in the cooling tower 6.5 times. Therefore, the blowdown will be concentrated before being discharged to the Santa Ana Regional Interceptor (SARI) brine line via truck transport.

Potable water for drinking and sanitary uses will be provided by Riverside Highland Water Company from an existing water main in Main Street that will be extended about 1,300 feet along Taylor Street. Sanitary wastewater disposal will be to the City of Grand Terrace's sanitary sewer. Figure 1-3 shows the site layout, including the location of the generating facility site and electric transmission line.

Primary access to the site will be provided via an existing entrance from Taylor Street, with vicinity access via Interstate 215 (I-215). A secondary entrance will be provided via Adventure Way on the north.

Post-construction treatment of stormwater will be accomplished by directing stormwater to a detention pond via sheet flow. Figure 1-4 shows the post-construction runoff and drainage patterns.

1.3 Implementation Schedule

Demolition of the existing power plant and construction of the new generating facility is expected to take approximately 14 months. Major milestones are listed in Table 1.3-1.

TABLE 1.3-1
Project Schedule Major Milestones

Activity	Date
Begin/Demolition	Second Quarter 2007
Startup and Test	Second Quarter 2008
Commercial Operation	Third Quarter 2008

There will be an average and peak workforce of approximately 77 and 147, respectively, of construction craft people, supervisory, support, and construction management personnel onsite during construction. The peak construction site workforce level is expected to occur in month ten of the construction period.

Construction will be scheduled to occur between 6:30 a.m. and 7 p.m., Monday through Saturday. Additional hours may be necessary to make up schedule deficiencies, or to complete critical construction activities. During some construction periods and during the startup phase of the project, some activities will continue 24 hours per day, 7 days per week.

The construction phases of the Highgrove Project as they pertain to stormwater management are expected to be as follows:

- **Demolition** – The overall project includes the demolition of the former Highgrove Generating Station; however, this SWPPP does not address this portion of the project. A separate SWPPP will be prepared by the demolition contractor before the demolition takes place. The demolition will occur in phases. As areas are demolished, they will be available for parking and construction laydown.
- **Preparation** – Parking areas for construction workers and laydown areas for construction materials will be prepared within the former Highgrove Generating Station Property, south of the Highgrove Project construction area. This area currently is completely developed with buildings, asphalt surfaces, and some landscape vegetation. This area will be demolished in phases as part of the project (see above). As the demolition occurs, the cleared areas will be available for use for parking and construction laydown.

Detailed information regarding timing and sequencing of demolition and the location of the laydown and parking areas will be developed post contractor hiring and incorporated into the SWPPP as appropriate.

- **Access Road** – Site access for construction will be provided via existing access roads. Primary access to the site will be provided via an existing entrance from Taylor Street, with vicinity access via Interstate 215 (I-215). A secondary entrance will be provided via Adventure Way on the north. A stabilized entrance/exit will be provided to clean vehicle wheels at both the plant site and construction laydown areas.
- **Site Grading** – No site grading will be necessary for the parking and construction laydown areas. This area is currently developed and will be demolished in phases. After demolition, portions of the exposed site will be filled (as necessary) and graveled to provide all weather use and further minimize soil erosion potential. Heavy equipment

will be stored on dunnage to protect it from ground moisture. Once construction is complete, the gravel will be removed. No re-grading will be necessary.

The Highgrove Project will be located north of the former Generating Station Property in an area that was formerly occupied by large oil tanks (the “Tank Farm Property”). This area is below grade (approximately 4 to 7 feet). Grading will be necessary to allow transition between the lower portion of the bermed area and the ground surface. The overall site grading scheme for the site will be designed to route surface water around and away from all equipment and buildings to a detention pond on the south end of the site.

- **Foundation** – All underground piping and wiring will be installed, followed by installation of the foundation for the new generating facility and associated structures. Post-construction treatment of stormwater will be accomplished by directing stormwater to a detention pond via sheet flow.
- **Plant Construction** – After final site design and prior to construction, the Applicant will be required to finalize the Drainage, Erosion and Sediment Control Plan (DESCP)/Construction SWPPP (this document). During construction, the Applicant will be required to follow the DESCP/SWPPP to prevent the offsite migration of sediment and other pollutants and to reduce the effects of runoff from the construction site. BMPs to be used at the site will be fully addressed in the DESCP/SWPPP; the DESCP/SWPPP will include the location of BMPs to be used, installation instructions, and maintenance schedules for each BMP.
- **Site Stabilization** – Permanent stormwater management fixtures will replace any temporary items at the end of project construction.
- **Demobilization** – All temporary construction facilities will be removed. Permanent stormwater controls will then be in effect.

A Notice of Intent (NOI) to comply with the terms of the General Permit to Discharge Storm Water associated with Construction Activity will be prepared and submitted prior to the commencement of construction (Appendix A). Any necessary revisions to the SWPPP will be prepared in a timely manner. The SWPPP will be amended whenever there is a change in construction or operations that may affect the discharge status of pollutants. Once construction activities have been concluded, a Notice of Termination will be submitted to the Regional Board and this Construction SWPPP will no longer be in effect.

1.4 Plan Availability

The SWPPP will remain on the construction site while the project is under construction during working hours, commencing with the initial construction activity and ending with termination of coverage under the General Permit (Appendix I). A copy of the California General Permit also will be maintained on the construction site. The SWPPP will be provided to the Regional Board upon request, and be made available to the public only through the Regional Board.

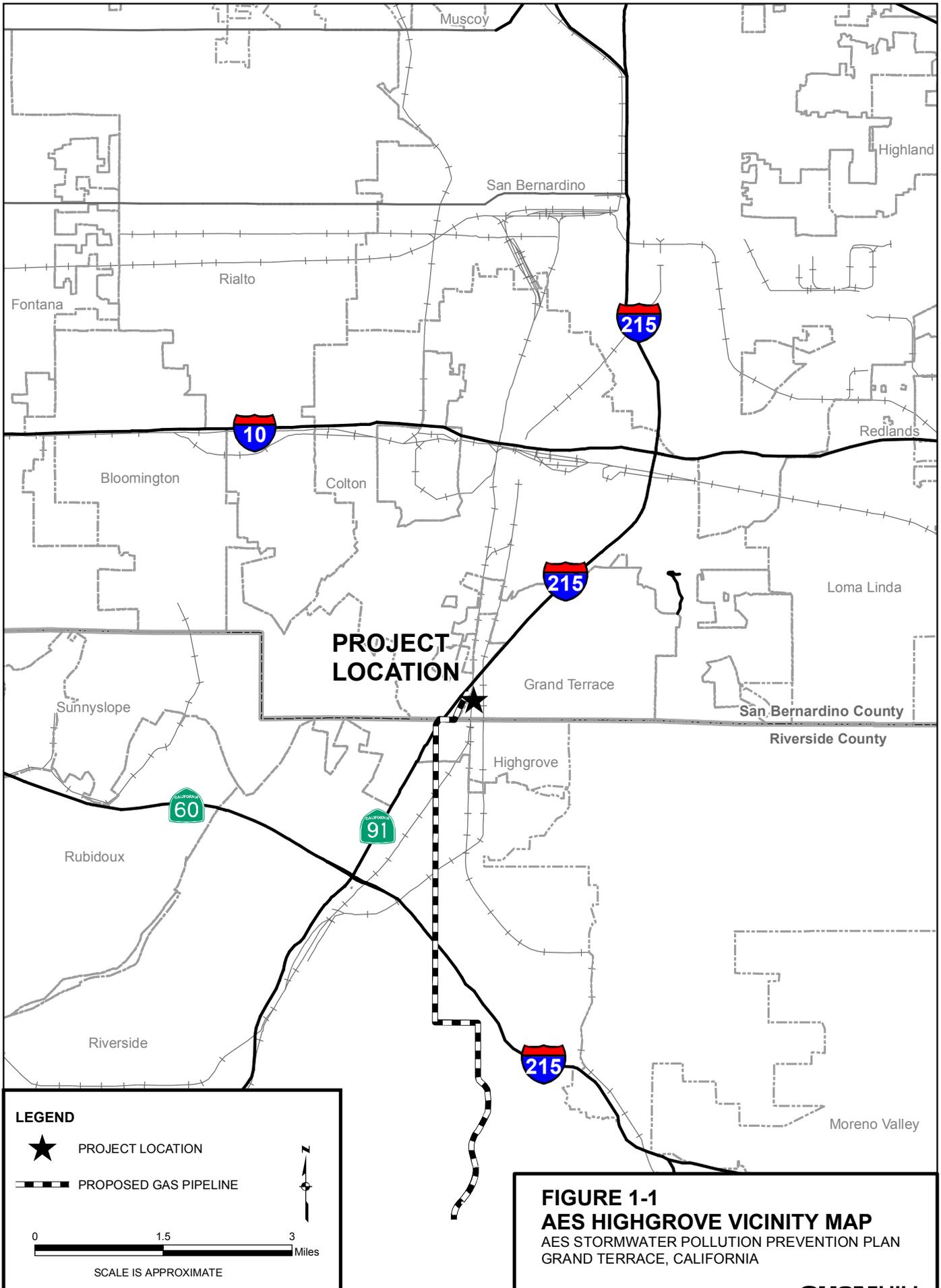
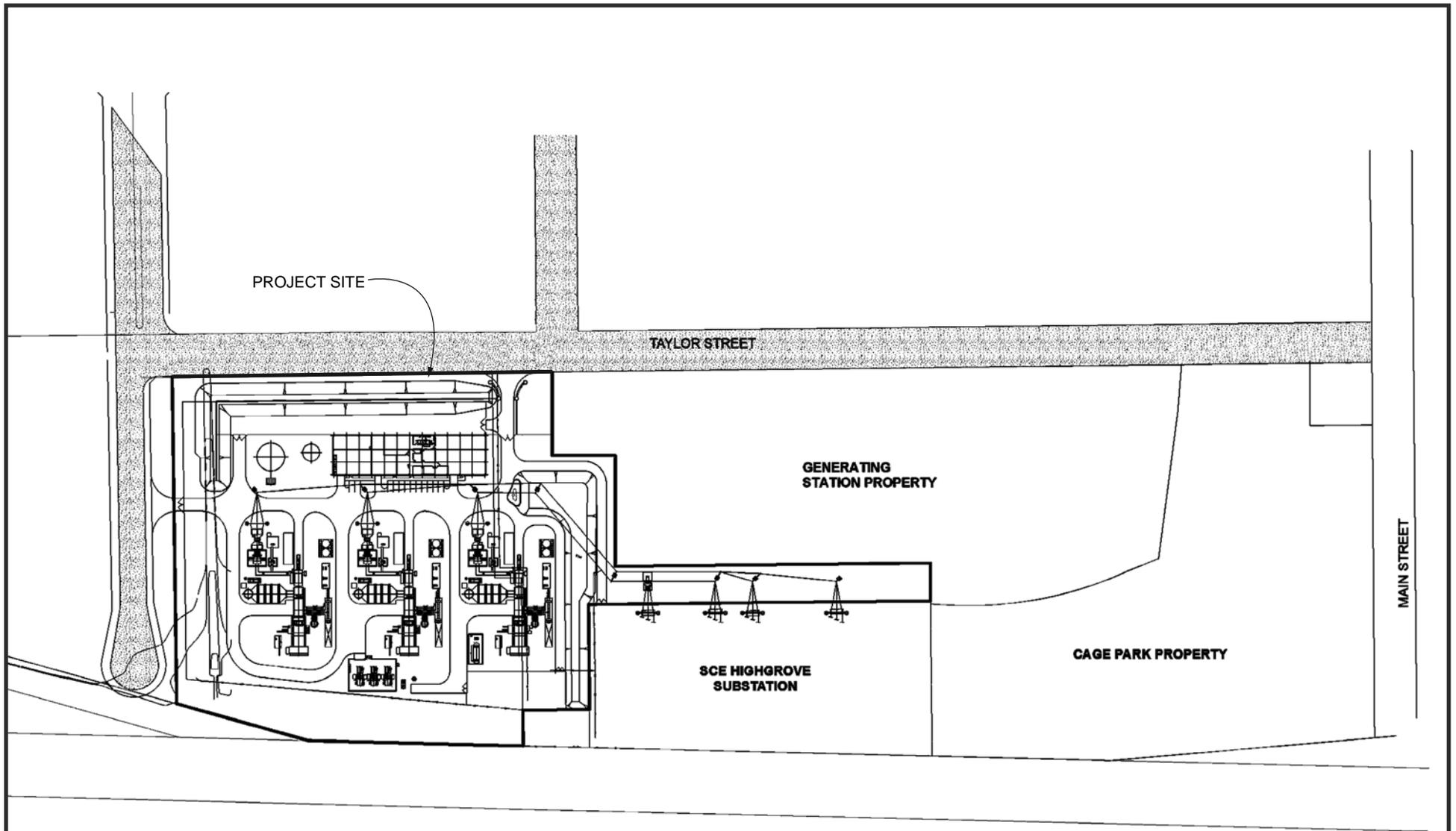


FIGURE 1-1
AES HIGHGROVE VICINITY MAP
 AES STORMWATER POLLUTION PREVENTION PLAN
 GRAND TERRACE, CALIFORNIA





NOT TO SCALE

FIGURE 1-3
AES HIGHGROVE SITE LAYOUT
 AES STORMWATER POLLUTION PREVENTION PLAN
 GRAND TERRACE, CALIFORNIA

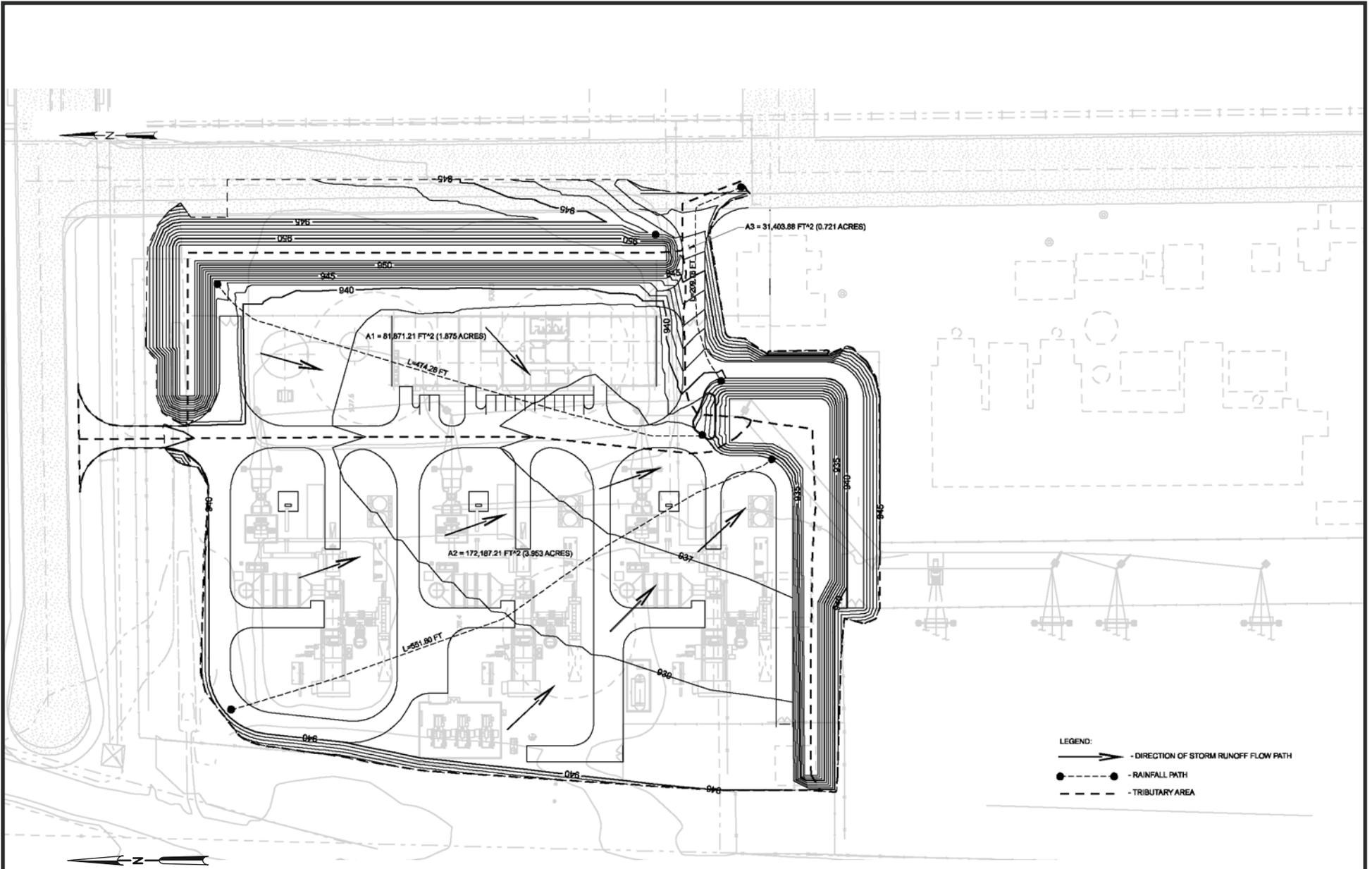


FIGURE 1-4
PROPOSED DRAINAGE FACILITIES
 AES STORMWATER POLLUTION PREVENTION PLAN
 GRAND TERRACE, CALIFORNIA

Site Description

2.1 Site Description and Project Activity

The site and linear facilities locations shown in Figure 1-2, a typical elevation view is shown in Figure 2-1, and conceptual image shown in Figure 2-2 illustrate the location and size of the proposed generating facility. The new generation facilities will occupy approximately 9.8 acres. The new facility will be located on property which was once part of SCE's former Highgrove Generating Station. The Highgrove Generating Station was constructed in the 1950s and consisted of four small generating units with a combined nominal capacity of 154 MW, cooling towers, boilers, tanks, and associated equipment, and several large oil storage tanks, which served the facility when the unit used oil as a primary fuel. The generating station was purchased from SCE in late 1998 by Thermo Ecotek, who operated the facility as Riverside Canal Power Company. Both the tank farm area, north of the generating equipment, and SCE's onsite Highgrove 115 kV Substation were excluded from this sale. The fuel oil tanks were later removed by SCE, which sold the property to its current owner. AES Corporation acquired Thermo Ecotek in 2001 and later decommissioned Riverside Canal Power Plant based on age and environmental considerations. The project includes the phased demolition of the former Highgrove Generating Station.

The new Highgrove Project facility will be located on the former tank farm site, which is under the Applicant's control (through an agreement with the current owner), and located north of the old generating equipment and along the SCE substation. The Tank Farm Property included berms that were used to contain any oil resulting from a potential tank rupture. These berms still exist and the plant will be built below grade inside the bermed area to reduce noise and visual impacts in the Taylor Street area.

Parking areas for construction workers and laydown areas for construction materials will be prepared within the Generating Station Property, south of the construction area. This area currently is completely developed with buildings, asphalt surfaces, and some landscape vegetation. The total available area for construction laydown (after the demolition of the former Highgrove Generating Station) will be approximately 7.5 acres. If more than 7.5 acres is required for construction laydown purposes, an amendment to the SWPPP will be completed for all additional areas.

2.1.1 Offsite Linear Descriptions and Project Activity

The proposed Highgrove Project will have utility connections for the electric transmission line, natural gas supply line, water supply line and sanitary wastewater discharge line. SCE owns an electrical switchyard adjacent to the project site to which the plant would connect through approximately 600 feet of new 115-kV overhead transmission line. Natural gas will be supplied by a proposed approximately 7-mile long, 12-inch diameter natural gas pipeline that would extend from the west side of the plant south into Riverside County. Because the gas line route will primarily follow existing roadways or other developed rights-of-way, it will not affect agricultural lands in the project area. Potable water supplies are located south

of the site. Potable water will be supplied to the project site from an existing water main that will be extended from Main Street along Taylor Street. This water line would not affect agricultural lands in the project area.

Once a final design has been established, the selected contractor will prepare site maps showing the construction project in detail. Site conditions, including paved areas, buildings, lots and roadways, general topography and drainage patterns for stormwater collection will be shown for the following phases of construction:

- **Existing Site Topography** – A plan showing existing site topography and drainage will be prepared.
- **Conceptual Rough Grading** – A plan with figures for interim grading and erosion control will be prepared. It will show the temporary onsite drainage patterns to be established by the grading of the project site, as well as any necessary erosion control features.
- **Stabilized Site** – A detailed finish grading and drainage plan with figures will be prepared showing the final conditions of the site as constructed.
- **Finished Project** – A conceptual image of the Highgrove Project facility (Figure 2-2), shows the completed generating facility.

2.2 Vegetation and Soils

The proposed 9.8-acre Highgrove Project site is bordered on the north by a ruderal area used for construction material storage, on the west by railroad tracks, Riverside Canal and Interstate-215, on the south by Cage Park Property (a private park previously owned by SCE), and on the east and northeast by agricultural fields and southeast by lumber companies (Figure 2-3). The agricultural land extends approximately 800 feet north of the site to Van Buren Street and approximately 1,500 feet eastward to developed urban areas of the City of Grand Terrace.

The portion of the Project site located on the Tank Farm Property is currently undeveloped with approximately 50 to 75 percent grass cover. The parking and construction laydown areas are located directly south of the plant construction area within the former Highgrove Generating Station Property. This area is completely developed with buildings, asphalt surfaces, and some landscape vegetation; however, this area will be demolished as part of the project.

Soil survey mapping units characterizing the types and distribution of soils within the project area, as shown on Figure 2-4, are taken from the *Soil Survey of San Bernardino County, Southwestern Part, California* (NRCS 1980) and *Soil Survey of Western Riverside Area, California* (NRCS 1971). The electronic shape files for these mapping units were downloaded from the NRCS web site. Detailed soil descriptions were developed from the soil survey publications (NRCS 1980, 1971) and from the Official Soil Descriptions (OSD) web page (NRCS 2005). Important farmland designations for the soil mapping units were taken from the Soil Candidate Listings for San Bernardino and Riverside Counties from the Farmland Mapping and Monitoring Program (CDC 2005, 2005a, 1995).

Soil types within one mile of the site boundaries are identified in Figure 2-4. Soil types along the proposed natural gas supply pipeline are identified in Figure 2-5. Table 2.2-1 summarizes the characteristics of each of the individual soil mapping units identified on Figures 2-4 and 2-5. The table summarizes depth, texture, drainage, permeability, erosion hazard rating, land capability classification, and fertility as an indicator of its revegetation potential.

Figure 2-6 shows “Important Farmlands” as defined by the California Department of Conservation (CDC) (CDC 2002) within one mile of the site boundaries. The farmland mapping designated specific areas as follows: Prime Farmland; Farmland of Statewide Importance; Unique Farmland, Farmlands of Local Importance, Grazing Land, Urban and Built-Up Land, and Other Land. Soil series designated as “Prime Farmland” (or Farmland of Statewide Importance) are also listed in Table 2.2-1.

2.2.1 Agricultural Use on and around the Proposed Highgrove Project Site

As previously mentioned, agricultural fields are located on the east side of Taylor Street, across from the Highgrove Project, and are currently farmed for row crops. These fields extend eastward toward the proposed alignment for Commerce Way beyond which are dense urban (industrial and residential) developments. The fields extend northward from existing industrial properties on the north side of Main Street and are bounded by Van Buren Street. These agricultural fields are not mapped within the San Bernardino County Agricultural Overlay District (City of Grand Terrace 2001, 1988). They are planned for conversion to a sports complex/playing fields associated with a proposed high school development for the properties along the east side of Taylor Street and the proposed Outdoor Adventure Center.

2.2.2 Agricultural Use along the Highgrove Project Features

Along the proposed natural gas supply pipeline route, the majority of land (74 percent) is classified as [D] Urban and Built-up Land. Orchards associated with the University of California at Riverside (UCR) campus are classified as [P] Prime Farmland and constitute approximately 13 percent of the total pipeline length. The remaining 13 percent of the pipeline length is comprised of [X] Other Land and is found to the south of the UCR orchards, near the southern end of the proposed pipeline route.

One orchard property is found in Riverside on the east side of Iowa Avenue between Columbia Avenue and Marlborough Avenue. The orchard runs along the proposed pipeline route for approximately 600 feet. Other orchards, associated with UCR, are found along both sides of Iowa Street (extending south about 0.38 mile from Everton Place to Martin Luther King Boulevard), then west about 0.5 mile along MLK Boulevard, then south about 0.22 mile along Canyon Crest Drive.

The 7-mile long natural gas supply pipeline will follow existing roadways or other rights-of-way. For these reasons, there will be no direct impacts to agricultural lands resulting from the proposed Highgrove Project.

2.2.3 Soil Types within the Study Area and Prime Farmlands

The designations of Important Farmlands in the project vicinity and along the proposed 7-mile natural gas supply pipeline are shown on Figures 2-4 and 2-5 and are also summarized in Table 2.2-1. Figure 2-4 shows that the project site and most of the area within the 1-mile buffer is mapped as [D] Urban and Built Up Land. The next largest area is the Loma Hills to the west, which are mapped as [G] Grazing Land. An area mapped as [X] Other Land is located north and northeast of the Highgrove Project site along the southeast side of Interstate 395.

There are three types of Important Farmlands mapped within the 1-mile buffer that represent a relatively small proportion of the total area. The largest part of these Important Farmlands occurs to the south in Riverside County and include (in decreasing order): Prime Farmlands, Farmland of Local Importance, and Farmland of Statewide Importance. The agricultural fields just east of the project site are mapped as Prime Farmlands and Farmland of Statewide Importance. The other Important Farmlands are located away from the project site west of Interstate 395 in San Bernardino County or along the southern boundary of the City of Highgrove in Riverside County.

As previously noted, the proposed project will not result in the conversion of any agricultural land because the pipeline will follow existing roadways and rights-of-way.

TABLE 2.2-1
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
San Bernardino County Soil Mapping Units (NRCS 1980)	
GtC	Greenfield sandy loam – slope class (2 to 9%)
	<ul style="list-style-type: none"> – Prime Farmland – Well drained – Deep soils, gently sloping to moderately sloping – Formed on alluvial fans in moderately coarse textured granitic alluvium – Sandy loam surface, subsoil, and substratum – Permeability is moderately rapid (2.0 to 6.0 inches/hour) – Runoff is medium – Water erosion hazard is moderate if soil is unprotected – Soils are slightly acidic in surface and subsoil and neutral in substratum – Low shrink-swell potential – Capability Class IIe-1 irrigated – Taxonomic class: Coarse-loamy, mixed, thermic Typic Haploxeralfs – Elevation range from 1,200 to 3,400 feet

TABLE 2.2-1
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
HaC	<p>Hanford coarse sandy loam – slope class (2 to 9%)</p> <ul style="list-style-type: none"> – Prime Farmland – Well drained – Deep soils, gently sloping to moderately sloping – Formed on alluvial fans in recent granitic alluvium – Sandy loam surface, subsurface, and substratum – Permeability is moderately rapid (2.0 to 6.0 inches/hour) – Runoff is slow – Water erosion hazard is slight if soil is unprotected – Soils are slightly acidic to neutral throughout – Low shrink-swell potential – Capability Class IIe-1 irrigated – Taxonomic class: Coarse-loamy, mixed, non-acid, thermic Typic Xerorthents – Elevation range from 1,000 to 1,800 feet
HaD	<p>Hanford coarse sandy loam – slope class (9 to 15%)</p> <p>Similar characteristics as noted above with the following differences:</p> <ul style="list-style-type: none"> – Farmland of Statewide Importance – Strongly sloping soils on fans and terraces with short side slopes – Runoff is medium – Water erosion hazard is medium to high if soil is unprotected – Capability Class IIIe-1 irrigated
MoC	<p>Monserate sandy loam – slope class (2 to 9%)</p> <p>The Highgrove Project site is located entirely within this soil mapping unit.</p> <ul style="list-style-type: none"> – Farmland of Statewide Importance – Moderately well drained – Deep soils, gently sloping to moderately sloping – Formed in granitic alluvium on alluvial fans and terraces – Sandy loam surface and clay subsoil over indurated hardpan underlain by a coarse sandy loam substratum – Permeability is moderately slow in surface and substratum (2.0 to 6.0 inches/hour), slow in subsoil (0.2 to 0.6 inches/hour); very slow in hardpan (<0.06 inches/hour) – Runoff is medium – Water erosion hazard is slight to moderate if soil is unprotected – Soils are slightly acidic in surface, neutral in subsoil, and slightly alkaline below – Low shrink-swell potential in surface and substratum; moderate in subsoil – Capability Class IIIe-8 irrigated – Taxonomic class: Fine loamy, mixed, thermic Typic Durixeralfs – Elevation range from 800 to 1,200 feet

TABLE 2.2-1
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
RmC	<p>Ramona sandy loam - slope class (2 to 9%)</p> <ul style="list-style-type: none"> - Prime Farmland - Well drained - Deep soils, gently sloping to moderately sloping - Formed in granitic alluvium on alluvial fans and terraces - Sandy loam surface over loam/clay loam subsoil and sandy loam substratum - Permeability is moderately slow (2.0 to 6.0 inches/hour in surface and substratum and 0.2 to 0.6 inches/hour in subsoil) - Runoff is medium - Water erosion hazard is moderate if soil is unprotected - Soils are slightly acidic in surface and neutral below - Low shrink-swell potential in surface and substratum; moderate in subsoil - Capability Class IIe-1 irrigated - Taxonomic class: Fine loamy, mixed, thermic Typic Haploxerafals - Elevation range from 1,000 to 3,000 feet
ShF	<p>Saugus sandy loam – slope class (30 to 50%)</p> <p>The gas supply pipeline within Grand Terrace passes through this soil mapping unit.</p> <ul style="list-style-type: none"> - Not listed as an Important Farmland soil - Well drained - Deep soils, steeply sloped - Formed on uplands in weakly consolidated sediment - Sandy loam surface and loam subsurface over weakly consolidated sediment in substratum - Permeability is moderate in surface (2.0 to 6.0 inches/hour) and slow in subsoil (0.6 to 2.0 inches/hour) - Runoff is rapid - Water erosion hazard is moderate to high if soil is unprotected - Soils are neutral in surface and slightly acidic below - Low shrink-swell potential in surface and moderate in subsoil - Capability Class VIIe-1 dryland - Taxonomic class: Coarse-loamy, mixed, non-acid, thermic Typic Xerorthents - Elevation range from 1,200 to 2,500 feet
Vr	<p>Vista-Rock outcrop complex – slope class (30 to 50%)</p> <p>Soil properties given below pertain to the Vista series</p> <ul style="list-style-type: none"> - Not listed as an Important Farmland soil - Well drained - Shallow to moderately deep soils over granitic rock, steeply sloped - Formed on upland foothills in material weathered from granitic rock - Sandy loam surface and subsoil over decomposed granitic subsurface - Permeability is moderately rapid (2.0 to 6.0 inches/hours) - Runoff is medium to rapid - Water erosion hazard is moderate - Slightly acidic surface soils becoming neutral with increasing depth - Low shrink-swell potential - Capability class VIIe-1 dryland - Taxonomic class: Coarse-loamy, mixed, superactive, thermic, Typic Haploxerepts - Elevation range from 1,200 to 3,500 feet

Riverside County Soil Mapping Units (NRCS 1971)

Note: All the following soil mapping units are along the proposed natural gas supply pipeline route.

TABLE 2.2-1
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
AoA	<p>Arlington fine sandy loam, deep – slope class (0 to 2%)</p> <ul style="list-style-type: none"> – Prime Farmland – Well drained – Deep soils over a weakly cemented layer – Formed on alluvial fans and terraces in alluvium dominantly from granitic rocks – Fine sandy loam surface and subsurface over weakly cemented alluvium substratum – Permeability is slow – Runoff is slow – Water erosion hazard is slight – Natural fertility is moderate – Slightly acidic to mildly alkaline surface; neutral to mildly alkaline subsoil and substratum – Capability Class IIs-8 irrigated – Taxonomic class: Coarse-loamy, mixed, thermic Haplic Durixeralfs – Elevation range from 500 to 2,000 feet
AoC	<p>Arlington fine sandy loam, deep – slope class (2 to 8%)</p> <p>Similar characteristics as noted above with the following differences:</p> <ul style="list-style-type: none"> – Also a Prime Farmland soil – Runoff is medium – Water erosion hazard is moderate – Capability Class IIIe-1 irrigated
ApB	<p>Arlington loam, deep, slope class (0 to 5%)</p> <p>Similar characteristics as noted above with the following differences:</p> <ul style="list-style-type: none"> – Farmland of Statewide Importance – Loamy surface texture – Runoff is slow to medium – Water erosion hazard is slight to moderate – Capability Class IIIe-8 irrigated
ArB	<p>Arlington loam, deep, slope class (5 to 15%)</p> <p>Similar characteristics as noted above with the following differences:</p> <ul style="list-style-type: none"> – Prime Farmland – Capability Class IIe-1 irrigated – Water erosion hazard is slight to moderate
ArD	<p>Arlington loam, deep, slope class (5 to 15%)</p> <p>Similar characteristics as noted above with the following differences:</p> <ul style="list-style-type: none"> – Not listed as an Important Farmland soil – Runoff is medium – Water erosion hazard is moderate

TABLE 2.2-1
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
BuC2	<p>Buren fine sandy loam, eroded – slope class (2 to 8%)</p> <ul style="list-style-type: none"> – Farmland of Statewide Importance – Moderately well drained – Moderately deep soils over a weakly cemented pan layer – Formed on alluvial fans and terraces in alluvium from mixed sources – Sandy loam surface and loam subsurface over weakly cemented loam substratum – Permeability is moderately slow – Runoff is medium – Water erosion hazard is moderate – Natural fertility is moderately high – Slightly acidic to moderately alkaline surface; neutral to moderately alkaline subsoil; moderately alkaline substratum – Capability Class IIIe-8 irrigated – Taxonomic class: Fine-loamy, mixed, thermic Haplic Durixeralfs – Elevation range from 700 to 3,000 feet
BuD2	<p>Buren fine sandy loam, eroded, slope class (8 to 15%)</p> <p>Similar characteristics as noted above with the following differences:</p> <ul style="list-style-type: none"> – Not listed as an Important Farmland soil – Loamy surface texture – Runoff is medium – Water erosion hazard is high – Capability Class IIIe-1 irrigated
FaD2	<p>Fallbrook sandy loam, eroded, slope class (8 to 15%)</p> <ul style="list-style-type: none"> – Farmland of Statewide Importance – Well drained – Shallow soils (approximately 2 feet) over a weathered bedrock – Formed in uplands on soils developed from granodiorite and tonalite – Sandy loam surface and loam to clay loam or sandy clay loam subsurface over weathered granodiorite or tonalite – Permeability is moderate – Runoff is medium – Water erosion hazard is moderate – Natural fertility is moderate – Slightly acidic to neutral surface; neutral subsoil; slightly acidic to neutral substratum – Capability Class IVe-1 irrigated – Taxonomic class: Fine-loamy, mixed, thermic Typic Haploxeralfs – Elevation range from 700 to 3,500 feet
FaE2	<p>Fallbrook sandy loam, eroded, slope class (15 to 25%)</p> <p>Similar characteristics as noted above with the following differences:</p> <ul style="list-style-type: none"> – Not listed as an Important Farmland soil – Runoff is rapid – Water erosion hazard is high

TABLE 2.2-1
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
GyC2	<p>Greenfield sandy loam, eroded – slope class (2 to 8%)</p> <ul style="list-style-type: none"> – Prime Farmland – Well drained – Deep soils – Formed on alluvial fans and terraces in alluvium dominantly from granitic materials – Sandy loam surface and subsurface over loam substratum – Permeability is moderate – Runoff is slow to medium – Water erosion hazard is slight to moderate – Natural fertility is high – Neutral surface, slightly acidic to mildly alkaline subsoil – Capability Class IIe-1 irrigated – Taxonomic class: Coarse-loamy, mixed, thermic Typic Haploxerafals – Elevation range from 600 to 3,500 feet
HcA	<p>Hanford coarse sandy loam, slope class (0 to 2%)</p> <ul style="list-style-type: none"> – Prime Farmland – Well drained and somewhat excessively drained – Deep soils – Formed on alluvial fans in alluvium dominantly from granitic materials – Coarse or fine sandy loam surface over loamy sand subsurface – Permeability is moderately rapid – Runoff is slow – Water erosion hazard is slight – Natural fertility is moderate – Slightly acidic surface and slightly acidic to neutral substratum – Capability Class IIs-4 irrigated – Taxonomic class: Coarse-loamy, mixed, nonacid, thermic Typic Xerorthents – Elevation range from 700 to 2,500 feet
HcC	<p>Hanford coarse sandy loam – slope class (2 to 8%)</p> <p>Similar characteristics as noted above with the following differences:</p> <ul style="list-style-type: none"> – Also a Prime Farmland soil – Runoff is slow to medium – Water erosion hazard is slight to moderate – Capability Class IIe-1 irrigated
HgA	<p>Hanford fine sandy loam, slope class (0 to 2%)</p> <p>Similar characteristics as noted above with the following differences:</p> <ul style="list-style-type: none"> – Also a Prime Farmland soil – Fine sandy loam surface texture – Runoff is slow – Capability Class I-1 irrigated

TABLE 2.2-1
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
MaB2	Madera fine sandy loam, eroded, slope class (2 to 5%)
	<ul style="list-style-type: none"> - Farmland of Statewide Importance - Well drained - Shallow soil over a cemented hardpan layer with cementation decreasing with depth - Formed on dissected terraces and old alluvial fans in alluvium dominantly from granitic materials - Sandy loam surface and clay subsoil over indurated hardpan - Permeability is very slow - Runoff is slow to medium - Water erosion hazard is slight to moderate - Natural fertility is moderate - Slightly acidic to neutral surface over strongly alkaline subsurface - Capability Class IIIe-3 irrigated - Taxonomic class: Fine, montmorillonitic, thermic Typic Durixeralfs - Elevation range from 600 to 1,600 feet
MmB	Monserate sandy loam – slope class (0 to 5%)
	<ul style="list-style-type: none"> - Farmland of Statewide Importance - Well drained - Shallow soil over a cemented hardpan layer with cementation decreasing with depth - Formed on terraces and old alluvial fans in alluvium dominantly from granitic materials - Sandy loam surface and sandy clay loam subsoil over hardpan underlain by loamy sand substratum - Permeability is moderately slow above the nearly impervious pan layer - Runoff is slow - Water erosion hazard is slight - Natural fertility is moderate - Slightly acidic to neutral surface and subsurface over a mildly alkaline subsoil - Capability Class IIIe-8 irrigated - Taxonomic class: Fine loamy, mixed, thermic Typic Durixeralfs - Elevation range from 700 to 2,500 feet
MoC	Mottsville loamy sand – slope class (0 to 5%)
	<ul style="list-style-type: none"> - Prime Farmland - Excessively drained - Shallow soil over a cemented hardpan layer with cementation decreasing with depth - Formed on alluvial fans and valley fills in alluvium dominantly from igneous materials - Loamy sand surface and subsoil over loamy coarse sand substratum - Permeability is rapid - Runoff is medium - Water erosion hazard is moderate - Natural fertility is moderate - Slightly acidic to neutral throughout profile - Capability Class IIIs-4 irrigated - Taxonomic class: Sandy, mixed, mesic Torriorthentic Haploxeralfs - Elevation range from 3,500 to 6,000 feet

TABLE 2.2-1
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
RsC	Riverwash
	<ul style="list-style-type: none"> - Not listed as an Important Farmland soil - Slopes of 0 to 8 percent in valley fills and on alluvial fans - Variable drainage - Depth is variable but generally 20 to 60 inches or more - Formed in the beds of the major streams or larger creeks - Sandy, gravelly, or cobbly textures - Slightly acidic to neutral throughout profile - Capability Class VIIIw-4 dryland
TeG	Terrace escarpments
	<ul style="list-style-type: none"> - Not listed as an Important Farmland soil - Slopes of 30 to 75 percent - Formed in variable alluvium on terraces or barrancas - Unaltered alluvial outwash from granite, gabbro, metamorphosed sandstone, sandstone, or mica-schists - Variable drainage with soil profiles that are commonly truncated - May have exposed 'rim-pan', gravel, cobblestones, stones, or large boulders in variable quantities - Slightly acidic to neutral throughout profile - Capability Class VIIe-1 dryland
VsF2	Vista coarse sandy loam, eroded, slope class (15 to 35%)
	<ul style="list-style-type: none"> - Not listed as an Important Farmland soil - Well drained - Shallow soil over a cemented hardpan layer with cementation decreasing with depth - Formed on uplands from weathered granite and granodiorite - Coarse sandy loam surface and gravelly coarse sandy loam subsurface over weathered granite or granodiorite - Permeability is moderately rapid - Runoff is medium - Water erosion hazard is moderate - Natural fertility is moderate - Medium to slightly acidic surface and slightly acidic to neutral subsurface over weathered bedrock subsoil - Capability Class VIe-1 dryland - Taxonomic class: Coarse loamy, mixed, thermic Typic Xerochrepts - Elevation range from 1,000 to 3,500 feet

Notes:

Soil characteristics are based on soil mapping provided in the published soil surveys (NRCS 1971, 1980) and a review of corresponding Official Series Descriptions (OSDs).

Soil map units described above are limited to those mapped by the NRCS in the vicinity (i.e., within one mile) of the project property boundaries or directly on the proposed natural gas supply pipeline route.

Important Farmland soils taken from the Farmland Mapping and Monitoring Program (FMMP) Soil Candidate Listing for Prime Farmland and Farmland of Statewide Importance for San Bernardino County and for Riverside County (both updated August 23, 2005).

2.3 Hydrology

Most of the precipitation in the project area falls between November and April. Monthly average rainfall at the Riverside Municipal Airport, which is similar to that at the project site, is presented in Table 2.3-1. The total annual average rainfall at the Riverside Municipal Airport is 9.95 inches.

TABLE 2.3-1
Average Monthly Rainfall Near the Proposed Project Site (2001 to 2005)

Precipitation	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average	9.95	1.81	3.72	1.10	0.62	0.09	0.01	0.03	0.00	0.01	0.78	0.70	1.09
Maximum		6.04	6.48	2.95	1.43	0.24	0.03	0.14	0.00	0.06	2.55	1.20	2.13
Minimum		0.01	0.04	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.32

Average Monthly Rainfall at Riverside Municipal Airport approximately 6 miles from project site.

2.4 Estimated Total Disturbed Area

The estimated area disturbed during project construction is:

Tank Farm Property	7.6 acres
Highgrove Generating Station Property	<u>10.1 acres</u>
Total Disturbed Area	17.7 acres
Linear Construction	7.0 miles

2.5 Existing Drainage

2.5.1 Highgrove Project Site Area

The Highgrove Project will be located mostly on the former oil tank area associated with the Highgrove Generating Station (“Tank Farm Property”). The Tank Farm Property included berms to contain any oil resulting from a potential tank rupture. These berms still exist and the plant will be built below grade inside the bermed area. The current runoff rate from that portion of the project area within the berms (approximately 6.55 acres) is approximately 10.1 cubic feet per second (cfs) based on an undeveloped site with prior industrial use and a 100-year rainfall intensity. However, since this site is a bermed area, the stormwater does not actually run off the site but stays within the berms until it evaporates. Additional runoff from the Tank Farm Property (outside of the bermed area) flows either into the bermed area or to existing storm drains on the west side of the property.

The project also includes demolition of the existing Highgrove Generating Station and use of that property for construction laydown. Runoff from the Generating Station Property generally flows to the west toward the Cage Park Property pond or to the sumps on the western part of the Generation Station Property. The Cage Park Property pond was used as a detention basin during operation of the Highgrove Generating Station, and received water from various plant and non-plant sources. Ultimately, all stormwater runoff from the site

(outside of the bermed area on the Tank Farm Property) flows to the Santa Ana River. The Generating Station Property (approximately 10.1 acres) has a runoff rate of approximately 36.5 cfs, for the developed site and a 100-year rainfall intensity.

The plant site is not located within a flood hazard zone as defined by the Federal Emergency Management Agency (FEMA 1997).

2.5.2 Linear Construction Areas

The project includes a 7-mile natural gas supply line and approximately 1,300 feet of potable water supply line. The proposed approximately 7-mile, 12-inch diameter natural gas line from the Highgrove Project to SoCalGas' Line 2001 would exit the west side of the power plant and follow the Riverside Canal southwest to Main Street. It would turn west on Main Street to Iowa Street and head south on Iowa Street to Martin Luther King Boulevard. It would turn east on Martin Luther King Boulevard to Canyon Crest Drive. On Canyon Crest Drive, the line would head south and end at Via Vista Drive where it would connect into Line 2001. The natural gas supply line will be completed in segments. The segments vary in length from 0.3 miles to 2.5 miles.

Potable water will be provided via a new pipeline approximately 1,300 feet long and 8 to 12 inches in diameter. It will connect to an existing water main that will be extended from Main Street along Taylor Street.

Open trench construction will be the primary type of construction. Any open trench will be covered with plywood or steel plates at the end of each workday. Accordingly, drainage from the linear construction areas will not be altered and it will follow existing drainage patterns along the roadways or other rights-of-way.

2.6 Proposed Drainage

2.6.1 Highgrove Project Areas

After final site design and prior to construction, the Applicant will be required to finalize this Drainage, Erosion and Sediment Control Plan (DESCP)/Construction SWPPP. During construction, the Applicant will be required to follow this DESCP/SWPPP to prevent the offsite migration of sediment and other pollutants and to reduce the effects of runoff from the construction site. BMPs to be used at the site will be fully addressed in the final DESCP/SWPPP; the DESCP/SWPPP will include the location of BMPs to be used, installation instructions, and maintenance schedules for each BMP.

Implementation of the project will alter existing drainage patterns. After construction, the rate of stormwater runoff would increase because of increased impervious surfaces. General site grading will provide positive drainage from buildings and structures. Stormwater will be directed to a detention pond via sheet flow. Figure 1-4 shows the post-construction runoff and drainage patterns.

The area within the Tank Farm Property berms will be approximately 6.5 acres (Figure 1-4). The total stormwater runoff for the 6.5-acre developed site would be approximately 1.62 acre-feet for a 10-year, 48-hour storm. The onsite detention basin will be designed to contain this flow. Stormwater calculations are attached as Appendix B.

2.6.2 Highgrove Project Linear Construction Areas

Implementation of the project will not alter existing drainage patterns along the roadways or other rights-of-way.

2.7 Construction and Maintenance Access Road

Site access for construction and maintenance will be provided via existing access roads. Primary access to the site will be provided via an existing entrance from Taylor Street, with vicinity access via Interstate 215 (I-215). A secondary entrance will be provided via Adventure Way on the north.

2.8 Earthwork

2.8.1 Highgrove Project Site Earthwork

Excavation work will consist of removal, storage, and/or disposal of earth, sand, gravel, vegetation, loose rock, and debris to the lines and grades necessary for construction. Materials suitable for backfill will be stored in stockpiles at designated locations using proper erosion protection methods. Excess materials will be incorporated into the unused portion of the site or removed from the site and disposed of at an acceptable location.

The proposed Highgrove Project site includes a portion of the former Highgrove Generating Station Property and all of the Tank Farm Property. The southern portion of the Highgrove Generating Station Property is nearly level due to previous grading. The Tank Farm Property included berms to contain any oil resulting from a potential tank rupture. These berms still exist and the plant will be built below grade (approximately 3 to 8 feet) inside the bermed area. Grading will be necessary to allow transition between the lower portion and the ground surface. The separator between the two basins also will need to be removed.

Graded areas will be smooth, compacted, free from irregular surface changes, and sloped to drain. Structures will be designed to meet appropriate seismic requirements (the site is located in Seismic Risk Zone 4) and California Building Code requirements. Areas to be backfilled will be prepared by removing unsuitable materials and rocks. The bottom of an excavation will be examined for loose or soft areas. Such areas will be excavated fully and backfilled with compacted fill.

Backfilling will be done in layers of uniform, specified thickness. Soil in each layer will be properly moistened to facilitate compaction to achieve the specified density. To verify compaction, representative field density and moisture-content tests will be performed during compaction in accordance with ASTM standards.

2.8.2 Highgrove Project Linear Construction

The Highgrove Project includes the construction of a proposed approximately 7-mile, 12-inch diameter natural gas pipeline from the Highgrove Project to SoCalGas' Line 2001. Construction primarily will be open trench. However, trenchless methods [e.g., Horizontal Auger Boring and horizontal directional drilling (HDD)] may also be employed to cross railroads, busy intersections or streams. Trench excavation will consist of concrete/asphalt

cutting and making subgrade to the depth, width, and grade necessary for construction of the pipeline. Disturbed soils such as those from trench excavation will be hauled away, backfilled into the trench, and/or covered (e.g. metal plates, pavement, plastic covers over spoil piles) at the end of the construction day. Materials suitable for backfill will be stored in stockpiles at designated locations using proper erosion and sediment control methods. Excess materials (i.e., asphalt debris, earth, sand, gravel, loose rock) will be incorporated into the unused portion of the site or removed from the site and disposed of at an acceptable location.

Areas to be backfilled will be prepared by removing unsuitable materials and rocks. The bottom of an excavation will be examined for loose or soft areas. Such areas will be excavated fully and backfilled with compacted fill.

Backfilling will be done in layers of uniform, specified thickness. Soil in each layer will be properly moistened to facilitate compaction to achieve the specified density. To verify compaction, representative field density and moisture-content tests will be performed during compaction in accordance with ASTM standards.

2.9 Potential Pollutant Sources

Construction of the project will involve handling a large variety of building materials. The primary potential pollutant source for stormwater during the construction of the Highgrove Project results from soil materials being exposed to wind and water movement. The greatest amount of soil will be exposed during trench excavation for the linear facilities and the demolition, preparation, and site grading phases of the project. Upon completion of the foundation phase, the amount of soil exposed will be significantly reduced. Due to the controls and BMPs described in subsequent sections of this SWPPP, soils and sediments in stormwater runoff from the Highgrove Project site will be minimized.

Other chemicals that could be potentially stored and used during construction of the facility include: gasoline, diesel fuel, oil, lubricants (i.e., motor oil, transmission fluid, and hydraulic fluid), solvents, adhesives, asphalt products, and paint materials. There are no feasible alternatives to these materials for construction or operation of construction vehicles and equipment, repaving areas, pouring concrete, or for painting and caulking buildings and equipment. Material Safety Data Sheets for each chemical used will be kept onsite, and construction employees will be made aware of their location and content. The contractor will be responsible for assuring that the use, storage and handling of these materials will comply with applicable federal, state, and local laws, ordinances, regulations, and standards (LORS), including licensing, personnel training, accumulation limits, reporting requirements, and record keeping.

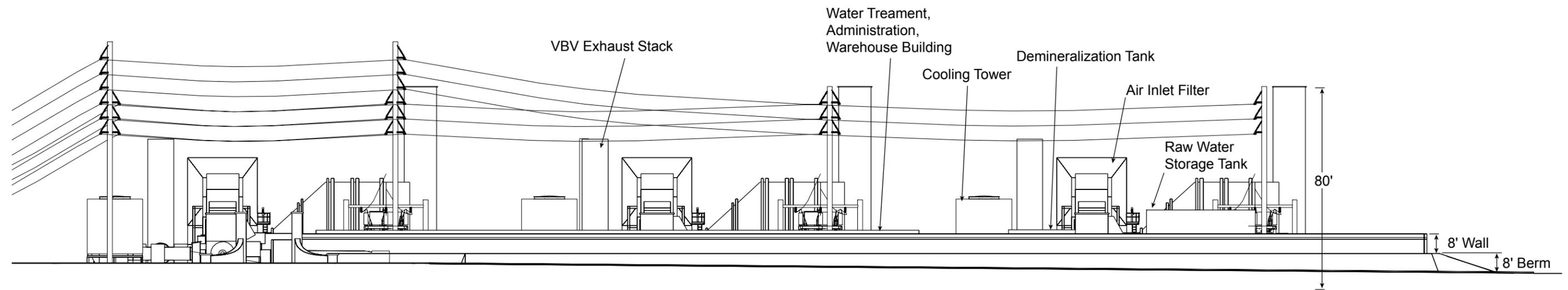
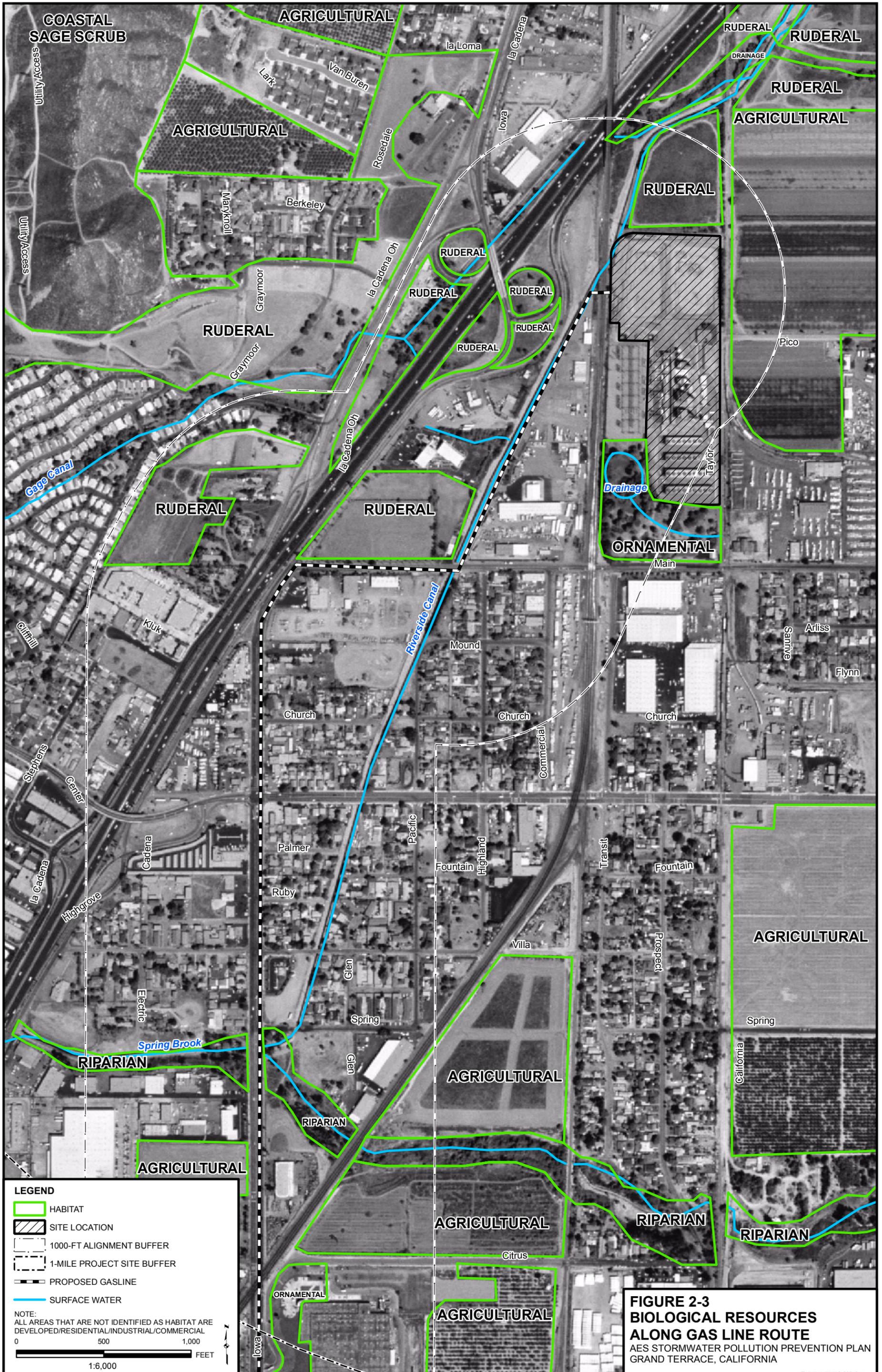
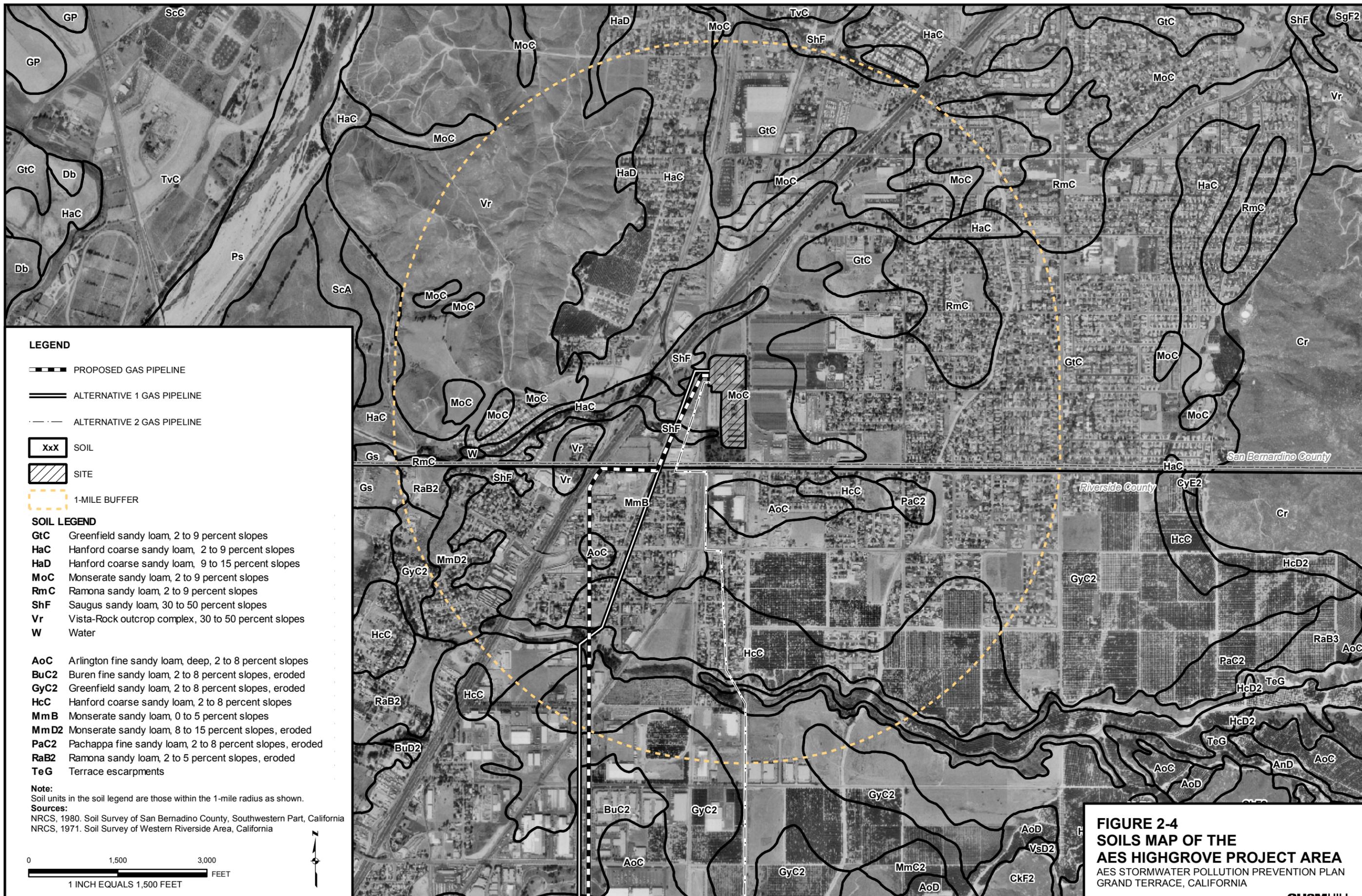


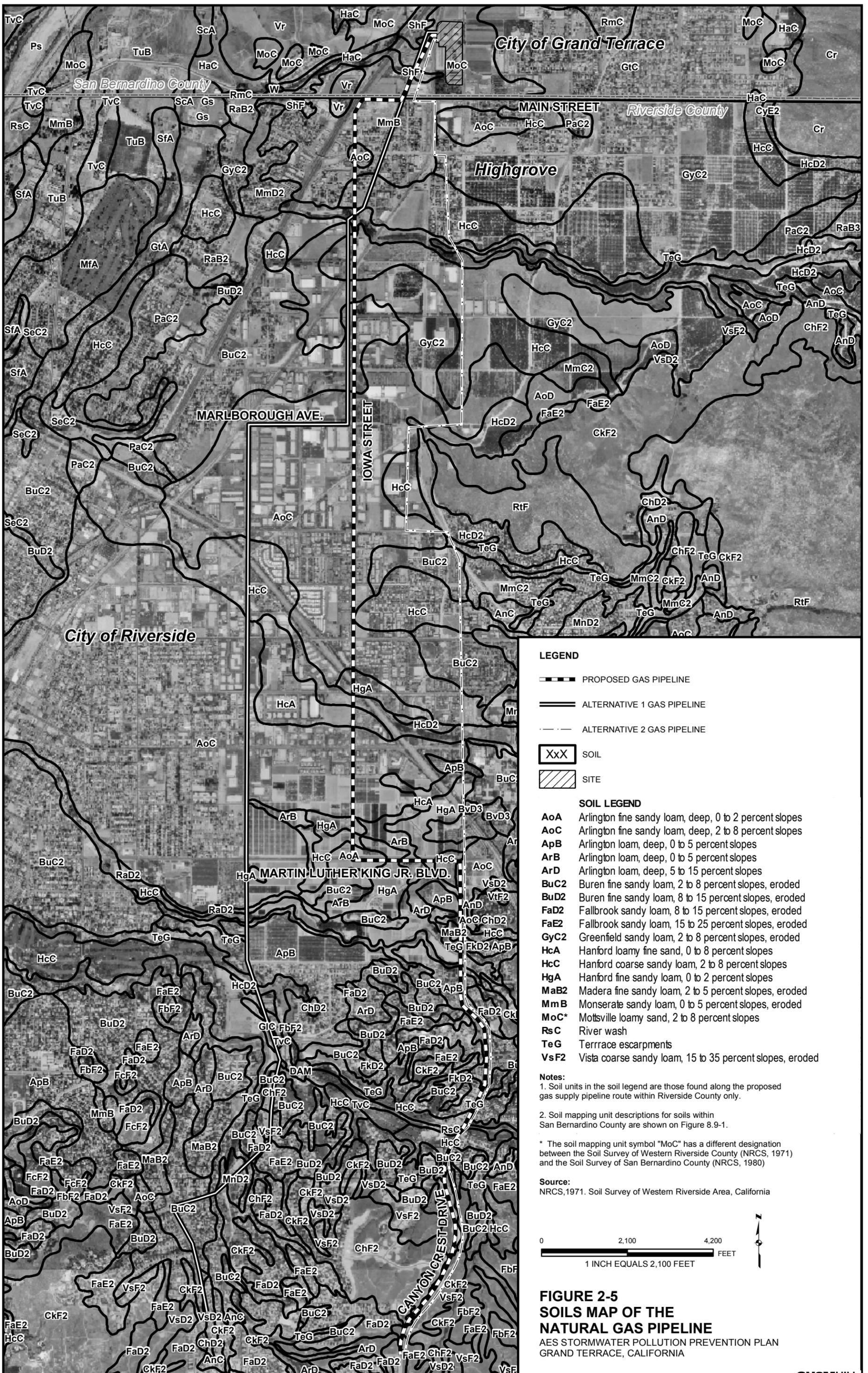
FIGURE 2-1
PLANT ELEVATION LOOKING WEST
 AES STORMWATER POLLUTION PREVENTION PLAN
 GRAND TERRACE, CALIFORNIA



FIGURE 2-2
CONCEPTUAL IMAGE OF THE
AES HIGHGROVE SITE
AES STORMWATER POLLUTION PREVENTION PLAN
GRAND TERRACE, CALIFORNIA







LEGEND

- PROPOSED GAS PIPELINE
- ALTERNATIVE 1 GAS PIPELINE
- ALTERNATIVE 2 GAS PIPELINE

- SOIL
- SITE

SOIL LEGEND

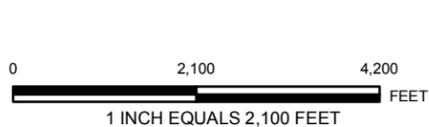
- AoA** Arlington fine sandy loam, deep, 0 to 2 percent slopes
- AoC** Arlington fine sandy loam, deep, 2 to 8 percent slopes
- ApB** Arlington loam, deep, 0 to 5 percent slopes
- ArB** Arlington loam, deep, 0 to 5 percent slopes
- ArD** Arlington loam, deep, 5 to 15 percent slopes
- BuC2** Buren fine sandy loam, 2 to 8 percent slopes, eroded
- BuD2** Buren fine sandy loam, 8 to 15 percent slopes, eroded
- FaD2** Fallbrook sandy loam, 8 to 15 percent slopes, eroded
- FaE2** Fallbrook sandy loam, 15 to 25 percent slopes, eroded
- GyC2** Greenfield sandy loam, 2 to 8 percent slopes, eroded
- HcA** Hanford loamy fine sand, 0 to 8 percent slopes
- HcC** Hanford coarse sandy loam, 2 to 8 percent slopes
- HgA** Hanford fine sandy loam, 0 to 2 percent slopes
- MaB2** Madera fine sandy loam, 2 to 5 percent slopes, eroded
- MmB** Monserate sandy loam, 0 to 5 percent slopes, eroded
- MoC*** Mottsville loamy sand, 2 to 8 percent slopes
- RsC** River wash
- TeG** Terrace escarpments
- VsF2** Vista coarse sandy loam, 15 to 35 percent slopes, eroded

Notes:
 1. Soil units in the soil legend are those found along the proposed gas supply pipeline route within Riverside County only.

2. Soil mapping unit descriptions for soils within San Bernardino County are shown on Figure 8.9-1.

* The soil mapping unit symbol "MoC" has a different designation between the Soil Survey of Western Riverside County (NRCS, 1971) and the Soil Survey of San Bernardino County (NRCS, 1980)

Source:
 NRCS, 1971. Soil Survey of Western Riverside Area, California



**FIGURE 2-5
 SOILS MAP OF THE
 NATURAL GAS PIPELINE**

AES STORMWATER POLLUTION PREVENTION PLAN
 GRAND TERRACE, CALIFORNIA



Erosion Control Plan

3.1 Best Management Practices

The following sections present standard construction Best Management Practices (BMPs) most of which are described in the *California Storm Water Best Management Practice Handbook* (1993) and the *Caltrans Storm Water Quality Handbook* (2003). These resource handbooks provide comprehensive details on BMP implementation and will be obtained and reviewed by managers for all construction contractors that may have an impact on implementation of the SWPPP. Additional BMPs are described where appropriate. The BMPs outlined in this SWPPP are considered the minimum requirements for erosion and sediment control. Specific BMPs are described in this section, but at this time, no BMP site map has been designed. Figure 3-1 illustrates installation methods for various BMPs. When the site is graded and topographical maps for the site have been developed, site-specific BMPs will be designed on the project site maps (Figures 3-2, 3-3, and 3-4 to be provided by the contractor). Appendix C contains the Caltrans BMP factsheets with detailed descriptions of BMPs discussed in the following sections.

3.2 General Erosion and Sediment Control Measures

The project has been designed to impact as small an area as possible at any given time, thereby limiting the amount of exposed soil. Construction is expected to proceed as expediently and efficiently as possible, while maintaining all levels of safety, thereby ensuring that as little soil is exposed for as short a time as possible. Work areas may be surrounded by dikes, drainage swales, sand bags, or combinations of these to prevent run-on and uncontrolled run-off from the work area. General erosion and sediment controls may include installation of filter fabric fencing, fiber rolls, or sand bags wherever appropriate. It may be appropriate to surround the site and neighboring laydown area with filter fabric fencing (silt fencing) and/or fiber rolls. All drains on surface streets surrounding the site will be protected with gravel bags and/or silt sacks.

A mitigation monitoring plan will also be developed in conjunction with California Energy Commission (CEC) staff to set performance standards and monitor the effectiveness of mitigation measures. This plan will address the timing and methods of such measures, as well as reporting and response requirements. Personnel will receive training to conduct their jobs properly and recognize and report abnormal/adverse situations so that they can be quickly corrected.

Following are general control measures that may be used during various phases of the project and in conjunction with phase-specific BMPs (see Appendix C):

- Proper scheduling and sequencing of activities (BMP SS-1)
- Silt Fences and Fiber Rolls (BMP SC-1 and SC-5)
- Straw mulch (BMP SS-6)

- Placement of geotextiles, plastic covers, & erosion control blankets/ mats (BMP SS-7)
- Gravel bag berm (BMP SC-6)
- Street sweeping (BMP SC-7)
- Sandbag barrier (BMP SC-8)
- Storm drain inlet protection (BMP SC-10)
- Stockpile management (BMP WM-3)
- Dust control (BMP WE-1)
- Employee and contractor training

3.2.1 Access Road, Entrance and Parking, Staging and Laydown Areas

Plant Site and Laydown Area

Approximately 9.8 acres will be used to accommodate the generation facilities. Parking areas for construction workers and laydown areas for construction materials will be prepared within the former Highgrove Generating Station plant site, south of the construction area. Figure 1-3 illustrates the general location of the construction laydown area. The laydown area is a previously disturbed, flat parcel of land. It is completely developed with buildings, asphalt surfaces, and some landscape vegetation. This area will be demolished as part of the project. The laydown area will be devoted to equipment and materials laydown, storage, construction equipment and employee parking, and office trailers. The total construction laydown area will be approximately 7.5 acres.

The plant entrance/exit off of Taylor Street will be stabilized using coarse aggregate. The aggregate cover will be maintained so as to limit sediment tracking and creation of dust. Filter fabric fencing (silt fencing) may be used at edges of these areas, as necessary, to minimize sediment discharges. The following BMPs may be used for construction access areas:

- Proper scheduling and sequencing of activities (BMP SS-1)
- Silt fencing (BMP SC-1)
- Fiber Rolls (BMP SC-5)
- Storm drain inlet protection (BMP SC-10 or silt sacks)
- Stockpile Management (WM-3)
- Stabilizing surfaces with coarse aggregate
- Compacting access/entrance road surfaces (BMPs TC-1 and TC-2)
- Placement of geotextile (BMP SS-7)
- Dust control (BMP WE-1)
- Temporary drains and swales (BMP SS-9)
- Vehicle and equipment cleaning (BMP NS-8)

Linear Construction Access

The project will include the construction of a nominal 300-megawatt (MW) peaking facility consisting of three natural gas-fired turbines and associated equipment; approximately 7 miles of 12-inch diameter natural gas pipeline that will connect to SoCalGas' Line 2001 at the intersection of Canyon Crest Drive and Via Vista Drive; a connection to SCE's electrical transmission system via the adjacent 115-kV Highgrove Substation; and a connection to the existing potable water main in Taylor Street.

Site access for construction and maintenance will be provided via existing city roads. Access roads are currently paved and prior to disturbance do not need to be provided with erosion and sediment controls. Prior to ground-disturbance associated with the linear construction phases, all or a combination of these BMPs may be used:

- Proper scheduling and sequencing of activities (BMP SS-1)
- Straw mulch (BMP SS-6)
- Placement of geotextiles, plastic covers, & erosion control blankets/ mats (BMP SS-7)
- Silt fencing (BMP SC-1)
- Fiber rolls (BMP SC-5)
- Gravel bag berm (BMP SC-6)
- Street sweeping and vacuuming (BMP SC-7)
- Sandbag barrier (BMP SC-8)
- Storm drain inlet protection (BMP SC-10 or silt sacks)
- Stockpile management (BMP WM-3)
- Dust control (BMP WE-1)

3.2.2 Site Grading

Prior to use as the construction laydown area, no grading will be necessary since the site is flat and completely developed with buildings, asphalt surfaces, and some landscape vegetation. The site may be graveled to provide all weather use and further minimize soil erosion potential. Heavy equipment stored onsite will be placed on dunnage to protect it from ground moisture. Once construction is completed, the gravel will be removed from the site.

Grading will be required for the plant site. The overall plant site grading scheme is designed to route surface water around and away from all equipment and buildings. The site will be constructed below grade; therefore, it is not considered necessary to place barriers around the property boundary. However, some barriers would be placed in locations where offsite drainage could occur to prevent sediment from leaving the site. If used, fiber rolls would be properly installed (staked), then removed after construction. Runoff detention basins, drainage diversions, and other large-scale sediment traps are not considered necessary due to the level topography and surrounding paved roads. Any stockpiles would be stabilized and covered if left onsite for long periods of time, including placement of sediment barriers around the base of the stockpile. These methods can be employed during trenching operations for the natural gas line.

3.2.3 Foundations

As the foundation for the project structures are developed, temporary BMPs will be replaced with permanent BMPs. Sediments and hydrocarbons will be minimized or prevented from entering the surface collectors with storm drain inlet protection devices and rings of hydrocarbon-absorbing fabric.

A concrete washout site will be designated or will occur offsite at the concrete contractor's facility. Dumping of excess concrete and washing out of delivery vehicles will be prohibited onsite. Notices will be posted to inform all drivers.

The following BMPs will be used around foundations:

- Storm drain inlet protection (BMP SC-10 or silt sacks)
- Concrete waste management (BMP WM-8)

3.2.4 Site Stabilization and Demobilization

As construction nears completion, areas used for parking, storage and laydown will be stabilized. Areas that will continue to be used (for parking or storage) will have permanent stormwater collection and conveyance structures provided. All disturbed areas associated with the linear facilities will be stabilized.

3.3 Other Controls

3.3.1 Hazardous Materials

There will be a variety of chemicals stored and used during the construction and operation of the Highgrove Project. The storage, handling, and use of all chemicals will be conducted in accordance with applicable LORS. Chemicals will be stored in appropriate chemical storage facilities. Bulk chemicals will be stored in storage tanks, and other chemicals will be stored in returnable delivery containers. Chemical storage and chemical feed areas will be designed to contain leaks and spills. Berm and drain piping design will allow a full-tank capacity spill without overflowing the berms. For multiple tanks located within the same bermed area, the capacity of the largest single tank will determine the volume of the bermed area and drain piping. Drain piping for volatile chemicals will be trapped and isolated from other drains to eliminate noxious or toxic vapors. After neutralization, if required, water collected from the chemical storage areas will be directed to the cooling tower basin. The aqueous ammonia storage area will have spill containment and ammonia vapor detection equipment

3.3.2 Solid and Hazardous Wastes

The construction of the facility will generate various types of non-hazardous solid wastes, including debris and other materials requiring removal during site grading and excavation, excess concrete, lumber, scrap metal, and empty non-hazardous chemical containers. Management of these wastes will be the responsibility of the construction contractor(s). The generation of waste materials will be minimized through efficient and careful use of materials, and recycling when possible. Non-hazardous materials will be used where acceptable to meet construction requirements. Drummed and bagged wastes will not be stored directly on the ground, and will be covered or stored indoors where feasible. Incompatible materials will be separated, and secondary containment will be provided for liquids. Sufficient spill cleanup materials will be kept in proximity to areas where materials are stored and used.

Small quantities of hazardous wastes will be generated over the course of construction. These may include flushing and cleaning fluids, passivating fluid (to prepare pipes for use), and solvents. All hazardous wastes generated during facility construction will be handled and disposed of in accordance with applicable laws, ordinances, regulations, and standards, including licensing, personnel training, accumulation limits and times, and reporting and

recordkeeping. The hazardous waste will be collected in satellite accumulation containers near the points of generation. It will be moved daily to the contractor's 90-day hazardous waste storage area, located at the site construction laydown area. The waste will be removed from the site by a certified hazardous waste collection company and delivered to an authorized hazardous waste management facility, prior to expiration of the 90-day storage limit.

Nonhazardous solid waste generated during construction will be collected in onsite dumpsters. The dumpsters will meet local and state solid waste management regulations, and be provided with solid lids or removable flexible covers. Wastes will be recycled where practical. Waste that cannot be recycled will be disposed of in a Class III landfill.

The following BMPs will be used at the designated storage locations:

- Cover or store hazardous materials indoors, if possible (BMP WM-1)
- Material delivery and storage (BMP WM-1)
- Material use (BMP WM-2)
- Spill Prevention and Control (BMP WM-4)
- Solid Waste Management (BMP WM-5)
- Hazardous Waste Management (BMP WM-6)
- Use of covered dumpsters and containers for waste (BMP WM-5)
- Sanitary and septic waste management (BMP WM-9)
- Stockpile management (BMP WM-3)

3.3.3 Potential Contaminated Soil

The proposed Highgrove Project site is located at the former Highgrove Generating Station. The site will be located on the former oil tank farm site, located north of the former generating equipment. The former tank farm site included berms to contain any oil resulting from a potential tank rupture. These berms still exist and the plant will be built below grade inside the bermed area.

A Phase I Environmental Site Assessment (ESA) was performed by ARCADIS Geraghty and Miller, Inc. on the tank farm area in March 2000. This area included two asphalt-bermed areas that enclosed three 3,360,000-gallon aboveground fuel tanks and a helicopter landing pad. The ESA investigated the aboveground fuel tanks and piping, a cement-lined water channel, and an Edison-owned undeveloped property to the north of the tank farm area.

Previous investigations cited by the ESA include a Baseline Tank Study Report conducted in 1996, a Phase 1 ESA on the Highgrove Generating Station conducted in 1997, and a Phase II ESA conducted in 1997. For the Baseline Tank Study Report, soil samples were collected from a depth of 3 feet from excavations at four locations around the perimeter of each storage tank. Total petroleum hydrocarbons (TPH) were detected at concentrations below 1,000 parts per million (ppm) at all sampling locations. In addition, concentrations of TPH below 1,000 ppm were detected beneath the fuel tanks. These findings were attributed by Edison to the application of oil to the tank area for corrosion protection and no further action was recommended. The 1997 Phase I ESA noted that no regulatory agency concurrence with the no further action recommendation had been obtained. The Phase II ESA conducted in 1997 did not include soil sampling in the vicinity of the fuel tanks, but it

did compare the results of the Baseline Tank Investigation soil analysis to Phase II screening criteria values. The Phase II report concluded that no further action was needed for the ASTs, but that negotiation, additional investigation, and/or remediation may be appropriate during decommissioning of the tanks.

3.3.4 Groundwater Controls

Groundwater at the project site is currently not used for potable water, and project construction will have no effect on groundwater. The linear facilities, minor excavation and foundation structures required for the Highgrove Project would not result in any substantial change from the existing groundwater flow and conditions at the site. During construction, the project would be subject to LORS requiring standards for isolating and controlling offsite runoff and contaminants that could enter groundwater. During construction, the project would isolate all work areas using fiber, rolls, mats or similar devices to keep contaminated runoff from leaving the site.

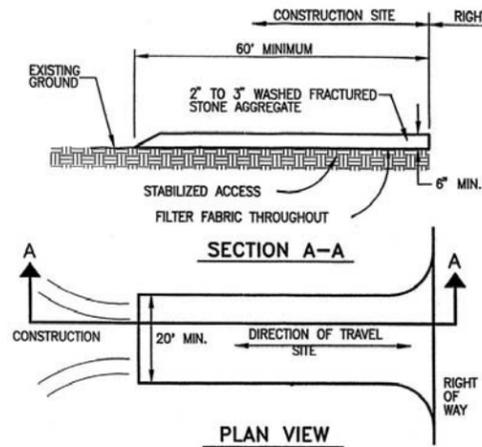
3.3.5 Offsite Vehicle Tracking

Because sediment reaching public roads generally has a clear path to water bodies, controls will be in place to minimize or eliminate soils from being tracked off the project site from vehicles. The site will have an access road and entrance/exit made of coarse aggregate to limit the amount of material adhering to tires. Paved roads used during the linear facilities construction phase and those located at the entrance of the construction site will be inspected daily and cleaned as necessary using manual or mechanical street sweepers (BMP SC-7).

3.3.6 Dust Suppression and Control

Wind erosion controls shall be evaluated and implemented as needed throughout the duration of the project on all disturbed soils on the project site and linear facility sites that are subject to wind erosion, and when significant wind and dry conditions are anticipated during project construction. Wind controls will be used to prevent the transport of soil from soil-disturbed areas of the project site. The following control methods will be used for dust suppression, as necessary:

- Water aggregate roadways, parking areas and construction areas as needed (BMP WE-1).
- Cover all trucks hauling soil, sand and other loose materials offsite or require all trucks to maintain at least 18 inches of freeboard.
- Sweep adjacent streets and onsite paved roadways (BMP SC-7).
- Hydroseed or apply non-toxic soil stabilizers to inactive or completed construction areas as soon as is practical (BMP SS-4 or SS-5).
- Enclose, cover, water or apply non-toxic soil stabilizers to exposed stockpiles of sand, dirt, etc. (BMP WM-3).
- Limit traffic speed onsite to 15 mph or less.
- Suspend excavation and grading during periods of high winds.

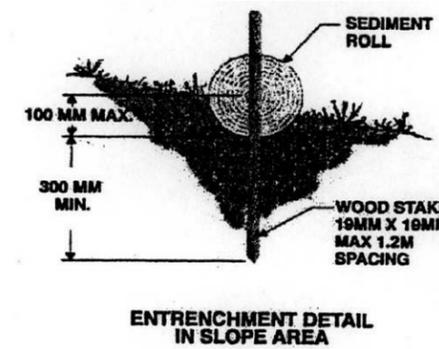
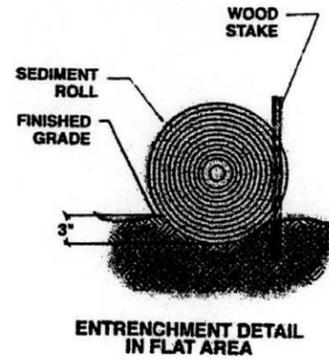


NOTES:

1. Stabilized construction entrance shall be 2" to 3" washed fracture stone. Material shall be placed to a minimum thickness of 6".
2. Length of entrance shall be a minimum length of 60 feet. Width must be a minimum of 20 feet, or greater if necessary to cover all vehicular ingress and egress.
3. The entrance shall be kept in good condition by occasional top dressing with additional fractured stone, similar in size.
4. Contractor shall inspect each construction entrance daily and after each rainfall.
5. All sediment deposited on paved roadway shall be wet swept at the end of each working day.
6. Gravel and filter fabric shall be removed at end of construction.

1. Stabilized Construction Site Access

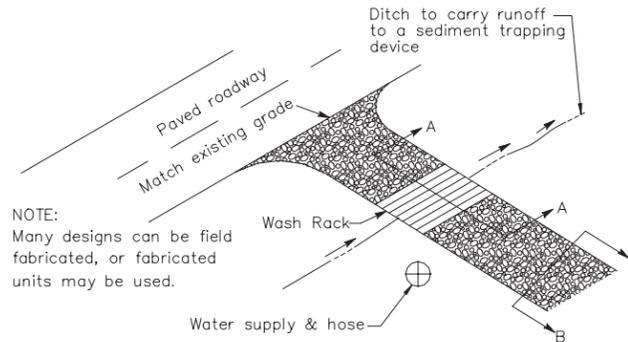
Note: Fiber rolls are not intended for use in concentrated flow situations.



NOTES:

1. Fiber rolls are typically placed along the perimeter of the property line. If heavy sediment is a concern, then the use of silt fences is more appropriate (refer to Silt Fence Detail).
2. Follow manufacturer's recommendations for installation, as well as the following:
3. Fine grade the subgrade where necessary to remove local deviations and to remove larger stones or debris that will inhibit intimate contact of the fiber roll with the subgrade;
4. Prior to installation, contour a concave key trench 2" to 4" deep along the proposed installation route;
5. Soil excavated in trenching should be placed on the uphill side or flow side of the roll to prevent water from undercutting the roll;
6. Place fiber rolls into the key trench and stake on both sides of the roll within 6 feet of each end and along length of roll with a minimum of 1"x2"x18" stake;
7. Drive stakes on alternating sides of roll. When placed in a continuous row, rolls should be abutted securely to one another to provide a tight joint, not overlapped.
8. Contractor shall make daily inspections to determine if repairs are necessary. Repair or replace split, torn, unraveling or slumping fiber rolls.

4. Fiber Roll Detail

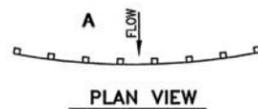
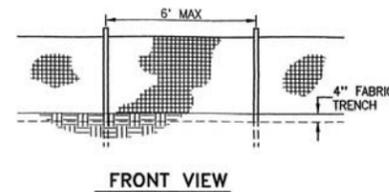


NOTE: Many designs can be field fabricated, or fabricated units may be used.

2. Typical Tire Wash

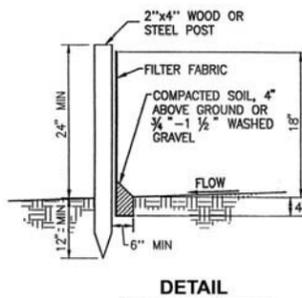
NOTES:

1. Will be constructed on level ground, on a pad of coarse aggregate, greater than 3" but smaller than 6".
2. Wash rack shall be designed and constructed for anticipated traffic loads.
3. Drainage ditch will convey the runoff from the wash area to a sediment sump device. The drainage ditch shall be of sufficient grade, width, and depth to carry the wash runoff.
4. Inspect routinely for damage and repair as needed.

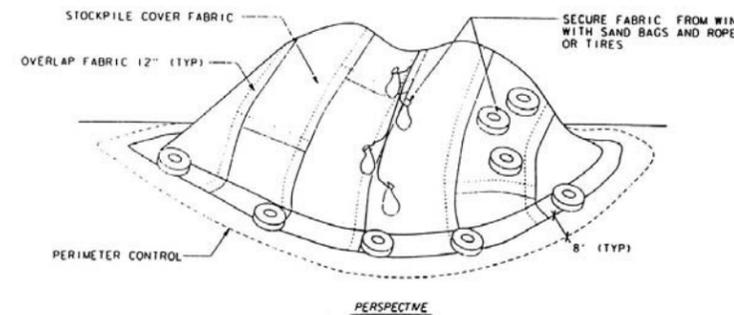


NOTES:

1. Silt fence shall be constructed along the perimeter of construction area where needed;
2. Filter fabric shall be propylene, nylon, polyester or ethylene yarn containing ultraviolet inhibitors. Filter fabric shall have a minimum efficiency of 75 percent and minimum tensile strength of 50 lbs./lineal foot at 20 percent maximum elongation;
3. Support posts shall be a minimum 3 foot length 2"x4" wood posts driven a minimum of 12" into the ground. Posts shall be spaced a maximum of 6' apart. Fabric shall be securely fastened to posts with 16 gauge wire ties spaced a maximum of 6" apart.
4. A minimum 4" trench shall be excavated along the uphill side of the posts. The bottom of the fabric shall extend to the bottom of the trench and at a minimum of 4" across the bottom of the trench. The trench shall be backfilled to 4" above ground and compacted to bury and secure the bottom of the filter fabric.
5. Contractor shall make daily inspections to determine if repairs and sediment removal is required. Sediment shall be removed before it has reached 8 inches in height upstream of the filter fabric.



3. Silt Fence Detail



NOTES:

- All stockpiled excavated soils to be stabilized, as follows:
1. If appropriate, stockpile will be covered with plastic, tarpaulins or equivalent and anchored in place with sand bags and rope, tires, or equivalent, or;
 2. Stockpile(s) to be treated with chemical dust control material and
 3. Perimeter control will include fiber rolls around the entire base of the stockpile(s).
 4. Contractor shall make daily inspections to determine sediment loss, if any. In the event of sediment loss, appropriate steps must be taken to secure the stockpile(s).

5. Stockpile Protection

**FIGURE 3-1
AES HIGHGROVE EROSION AND
SEDIMENT CONTROL PLAN
EXAMPLE INSTALLATION METHODS
AES STORMWATER POLLUTION PREVENTION PLAN**

INSERT FIGURE 3-2 BMP MAP MAIN SITE

Will be provided by contractor for Final document

INSERT FIGURE 3-3 BMP MAP- WATER LINE

Will be provide by contractor for Final Document

INSERT FIGURE 3-4 BMP MAP- GAS AND TRANSMISSION LINES

Will be provided by contractor for Final document

SECTION 4

Training

Prior to project startup, all designated onsite representatives will participate in a pre-project stormwater training workshop. The workshop will cover basic stormwater information, the requirements of the general permit, and the SWPPP. Specifically, the workshop will focus on implementation, inspection, and maintenance of stormwater controls. All new employees will be trained by staff familiar with these topics.

As required by the SWRCB, individuals responsible for SWPPP preparation, implementation, and permit compliance will be appropriately trained, and the training will be documented. This includes those personnel responsible for installation, inspection, maintenance, and repair of BMPs. Those responsible for overseeing, revising, and amending the SWPPP shall also document their training.

All contractors are responsible for familiarizing their personnel with the information contained in the SWPPP. Contractors will be informed of this obligation and will be expected to have one or more employee training or briefing sessions conducted. The purpose of the meetings will be to review the proper installation methods and maintenance of all erosion control BMPs to be used on the project. Monitoring and inspection activities will only be conducted by individuals who have had additional training specific for this purpose. Training records will be maintained. All contractors are responsible for familiarizing subcontractors with information contained in the SWPPP.

Each contractor will be required to certify that they understand the requirements of the SWPPP, and will perform their duties in accordance with its requirements. An example Certification Form is included as Appendix D. These signed Certifications will be collected by the Project Manager (or designee) to identify authorized contractors in the SWPPP (see Appendix E).

Maintenance, Inspection, and Repair

5.1 Maintenance

Erosion and sediment control structures must be maintained to remain effective. Features that are washed out or damaged will be repaired as soon as possible, contingent at all times on worker safety. Structures designed to accumulate sediment will have sediment removed in advance of the rainy season, and before major storm events. The following criteria will be used to determine whether erosion and sediment control features should be cleaned, repaired, or replaced:

- Sediment or other debris has accumulated to greater than one-third the height of sediment fabric fences.
- Sediment or debris has reduced the storage capacity of sediment traps by 50 percent or more
- More than one-third of the cross-section of conveyance structures, such as drainage swales or ditches are plugged or blocked

In addition, the following maintenance activities will be performed:

- Paved roads immediately surrounding the construction sites will be cleaned as necessary using manual or mechanical street sweepers.
- Coarse aggregate on plant access road and entrance/exit will be maintained so as to limit sediment tracking and creation of dust.
- Surfaces that are not paved or provided with gravel surfacing will be watered to limit the generation of dust (but will not be excessively watered so as to generate runoff).
- All equipment will be maintained according to manufacturers' specifications so as to prevent leaks and spills.
- Any contaminated soils resulting from spills will be dug up as quickly as possible, and then removed from the site for proper disposal.

5.2 Inspections and Record Keeping

Inspections of the construction sites will be conducted prior to anticipated storm events and after actual storm events that cause runoff from the site. This will be accomplished by conducting weekly inspections. In addition, inspections will be made during each 24-hour period during extended storm events. SWPPP inspections may be conducted in conjunction with other facility inspections. For instance, if a regulated amount of petroleum materials is onsite and there is a Spill Prevention, Control and Countermeasures Plan (SPCC), the SWPPP inspections may be conducted in conjunction with SPCC inspections.

The goals of these inspections are: (1) to identify areas contributing to a stormwater discharge; (2) to evaluate whether measures to reduce pollutant loadings identified in the SWPPP are adequate, properly installed and functioning in accordance with the terms of the General Permit; and (3) whether additional control practices or corrective maintenance activities are needed.

Personnel responsible for inspections before, during and after storm events will receive additional training specific for this purpose. This can take the form of formal classroom training and/or “walk-around” with an experienced individual, who discusses the appropriate conditions and those conditions requiring action. The Project Manager (or designee) will maintain a list of authorized inspection individuals for the SWPPP (Appendix F).

All required inspections will be recorded on an inspection form (Appendix G). Records of SWPPP inspections will be maintained onsite for at least 3 years. An example checklist will contain, at a minimum, the following information required by the Regional Water Quality Control Board:

- Inspection date
- Weather information: best estimate of beginning of storm event, duration of event, time elapsed since last storm, and approximate amount of rainfall (inches)
- Description of any inadequate BMPs
- If possible to safely access during inclement weather, observations of all BMPs: erosion controls, sediment controls, chemical and waste controls, and non-stormwater controls; otherwise, result of visual inspection at relevant outfall, discharge point, or downstream location and projected required maintenance activities.
- Corrective actions required, including any changes to SWPPP necessary and implementation dates
- Inspectors name, title, and signature

Records of all monitoring information, copies of all reports required by the general stormwater permit, and records of all data used to complete the Notice of Intent for the construction activity shall be held, retained, and kept in possession by the facility operator and/or contractor for at least 3 years.

The facility operator and/or contractor will annually certify that its construction activity is in compliance with the requirements of this general permit and its SWPPP. Noncompliance notifications will be submitted within 30 days of identification of noncompliance to the Regional Water Quality Control Board.

Equipment, materials, and workers will be available for rapid response to failures and emergencies. All corrective maintenance to BMPs will be performed as soon as possible, depending upon worker safety.

Prior to plan commencement, names of responsible personnel will be added to this plan.

SECTION 6

Sampling and Analysis Program

The General Permit requires permittees to implement specific sampling and analytical procedures to determine whether BMPs implemented on the construction site are:

- Preventing sediment impaired waters from further impairment by direct discharge of sediments in stormwaters to listed waters
- Preventing other pollutants (not visually detectable) from causing or contributing to exceedances of water quality objectives

6.1 Sampling and Analysis Plan for Sediment

This project does not have the potential to discharge directly to a water body listed as impaired due to Sedimentation/Siltation and/or Turbidity pursuant to Clean Water Act, Section 303(d); therefore a Sampling and Analysis Plan for Sediment is not required.

6.2 Sampling and Analysis Plan for Non-Visible Pollutants

The Sampling and Analysis Plan (SAP) for non-visible pollutants describes the sampling and analysis strategy and schedule for monitoring non-visible pollutants in stormwater discharges from the project site and offsite activities directly related to the project in accordance with the requirements of Section B of the General Permit, including SWRCB Resolution 2001-046.

6.2.1 Scope of Monitoring Activities

The following are common construction materials, wastes, or activities that are potential sources of non-visible pollutants to stormwater discharges from a project. Identification, storage, use, and operational locations of the potential sources at this project will be determined, identified on site maps, and incorporated into this SWPPP at a later date.

- Vehicle batteries
- Painting products
- Contaminated soil
- Line flushing products
- Dust palliative products
- Masonry products
- Landscaping products
- Concrete curing
- Sealants
- Adhesives
- Cleaning products

Soil amendments may be used on the project site that have the potential to change the chemical properties, engineering properties, or erosion resistance of the soil.

The project may have the potential to receive stormwater run-on with the potential to contribute non-visible pollutants to stormwater discharges from the project. There currently are no data available regarding stormwater run-on. This data will be added to the SWPPP when it is available.

Sampling for non-visible pollutants will be conducted when (1) a breach, leakage, malfunction, or spill is observed; and (2) the leak or spill has not been cleaned up prior to the rain event; and (3) there is the potential for discharge of non-visible pollutants to surface waters or drainage system.

6.2.2 Monitoring Strategy

Sampling Schedule

Samples for the applicable non-visible pollutant(s) and a sufficiently large uncontaminated background sample shall be collected during the first two hours of discharge from rain events that result in a sufficient discharge for sample collection. Samples shall be collected during daylight hours (sunrise to sunset) and shall be collected regardless of the time of year, status of the construction site, or day of the week.

In conformance with the U.S. Environmental Protection Agency definition, a minimum of 72 hours of dry weather will be used to distinguish between separate rain events.

Collection of discharge samples for non-visible pollutant monitoring will be triggered when any of the following conditions are observed during the required inspections conducted before or during rain events:

- Materials or wastes containing potential non-visible pollutants are not stored under watertight conditions. Watertight conditions are defined as: (1) storage in a watertight container, (2) storage under a watertight roof or within a building, or (3) protected by temporary cover and containment that prevents stormwater contact and runoff from storage area.
- Materials or wastes containing potential non-visible pollutants are stored under watertight conditions, but: (1) a breach, malfunction, leakage, or spill is observed, (2) the leak or spill is not cleaned up prior to the rain event, and (3) there is the potential for discharge of non-visible pollutants to surface waters or a storm sewer system.
- An operational activity with the potential to contribute non-visible pollutants (1) was occurring during or within 24 hours prior to the rain event, (2) applicable BMPs were observed to be breached, malfunctioning, or improperly implemented, and (3) there is the potential for discharge of non-visible pollutants to surface waters or storm sewer system.
- Soil amendments that have the potential to change the chemical properties, engineering properties, or erosion resistance of the soil have been applied, and there is the potential for discharge of non-visible pollutants to surface waters or a storm sewer system.

Sampling Locations

Considerations for determining sampling locations will be proximity to the non-visible pollutant of concern, accessibility for sampling, personnel safety, and other factors in accordance with the applicable requirements in the Permit.

Sampling locations for the collection of samples of run-on to the project site with the potential to combine with discharges being sampled for non-visible pollutants will be identified at a later date. These samples will be intended to identify sources of potential non-visible pollutants that originate off the project site.

A background sample location for comparison with the samples being analyzed for non-visible pollutants will be selected such that the sample will not have come in contact with: (1) operational or storage areas associated with project materials, wastes, and activities; (2) areas in which soil amendments that have the potential to change the chemical properties, engineering properties, or erosion resistance of the soil have been applied; or (3) disturbed soil areas.

If an operational activity or stormwater inspection conducted 24 hours prior to or during a rain event identifies the presence of a material storage, waste storage, or operations area with spills or the potential for the discharge of non-visible pollutants to surface waters or a storm sewer system that was an unplanned location, sampling locations will be selected using the same rationale as that used to identify planned locations.

6.2.3 Monitoring Preparation

The person collecting samples on the project site will be selected at a later date.

Prior to the rainy season, all sampling personnel and alternates will review the SAP. Qualifications of designated personnel describing environmental sampling training and experience will be provided as an Attachment in this SWPPP.

An adequate stock of monitoring supplies and equipment for monitoring non-visible pollutants will be available on the project site prior to a sampling event. Monitoring supplies and equipment will be stored in a cool-temperature environment that will not come into contact with rain or direct sunlight. Sampling personnel will be available to collect samples in accordance with the sampling schedule.

Supplies maintained at the project site will include, but are not limited to, surgical gloves, sample collection equipment, coolers, appropriate number and volume of sample bottles, identification labels, re-sealable storage bags, paper towels, personal rain gear, ice, Sampling Activity Log forms, and Chain of Custody (COC) forms. Field equipment will be obtained and maintained for analyzing samples in the field.

6.2.4 Analytical Constituents

Identification of Non-Visible Pollutants

Table 6.2-1 lists common potential sources and types of non-visible pollutants on a project site and the applicable water quality indicator constituent(s) for that pollutant. The table will be updated with the onsite materials at a later date.

TABLE 6.2-1
Potential Non-Visible Pollutants and Water Quality Indicator Constituents

Pollutant Source	Pollutant	Water Quality Indicator Constituent
Sealant	Methyl Methacrylate, Cobalt, Zinc	Methyl Methacrylate, Cobalt, Zinc
Solvents/Thinners	VOC	COD, VOC
Adhesives	Phenols, SVOC	COD, Phenols, SVOC
Batteries	Sulfuric acid, Lead	Sulfuric acid, Lead, pH
Herbicides	Herbicide	Herbicide

6.2.5 Sample Collection and Handling

Procedures

Samples of discharge will be collected at the designated sampling locations for observed breaches, malfunctions, leakages, spills, operational areas, soil amendment application areas, and historical site usage areas that triggered the sampling event.

Grab samples will be collected and preserved in accordance with the methods identified in the Table included in the Sample Analysis Section. Only personnel trained in proper water quality sampling will collect samples.

Samples will be collected by placing a separate lab-provided sample container directly into a stream of water downgradient and within close proximity to the potential non-visible pollutant discharge location. This separate lab-provided sample container will be used to collect water, which will be transferred to sample bottles for laboratory analysis. The upgradient and uncontaminated background samples shall be collected first prior to collecting the downgradient to minimize cross-contamination. The sampling personnel will collect the water upgradient of where they are standing. Once the separate lab-provided sample container is filled, the water sample will be poured directly into sample bottles provided by the laboratory for the analyte(s) being monitored.

To maintain sample integrity and prevent cross-contamination, sampling collection personnel will:

- Wear a clean pair of surgical gloves prior to the collection and handling of each sample at each location.
- Not contaminate the inside of the sample bottle by not allowing it to come into contact with any material other than the water sample.
- Discard sample bottles or sample lids that have been dropped onto the ground prior to sample collection.
- Not leave the cooler lid open for an extended period of time once samples are placed inside.
- Not sample near a running vehicle where exhaust fumes may impact the sample.

- Not touch the exposed end of a sampling tube, if applicable.
- Avoid allowing rainwater to drip from rain gear or other surfaces into sample bottles.
- Not eat, smoke, or drink during sample collection.
- Not sneeze or cough in the direction of an open sample bottle.
- Minimize the exposure of the samples to direct sunlight, as sunlight may cause biochemical transformation of the samples to take place.
- Decontaminate sampling equipment prior to sample collection using a TSP-soapy water wash, distilled water rinse, and final rinse with distilled water.
- Dispose of decontamination water/soaps appropriately; i.e., not discharge to the storm drain system or receiving water.

Sample Handling Procedures

Immediately following collection, sample bottles for laboratory analytical testing will be capped, labeled, documented on a COC form provided by the analytical laboratory, sealed in a re-sealable storage bag, placed in an ice-chilled cooler, at as near to 4 degrees Celsius as practicable, and delivered within 24 hours to a California state-certified laboratory to be identified at a later date.

Any samples for field analysis will be tested immediately following collected in accordance with the field instrument manufacturer's instructions and results recorded on a Sampling Activity Log.

Sample Documentation Procedures

All original data documented on sample bottle identification labels, COC forms, Sampling Activity Logs, and Inspection Checklists will be recorded using waterproof ink. These will be considered accountable documents. If an error is made on an accountable document, the individual will make corrections by lining through the error and entering the correct information. The erroneous information will not be obliterated. All corrections will be initialed and dated.

Sampling and field analysis activities will be documented using the following:

Sample Bottle Identification Labels. Sampling personnel will attach an identification label to each sample bottle. At a minimum, the following information will be recorded on the label, as appropriate:

- Project name
- Project number
- Unique sample identification number and location
- [Project Number]-[Six digit sample collection date]-[Location]
- Quality assurance/quality control (QA/QC) samples shall be identified similarly using a unique sample number or designation

- Collection date/time (No time applied to QA/QC samples)
- Analysis constituent

Sampling Activity Logs. A log of sampling events will identify:

- Sampling date
- Separate times for collected samples and QA/QC samples recorded to the nearest minute
- Unique sample identification number and location
- Analysis constituent
- Names of sampling personnel
- Weather conditions (including precipitation amount)
- Field analysis results
- Other pertinent data

Chain of Custody (COC) forms. All samples to be analyzed by a laboratory will be accompanied by a COC form provided by the laboratory. Only the sample collectors will sign the COC form over to the lab. COC procedures will be strictly adhered to for QA/QC purposes.

Stormwater Quality Construction Inspection Checklists. When applicable, the Contractor's stormwater inspector will document on the checklist that samples for non-visible pollutants were taken during a rain event.

6.2.6 Sample Analysis

Samples will be analyzed for applicable constituents using the analytical methods identified in Table 6.2-2. The table will be updated once the onsite materials have been identified. For samples collected for field analysis, collection, analysis, and equipment calibration and maintenance will be in accordance with the field instrument manufacturer's specifications.

TABLE 6.2-2
Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants

Constituent	Analytical Method	Minimum Sample Volume	Sample Bottle	Sample Preservation	Reporting Limit	Maximum Holding Time
VOCs – Solvents	EPA 8260B	3 x 40 mL	VOA – glass	Store at 4° C, HCl to pH < 2	1 microgram/L	14 days
SVOCs	EPA 8270C	1 x 1 L	Glass – amber	Store at 4° C	10 micrograms/L	7 days
COD	EPA 410.4	1 x 250 mL	Glass – amber	Store at 4° C, H ₂ SO ₄ to pH < 2	5 mg/L	28 days
pH	EPA 150.1	1 x 100 mL	Polypropylene	None	Unitless	Immediate

metals	EPA 6010B/7470A	1 x 250 mL	Polypropylene	Store at 4° C, HNO ₃ to pH < 2	0.1 mg/L	6 months
Herbicides	EPA 8151A	1 x 1 L	Glass – amber	Store at 4° C	Check lab	7 days

The instrument(s) will be calibrated before each sampling and analysis event. Maintenance and calibration records will be maintained with the SWPPP.

6.2.7 Quality Assurance/Quality Control

For an initial verification of laboratory or field analysis, duplicate samples will be collected at a rate of 10 percent or 1 duplicate per sampling event. The duplicate sample will be collected, handled, and analyzed using the same protocols as primary samples. A duplicate sample will be collected at each location immediately after the primary sample has been collected. Duplicates will be collected where contamination is likely, not on the background sample. Duplicate samples will not influence any evaluations or conclusions; however, they will be used as a check on laboratory quality assurance.

6.2.8 Data Management and Reporting

A copy of all water quality analytical results and QA/QC data will be submitted to the Owner/Developer within 5 days of sampling (for field analyses) and within 30 days (for laboratory analyses).

Lab reports and COCs will be reviewed for consistency between lab methods, sample identifications, dates, and times for both primary samples and QA/QC samples. All data, including COC forms and Sampling Activity Logs, shall be kept with the SWPPP.

6.2.9 Data Evaluation

An evaluation of the water quality sample analytical results, including figures with sample locations, will be submitted to the Owner/Developer with the water quality analytical results and the QA/QC data.

Should the runoff/ downgradient sample show an increased level of the tested analyte relative to the background sample, the BMPs, site conditions, and surrounding influences will be assessed to determine the probable cause for the increase. As determined by the site and data evaluation, appropriate BMPs will be repaired or modified to mitigate discharges of non-visual pollutant concentrations. Any revisions to the BMPs will be recorded as an amendment to the SWPPP.

6.2.10 Change of Conditions

Whenever SWPPP monitoring, pursuant to Section B of the General Permit, indicates a change in site conditions that might affect the appropriateness of sampling locations or introduce additional non-visible pollutants of concern, testing protocols will be revised accordingly. All such revisions will be recorded as amendments to the SWPPP.

Non-Stormwater Management

7.1 General

Non-stormwater management at the construction sites mainly involves prevention of contamination in runoff. Non-stormwater discharges from the project site are not anticipated due to effective implementation of control practices.

7.2 Inventory for Pollution Prevention Plan

The following substances are expected to be present onsite during construction:

- Portland Concrete Cement and masonry products
- Paints
- Detergents
- Fuels
- Lubricants
- Lumber
- Solvents
- Asphalt products
- Adhesives

Contractors are required by state and federal law to have inventories of hazardous materials. If the use of other types of hazardous materials at the site becomes necessary, the SWPPP will be amended as needed.

7.3 Hazardous Materials Management Plan

A variety of chemicals will be stored and used during construction of the facility. Hazardous materials to be used during construction include unleaded gasoline, diesel fuel, oil, lubricants (i.e., motor oil, transmission fluid, and hydraulic fluid), solvents, adhesives, paint materials, and building materials such as asphalt, sealants, and concrete. There are no feasible alternatives to these materials for construction or operation of construction vehicles and equipment, or for painting and caulking buildings and equipment.

In general, construction contractors will use lubricating oils, solvents, and other hazardous materials during construction of the Highgrove Project. The contractor will be responsible for assuring that the use, storage and handling of these materials will comply with applicable federal, state, and local LORS, including licensing, personnel training, accumulation limits, reporting requirements, and recordkeeping.

All equipment will be maintained to prevent leaks and spills, and fueling will only be conducted within contained areas. Spill containment equipment will be available if it is

needed. Any contaminated soils resulting from spills will be dug up as quickly as possible, and then removed from the site for proper disposal.

7.4 Prevention of Non-Stormwater Discharges

There will be specific designated temporary waste storage areas onsite. These areas will be contained within earthen berms or an equivalent barrier measure. Non-hazardous construction wastes (trash and construction debris) will be collected and placed into commercial disposal containers as soon as possible.

BMPs that will be implemented to prevent non-stormwater discharges include:

- Monitor all vehicle and equipment fueling and maintenance activities; fuel offsite wherever possible (BMPs NS-9 and NS-10)
- Use secondary containment for hazardous material delivery and storage areas to prevent spills or leakage of liquid material from contaminating soil or soaking into the ground (BMP WM-1)
- Train employees on the proper use of materials such as fuel, oil, asphalt and concrete compounds, paints, solvents, etc. (BMP WM-2)
- Store all liquid wastes in covered containers (BMP WM-4)
- Regularly remove construction wastes (BMP WM-5)
- Educate employees, subcontractors, and suppliers on concrete waste management techniques (BMP WM-8)
- Use portable toilet facilities managed and regularly serviced by a licensed contractor (BMP WM-9)
- Keep water equipment in good working condition; do not use water to clean pavement (BMP NS-1)
- Use practices for conducting paving operations to minimize the transport of pollutants to the stormdrain system (BMP NS-3)
- Recognize and report illicit connections or discharges (BMP NS-6)
- Restrict vehicle and equipment washing to designated areas (BMP NS-8)
- Use proper procedures to minimize pollution of runoff during concrete curing and finishing (BMPs NS-12 and NS-14)

7.4.1 Good Housekeeping

The following good housekeeping practices will be followed on all construction sites during the construction project:

- An effort will be made to store only enough product required to do the job.
- All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers, and, if possible, under a roof or other enclosure.

- Products will be kept in their original containers with the original manufacturer's label.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all of a product will be used before disposing of the container.
- Manufacturer and/or State and local recommendations for proper use and disposal will be followed.
- Storage areas including equipment storage will be inspected for visible signs of oil or other spillages.

7.4.2 Product Specific Practices

The following product-specific practices will be followed onsite:

- **Petroleum Products:** All onsite vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the potential for leakage. Petroleum products will be stored in tightly sealed containers that are clearly labeled. Asphalt substances used onsite will be applied according to the manufacturers' recommendations.
- **Paints:** Containers will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the storm sewer system but will be disposed of properly according to manufacturers' instructions and State and local regulations.
- **Concrete:** Equipment used for concrete mixing and transport will not be allowed to wash out or discharge surplus concrete or drum wash water on the site except in areas specifically designated for rinse out as indicated in Section 3.2.3. Wash water will be contained in a temporary pit where waste concrete can harden for later removal. Fresh concrete washing will be avoided unless runoff can be drained to a bermed or level area, away from waterways and storm drain inlets.

7.4.3 Spill Prevention Practices

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup:

- Manufacturers' recommended methods for spill cleanup will be clearly posted and personnel will be made aware of the procedures and the location of the information and cleanup supplies.
- Materials and equipment necessary for spill cleanup will be kept in the material storage area onsite, and will include, but not limited to brooms, dustpans, mops, rags, gloves, goggles, absorbents (e.g., kitty litter, sand, sawdust), and plastic and metal trash containers specifically for this purpose.
- Spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from and contact with a hazardous substance.

- The Project Manager (or designee) will be the spill prevention and cleanup coordinator. The names of additional responsible spill personnel and authorized contractors will be posted in various areas.
- Spills of toxic or hazardous materials will be reported to the Project Supervisor (or designee) regardless of the size.
- Spills of hazardous materials that exceed their reportable quantities will be reported to all appropriate local, state and federal government agencies.

Contaminated soil or debris that cannot be recycled, reused or salvaged, will be collected and stored in securely lidded dumpsters rented from a licensed solid waste management company. The dumpsters will meet all local and State solid waste management regulations. Potentially hazardous wastes will be separated from known non-hazardous wastes. This includes the segregation of storage areas and proper labeling of containers. All waste will be removed from the site by licensed contractors in accordance with applicable regulatory requirements and disposed of at either local or regional approved facilities. No waste materials will be buried onsite. All personnel will be instructed regarding the correct procedures for waste disposal. Notices stating these procedures will be posted in various areas.

The Project Manager (or designee) will be responsible for investigating spills and determining whether the reportable quantity has been exceeded. Regulations defining the reportable quantity levels for oil and hazardous substances are found in 40 CFR Part 110, Part 117 or Part 302. Should a release occur during construction activities that exceeds the reportable quantity, the following steps should be taken:

- Notify Local Emergency Response Agency at 9-1-1
- Notify the National Response Center immediately at 800-424-8802
- Notify Governor's office of Emergency Services Warning Center at 805-852-7550

A written description of the release should be submitted to the USEPA Regional Office providing the date, circumstances of the release, and the preventative measures taken to prevent further releases.

7.4.4 Isolation of Potentially Hazardous Materials

A supply of drums will be available in the event of spills of known materials or if potentially hazardous materials are found during project construction. The contaminated material will be placed in the drums, sealed and placed in a storage area to await proper characterization and disposal. The sealed drums should be further placed in a lined roll-off container with a tarpaulin cover. In this case, the potentially hazardous materials are stored in a marked covered area that has secondary containment. In the event that a larger amount of material needs to be isolated, it will be placed directly into a lined roll-off container from a licensed hazardous waste transporter. The roll-off container will be placed out of the flow of construction traffic and equipment, in a bermed area to contain and isolate possible leaks and rainwater. In the unlikely event that even larger volumes of potentially hazardous material must be temporarily held awaiting disposition, a containment area will be constructed. Plastic sheeting will be laid on the ground prior to placement of the contaminated material and the material itself will be covered. A berm will surround the covered material to keep any rainwater from leaving the site.

SECTION 8

Waste Management and Disposal

All wastes (including waste oil and other equipment maintenance waste) from the Highgrove Project construction shall be disposed of in compliance with federal, state, and local laws, regulations, and ordinances. Specific waste management and disposal procedures have been addressed in previous sections of this plan (see Section 3.3.2).

SECTION 9

Annual Review and Certification

Annually, the Project Manager (or designee) will review performance under the SWPPP and certify that construction activities are in compliance with the requirements of the Storm Water General Permit and the SWPPP. This Certification shall be based upon knowledge of construction activities and the site inspections conducted in accordance with the General Permit. The certification must be completed by July 1 of each year, and maintained for at least 3 years. If necessary, amendments to the SWPPP will be prepared and submitted at this time.

SECTION 10

SWPPP Administration

The Project Manager (or designee) will be identified in this SWPPP as the qualified person(s) assigned responsibility to ensure full compliance with the permit and implementation of all elements of the SWPPP, including the preparation of the annual compliance evaluation and the elimination of all unauthorized discharges.

The following lists required as part of the SWPPP will be maintained by the Project Manager:

- List of authorized contractors who have signed certifications that they understand and will comply with the SWPPP will be maintained in Appendix E. Additional information including current and emergency telephone numbers, address, contractor's responsibilities, and the specific names of individuals responsible for implementation of the SWPPP will also be maintained.
- List the name and telephone number of the qualified person(s) who have been assigned responsibility for pre-storm, post-storm, and storm event inspections (Appendix F).
- List of amendments will be maintained from the date of the first amendment prepared to the date of the most recent amendment (Appendix H). The SWPPP and each amendment will be certified by the Project Manager (or designee).

SECTION 11

Contractors/Subcontractors

The prime construction contractor will be included in this SWPPP upon award of the construction contract. Portions of the work are likely to be subcontracted to various specialty contractors. All subcontractors will be required to comply with the requirements of this permit. A list of authorized contractors/subcontractors will be maintained in Appendix E.

SECTION 12

SWPPP Certification by Contractor

The contractor who is authorized to implement and amend this SWPPP will be required to sign and certify that the SWPPP is in conformance with the General Permit. The Contractor is designated as the responsible party for the overall stormwater management at the site. By signing the Certification (found in Appendix D), the Contractor agrees to the following:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel prepared the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for preparing 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.

SECTION 13

SWPPP Certification by Preparer

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel prepared the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for preparing 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.

Signed

Position

Date

SECTION 14

Notice of Intent

A copy of a blank Notice of Intent (NOI) Form to obtain coverage under the State General Construction Activity Storm Water Permit is included in Appendix A. The Notice of Intent will be filed by the contractor prior to initiation of project construction as required.

References

California Department of Conservation (CDC). 2005. Farmland Mapping and Monitoring Program, Soil Candidate Listing for Prime Farmland and Farmland of Statewide Importance for San Bernardino County. Updated August 23.

CDC. 2005a. Farmland Mapping and Monitoring Program, Soil Candidate Listing for Prime Farmland and Farmland of Statewide Importance for Riverside County. Updated August 23.

CDC. 2002. Farmland Mapping and Monitoring Program Maps for San Bernardino County and for Riverside County. Division of Land Resource Protection, Sacramento.

CDC. 1995. Farmland Mapping and Monitoring Program Soil Candidate Listing for Prime Farmland and Farmland of Statewide Importance for Riverside County. August 1.

City of Grand Terrace. 2001. Zoning Code (Title 18 of the Grand Terrace Municipal Code). August.

City of Grand Terrace. 1988. General Plan. December.

Federal Emergency Management Agency (FEMA). 1997. Flood Insurance Rate Map: County of San Bernardino (panel number 060270)/City of Grand Terrace (panel number 060737).

National Resource Conservation Service (NRCS) (formerly the Soil Conservation Service [SCS] of the U.S. Department of Agriculture). 2005. Official Soil Series Descriptions [Online WWW]. Available URL: "<http://soils.usda.gov/technical/classification/osd/index.html>" [Accessed January 16, 2005].

NRCS. 1980. Soil Survey of San Bernardino County, Southwestern Part, California. January.

NRCS. 1971. Soil Survey Western Riverside Area, California. November.

State of California Department of Transportation (Caltrans). 2003. *Caltrans Storm Water Quality Handbooks*.

Storm Water Quality Task Force. 1993. *California Stormwater Best Management Practices Handbooks*. Volume 2: Commercial/Industrial Handbook.

APPENDIX A

Notice of Intent



State Water Resources Control Board

NOTICE OF INTENT

TO COMPLY WITH THE TERMS OF THE
GENERAL PERMIT TO DISCHARGE STORM WATER
ASSOCIATED WITH CONSTRUCTION ACTIVITY (WQ ORDER No. 99-08-DWQ)



I. NOI STATUS (SEE INSTRUCTIONS)

MARK ONLY ONE ITEM	1. <input type="checkbox"/> New Construction	2. <input type="checkbox"/> Change of Information for WDID#	<input type="text"/>
--------------------	--	---	----------------------

II. PROPERTY OWNER

Name	Contact Person		
Mailing Address	Title		
City	State	Zip	Phone

III. DEVELOPER/CONTRACTOR INFORMATION

Developer/Contractor	Contact Person		
Mailing Address	Title		
City	State	Zip	Phone

IV. CONSTRUCTION PROJECT INFORMATION

Site/Project Name		Site Contact Person		
Physical Address/Location		Latitude	Longitude	County
City (or nearest City)		Zip	Site Phone Number	Emergency Phone Number
A. Total size of construction site area: _____ Acres	C. Percent of site imperviousness (including rooftops): Before Construction: _____% After Construction: _____%		D. Tract Number(s) E. Mile Post Marker:	
B. Total area to be disturbed: _____ Acres (% of total _____)		F. Is the construction site part of a larger common plan of development or sale? <input type="checkbox"/> YES <input type="checkbox"/> NO		
G. Name of plan or development:		H. Construction commencement date: ____/____/____		
I. % of site to be mass graded: _____		J. Projected construction dates: Complete grading: _____ Complete project: _____		
K. Type of Construction (Check all that apply): 1. <input type="checkbox"/> Residential 2. <input type="checkbox"/> Commercial 3. <input type="checkbox"/> Industrial 4. <input type="checkbox"/> Reconstruction 5. <input type="checkbox"/> Transportation 6. <input type="checkbox"/> Utility Description: _____ 7. <input type="checkbox"/> Other (Please List): _____				

V. BILLING INFORMATION

SEND BILL TO: <input type="checkbox"/> OWNER (as in II. above)	Name.	Contact Person	
<input type="checkbox"/> DEVELOPER (as in III. above)	Mailing Address	Phone/Fax	
<input type="checkbox"/> OTHER (enter information at right)	City	State	Zip

VI. REGULATORY STATUS

A. Has a local agency approved a required erosion/sediment control plan?..... YES NO
 Does the erosion/sediment control plan address construction activities such as infrastructure and structures?..... YES NO
 Name of local agency: _____ Phone: _____

B. Is this project or any part thereof, subject to conditions imposed under a CWA Section 404 permit of 401 Water Quality Certification?..... YES NO
 If yes, provide details: _____

VII. RECEIVING WATER INFORMATION

A. Does the storm water runoff from the construction site discharge to (Check all that apply):

1. Indirectly to waters of the U.S.
2. Storm drain system - Enter owner's name: _____
3. Directly to waters of U.S. (e.g. , river, lake, creek, stream, bay, ocean, etc.)

B. Name of receiving water: (river, lake, creek, stream, bay, ocean): _____

VIII. IMPLEMENTATION OF NPDES PERMIT REQUIREMENTS

A. STORM WATER POLLUTION PREVENTION PLAN (SWPPP) (check one)

A SWPPP has been prepared for this facility and is available for review: Date Prepared: ____/____/____ Date Amended: ____/____/____

A SWPPP will be prepared and ready for review by (enter date): ____/____/____

A tentative schedule has been included in the SWPPP for activities such as grading, street construction, home construction, etc.

B. MONITORING PROGRAM

A monitoring and maintenance schedule has been developed that includes inspection of the construction BMPs before anticipated storm events and after actual storm events and is available for review.

If checked above: A qualified person has been assigned responsibility for pre-storm and post-storm BMP inspections to identify effectiveness and necessary repairs or design changes..... YES NO

Name: _____ Phone: _____

C. PERMIT COMPLIANCE RESPONSIBILITY

A qualified person has been assigned responsibility to ensure full compliance with the Permit, and to implement all elements of the Storm Water Pollution Prevention Plan including:

1. Preparing an annual compliance evaluation..... YES NO
 Name: _____ Phone: _____
2. Eliminating all unauthorized discharges..... YES NO

IX. VICINITY MAP AND FEE (must show site location in relation to nearest named streets, intersections, etc.)

Have you included a vicinity map with this submittal? YES NO

Have you included payment of the annual fee with this submittal? YES NO

X. CERTIFICATIONS

"I certify under penalty of law that this document and all attachments were prepared under my direction and 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 or imprisonment. In addition, I certify that the provisions of the permit, including the development and implementation of a Storm Water Pollution Prevention Plan and a Monitoring Program Plan will be complied with."

Printed Name: _____

Signature: _____ Date: _____

Title: _____

APPENDIX B

Stormwater Calculations



**AES HIGHGROVE ENERGY FACILITY
CITY OF GRAND TERRACE, CA**

STORM DRAIN CALCULATIONS

Project Number 322752

AES Highgrove Energy Facility, City of Grand Terrace, CA

Storm Drainage, Rational Method

Design Criteria:

Rainfall Intensity: 100 yr Storm Event

Tc = 5 min (Based from Nomograph for Kirpich Equation, Civil Engineering, Vol. 10, No. 6, June 1940, p.362)

i = 5.16 in/hr (Based on the IDF curve for 100 year storm, from NOAA Atlas 14)

A1 = 1.875 Acres
A2 = 3.953 Acres
A3 = 0.721 Acres
(See Attached Drainage Study Plan)

$$\Sigma Q = \Sigma CiA$$

Units:

Q = CFS

C = 0.69 (Recommended Rational Runoff Coefficient, San Bernardino County Hydrology Manual)

i = in/hr

A = Acres

Capacity Calculation for Detention Basin

A1 = 1.875 Acres

(See Attached Drainage Study Plan)

A2 = 3.953 Acres

A3 = 0.721 Acres

R = 4.310 in

(Based on the IDF curve, from NOAA Atlas 14 for 10 year-48 hour storm event per Caltrans Standard Specifications, Section 77, July 1992)

 $\Sigma V = \Sigma CAR/12$

Caltrans Standard Specifications, Section 77, July 1992

Units:

V = Acre-Feet

C = 0.69 (Recommended Rational Runoff Coefficient, San Bernardino County Hydrology Manual)

A = Acres

R = Rainfall Value in inches



Preliminary
(to be verified in final design)

AES HIGHGROVE ENERGY FACILITY
STORM DRAINAGE RUNOFF (POST DEVELOPMENT)

DRAINAGE AREA	Rainfall (inches)	TYPE OF SURFACE	AREA (FT ²)	AREA (ACRES)	COEFFICIENT ©	I(100yr) (in/hr)	Q (100yr) (cfs)	Q' (100yr)	Q CUM (cfs)	Volume (acre-feet)
								(cfs)		
								LINE TOTAL	BRANCH TOTAL	
A1	4.310	Asphalt Paving	81671.21	1.875	0.69	5.16	6.73			0.465
A2	4.310	Asphalt Paving	172187.21	3.953	0.69	5.16	14.19			0.980
A3	4.310	Asphalt Paving	31403.88	0.721	0.69	5.16	2.59	23.51	23.51	0.179
SUM=										1.623



POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14



California 34.03 N 117.32 W 1062 feet

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 1, Version 3

G.M. Bonnin, D. Todd, B. Lin, T. Parzybok, M. Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland, 2003

Extracted: Thu May 4 2006

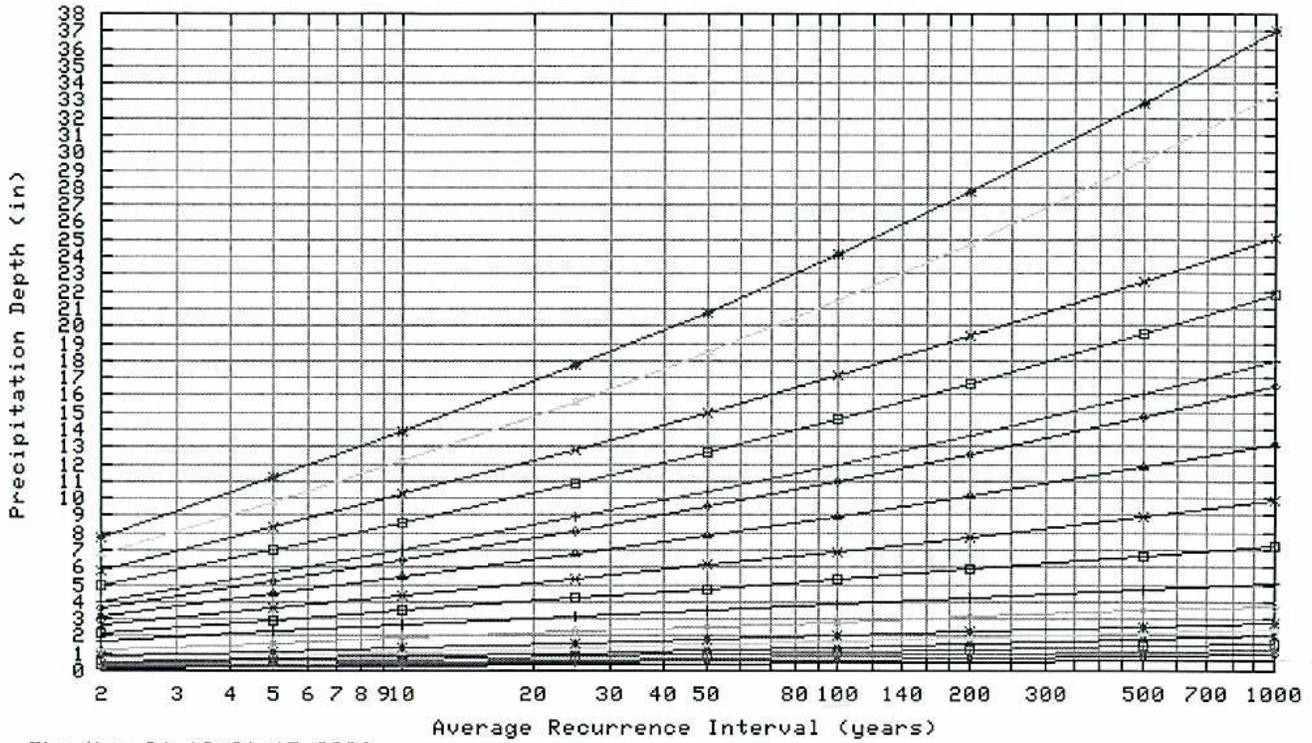
Confidence Limits	Seasonality	Location Maps	Other Info.	GIS data	Maps	Help	D
-------------------	-------------	---------------	-------------	----------	------	------	---

Precipitation Frequency Estimates (inches)																		
ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
2	0.16	0.25	0.31	0.42	0.52	0.72	0.88	1.26	1.73	2.21	2.61	3.15	3.64	4.03	4.91	5.82	6.73	7.74
5	0.22	0.33	0.41	0.55	0.68	0.93	1.12	1.61	2.24	2.94	3.58	4.43	5.19	5.72	6.99	8.31	9.77	11.17
10	0.26	0.39	0.49	0.66	0.81	1.09	1.32	1.89	2.62	3.48	4.31	5.41	6.40	7.04	8.60	10.21	12.18	13.87
25	0.32	0.48	0.60	0.81	1.00	1.32	1.59	2.25	3.13	4.21	5.32	6.75	8.10	8.89	10.86	12.83	15.62	17.70
50	0.37	0.56	0.70	0.94	1.16	1.51	1.81	2.52	3.50	4.76	6.11	7.83	9.47	10.38	12.68	14.91	18.44	20.81
100	0.43	0.65	0.80	1.08	1.34	1.71	2.03	2.81	3.88	5.33	6.93	8.95	10.94	11.96	14.60	17.09	21.49	24.16
200	0.48	0.74	0.91	1.23	1.52	1.92	2.26	3.09	4.26	5.89	7.78	10.13	12.50	13.64	16.63	19.37	24.78	27.74
500	0.57	0.86	1.07	1.44	1.79	2.21	2.58	3.48	4.75	6.65	8.94	11.78	14.71	16.02	19.50	22.54	29.51	32.85
1000	0.64	0.97	1.20	1.62	2.00	2.44	2.83	3.77	5.13	7.22	9.86	13.09	16.50	17.94	21.80	25.07	33.42	37.04

Text version of table

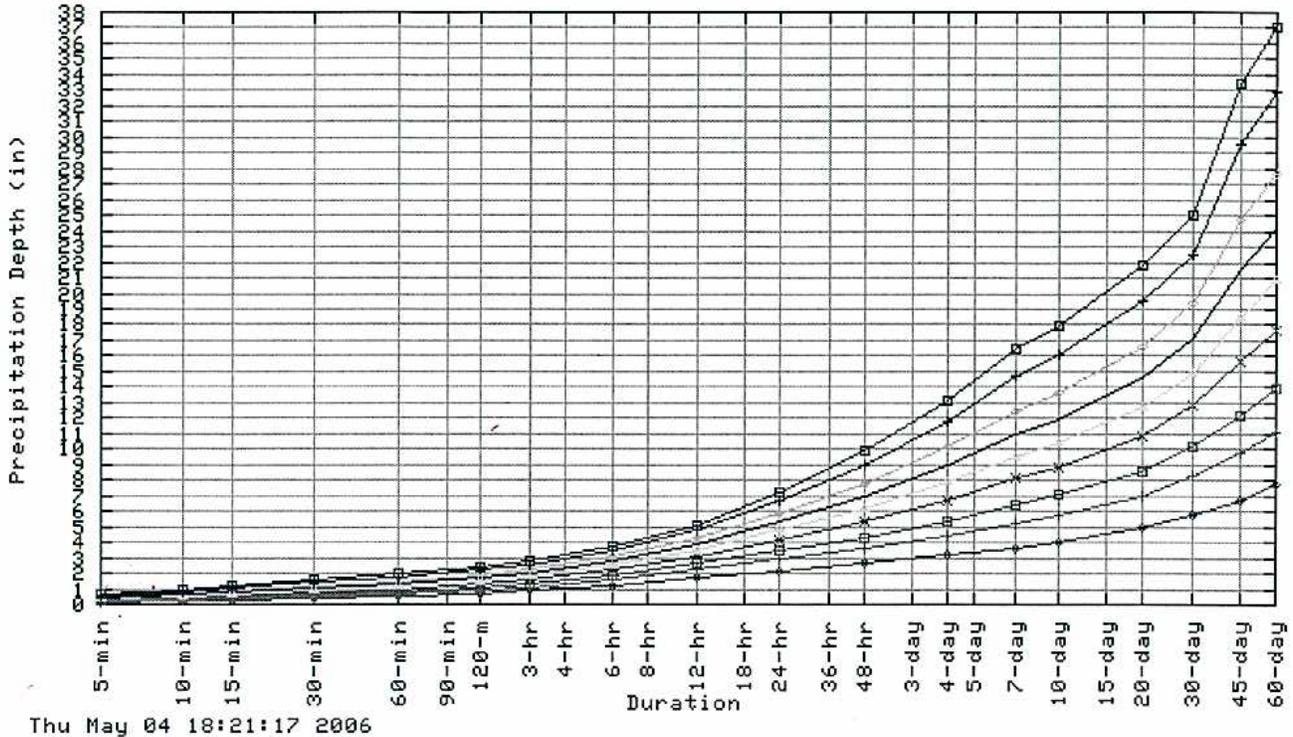
* These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval. Please refer to the documentation for more information. NOTE: Formatting forces estimates near zero to appear as zero.

Partial duration based Point Precipitation Frequency Estimates Version: 3
 34.03 N 117.32 W 1062 ft



Thu May 04 18:21:17 2006

Duration			
5-min	—	120-min	—
10-min	+	3-hr	*
15-min	+	6-hr	*
30-min	+	12-hr	+
60-min	+	24-hr	+
48-hr	+	30-day	+
4-day	+	45-day	+
7-day	+	60-day	*
10-day	+		
20-day	+		



Average Recurrence Interval (years)	
2	—
5	—
10	—
25	—
50	—
100	—
200	—
500	—
1000	—

Confidence Limits -

* Upper bound of the 90% confidence interval Precipitation Frequency Estimates (inches)																		
ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
2	0.19	0.29	0.36	0.48	0.59	0.81	1.00	1.40	1.92	2.48	2.93	3.51	4.06	4.50	5.49	6.51	7.63	8.75
5	0.25	0.38	0.47	0.63	0.78	1.05	1.27	1.79	2.49	3.30	4.01	4.92	5.78	6.38	7.82	9.28	11.05	12.62
10	0.29	0.45	0.56	0.75	0.93	1.23	1.50	2.08	2.91	3.90	4.83	6.00	7.12	7.84	9.61	11.39	13.75	15.63
25	0.36	0.55	0.69	0.92	1.14	1.49	1.80	2.49	3.46	4.71	5.95	7.49	8.98	9.87	12.10	14.27	17.55	19.87
50	0.42	0.64	0.79	1.07	1.32	1.70	2.04	2.79	3.88	5.32	6.82	8.67	10.51	11.51	14.10	16.58	20.69	23.34
100	0.48	0.73	0.91	1.23	1.52	1.92	2.29	3.10	4.29	5.94	7.74	9.92	12.13	13.27	16.22	18.99	24.09	27.06
200	0.55	0.83	1.03	1.39	1.72	2.15	2.55	3.42	4.71	6.56	8.69	11.24	13.87	15.12	18.46	21.52	27.73	31.06
500	0.64	0.98	1.21	1.63	2.02	2.48	2.90	3.84	5.26	7.40	9.99	13.07	16.33	17.76	21.65	25.03	33.07	36.80
1000	0.72	1.10	1.36	1.83	2.26	2.74	3.19	4.17	5.67	8.04	11.03	14.54	18.35	19.93	24.25	27.89	37.48	41.50

* The upper bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are greater than.
 ** These precipitation frequency estimates are based on a partial duration series, ARI is the Average Recurrence Interval.
 Please refer to the documentation for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

* Lower bound of the 90% confidence interval Precipitation Frequency Estimates (inches)																		
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

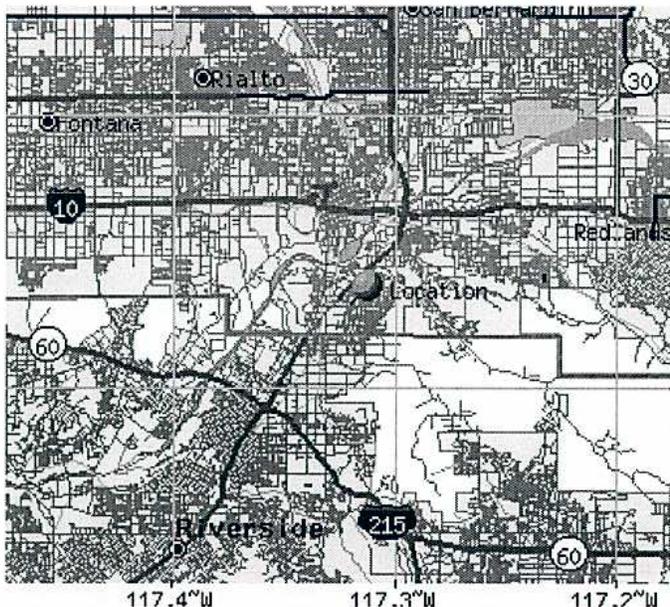
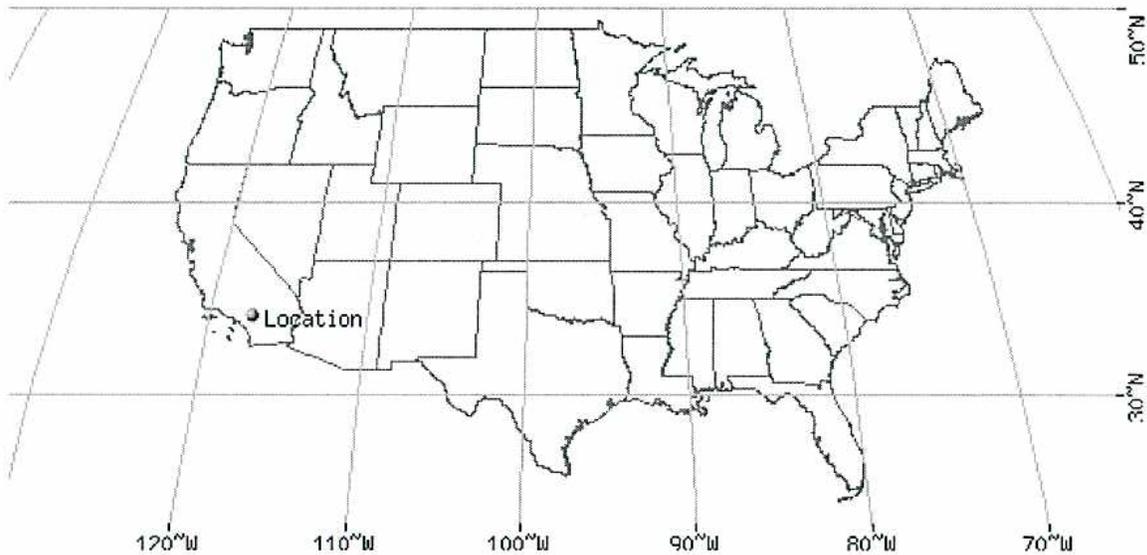
ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
2	0.15	0.22	0.28	0.37	0.46	0.64	0.79	1.14	1.56	1.97	2.32	2.85	3.27	3.62	4.41	5.21	6.00	6.93
5	0.19	0.29	0.36	0.49	0.60	0.83	1.00	1.46	2.01	2.62	3.19	4.00	4.66	5.14	6.27	7.44	8.68	9.98
10	0.23	0.35	0.43	0.58	0.72	0.97	1.18	1.69	2.35	3.10	3.82	4.86	5.72	6.31	7.69	9.11	10.77	12.34
25	0.28	0.43	0.53	0.71	0.88	1.17	1.41	2.01	2.80	3.73	4.70	6.05	7.19	7.92	9.66	11.40	13.73	15.63
50	0.32	0.49	0.61	0.82	1.01	1.33	1.59	2.25	3.12	4.20	5.37	6.98	8.36	9.21	11.21	13.17	16.11	18.27
100	0.37	0.56	0.69	0.93	1.15	1.50	1.78	2.50	3.45	4.68	6.05	7.94	9.60	10.55	12.84	15.02	18.64	21.08
200	0.41	0.63	0.78	1.05	1.30	1.67	1.97	2.74	3.77	5.16	6.75	8.93	10.88	11.94	14.52	16.91	21.32	24.02
500	0.48	0.73	0.90	1.21	1.50	1.91	2.23	3.06	4.19	5.78	7.70	10.27	12.67	13.88	16.84	19.50	25.11	28.08
1000	0.53	0.81	1.00	1.35	1.67	2.09	2.42	3.30	4.49	6.25	8.43	11.32	14.10	15.41	18.66	21.53	28.14	31.39

* The lower bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are less than.

** These precipitation frequency estimates are based on a partial duration maxima series. ARI is the Average Recurrence Interval.

Please refer to the documentation for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

Maps -



These maps were produced using a direct map request from the U.S. Census Bureau Mapping and Cartographic Resources Tiger Map Server.

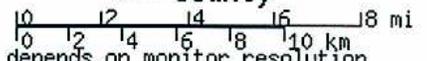
Please read disclaimer for more information.

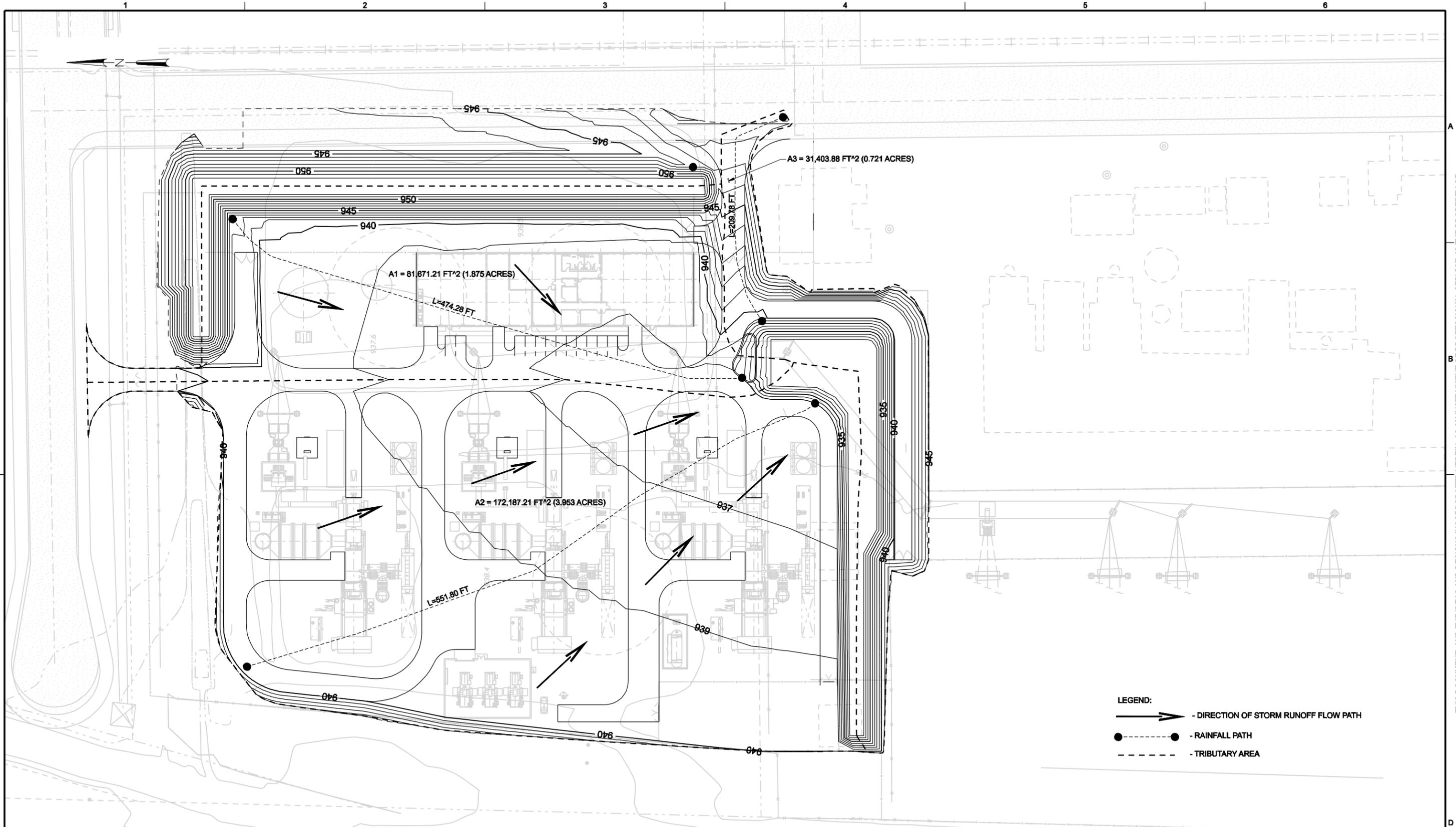
LEGEND

- State
- County
- Indian Resv
- Lake/Pond/Ocean
- Street
- Expressway
- Highway
- Connector
- Stream
- Military Area
- National Park
- Other Park
- City
- County

Scale 1:228583

*average--true scale depends on monitor resolution





LEGEND:
 → - DIRECTION OF STORM RUNOFF FLOW PATH
 ● - RAINFALL PATH
 - - - - - TRIBUTARY AREA

NO.	DATE	REVISION	BY	CHK	REVISION APPROVAL		REV	DATE	PRINT DISTRIBUTION	STATUS				
					DISCIPLINE	REVIEWED				DISCIPLINE	REVIEWED	ISSUED	REV	DATE
P1	mm/dd/yy	Preliminary For Internal Review	XXX	YYY						ISSUED				
					CIVIL					PRELIMINARY				
					STRUCTURAL					FOR REVIEW AND APPROVAL				
					MECHANICAL					APPROVED FOR CONSTRUCTION				
					PROCESS					REVISED & APPROVED FOR CONSTRUCTION				
					PIPING									

CIVIL

AES
HIGHGROVE ENERGY FACILITY

DRAINAGE STUDY
FIGURE 8.14-5

PROJ NO. 322752

CH2MHILL

DWG. NO. _____ REV. P1

SCALE 1"=40'

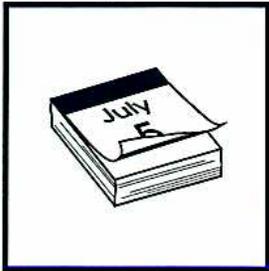
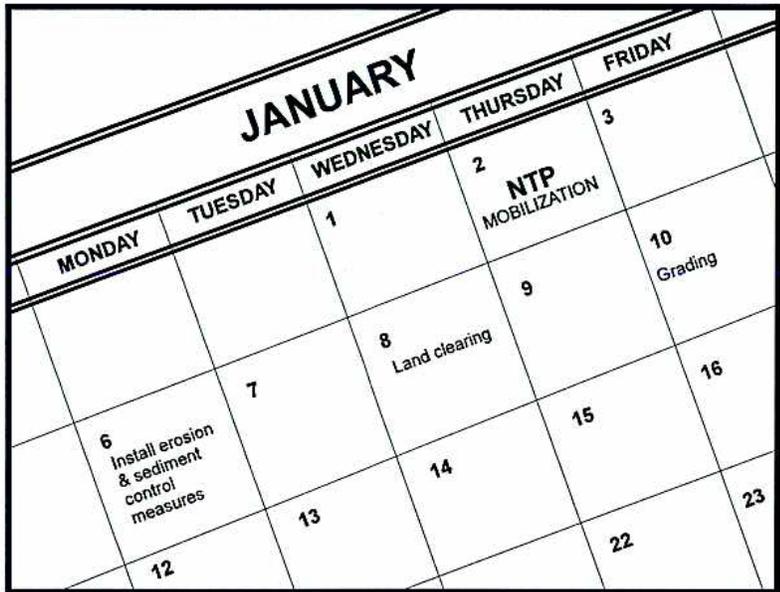
FILENAME: _____ PLOT DATE: _____ PLOT TIME: _____

BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF CH2M HILL. REUSE OF DOCUMENTS: CH2M HILL AND IS NOT TO BE USED, IN WHOLE OR IN PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF CH2M HILL. © CH2M HILL

APPENDIX C

Detailed Description of CALTRANS BMPs



Standard Symbol

- 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 developing, for every project, a schedule that includes sequencing of construction activities with the implementation of construction site BMPs such as temporary soil stabilization (erosion control) and temporary sediment controls measures. The purpose is to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff and vehicle tracking, and to perform the construction activities and control practices in accordance with the planned schedule.

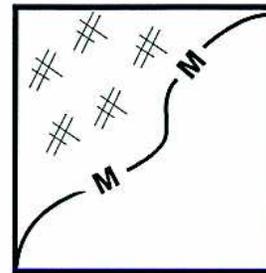
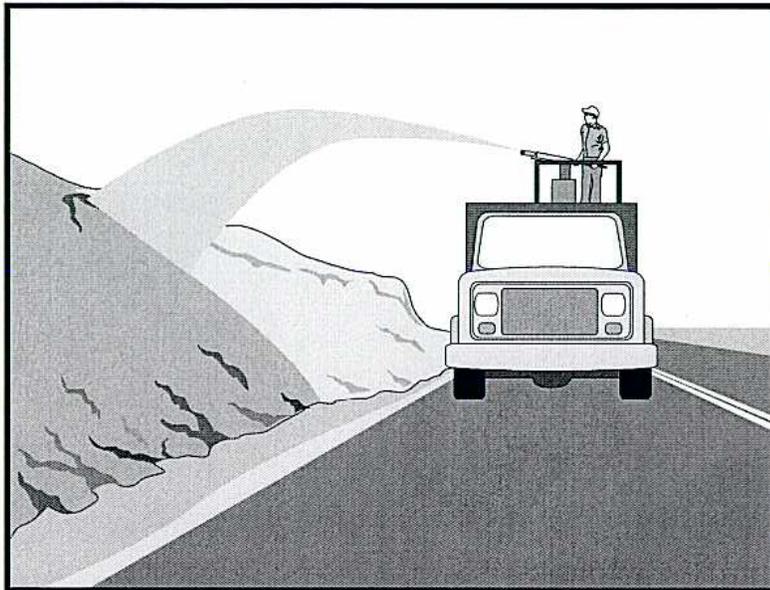
Appropriate Applications Construction sequencing shall be scheduled to minimize land disturbance for all projects during the rainy and non-rainy season. Appropriate BMPs shall be implemented during both rainy and non-rainy seasons.

Limitations None identified.

- Standards and Specifications**
- Developing a schedule and planning the project are the very first steps in an effective storm water program. The schedule shall clearly show how the rainy season relates to soil-disturbing and re-stabilization activities. The construction schedule shall be incorporated into the SWPPP or WPCP.
 - The schedule shall include detail on the rainy season implementation and deployment of:
 - Temporary soil stabilization BMPs.
 - Temporary sediment control BMPs.
 - Tracking control BMPs.
 - Wind erosion control BMPs.

- Non-storm water BMPs.
- Waste management and materials pollution control BMPs.
- Schedule shall also include dates for significant long-term operations or activities that may have planned non-storm water discharges such as dewatering, sawcutting, grinding, drilling, boring, crushing, blasting, painting, hydro-demolition, mortar mixing, bridge cleaning, etc.
- Schedule work to minimize soil disturbing activities during the rainy season.
- Develop the sequencing and timetable for the start and completion of each item such as site clearing and grubbing, grading, excavation, paving, pouring foundations, installing utilities, etc., to minimize the active construction area during the rainy season.
- Schedule major grading operations for the non-rainy season when practical.
- Stabilize non-active areas within 14 days from the cessation of soil-disturbing activities or one day prior to the onset of precipitation, whichever occurs first.
- Monitor the weather forecast for rainfall.
- When rainfall is predicted, adjust the construction schedule to allow the implementation of soil stabilization and sediment controls and sediment treatment controls on all disturbed areas prior to the onset of rain.
- Be prepared year-round to deploy soil stabilization and sediment control practices as required by Section 2 of this Manual. Erosion may be caused during dry seasons by unseasonal rainfall, wind, and vehicle tracking. Keep the site stabilized year-round, and retain and maintain rainy season sediment trapping devices in operational condition.
- Sequence trenching activities so that most open portions are closed before new trenching begins.
- Incorporate staged seeding and re-vegetation of graded slopes as work progresses.
- Consider scheduling when establishing permanent vegetation (appropriate planting time for specified vegetation).
- Apply permanent erosion control to areas deemed substantially complete during the project's defined seeding window.

- Maintenance and Inspection
- Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions.
 - Amend the schedule when changes are warranted or when directed by the Resident Engineer (RE).
 - The Special Provisions require annual submittal of a rainy season implementation schedule. Amend the schedule prior to the rainy season to show updated information on the deployment and implementation of construction site BMPs.



Standard Symbol

- BMP Objectives**

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

Definition and Purpose Hydraulic mulch consists of applying a mixture of shredded wood fiber or a hydraulic matrix and a stabilizing emulsion or tackifier with hydroseeding equipment, which temporarily protects exposed soil from erosion by raindrop impact or wind. This is one of five temporary soil stabilization alternatives to consider.

Appropriate Applications

- Hydraulic mulch is applied to disturbed areas requiring temporary protection until permanent vegetation is established or disturbed areas that must re-disturbed following an extended period of inactivity.

Limitations

- Wood fiber hydraulic mulches are generally short-lived (only last a part of a growing season) and need 24 hours to dry before rainfall occurs to be effective.
- Paper mulches are not permitted.
- Avoid use in areas where the mulch would be incompatible with immediate future earthwork activities and would have to be removed.

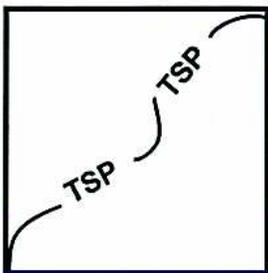
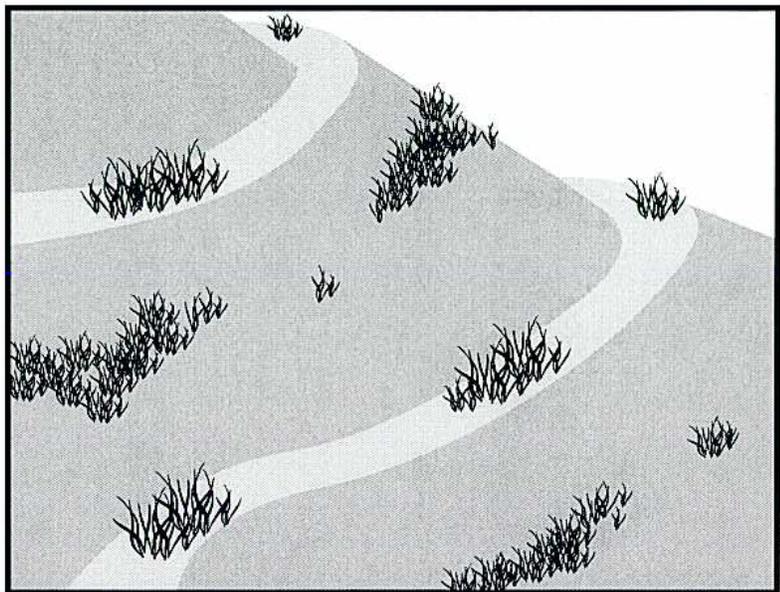
Standards and Specifications

- Prior to application, roughen embankment and fill areas by rolling with a crimping or punching type roller or by track walking. Track walking shall only be used where other methods are impractical.
- Hydraulic matrices require 24 hours to dry before rainfall occurs to be effective unless approved by the Resident Engineer.
- Avoid mulch over-spray onto the traveled way, sidewalks, lined drainage channels, and existing vegetation.
- Selection of hydraulic mulches by the Contractor must be approved by the Resident Engineer (RE) or Construction Storm Water Coordinator.

- Materials for wood fiber based hydraulic mulches and hydraulic matrices shall conform to Standard Specifications Section 20-2.07.
- Hydraulic Mulch
- Wood fiber mulch is a component of hydraulic applications. It is typically applied at the rate of 2,250 to 4,500 kilograms per hectare (kg/ha) (2,000 to 4,000 lb/ac) with 0-5% by weight of a stabilizing emulsion or tackifier (e.g., guar, psyllium, acrylic copolymer) and applied as a slurry. This type of mulch is manufactured from wood or wood waste from lumber mills or from urban sources. Specifications for wood fiber mulch can be found in Standard Specifications Sections 20-2.07 and 20-2.08.
- Hydraulic matrix is a combination of wood fiber mulch and a tackifier applied as a slurry. It is typically applied at the rate of 2,250 to 4,500 kilograms per hectare (kg/Ha) with 5-10% by weight of a stabilizing emulsion or tackifier (e.g., guar, psyllium, acrylic copolymer).
- Hydraulic Matrix
- Hydraulic matrix is a combination of wood fiber mulch and tackifier applied as a slurry. It is typically applied at the rate of 2,250 to 4,500 kg/ha with 5-10% by weight of a stabilizing emulsion or tackifier (e.g., guar, psyllium, acrylic copolymer).
- Bonded Fiber Matrix
- Bonded fiber matrix (BFM) is a hydraulically-applied system of fibers and adhesives that upon drying forms an erosion-resistant blanket that promotes vegetation, and prevents soil erosion. BFMs are typically applied at rates from 3,400 kg/ha to 4,500 kg/ha based on the manufacturer's recommendation. The biodegradable BFM is composed of materials that are 100% biodegradable. The binder in the BFM should also be biodegradable and should not dissolve or disperse upon re-wetting. Typically, biodegradable BFMs should not be applied immediately before, during or immediately after rainfall if the soil is saturated. Depending on the product, BFMs require 12 to 24 hours to dry to become effective.

Maintenance and Inspections

- Maintain an unbroken, temporary mulched ground cover throughout the period of construction when the soils are not being reworked. Inspect before expected rain storms and repair any damaged ground cover and re-mulch exposed areas of bare soil.
- After any rainfall event, the Contractor is responsible for maintaining all slopes to prevent erosion.



Standard Symbol

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

Definition and Purpose Hydroseeding typically consists of applying a mixture of wood fiber, seed, fertilizer, and stabilizing emulsion with hydro-mulch equipment, which temporarily protects exposed soils from erosion by water and wind. This is one of five temporary soil stabilization alternatives to consider.

Appropriate Applications

- Hydroseeding is applied on disturbed soil areas requiring temporary protection until permanent vegetation is established or disturbed soil areas that must be re-disturbed following an extended period of inactivity.

- Limitations**
- Hydroseeding may be used alone only when there is sufficient time in the season to ensure adequate vegetation establishment and erosion control. Otherwise, hydroseeding must be used in conjunction with a soil binder or mulching (i.e., straw mulch), refer to BMP SS-5, Table 1 for options.
 - Steep slopes are difficult to protect with temporary seeding.
 - Temporary seeding may not be appropriate in dry periods without supplemental irrigation.
 - Temporary vegetation may have to be removed before permanent vegetation is applied.
 - Temporary vegetation is not appropriate for short-term inactivity.

Standards and Specifications To select appropriate hydroseeding mixtures, an evaluation of site conditions shall be performed with respect to:

- Soil conditions
- Site topography
- Season and climate
- Vegetation types
- Maintenance requirements
- Sensitive adjacent areas
- Water availability
- Plans for permanent vegetation

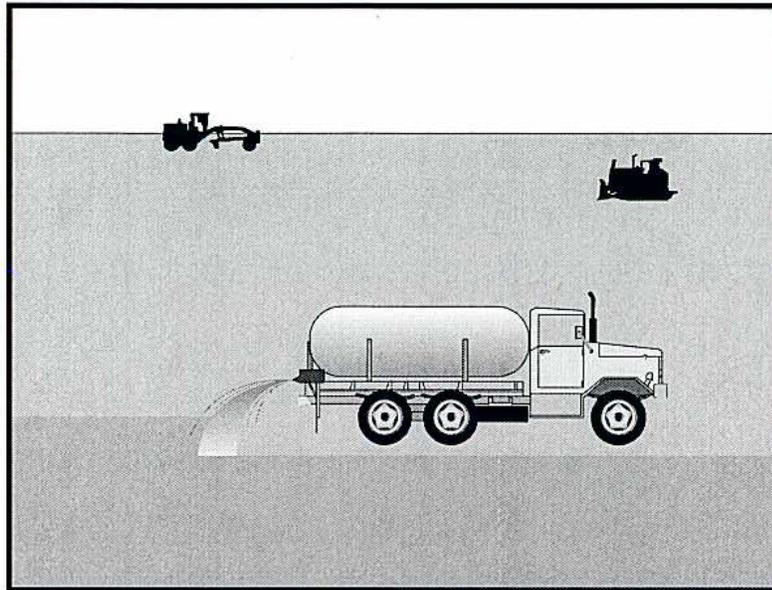
- Selection of hydroseeding mixtures shall be approved by the District Landscape Architect and the Construction Storm Water Coordinator.

The following steps shall be followed for implementation:

- Seed mix shall comply with the Standard Specifications Section 20-2.10, and the project's special provisions.
- Hydroseeding can be accomplished using a multiple-step or one-step process; refer to the special provisions for specified process. The multiple-step process ensures maximum direct contact of the seeds to soil. When the one-step process is used to apply the mixture of fiber, seed, etc., the seed rate shall be increased to compensate for all seeds not having direct contact with the soil.
- Prior to application, roughen the slope, fill area, or area to be seeded with the furrows trending along the contours. Rolling with a crimping or punching type roller or track walking is required on all slopes prior to hydroseeding. Track walking shall only be used where other methods are impractical.
- Apply a straw mulch to keep seeds in place and to moderate soil moisture and temperature until the seeds germinate and grow, refer to Standard Specifications Sections 20-2.06 and 20-3.03.
- All seeds shall be in conformance with the California State Seed Law of the Department of Agriculture. Each seed bag shall be delivered to the site sealed and clearly marked as to species, purity, percent germination, dealer's guarantee, and dates of test; provide the Resident Engineer (RE) with such documentation. The container shall be labeled to clearly reflect the amount of Pure Live Seed (PLS) contained. All legume seed shall be pellet-inoculated. Inoculant sources shall be species-specific and shall be applied at a rate of 2 kg of inoculant per 100 kg of seed (2-lb inoculant per 100-lb seed), refer to Standard Specifications Section 20-2.10.
- Commercial fertilizer shall conform to the requirements of the California Food and Agricultural Code. Fertilizer shall be pelleted or granular form.

Maintenance and Inspection

- Follow-up applications shall be made as needed to cover weak spots, and to maintain adequate soil protection.
- Avoid over-spray onto the traveled way, sidewalks, lined drainage channels, and existing vegetation.
- All seeded areas shall be inspected for failures and re-seeded, fertilized, and mulched within the planting season, using not less than half the original application rates. Any temporary revegetation efforts that do not provide adequate cover must be reapplied at a scheduled recommended by the Caltrans Landscape Architect or RE.
- After any rainfall event, the Contractor is responsible for maintaining all slopes to prevent erosion.



Standard Symbol

BMP Objectives

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

Definition and Purpose Soil binders consist of applying and maintaining a soil stabilizer to exposed soil surfaces. Soil binders are materials applied to the soil surface to temporarily prevent water-induced erosion of exposed soils on construction sites. Soil binders also provide temporary dust, wind, and soil stabilization (erosion control) benefits. This is one of five temporary soil stabilization alternatives to consider.

Appropriate Applications Soil binders are typically applied to disturbed areas requiring short-term temporary protection. Because soil binders can often be incorporated into the work, they may be a good choice for areas where grading activities will soon resume. Application on stockpiles to prevent water and wind erosion.

- Limitations**
- Soil binders are temporary in nature and may need reapplication.
 - Soil binders require a minimum curing time until fully effective, as prescribed by the manufacturer, which may be 24 hours or longer. Soil binders may need reapplication after a storm event.
 - Soil binders will generally experience spot failures during heavy rainfall events. If runoff penetrates the soil at the top of a slope treated with a soil binder, it is likely that the runoff will undercut the stabilized soil layer and discharge at a point further down slope.
 - Soil binders do not hold up to pedestrian or vehicular traffic across treated areas.
 - Soil binders may not penetrate soil surfaces made up primarily of silt and clay, particularly when compacted.
 - Storm water quality runoff sampling is required for many soil binders. Soil binders that do not require sampling are identified in the Caltrans SWPPP/WPCP Preparation Manual, Pollutant Table, Attachment S.

- Some soil binders may not perform well with low relative humidity. Under rainy conditions, some agents may become slippery or leach out of the soil.
- May not cure if low temperatures occur within 24 hours of application.

Standards and Specifications

General Considerations

- Site-specific soil types will dictate appropriate soil binders to be used.
- A soil binder must be environmentally benign (non-toxic to plant and animal life), easy to apply, easy to maintain, economical, and shall not stain paved or painted surfaces, refer to Standard Specifications Section 20-2.11.
- Some soil binders are compatible with existing vegetation.
- Performance of soil binders depends on temperature, humidity, and traffic across treated areas.
- Avoid over-spray onto the traveled way, sidewalks, lined drainage channels, and existing vegetation.

Soil Binders Applications

After selecting an appropriate soil binder, the untreated soil surface must be prepared before applying the soil binder. The untreated soil surface must contain sufficient moisture to assist the agent in achieving uniform distribution. In general, the following steps shall be followed:

- Follow manufacturer's recommendations for application rates, pre-wetting of application area, and cleaning of equipment after use.
- Prior to application, roughen embankment and fill areas by rolling with a crimping or punching type roller or by track walking. Track walking shall only be used where rolling is impractical.
- Consider the drying time for the selected soil binder and apply with sufficient time before anticipated rainfall. Soil binders shall not be applied during or immediately before rainfall.
- Avoid over-spray onto the traveled way, sidewalks, lined drainage channels, sound walls, and existing vegetation.
- Soil binders shall not be applied to frozen soil, areas with standing water, under freezing or rainy conditions, or when the air temperature is below 40C (40oF) during the curing period.
- More than one treatment is often necessary, although the second treatment may be diluted or have a lower application rate.
- Generally, soil binders require a minimum curing time of 24 hours before they are fully effective. Refer to manufacturer's instructions for specific cure times.

- For liquid agents:
 - Crown or slope ground to avoid ponding.
 - Uniformly pre-wet ground at 0.14 to 1.4 L/m² (0.03 to 0.3 gal/yd²) or according to manufacturer's recommendations.
 - Apply solution under pressure. Overlap solution 150 to 300 mm (6 to 12 in).
 - Allow treated area to cure for the time recommended by the manufacturer; typically, at least 24 hours.
 - In low humidities, reactivate chemicals by re-wetting with water at 0.5 to 0.9 L/m² (0.1 to 0.2 gal/yd²).

Selecting a Soil Binder

Properties of common soil binders used for erosion control are provided in Table 1 and Appendix B. Use Table 1 to select an appropriate soil binder.

Factors to consider when selecting a soil binder include the following:

- Suitability to situation - Consider where the soil binder will be applied; determine if it needs a high resistance to leaching or abrasion, and whether it needs to be compatible with any existing vegetation. Determine the length of time soil stabilization will be needed, and if the soil binder will be placed in an area where it will degrade rapidly. In general, slope steepness is not a discriminating factor for the listed soil binders.
- Soil types and surface materials - Fines and moisture content are key properties of surface materials. Consider a soil binder's ability to penetrate, likelihood of leaching, and ability to form a surface crust on the surface materials.
- Frequency of application - The frequency of application can be affected by subgrade conditions, surface type, climate, and maintenance schedule. Frequent applications could lead to high costs. Application frequency may be minimized if the soil binder has good penetration, low evaporation, and good longevity. Consider also that frequent application will require frequent equipment clean-up.

After considering the above factors, the soil binders in Table 1 will be generally appropriate as follows:

Plant-Material Based (Short Lived)

-Guar: Guar is a non-toxic, biodegradable, natural galactomannan-based hydrocolloid treated with dispersant agents for easy field mixing. It shall be diluted at the rate of 1.2 to 1.8 kg per 1,000 liters (1 to 5 lb per 100 gallons) of water, depending on application machine capacity. Recommended minimum application rates are as follows:

Application Rates for Guar Soil Stabilizer

Slope (V:H):	Flat	1:4	1:3	1:2	1:1
Kg/Ha:	45	50	56	67	78
lb/ac	40	45	50	60	70

-Psyllium: Psyllium is composed of the finely ground muciloid coating of plantago seeds that is applied as a dry powder or in a wet slurry to the surface of the soil. It dries to form a firm but rewettable membrane that binds soil particles together but permits germination and growth of seed. Psyllium requires 12 to 18 hours drying time. Psyllium shall be applied at a rate of 90 to 225 kg/ha (80 to 200 lb/ac), with enough water in solution to allow for a uniform slurry flow.

-Starch: Starch is non-ionic, cold-water soluble (pre-gelatinized) granular cornstarch. The material is mixed with water and applied at the rate of 170 kg/ha (150 lb/ac). Approximate drying time is 9 to 12 hours.

Plant-Material Based (Long Lived)

-Pitch and Rosin Emulsion: Generally, a non-ionic pitch and rosin emulsion has a minimum solids content of 48%. The rosin shall be a minimum of 26% of the total solids content. The soil stabilizer shall be non-corrosive, water-dilutable emulsion that upon application cures to a water insoluble binding and cementing agent. For soil erosion control applications, the emulsion is diluted and shall be applied as follows:

For clayey soil: 5 parts water to 1 part emulsion

For sandy soil: 10 parts water to 1 part emulsion

Application can be by water truck or hydraulic seeder with the emulsion/product mixture applied at the rate specified by the manufacturer. Approximate drying time is 19 to 24 hours.

Polymeric Emulsion Blends

-Acrylic Copolymers and Polymers: Polymeric soil stabilizers shall consist of a liquid or solid polymer or copolymer with an acrylic base that contains a minimum of 55% solids. The polymeric compound shall be handled and mixed in a manner that will not cause foaming or shall contain an anti-foaming agent. The polymeric emulsion shall not exceed its shelf life or expiration date; manufacturers shall provide the expiration date. Polymeric soil stabilizer shall be readily miscible in water, non-injurious to seed or animal life, non-flammable, shall provide surface soil stabilization for various soil types without totally inhibiting water infiltration, and shall not re-emulsify when cured. The applied compound shall air cure within a maximum of 36 to 48 hours. Liquid copolymer shall be diluted at a rate of 10 parts water to 1 part polymer and applied to soil at a rate of 11,000 liters/hectare (1,175 gal/ac).

-Liquid Polymers of Methacrylates and Acrylates: This material consists of a tackifier/sealer that is a liquid polymer of methacrylates and acrylates. It is an aqueous 100% acrylic emulsion blend of 40% solids by volume that is free from styrene, acetate, vinyl, ethoxylated surfactants or silicates. For soil stabilization applications, it is diluted with water in accordance with manufacturer's recommendations, and applied with a hydraulic seeder at the rate of 190 L/ha (20 gal/ac). Drying time is 12 to 18 hours after application.

-Copolymers of Sodium Acrylates and Acrylamides: These materials are non-toxic, dry powders that are copolymers of sodium acrylate and acrylamide. They are mixed with water and applied to the soil surface for erosion control at rates that are determined by slope gradient:

Slope Gradient (V:H)	kg/ha (lb/ac)
Flat to 1:5	3.4 – 5.6 (3-5)
1:5 to 1:3	5.6 – 11.2 (5-10)
1:2 to 1:1	11.2 – 22.4 (10-20)

-Poly-Acrylamide and Copolymer of Acrylamide: Linear copolymer polyacrylamide is packaged as a dry-flowable solid. When used as a stand-alone stabilizer, it is diluted at a rate of 1.5 kg/1,000 liters (1 lb/100 gal) of water and applied at the rate of 5.6 kg/ha (5 lb/ac).

-Hydro-Colloid Polymers: Hydro-Colloid Polymers are various combinations of dry-flowable poly-acrylamides, copolymers and hydro-colloid polymers that are mixed with water and applied to the soil surface at rates of 60 to 70 kg/ha (53 to 62 lb/ac). Drying times are 0 to 4 hours.

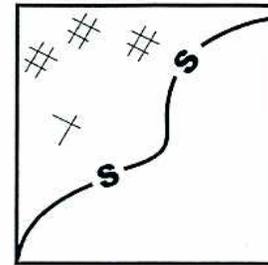
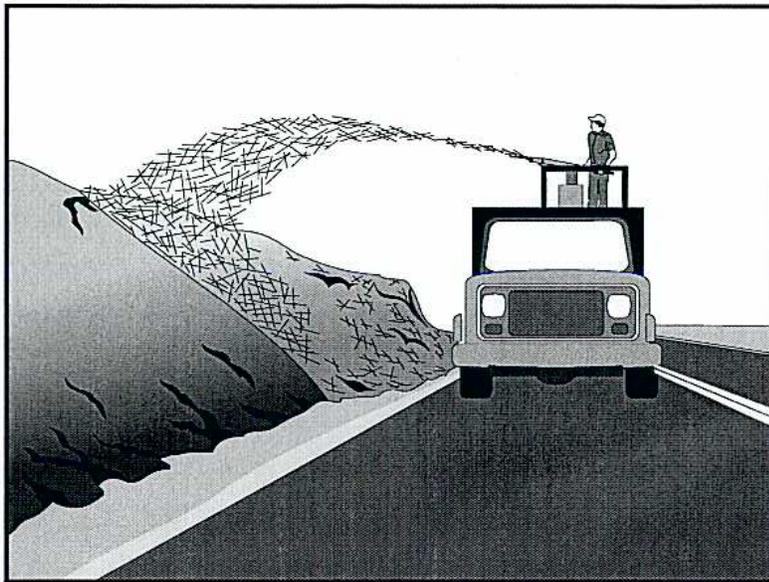
Cementitious-Based Binders

-Gypsum: This is a formulated gypsum-based product that readily mixes with water and mulch to form a thin protective crust on the soil surface. It is composed of high purity gypsum that is ground, calcined and processed into calcium sulfate hemihydrate with a minimum purity of 86%. It is mixed in a hydraulic seeder and applied at rates 4,500 to 13,500 kg/ha (4,000 to 12,000 lb/ac). Drying time is 4 to 8 hours.

- Maintenance and Inspection
- Reapplying the selected soil binder may be needed for proper maintenance. High traffic areas shall be inspected daily, and lower traffic areas shall be inspected weekly.
 - After any rainfall event, the Contractor is responsible for maintaining all slopes to prevent erosion.
 - Maintain an unbroken, temporary stabilized area while DSAs are nonactive. Repair any damaged stabilized area and re-apply soil binder to exposed areas.

Table 1 Properties of Soil Binders for Erosion Control				
Chemicals	Plant Material Based (Short Lived)	Plant Material Based (Long Lived)	Polymeric Emulsion Blends	Cementitious-Based Binders
Relative Cost	Low	Low	Low	Low
Resistance to Leaching	High	High	Low to Moderate	Moderate
Resistance to Abrasion	Moderate	Low	Moderate to High	Moderate to High
Longevity	Short to Medium	Medium	Medium to Long	Medium
Minimum Curing Time before Rain	9 to 18 hours	19 to 24 hours	0 to 24 hours	4 to 8 hours
Compatibility with Existing Vegetation	Good	Poor	Poor	Poor
Mode of Degradation	Biodegradable	Biodegradable	Photodegradable/ Chemically Degradable	Photodegradable/ Chemically Degradable
Labor Intensive	No	No	No	No
Specialized Application Equipment	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher
Liquid/Powder	Powder	Liquid	Liquid/Powder	Powder
Surface Crusting	Yes, but dissolves on rewetting	Yes	Yes, but dissolves on rewetting	Yes
Clean-Up	Water	Water	Water	Water
Erosion Control Application Rate	Varies ⁽¹⁾	Varies ⁽¹⁾	Varies ⁽¹⁾	4,500 to 13,500 kg/ha

(1) Dependant on product, soil type, and slope inclination



Standard Symbol

BMP Objectives

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

Definition and Purpose Straw mulch consists of placing a uniform layer of straw and incorporating it into the soil with a studded roller or anchoring it with a stabilizing emulsion. This is one of five temporary soil stabilization alternatives to consider.

- Appropriate Applications**
- Straw mulch is typically used for soil stabilization as a temporary surface cover on disturbed areas until soils can be prepared for revegetation and permanent vegetation is established.
 - Also typically used in combination with temporary and/or permanent seeding strategies to enhance plant establishment.

- Limitations**
- Availability of erosion control contractors and straw may be limited prior to the rainy season due to high demand.
 - There is a potential for introduction of weed-seed and unwanted plant material.
 - When straw blowers are used to apply straw mulch, the treatment areas must be within 45 m (150 ft) of a road or surface capable of supporting trucks.
 - Straw mulch applied by hand is more time intensive and potentially costly.
 - May have to be removed prior to permanent seeding or soil stabilization.
 - “Punching” of straw does not work in sandy soils.

Standards and Specifications

- Straw shall be derived from wheat, rice, or barley.
- All materials shall conform to Standard Specifications Sections 20-2.06, 20-2.07 and 20-2.11.
- A tackifier is the preferred method for anchoring straw mulch to the soil on slopes.
- Crimping, punch roller-type rollers, or track-walking may also be used to incorporate straw mulch into the soil on slopes. Track walking shall only be used where other methods are impractical.
- Avoid placing straw onto the traveled way, sidewalks, lined drainage channels, sound walls, and existing vegetation.
- Straw mulch with tackifier shall not be applied during or immediately before rainfall.

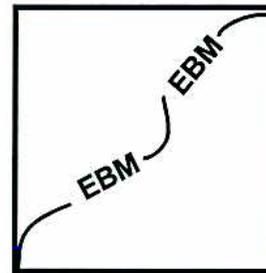
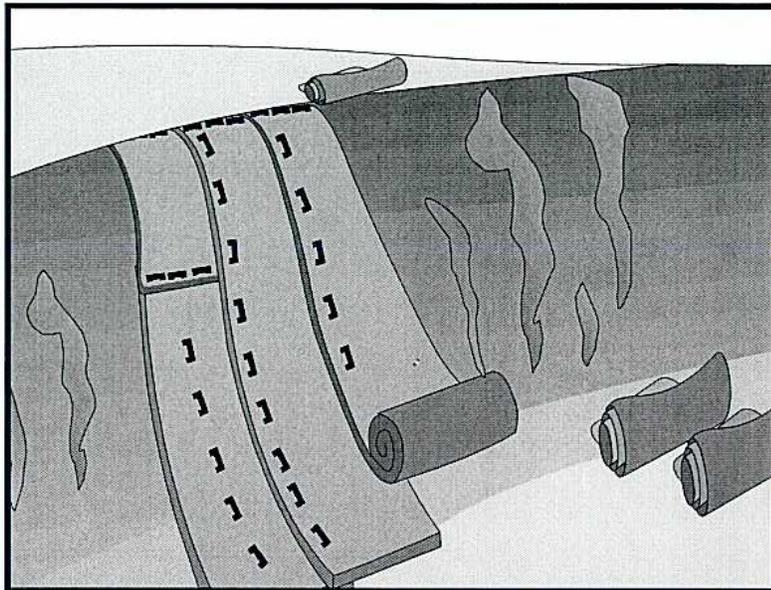
Application Procedures

- Apply loose straw at a minimum rate of 3,570 kg/ha (4,000 lb/ac), or as indicated in the project's special provisions, either by machine or by hand distribution.
- If stabilizing emulsion will be used to anchor the straw mulch in lieu of incorporation, roughen embankment or fill areas by rolling with a crimping or punching-type roller or by track walking before placing the straw mulch. Track walking should only be used where rolling is impractical.
- The straw mulch must be evenly distributed on the soil surface.
- Anchor the mulch in place by using a tackifier or by "punching" it into the soil mechanically (incorporating).
- A tackifier acts to glue the straw fibers together and to the soil surface. The tackifier shall be selected based on longevity and ability to hold the fibers in place.
- A tackifier is typically applied at a rate of 140 kg/ha (125 lb/ac). In windy conditions, the rates are typically 200 kg/ha (178 lb/ac).
- Methods for holding the straw mulch in place depend upon the slope steepness, accessibility, soil conditions and longevity. If the selected method is incorporation of straw mulch into the soil, then do as follows:
 - Applying and incorporating straw shall follow the requirements in Standard Specifications Section 20-3.03.
 - On small areas, a spade or shovel can be used.

- On slopes with soils, which are stable enough and of sufficient gradient to safely support construction equipment without contributing to compaction and instability problems, straw can be “punched” into the ground using a knife-blade roller or a straight bladed coulter, known commercially as a “crimper.”
- On small areas and/or steep slopes, straw can also be held in place using plastic netting or jute. The netting shall be held in place using 11 gauge wire staples, geotextile pins or wooden stakes. Refer to BMP SS-7, “Geotextiles, Plastic Covers and Erosion Control Blankets/Mats.”

Maintenance and Inspections

- The key consideration in Maintenance and Inspection is that the straw needs to last long enough to achieve erosion control objectives.
- Maintain an unbroken, temporary mulched ground cover while DSAs are non-active. Repair any damaged ground cover and re-mulch exposed areas.
- Reapplication of straw mulch and tackifier may be required by the Resident Engineer (RE) to maintain effective soil stabilization over disturbed areas and slopes.
- After any rainfall event, the Contractor is responsible for maintaining all slopes to prevent erosion.



Standard Symbol

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, mats, plastic covers, or erosion control blankets 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 potential is high.
- Slopes and disturbed soils where mulch must be anchored.
- Disturbed areas where plants are slow to develop.
- Channels with flows exceeding 1.0 m/s (3.3 ft/s).
- Channels 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.
 - 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% 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.
 - Geotextiles, mats, plastic covers, and erosion control covers have maximum flow rate limitations; consult the manufacturer for proper selection.

Standards and Specifications **Material Selection**

There are many types of erosion control blankets and mats, and selection of the appropriate type shall 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); certification of compliance shall be in accordance with Standard Specifications Section 6-1.07.

Geotextiles

- Material shall be a woven polypropylene fabric with minimum thickness of 1.5 mm (0.06 inch), minimum width of 3.7 m (12 ft) 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 and edges to prevent infiltration of surface waters under Geotextile. Staples shall be made of 3.05-mm (0.12-inch) steel wire and shall be U-shaped with 200-mm (8-inch) legs and 50-mm (2-inch) crown.
- Geotextiles may be reused if, in the opinion of the RE, they are suitable for the use intended.

Plastic Covers

- Plastic sheeting shall have a minimum thickness of 6 mil, and shall be keyed in at the top of slope and firmly held in place with sandbags or other weights placed no more than 3 m (10 ft) apart. Seams are typically taped or weighted down their entire length, and there shall be at least a 300 mm to 600 mm (12 to 24 inches) overlap of all seams. Edges shall be embedded a minimum of 150 mm (6 inches) in soil.
- All sheeting shall be inspected periodically after installation and after significant rainstorms to check for erosion, undermining, and anchorage failure. Any failures shall be repaired immediately. If washout or breakages occurs, the material shall be re-installed after repairing the damage to the slope.

Erosion Control Blankets/Mats

- Biodegradable rolled erosion control products (RECPs) are typically composed of jute fibers, curled wood fibers, straw, coconut fiber, or a combination of these materials. For an RECP to be considered 100% biodegradable, the netting, sewing or adhesive system that holds the biodegradable mulch fibers together must also be biodegradable.
 - **Jute** is a natural fiber that is made into a yarn, which is loosely woven into a biodegradable mesh. It is designed to be used in conjunction with vegetation and has longevity of approximately one year. The material is supplied in rolled strips, which shall be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.
 - **Excelsior (curled wood fiber)** blanket material shall consist of machine produced mats of curled wood excelsior with 80 percent of the fiber 150 mm (6 inches) or longer. The excelsior blanket shall be of consistent thickness. The wood fiber shall be evenly distributed over the entire area of the blanket. The top surface of the blanket shall be covered with a photodegradable extruded plastic mesh. The blanket shall be smolder resistant without the use of chemical additives and shall be non-toxic and non-injurious to plant and animal life. Excelsior blanket shall be furnished in rolled strips, a minimum of 1220 mm (48 inches) wide, and shall have an average weight of 0.5 kg/m² (12 lb/ft²), ±10 percent, at the time of manufacture. Excelsior blankets shall be secured in place with wire staples. Staples shall be made of 3.05-mm (0.12 inch) steel wire and shall be U-shaped with 200-mm (8-inch) legs and 50-mm (2-inch) crown.

- **Straw blanket** shall be machine-produced mats of straw with a lightweight biodegradable netting top layer. The straw shall be attached to the netting with biodegradable thread or glue strips. The straw blanket shall be of consistent thickness. The straw shall be evenly distributed over the entire area of the blanket. Straw blanket shall be furnished in rolled strips a minimum of 2 m (6.5 ft) wide, a minimum of 25 m (80 ft) long and a minimum of 0.27 kg/m² (6.4 lb/ft²). Straw blankets shall be secured in place with wire staples. Staples shall be made of 3.05-mm (0.12 inch) steel wire and shall be U-shaped with 200-mm (8-inch) legs and 50-mm (2-inch) crown.
- **Wood fiber blanket** is composed of biodegradable fiber mulch with extruded plastic netting held together with adhesives. The material is designed to enhance revegetation. The material is furnished in rolled strips, which shall be secured to the ground with U-shaped staples or stakes in accordance with manufacturers' recommendations.
- **Coconut fiber blanket** shall be machine-produced mats of 100% coconut fiber with biodegradable netting on the top and bottom. The coconut fiber shall be attached to the netting with biodegradable thread or glue strips. The coconut fiber blanket shall be of consistent thickness. The coconut fiber shall be evenly distributed over the entire area of the blanket. Coconut fiber blanket shall be furnished in rolled strips with a minimum of 2 m (6.5 ft) wide, a minimum of 25 m (80 ft) long and a minimum of 0.27-kg/m² (6.4 lb/ft²). Coconut fiber blankets shall be secured in place with wire staples. Staples shall be made of 3.05-mm (0.12 inch) steel wire and shall be U-shaped with 200-mm (8-inch) legs and 50-mm (2-inch) crown.
- **Coconut fiber mesh** is a thin permeable membrane made from coconut or corn fiber that is spun into a yarn and woven into a biodegradable mat. It is designed to be used in conjunction with vegetation and typically has longevity of several years. The material is supplied in rolled strips, which shall be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.
- **Straw coconut fiber blanket** shall be machine-produced mats of 70% straw and 30% coconut fiber with a biodegradable netting top layer and a biodegradable bottom net. The straw and coconut fiber shall be attached to the netting with biodegradable thread or glue strips. The straw coconut fiber blanket shall be of consistent thickness. The straw and coconut fiber shall be evenly distributed over the entire area of the blanket. Straw coconut fiber blanket shall be furnished in rolled strips a minimum of 2 m (6.5 ft) wide, a minimum of 25 m (80 ft) long and a minimum of 0.27 kg/m² (6.4 lb/ft²). Straw coconut fiber blankets shall be secured in place with wire staples. Staples shall be made of 3.05-mm (0.12-inch) steel wire and shall be U-shaped with 200-mm (8-inch) legs and 50-mm (2-inch) crown.

- Non-biodegradable RECPs are typically composed of polypropylene, polyethylene, nylon or other synthetic fibers. In some cases, a combination of biodegradable and synthetic fibers is used to construct the RECP. Netting used to hold these fibers together is typically non-biodegradable as well.
- **Plastic netting** is a lightweight biaxially-oriented netting designed for securing loose mulches like straw to soil surfaces to establish vegetation. The netting is photodegradable. The netting is supplied in rolled strips, which shall be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.
- **Plastic mesh** is an open-weave geotextile that is composed of an extruded synthetic fiber woven into a mesh with an opening size of less than 0.5 cm (0.2 inch). It is used with revegetation or may be used to secure loose fiber such as straw to the ground. The material is supplied in rolled strips, which shall be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.
- **Synthetic fiber with netting** is a mat that is composed of durable synthetic fibers treated to resist chemicals and ultraviolet light. The mat is a dense, three-dimensional mesh of synthetic (typically polyolefin) fibers stitched between two polypropylene nets. The mats are designed to be revegetated and provide a permanent composite system of soil, roots, and geomatrix. The material is furnished in rolled strips, which shall be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.
- **Bonded synthetic fibers** consist of a three-dimensional geomatrix nylon (or other synthetic) matting. Typically it has more than 90% open area, which facilitates root growth. Its tough root-reinforcing system anchors vegetation and protects against hydraulic lift and shear forces created by high volume discharges. It can be installed over prepared soil, followed by seeding into the mat. Once vegetated, it becomes an invisible composite system of soil, roots, and geomatrix. The material is furnished in rolled strips that shall be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.
- **Combination synthetic and biodegradable RECPs** consist of biodegradable fibers, such as wood fiber or coconut fiber, with a heavy polypropylene net stitched to the top and a high-strength continuous-filament geomatrix or net stitched to the bottom. The material is designed to enhance revegetation. The material is furnished in rolled strips, which shall be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

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 (0.12 inch) steel wire and shall be U-shaped with 200-mm (8-inch) legs and 50-mm (2-inch) crown.
- 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

Installation shall be in accordance with the manufacturer's recommendations. 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/m² (2 staples/yd²). Moderate slopes, 1:2 (V:H) to 1:3 (V:H), require a minimum of 1½ staples/m² (1 ½ staples/yd²), placing 1 staple/m (1 staple/yd) on centers. Gentle slopes require a minimum of 1 staple/m² (1 staple/yd²).

Installation in Channels

Installation shall be in accordance with the manufacturer's recommendations. 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.

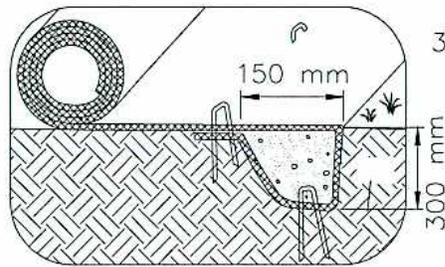
Temporary Soil Stabilization Removal

- 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 Standard Specifications Section 7-1.13. If approved by the RE, the contractor may leave the temporary soil stabilizer in place.

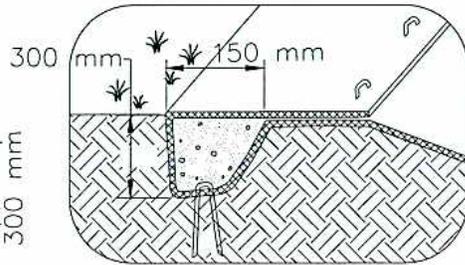
Maintenance and Inspection Areas treated with temporary soil stabilization shall be inspected as specified in the special provisions. Areas treated with temporary soil stabilization shall be maintained to provide adequate erosion control. Temporary soil stabilization shall be reapplied or replaced on exposed soils when 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.

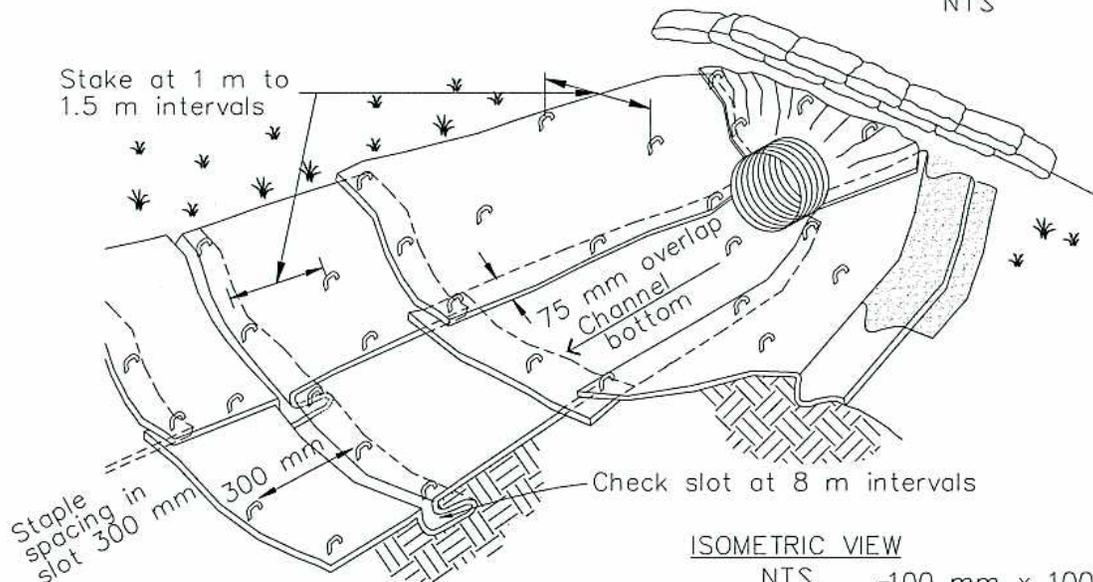
Typical Installation Detail



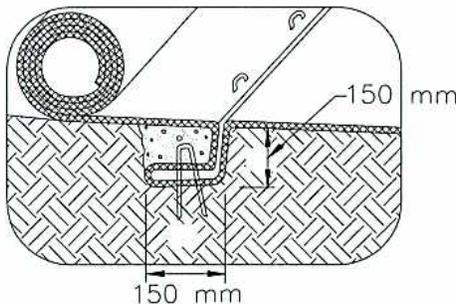
INITIAL CHANNEL ANCHOR TRENCH
NTS



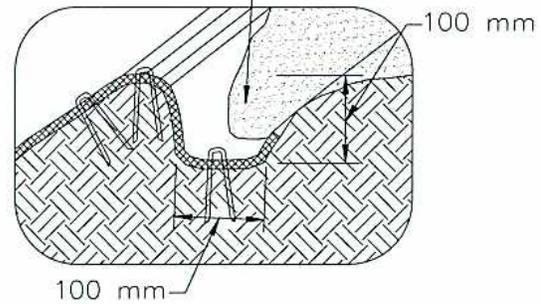
TERMINAL SLOPE AND CHANNEL
ANCHOR TRENCH
NTS



ISOMETRIC VIEW
NTS



INTERMITTENT CHECK SLOT
NTS



LONGITUDINAL ANCHOR TRENCH
NTS

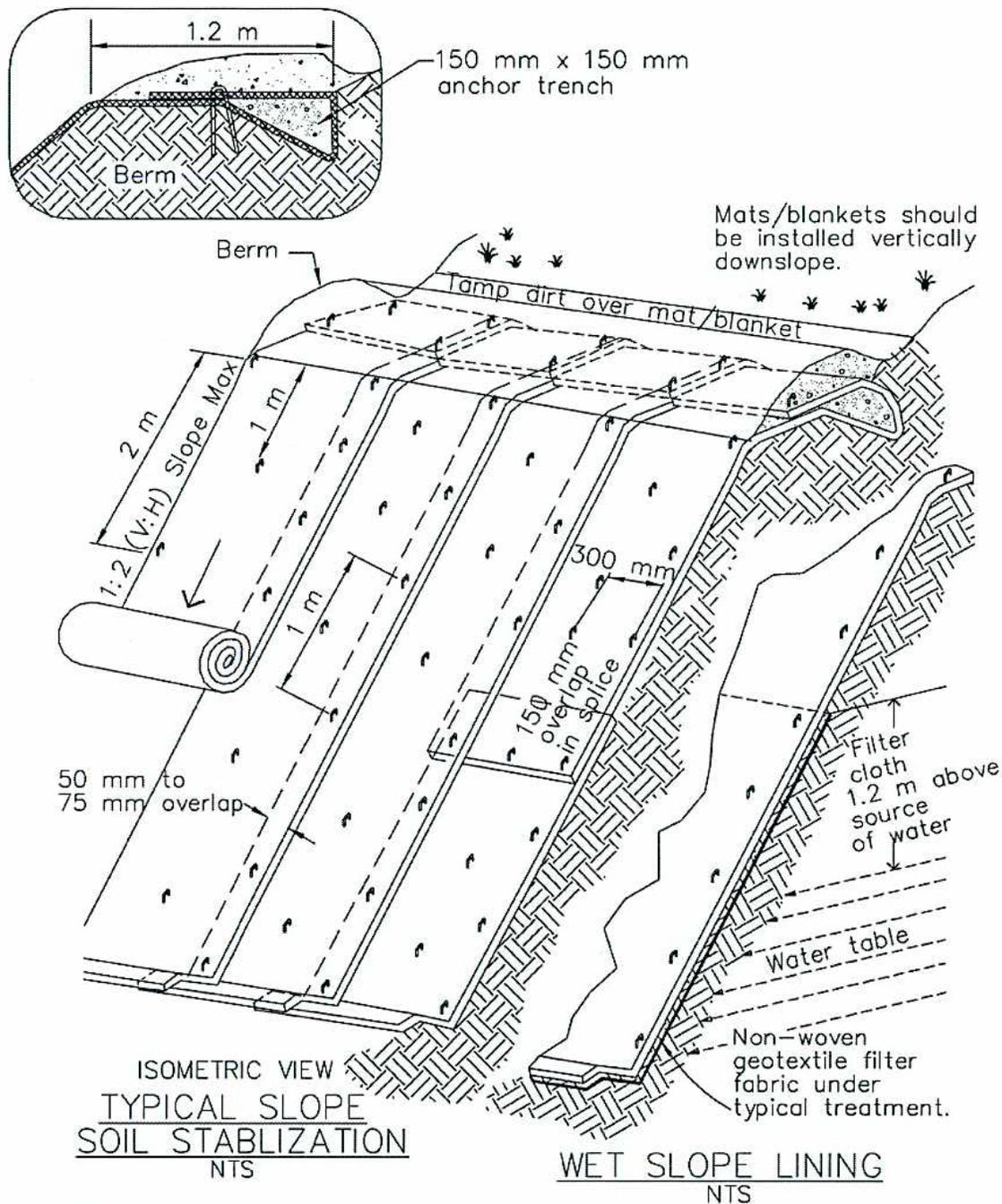
NOTES:

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

Geotextiles, Mats, Plastic Covers and Erosion Control Blankets

SS-7

Typical Installation Detail

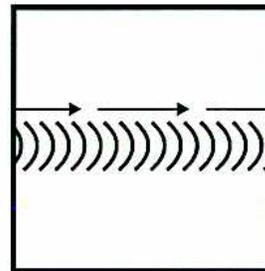
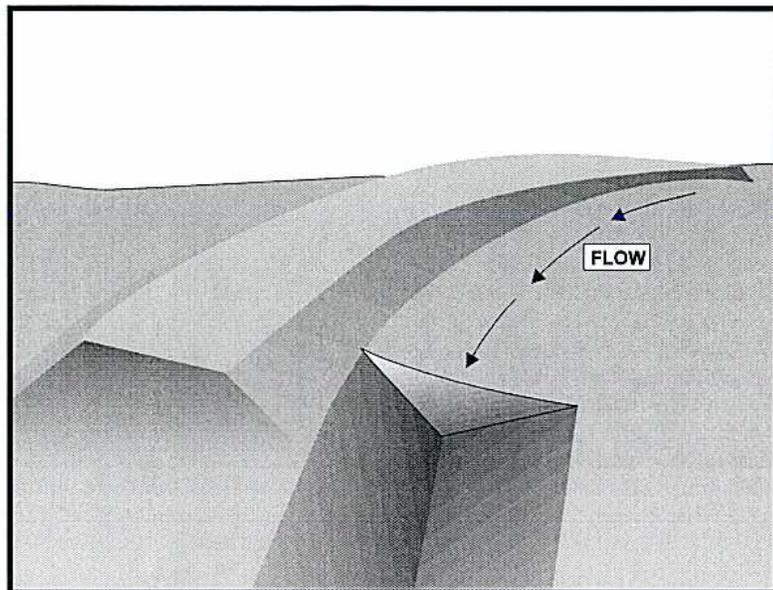


NOTES:

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

Earth Dikes/Drainage Swales and Lined Ditches

SS-9



Standard Symbol

BMP Objectives

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

Definition and Purpose These are structures that intercept, divert and convey surface run-on, generally sheet flow, to prevent erosion.

Appropriate Applications

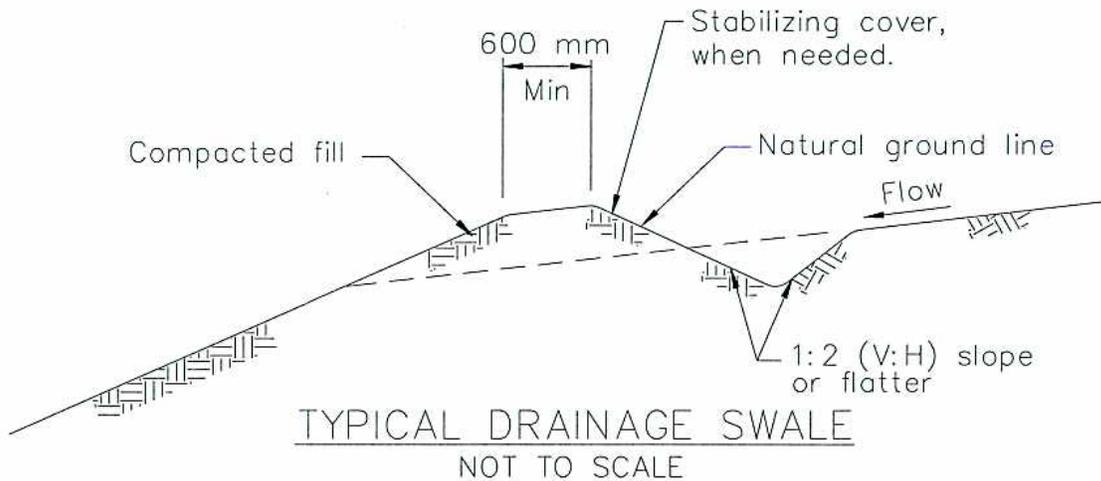
- Earth dikes/drainage swales and lined ditches may be used to:
 - Convey surface runoff down sloping land.
 - Intercept and divert runoff to avoid sheet flow over sloped surfaces.
 - Divert and direct runoff towards a stabilized watercourse, drainage pipe or channel.
 - Intercept runoff from paved surfaces.
- Earth dikes/drainage swales and lined ditches also may be used:
 - Below steep grades where runoff begins to concentrate.
 - Along roadways and facility improvements subject to flood drainage.
 - At the top of slopes to divert run-on from adjacent or undisturbed slopes.
 - At bottom and mid-slope locations to intercept sheet flow and convey concentrated flows.
- This BMP may be implemented on a project-by-project basis with other BMPs when determined necessary and feasible by the Resident Engineer (RE).

Earth Dikes/Drainage Swales and Lined Ditches

SS-9

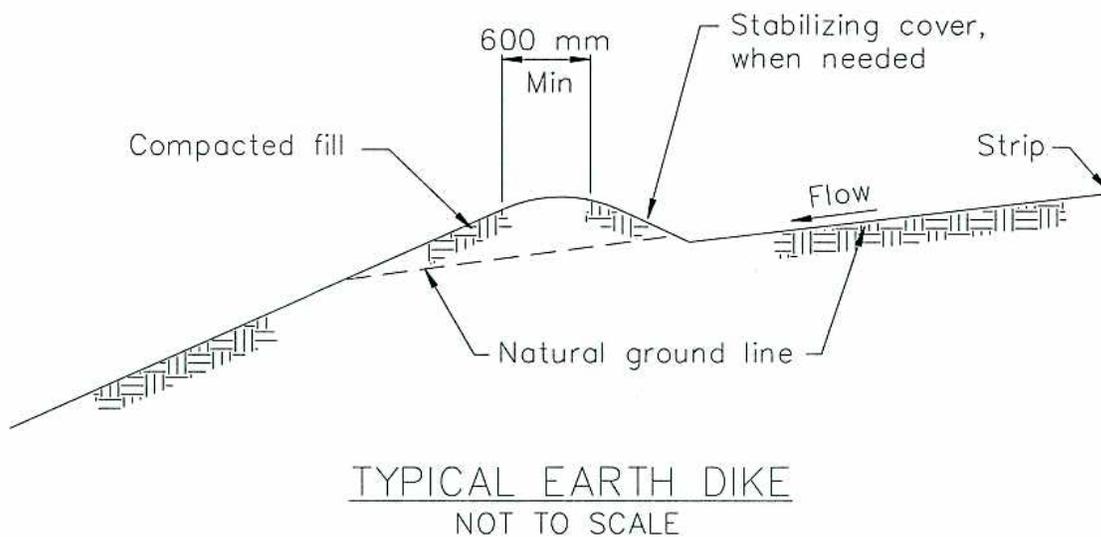
- Limitations**
- Earth dikes/drainage swales and lined ditches are not suitable as sediment trapping devices.
 - May be necessary to use other soil stabilization and sediment controls, such as check dams, plastics, and blankets, to prevent scour and erosion in newly graded dikes, swales and ditches.
- Standards and Specifications**
- Care must be applied to correctly size and locate earth dikes, drainage swales and lined ditches. Excessively steep, unlined dikes and swales are subject to erosion and gully formation.
 - Conveyances shall be stabilized.
 - Use a lined ditch for high flow velocities.
 - Select flow velocity based on careful evaluation of the risks due to erosion of the measure, soil types, over topping, flow backups, washout, and drainage flow patterns for each project site.
 - Compact any fills to prevent unequal settlement.
 - Do not divert runoff from the highway right-of-way onto other property.
 - When possible, install and utilize permanent dikes, swales and ditches early in the construction process.
 - Provide stabilized outlets. Refer to SS-10, "Outlet Protection/Velocity/Dissipation Devices."
- Maintenance and Inspections**
- Inspect temporary measures prior to the rainy season, after rainfall events, and regularly (approximately once per week) during the rainy season.
 - Inspect ditches and berms for washouts. Replace lost riprap, damaged linings or soil stabilizers as needed.
 - Inspect channel linings, embankments, and beds of ditches and berms for erosion and accumulation of debris and sediment. Remove debris and sediment, and repair linings and embankments as needed or as directed by the RE.
 - Temporary conveyances shall be completely removed as soon as the surrounding drainage area has been stabilized, or at the completion of construction.

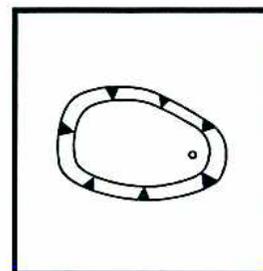
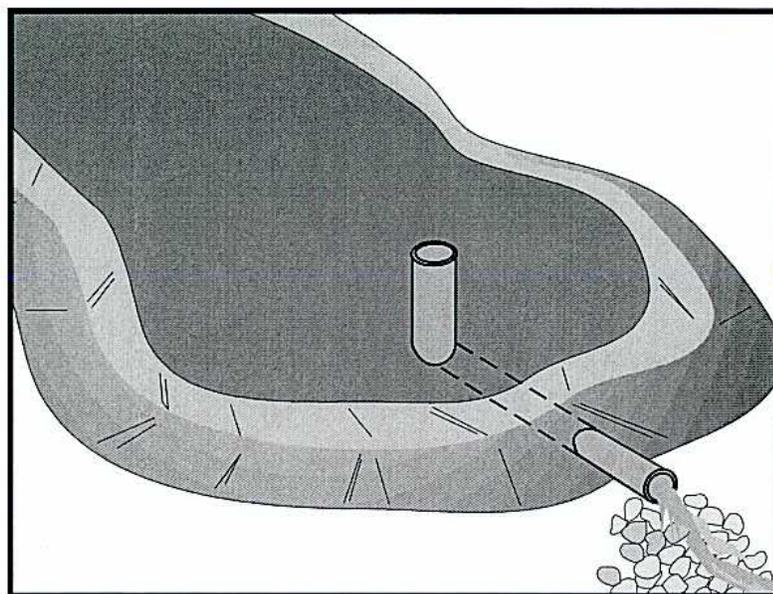
Earth Dikes/Drainage Swales and Lined Ditches



NOTES:

1. Stabilize inlet, outlets and slopes.
2. Properly compact the subgrade, in conformance with Section 19-5 of the Caltrans Standard Specifications.





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 sediment/desilting basin is a temporary basin formed by excavating and/or constructing an embankment so that sediment-laden runoff is temporarily detained under quiescent conditions, allowing sediment to settle out before the runoff is discharged (refer to Figures 1 and 2).

Appropriate Applications Sediment basins shall be designed in accordance with Section A of the State of California NPDES General Permit for Storm Water Discharges Associated with Construction Activities (General Permit). If there is insufficient area to construct a sediment basin in accordance with the General Permit requirements, then the alternate desilting design standards specified herein may be used. This BMP may be implemented on a project-by-project basis with other BMPs when determined necessary and feasible by the RE.

Sediment/Desilting Basins shall be considered for use:

- On construction projects with disturbed areas during the rainy season.
- Where sediment-laden water may enter the drainage system or watercourses.
- At outlets of disturbed soil areas with areas between 2 ha and 4 ha (5 ac and 10 ac).

Limitations

- Alternative BMPs must be thoroughly investigated for erosion control before selecting temporary desilting basins.
- Requires large surface areas to permit settling of sediment.
- Not appropriate for drainage areas greater than 30 ha (75 ac).
- Not to be located in live streams

Standards and Specifications

- For safety reasons, basins shall have protective fencing.
- Size may be limited by availability of right-of-way.
- Limit the contributing area to the sediment/desilting basin to only the runoff from the disturbed soil areas. Use temporary concentrated flow conveyance controls to divert runoff from undisturbed areas away from the sediment/desilting basin.

Sediment Basin

- Sediment basins shall, at a minimum, be designed as follows:
 - Option 1: Pursuant to local ordinance for sediment basin design and maintenance, provided that the design efficiency is as protective or more protective of water quality than Option 3.

OR

- Option 2: Sediment basin(s), as measured from the bottom of the basin to the principal outlet, shall have at least a capacity equivalent to 102 cubic meters (3,600 cubic feet) of storage per 0.4 hectare (1 acre) draining into the sediment basin. The length of the basin shall be more than twice the width of the basin. The length is determined by measuring the distance between the inlet and the outlet; and the depth must not be less than 0.9 m (3 ft) nor greater than 1.5 m (5 ft) for safety reasons and for maximum efficiency.

OR

- Option 3: Sediment basin(s) shall be designed using the standard equation:

$$A_s = 1.2Q/V_s \quad (\text{Eq. 1})$$

Where:

A_s = Minimum surface area for trapping soil particles of a certain size

V_s = Settling velocity of the design particle size chosen

$$Q = C I A$$

Where:

Q = Discharge rate measured in cubic feet per second

C = Runoff coefficient

I = Precipitation intensity for the 10-year, 6-hour rain event

A = Area draining into the sediment basin in acres

The design particle size shall be the smallest soil grain size determined by wet sieve analysis, or the fine silt sized (0.01mm) particle, and the V_s used shall be 100 percent of the calculated settling velocity.

The length is determined by measuring the distance between the inlet and the outlet; the length shall be more than twice the dimension as the width; the depth shall not be less than 0.9 m (3 ft) nor greater than 1.5 m (5 ft) for safety reasons and for maximum efficiency [0.6 m (2 ft) of sediment storage, 0.6 m (2 ft) of capacity]. The basin(s) shall be located on the site where it can be maintained on a year-round basis and shall be maintained on a schedule to retain the 0.6 m (2 ft) of capacity.

OR

- Option 4: The use of an equivalent surface area design or equation, provided that the design efficiency is as protective or more protective of water quality than Option 3.

Desilting Basin

- Desilting basins shall be designed to have a capacity equivalent to 100 cubic meters of storage (as measured from the top of the basin to the principal outlet) per hectare of contributory area. This design is less than the required to capture the 0.01 mm particle size but larger than that required to capture particles 0.02 mm or larger.
- The length of the basin shall be more than twice the width of the basin; the length shall be determined by measuring the distance between the inlet and the outlet.
- The depth must be no less than one (1) meter nor greater than 1.5 m.
- Basins with an impounding levee greater than 1.5 m (5 ft) tall, measured from the lowest point to the impounding area to the highest point of the levee, and basins capable of impounding more than 1000 cubic meters (35,300 cubic feet), shall be designed by a professional Civil Engineer registered with the state of California. The design must be submitted to the Resident Engineer (RE) for approval at least 7 days prior to the basin construction. The design shall include maintenance requirements, including sediment and vegetation removal, to ensure continuous function of the basin outlet and bypass structures.

General Requirements

- Design and locate sediment/desilting basins so that they can be maintained. Construct desilting basins prior to the rainy season and construction activities.
- Sediment/desilting basins, regardless of size and storage volume, shall include features to accommodate overflow or bypass flows that exceed the design storm event. The calculated basin volume and proposed location shall be submitted to

the RE for approval at least 3 days prior to the basin construction.

- Construct an emergency spillway to accommodate flows not carried by the principal spillway. Spillway shall consist of an open channel (earthen or vegetated) over undisturbed material (not fill) or constructed of a non-erodible riprap.
- Spillway control section, which is a level portion of the spillway channel at the highest elevation in the channel, shall be a minimum of 6 m (20 ft) in length.
- A forebay, constructed upstream of the basin may be provided to remove debris and larger particles.
- Basin inlets shall be located to maximize travel distance to the basin outlet.
- Rock or vegetation shall be used to protect the basin inlet and slopes against erosion.
- The outflow from the basins shall be provided with outlet protection to prevent erosion and scouring of the embankment and channel. See BMP SS-10, "Outlet Protection/Velocity Dissipation Devices."
- Basin shall be located: (1) by excavating a suitable area or where a low embankment can be constructed across a swale, (2) where post-construction (permanent) detention basins will be constructed, (3) where failure would not cause loss of life or property damage, (4) where the basins can be maintained on a year-round basins to provide access for maintenance, including sediment removal and sediment stockpiling in a protected area, and to maintain the basin to provide the required capacity.
- Areas under embankments, structural works, and sediment/desilting basin must be cleared, stripped of vegetation in accordance with Standard Specifications Section 16 – "Clearing and Grubbing."
- Earthwork shall be in accordance with Standard Specifications Section 19 – "Earthwork". Contractor is specifically directed to Standard Specifications Sections 19-5, "Compaction," and 19-6, "Embankment Construction."
- Structure shall be placed on a firm, smooth foundation with the base securely anchored with concrete or other means to prevent floatation.
- Discharge from the basin shall be accomplished through a water quality outlet. An example is shown in Figure 3. The Principal outlet shall consist of a corrugated metal, high density polyethylene (HDPE), or reinforced concrete riser pipe with dewatering holes and an anti-vortex device and trash rack attached to the top of the riser, to prevent floating debris from flowing out of the basin or obstructing the system. This principal structure shall be designed

to accommodate the inflow design storm.

- A rock pile or rock-filled gabions can serve as alternatives to the debris screen, although the designer should be aware of the potential for extra maintenance involved should the pore spaces in the rock pile clog.
- Proper hydraulic design of the outlet is critical to achieving the desired performance of the basin. The water quality outlet should be designed to drain the basin within 24 to 72 hours (also referred to as “drawdown time”). (The 24-hour limit is specified to provide adequate settling time; the 72-hour limit is specified to mitigate vector control concerns.)
- The two most common outlet problems that occur are: (1) the capacity of the outlet is too great resulting in only partial filling of the basin and drawdown time less than designed for; and (2) the outlet clogs because it is not adequately protected against trash and debris. To avoid these problems, the following outlet types are recommended for use: (1) a single orifice outlet with or without the protection of a riser pipe, and (2) perforated riser. Design guidance for single orifice and perforated riser outlets are as follows:

Flow Control Using a Single Orifice At The Bottom Of The Basin

(Figure 1): The outlet control orifice should be sized using the following equation:

$$a = \frac{2A(H - H_o)^{0.5}}{3600CT(2g)^{0.5}} = \frac{(7 \times 10^{-5})A(H - H_o)^{0.5}}{CT} \quad (\text{Eq. 2})$$

where:

- a = area of orifice (ft²) (1 ft² = 0.0929m²)
- A = surface area of the basin at mid elevation (ft²)
- C = orifice coefficient
- T = drawdown time of full basin (hrs)
- G = gravity (32.2 ft/s²)
- H = elevation when the basin is full (ft)
- H_o = final elevation when basin is empty (ft)

With a drawdown time of 40 hours, the equation becomes:

$$a = \frac{(1.75 \times 10^{-6})A(H - H_o)^{0.5}}{C} \quad (\text{Eq. 3})$$

Flow Control Using Multiple Orifices (see Figure2):

$$a_t = \frac{2A(h_{max})}{CT(2g[h_{max} - h_{centroid\ of\ orifices}])^{0.5}} \quad (\text{Eq. 4})$$

With terms as described above except:

a_t = total area of orifices

h_{max} = maximum height from lowest orifice to the maximum water surface (ft)

$h_{centroid\ of\ orifices}$ = height from the lowest orifice to the centroid of the orifice configuration (ft)

Allocate the orifices evenly on two rows; separate the holes by 3x hole diameter vertically, and by 120 degrees horizontally (refer to Figure 3).

Because basins are not maintained for infiltration, water loss by infiltration should be disregarded when designing the hydraulic capacity of the outlet structure.

Care must be taken in the selection of "C"; 0.60 is most often recommended and used. However, based on actual tests, GKY (1989), "Outlet Hydraulics of Extended Detention Facilities for Northern Virginia Planning District Commission", recommends the following:

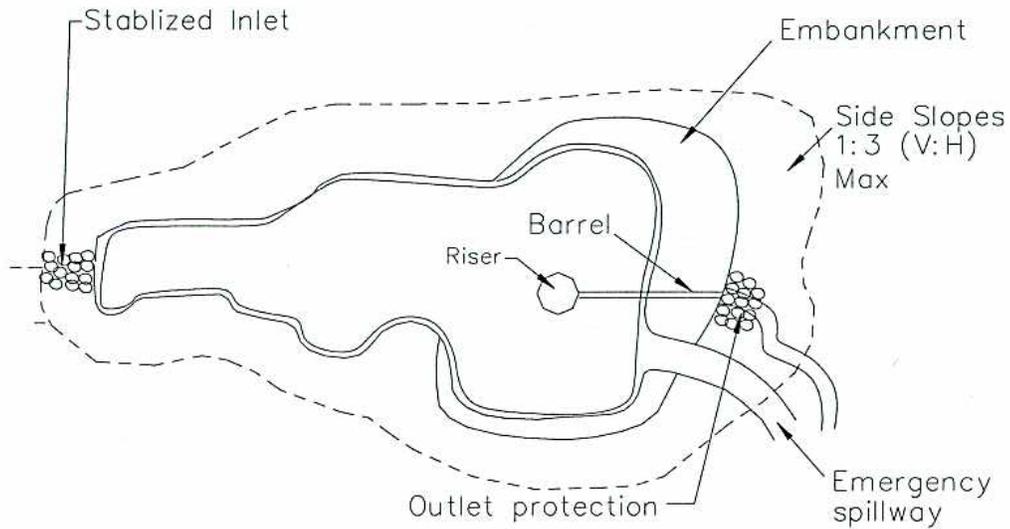
C = 0.66 for thin materials; where the thickness is equal to or less than the orifice diameter, or

C = 0.80 when the material is thicker than the orifice diameter

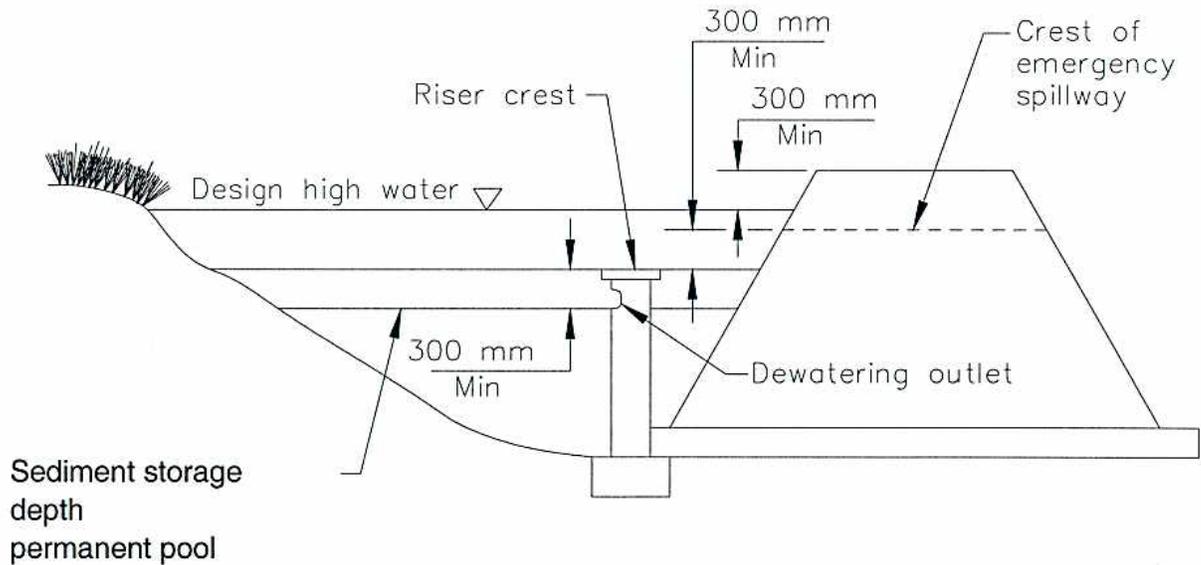
- The Contractor shall verify that the outlet is properly designed to handle the design and peak flows.
 - Attach riser pipe (watertight connection) to a horizontal pipe (barrel), which extends through the embankment to toe of fill. Provide anti-seep collars on the barrel.
 - Cleanout level shall be clearly marked on the riser pipe
 - Avoid dewatering of groundwater to the sediment/desilting basin during the rainy season. Insignificant quantities of accumulated precipitation may be dewatered to the sediment/desilting basin unless precipitation is forecasted within 24 hours. Refer to NS-2 "Dewatering Operations."
 - Chain link fencing shall be provided around each sediment/desilting basin to prevent unauthorized entry to the basin or if safety is a concern. Fencing shall be in accordance with Standard Specifications Section 80 – "Fencing."
- Maintenance and Inspection ■ Inspect sediment/desilting basins before and after rainfall events and weekly during the rest of the rainy season. During extended rainfall events, inspect at

least every 24 hours.

- Examine basin banks for seepage and structural soundness.
- Check inlet and outlet structures and spillway for any damage or obstructions. Repair damage and remove obstructions as needed, or as directed by the RE.
- Remove standing water from the basin within 72 hours after accumulation.
- Check inlet and outlet area for erosion and stabilize if required, or if directed by the RE.
- Remove accumulated sediment when its volume reaches one-third the volume of the sediment storage. Properly dispose of sediment and debris removed from the basin.
- Check fencing for damage and repair as needed or as directed by the RE.

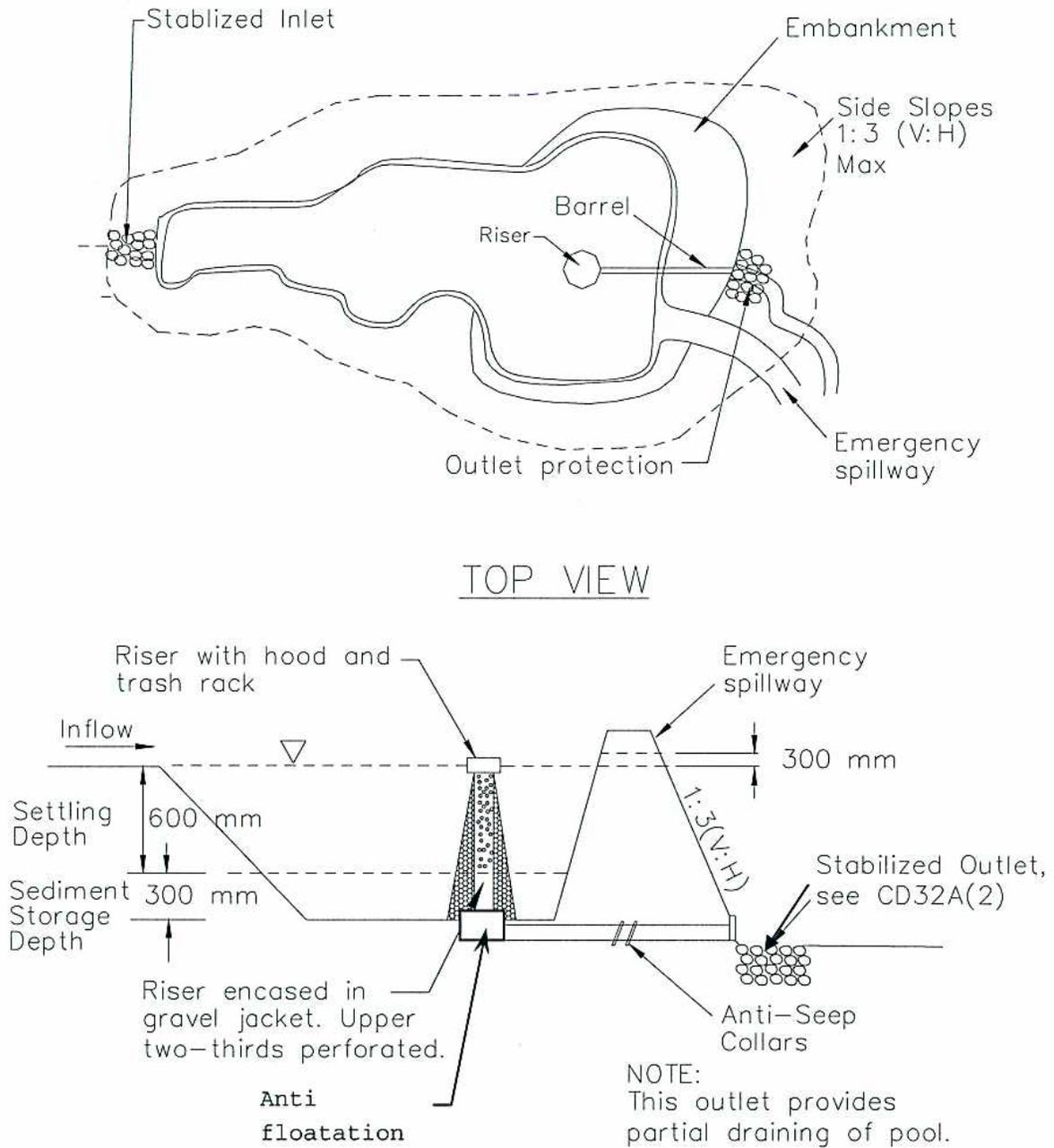


TOP VIEW



This outlet provides no drainage for permanent pool.

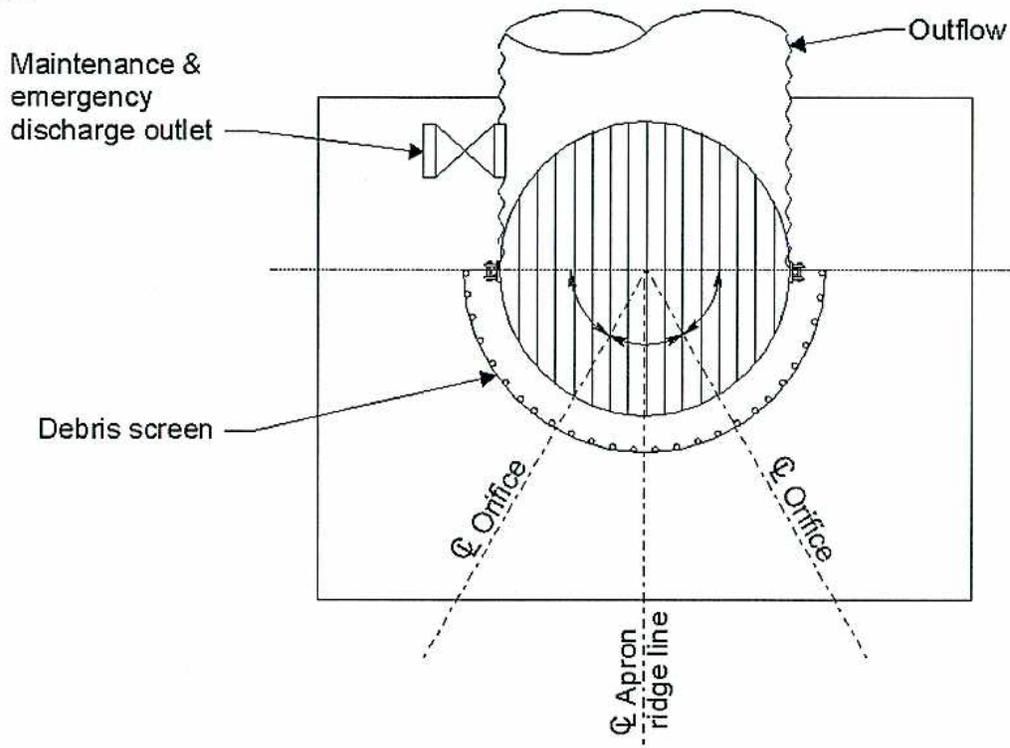
FIGURE 1: SINGLE ORIFICE DESIGN
NOT TO SCALE



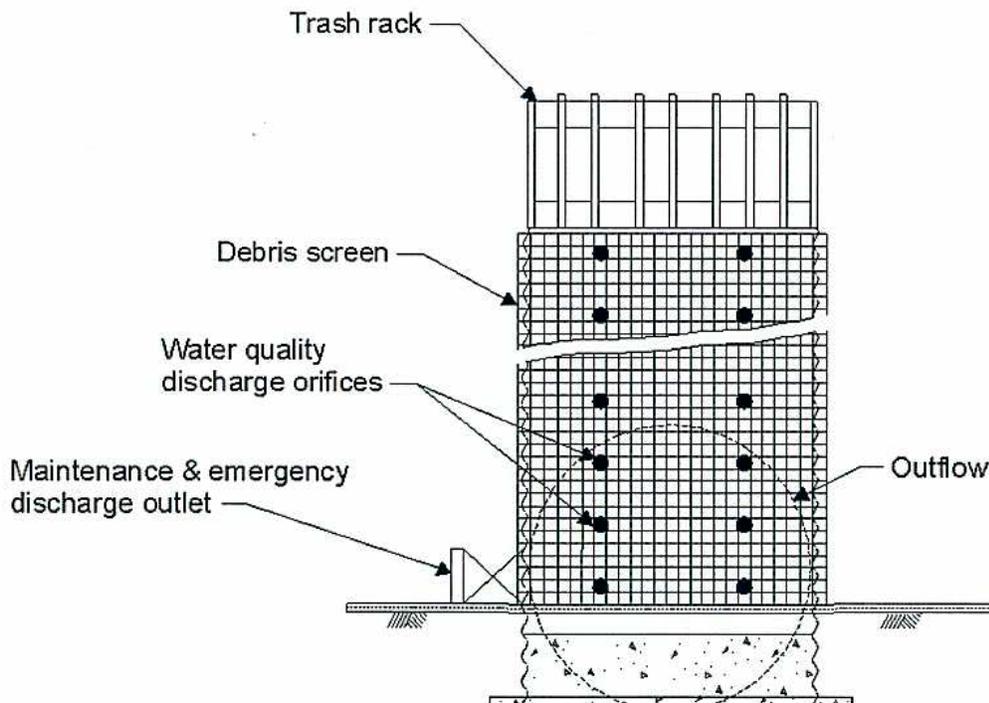
TOP VIEW

**FIGURE 2: MULTIPLE ORIFICE DESIGN
NOT TO SCALE**

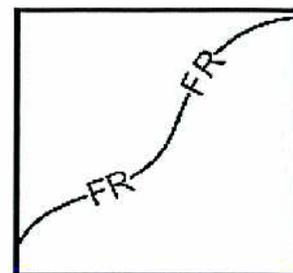
Plan



Profile



**FIGURE 3: MULTIPLE ORIFICE OUTLET RISER
NOT TO SCALE**



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.
 - Fiber rolls may be used as check dams in unlined ditches if approved by the Resident Engineer (RE) or the District Construction Storm Water Coordinator (refer to SC-4 “Check Dams”).
 - Fiber rolls may be used for drain inlet protection if approved by the RE or the District Construction Storm Water Coordinator (refer to SC-10 “Storm Drain Inlet Protection”).
 - 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.

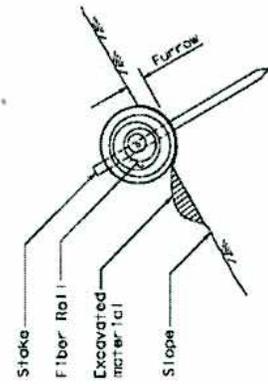
- Drive stakes at the end of each fiber roll and spaced 600 mm (2 ft) apart if Type 2 installation is used (refer to Page 4). Otherwise, space stakes 1.2 m (4 ft) maximum on center if installed as shown on Pages 5 and 6.
- Use wood stakes with a nominal classification of 19 by 19 mm (3/4 by 3/4 in), 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

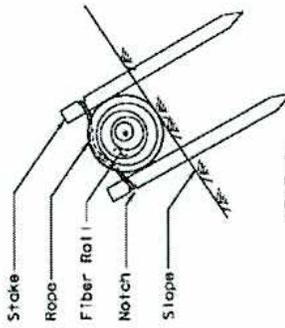
- Fiber rolls are typically left in place.
- If fiber rolls are removed, collect and dispose of sediment accumulation, and fill and compact holes, trenches, depressions or any other ground disturbance to blend with adjacent ground.

Maintenance and Inspection

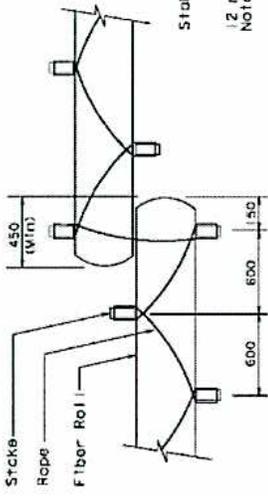
- Repair or replace split, torn, unraveling, or slumping fiber rolls.
- Inspect fiber rolls when rain is forecast. Perform maintenance as needed or as required by the RE.
- Inspect fiber rolls following rainfall events and a least daily during prolonged rainfall. Perform maintenance as needed or as required by the RE.
- 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. 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.



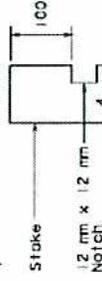
SECTION
TEMPORARY FIBER ROLL
(TYPE 1)



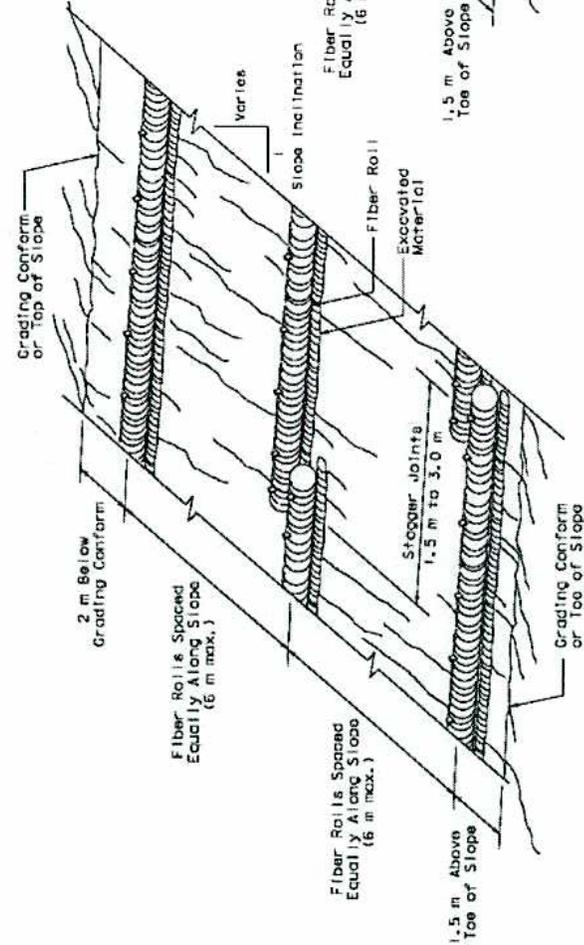
SECTION
TEMPORARY FIBER ROLL
(TYPE 2)



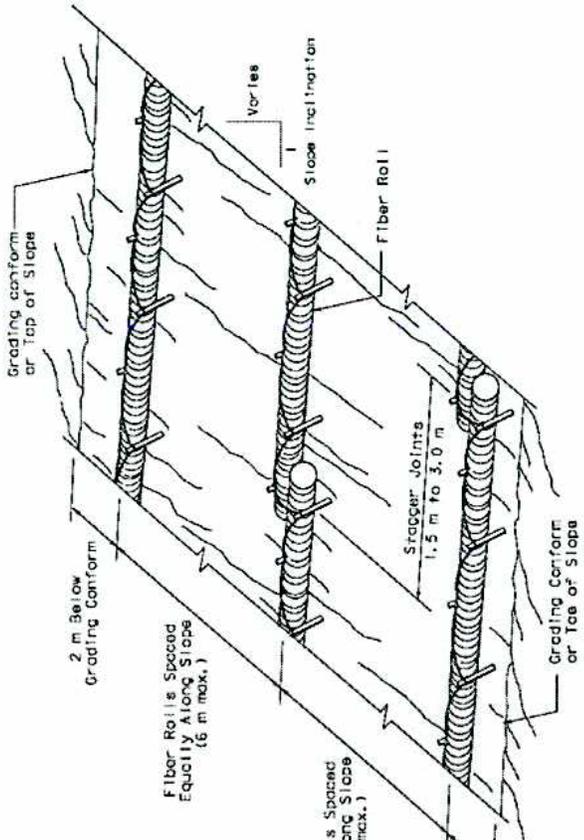
PLAN
TEMPORARY FIBER ROLL
(TYPE 2)



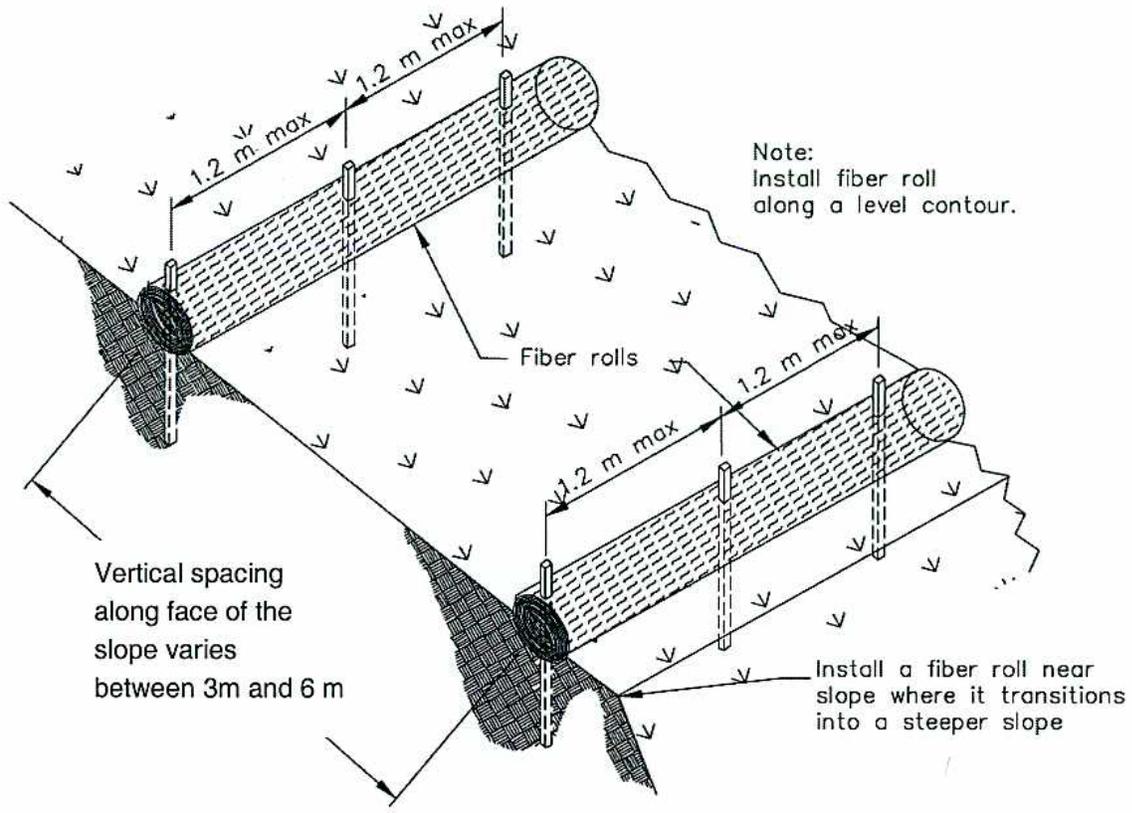
NOTE
1. Temporary fiber roll spacing varies depending upon slope inclination.



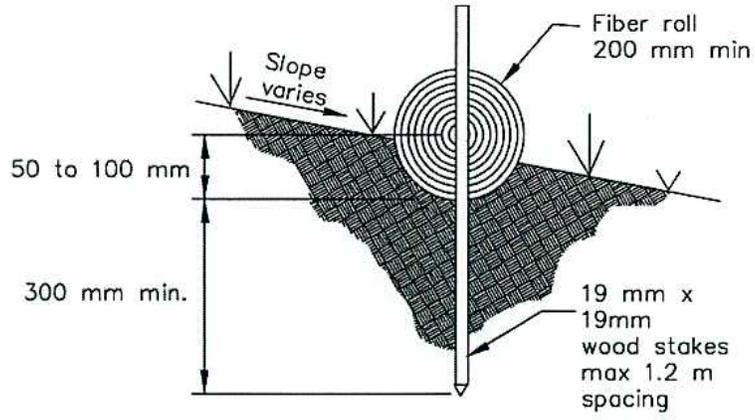
PERSPECTIVE
TEMPORARY FIBER ROLL (TYPE 1)



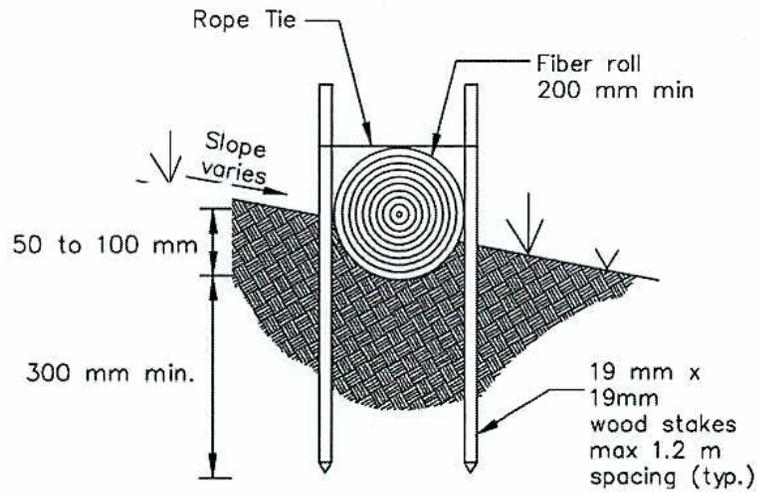
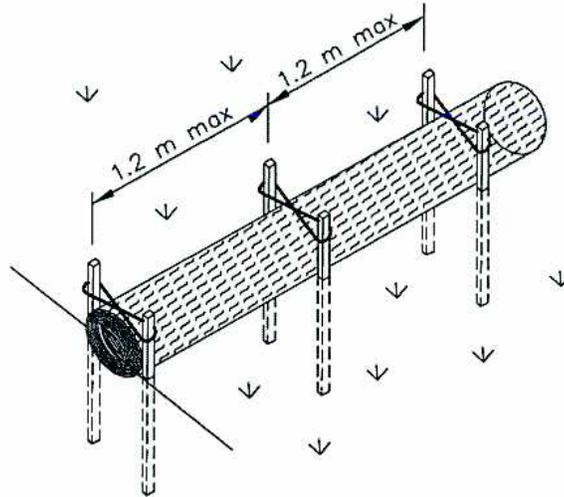
PERSPECTIVE
TEMPORARY FIBER ROLL (TYPE 2)



TYPICAL FIBER ROLL INSTALLATION
N.T.S.

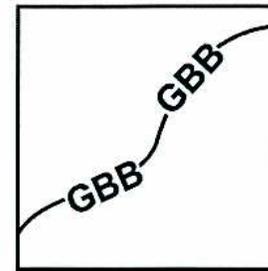
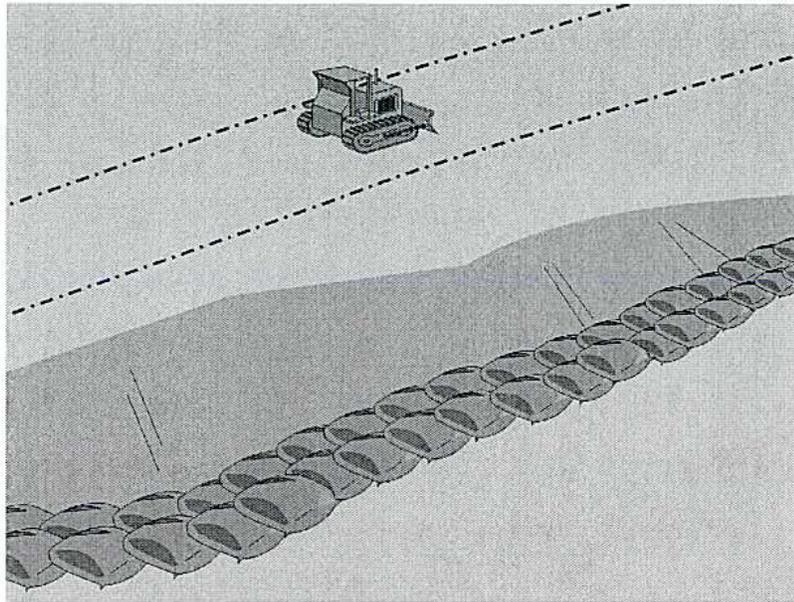


ENTRENCHMENT DETAIL
N.T.S.



OPTIONAL ENTRENCHMENT DETAIL

N.T.S.



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 gravel bag berm consists of a single row of gravel bags that are installed end to end to form a barrier across a slope to intercept runoff, reduce its flow velocity, release the runoff as sheet flow and provide some sediment removal. Gravel bags can 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**
- BMP may be implemented on a project-by-project basis with other BMPs when determined necessary and feasible by the RE.
 - 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.
 - Along the perimeter of a site.
 - 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.
- When site conditions or construction sequencing require adjustments or relocation of the barrier to meet changing field conditions and needs during construction.
- At grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.

Limitations

- Degraded gravel bags may rupture when removed, spilling contents.
- Installation can be labor intensive.
- Limited durability for long term projects.
- When used to detain concentrated flows, maintenance requirements increase.

Standards and Specifications

Materials

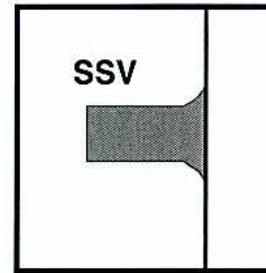
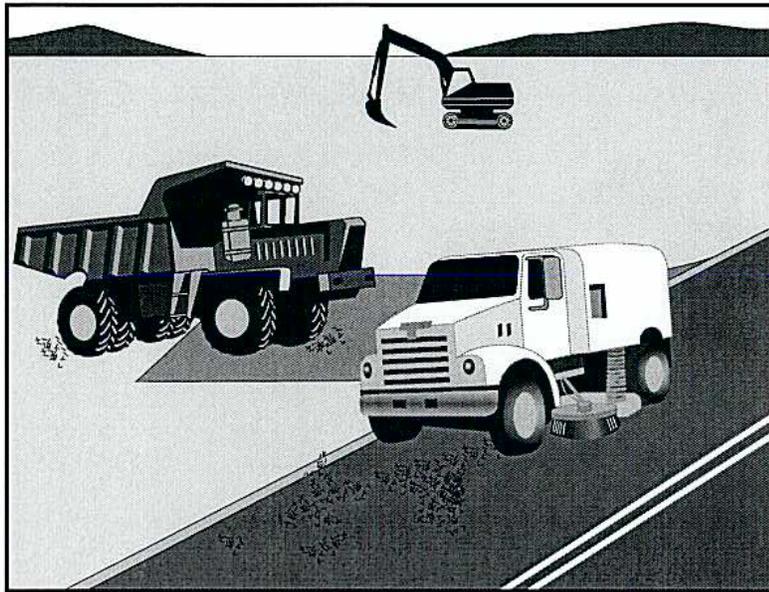
- **Bag Material:** Bags shall be woven polypropylene, polyethylene or polyamide fabric, minimum unit weight 135 g/m² (four ounces per square yard), mullen burst strength exceeding 2,070 kPa (300 psi) in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70% in conformance with the requirements in ASTM designation D4355.
- **Bag Size:** Each gravel-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 RE for approval prior to deployment.
- **Fill Material:** Gravel shall be between 10 mm and 20 mm (0.4 and 0.8 inch) in diameter, and shall be clean and free from clay balls, organic matter, and other deleterious materials. The opening of gravel-filled bags shall be between 13 kg and 22 kg (28 and 48 lb) in mass. 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 gravel bag row up slope to prevent flow around the ends.
 - Generally, gravel bag barriers shall be used in conjunction with temporary soil stabilization controls up slope to provide effective erosion and sediment

control.

- When used for concentrated flows:
 - Stack gravel bags to required height using a pyramid approach.
 - Upper rows of gravel bags shall overlap joints in lower rows.
 - Construct gravel bag 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 gravel bag barrier may be constructed at the toe of the slope, but shall be constructed as far from the toe of the slope as practicable.
 - Requires Certificate of Compliance per Standard Specifications 6-1.07.
- Maintenance and Inspection
- Inspect gravel bag berms before and after each rainfall event, and weekly throughout the rainy season.
 - Reshape or replace gravel bags as needed, or as directed by the RE.
 - Repair washouts or other damages as needed, or as directed by the RE.
 - Inspect gravel bag berms for sediment accumulations and remove sediments when accumulation reaches one-third of the berm 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 gravel bag berms when no longer needed. Remove sediment accumulations and clean, re-grade, and stabilize the area.



Standard Symbol

BMP Objectives

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

Definition and Purpose Practices to remove tracked sediment to prevent the sediment from entering a storm drain or watercourse.

Appropriate Applications These practices are implemented anywhere sediment is tracked from the project site onto public or private paved roads, typically at points of ingress/egress.

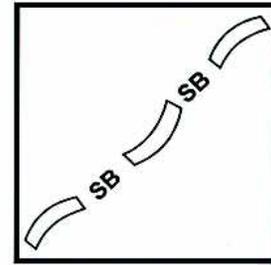
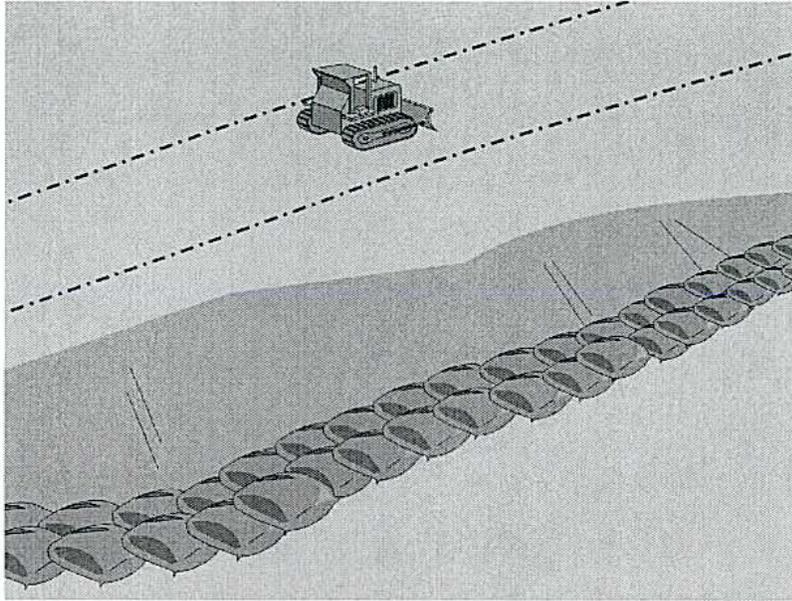
Limitations Sweeping and vacuuming may not be effective when soil is wet or muddy.

Standards and Specifications

- Kick brooms or sweeper attachments shall not be used.
- Inspect potential sediment tracking locations daily.
- Visible sediment tracking shall be swept and/or vacuumed daily.
- If not mixed with debris or trash, consider incorporating the removed sediment back into the project.

Maintenance and Inspection

- Inspect ingress/egress access points daily and sweep tracked sediment as needed, or as required by the Resident Engineer (RE).
- Be careful not to sweep up any unknown substance or any object that may be potentially hazardous.
- Adjust brooms frequently; maximize efficiency of sweeping operations.
- After sweeping is finished, properly dispose of sweeper wastes at an approved dumpsite in conformance with the provisions in Standard Specifications Section 7-1.13 .



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 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.

- Appropriate Applications**
- 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).
 - 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/desilting 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.

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

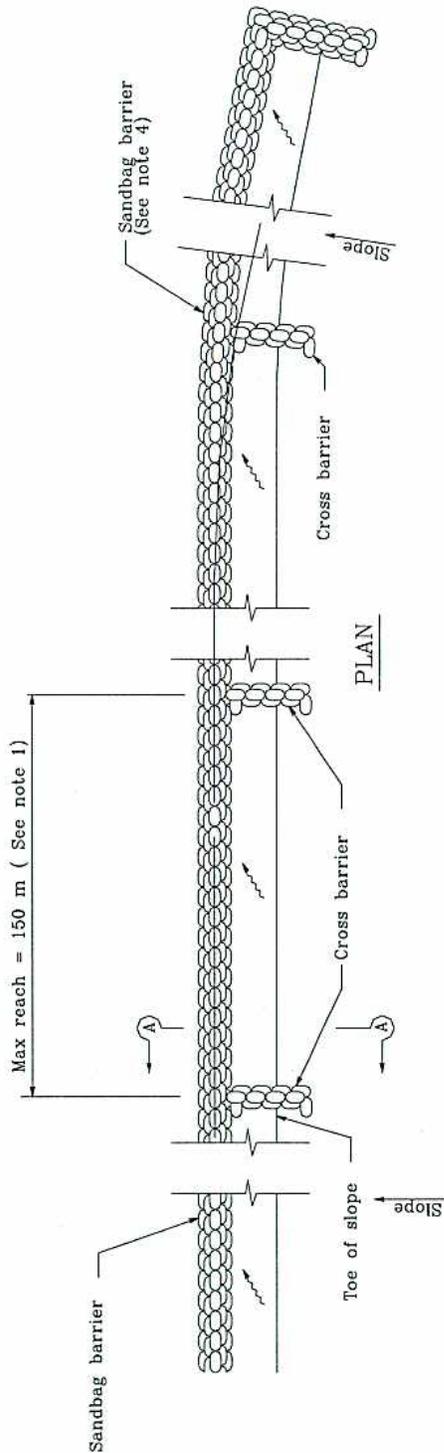
- **Sandbag Material:** Sandbag shall be woven polypropylene, polyethylene or polyamide fabric, minimum unit weight 135 g/m² (four ounces per square yard), mullen burst strength exceeding 2,070 kPa (300 psi) in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70% 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 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 Standard Specifications Section 68-1.025 "Permeable Material". 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 sediment control:
 - 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 erosion and sediment control.
 - Install as shown in Pages 4 and 5 of this BMP.
- Construct sandbag barriers with a set-back of at least 1m (3 ft) from the toe of a slope. Where it is determined to be not practical 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.



TEMPORARY LINEAR SEDIMENT BARRIER (TYPE SANDBAG)



STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

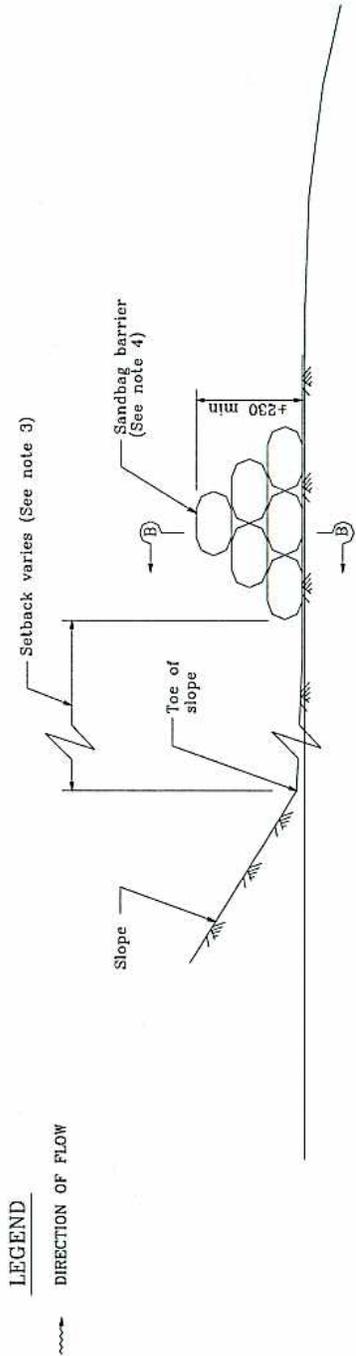
TEMPORARY LINEAR SEDIMENT BARRIER (TYPE SANDBAG)

NO SCALE

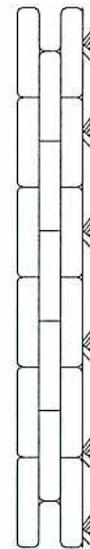
ALL DIMENSIONS ARE IN
MILLIMETERS UNLESS OTHERWISE SHOWN

NOTES

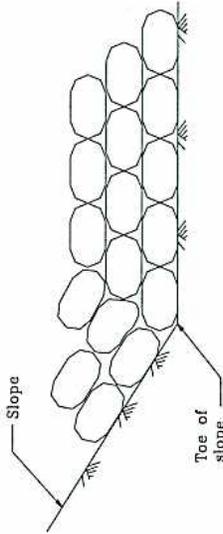
1. Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/2 the height of the linear barrier. In no case shall the reach length exceed 150 m.
2. Place sandbags tightly.
3. Dimension may vary to fit field condition.
4. Sandbag barrier shall be a minimum 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.



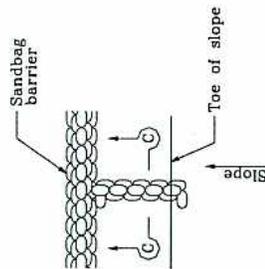
SECTION A-A



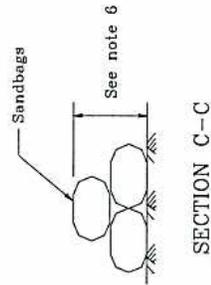
SECTION B-B



END DETAIL



CROSS BARRIER DETAIL

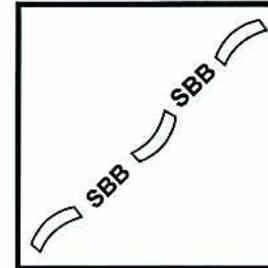
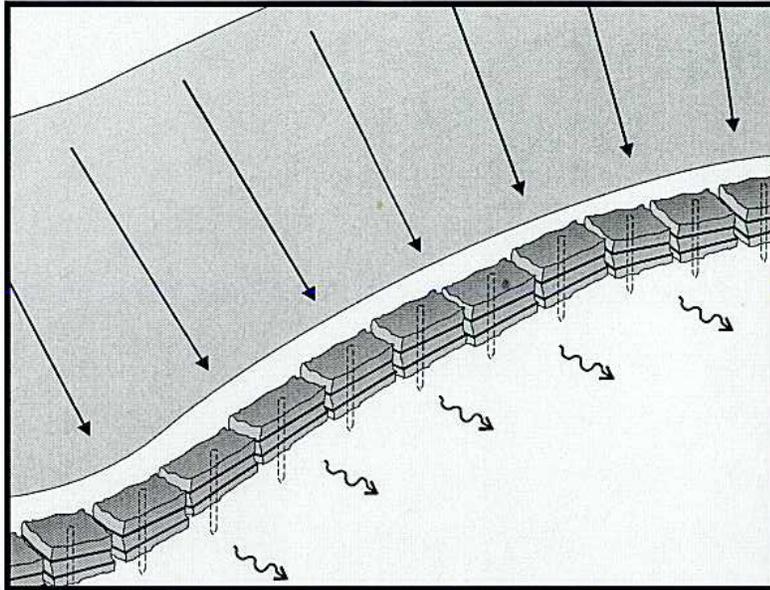


SECTION C-C

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TEMPORARY LINEAR SEDIMENT BARRIER
(TYPE SANDBAG)

NO SCALE
ALL DIMENSIONS ARE IN
MILLIMETERS UNLESS OTHERWISE SHOWN



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 straw bale barrier is a temporary linear sediment barrier consisting of straw bales, designed to intercept and slow sediment-laden sheet flow runoff. Straw bale barriers allow sediment to settle from runoff before water leaves the construction site.

Appropriate Applications

- 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).
- 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 minor swales or ditches with small catchments.
- Around above grade type temporary concrete washouts (See BMP WM-8, "Concrete Waste Management").
- Parallel to a roadway to keep sediment off paved areas.

- Limitations
- Installation can be labor intensive.
 - Straw bale barriers are maintenance intensive.
 - Degraded straw bales may fall apart when removed or left in place for extended periods.
 - Can't be used on paved surfaces.
 - Not to be used for drain inlet protection.
 - Shall not be used in areas of concentrated flow.
 - Can be an attractive food source for some animals.
 - May introduce undesirable non-native plants to the area.

Standards and Specifications

Materials

- **Straw Bale Material:** Straw bale materials shall conform to the provisions in Standard Specifications Section 20-2.06, "Straw."
- **Straw Bale Size:** Each straw bale shall be a minimum of 360 mm (14 in) wide, 450 mm (18 in) in height, 900 mm (36 in) in length and shall have a minimum mass of 23 kg (51 lb.) The straw bale shall be composed entirely of vegetative matter, except for the binding material.
- **Bale Bindings:** Bales shall be bound by either steel wire, nylon or polypropylene string placed horizontally. Jute and cotton binding shall not be used. Baling wire shall be a minimum diameter of 1.57 mm (0.06 inch). Nylon or polypropylene string shall be approximately 2 mm (0.08 inch) in diameter with a breaking strength of 360 N.
- **Stakes:** 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. Steel bar reinforcement shall be equal to a number four designation or greater. End protection shall be provided for any exposed bar reinforcement.

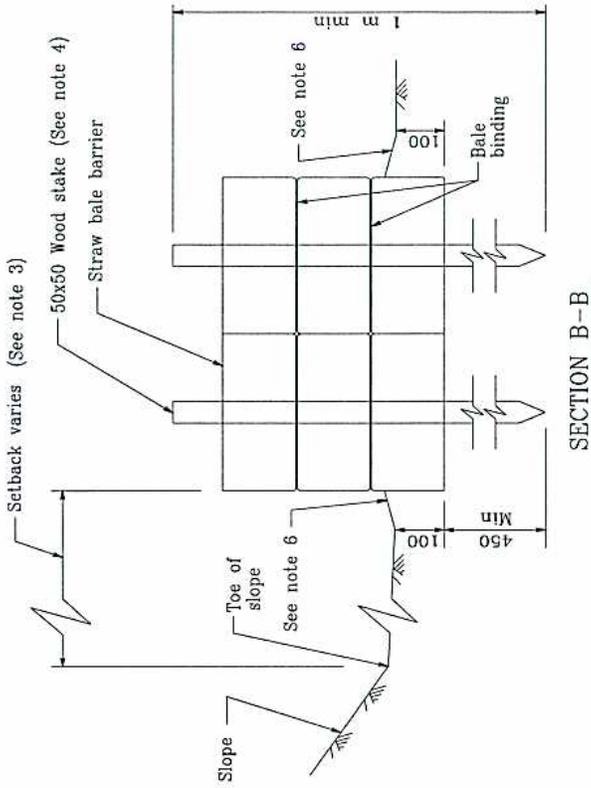
Installation

- Limit the drainage area upstream of the barrier to 0.3 ha/100 m (0.25 ac/100ft) or barrier.
- Limit the slope length draining to the straw bale barrier to 30 m (100 ft.)

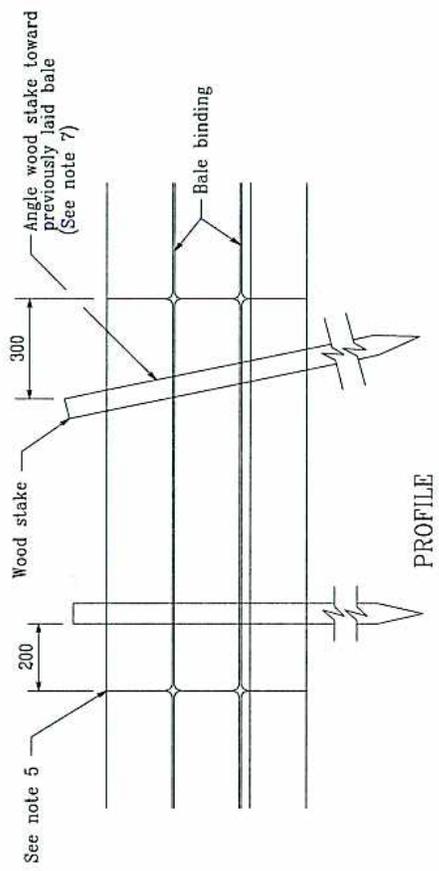
- Slopes of 2:100 (V:H) (2%) or flatter are preferred. If the slope exceeds 1:10 (V:H) (10%), the length of slope upstream of the barrier must be less than 15 m (50 ft).
- Install straw bale barriers along a level contour, with the last straw bale turned up slope.
- Straw bales must be installed in a trench and tightly abut adjacent bales.
- Construct straw bale barriers with a set-back of at least 1 m (3 ft) from the toe of a slope. Where it is determined to be not practical due to specific site conditions, the straw bale barrier may be constructed at the toe of the slope, but shall be constructed as far from the toe of the slope as practical.
- See pages 4 and 5 of this BMP for installation detail.

Maintenance and Inspection

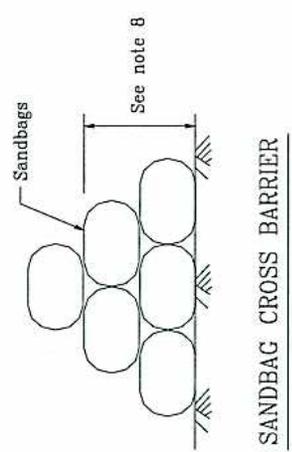
- Inspect straw bale barriers before and after each rainfall event, and weekly throughout the rainy season.
- Inspect straw bale barriers for sediment accumulations and remove sediment when depth reaches one-third the barrier height. Removed sediment shall be incorporated in the project at locations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



SECTION B-B



PROFILE

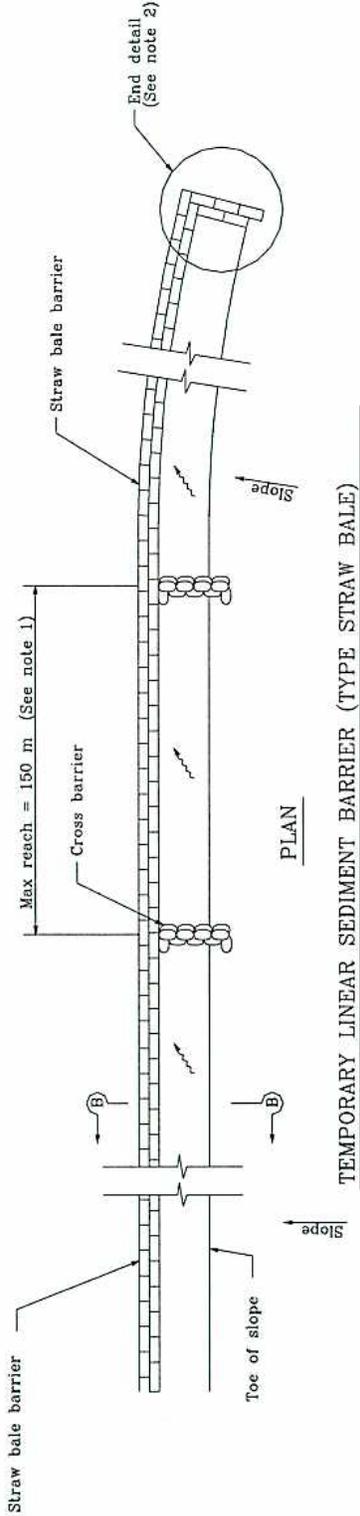


SANDBAG CROSS BARRIER

LEGEND

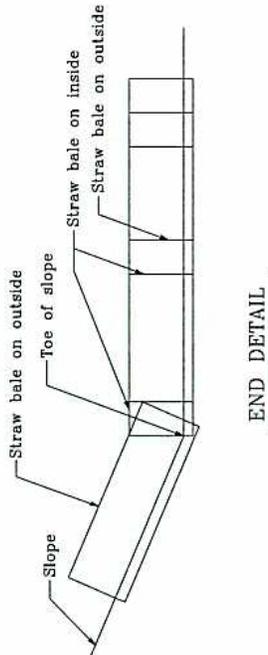
~ ~ ~ DIRECTION OF FLOW

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
TEMPORARY LINEAR SEDIMENT BARRIER
(TYPE STRAW BALE)
NO SCALE
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



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. The end of barrier shall be turned up slope.
3. Dimension may vary to fit field condition.
4. Stake dimensions are nominal.
5. Place straw bales tightly together.
6. Tamp embedment spoils against sides of installed bales.
7. Drive angled wood stake before vertical stake to ensure tight abutment to adjacent bale.
8. Cross barriers shall be a min of 1/2 and a max of 2/3 the height of the linear barrier.
9. Sandbag rows and layers shall be offset to eliminate gaps.

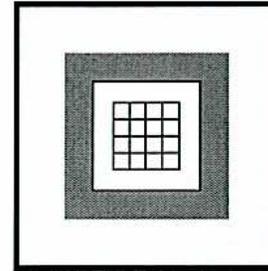
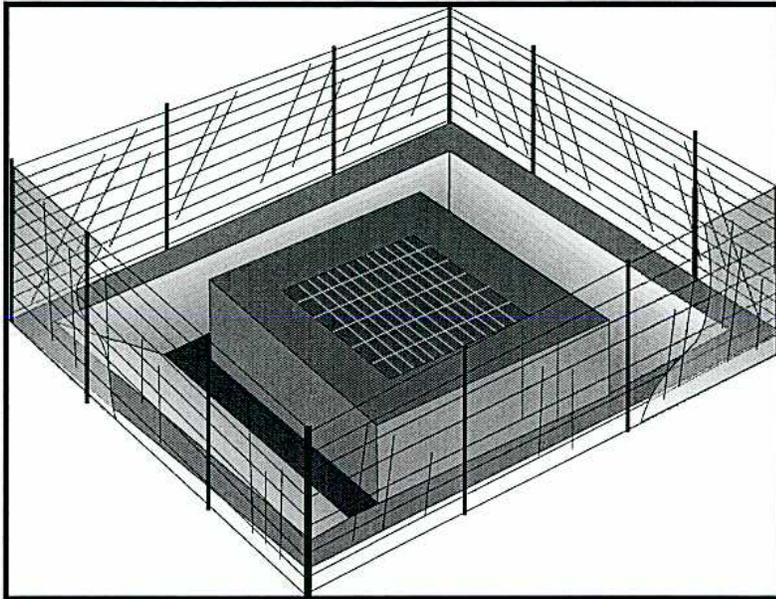


STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TEMPORARY LINEAR SEDIMENT BARRIER (TYPE STRAW BALE)

NO SCALE

ALL DIMENSIONS ARE IN
MILLIMETERS UNLESS OTHERWISE SHOWN



Standard Symbol

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 into storm 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**
- Requires an adequate area for water to pond without encroaching upon traveled way and should not present itself to be an obstacle to oncoming traffic.
 - May require other methods of temporary protection to prevent sediment-laden storm water and non-storm water discharges from entering 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 (e.g. check dams) in conjunction with inlet protection.
 - Frequent maintenance is required.
 - For drainage areas larger than 0.4 ha (1 ac), runoff shall be routed to a sediment trapping device designed for larger flows. See BMPs SC-2, "Sediment/Desilting Basin," and SC-3 "Sediment Trap."

- Filter fabric fence inlet protection is appropriate in open areas that are subject to sheet flow and for flows not exceeding 0.014 m³/s (0.5 cfs).
- Gravel bag barriers for inlet protection are applicable when sheet flows or concentrated flows exceed 0.014 m³/s (0.5 cfs), and it is necessary to allow for overtopping to prevent flooding.
- Fiber rolls and foam barriers are not appropriate for locations where they cannot be properly anchored to the surface.
- 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 on Page 5. 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 6. 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 m³/ha (67 yd³/ac) of drainage area.
- **DI Protection Type 3 - Gravel bag** - The gravel bag barrier (Type 3) is illustrated in Page 7. 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 gravel bags in accordance with BMP SC-6, "Gravel Bag Berm." Gravel bags shall be used due to their high permeability.
- **DI Protection Type 4 - Foam Barriers and Fiber Rolls** - Foam barrier or fiber roll (Type 4) is placed around the inlet and keyed and anchored to the surface. Foam barriers and fiber rolls are intended for use as inlet protection where the area around the inlet is unpaved and the foam barrier or fiber roll can be secured to the surface. RE or Construction Storm Water Coordinator approval is required.

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***

- This method shall be used for drain inlets requiring protection in areas where finished grade is established and erosion control seeding has been applied or is pending.
- Make sure the stakes are securely driven in the ground and are structurally sound (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 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 Section 7-1.13.

■ ***Type 2 - Excavated Drop Inlet Sediment Trap***

- This method may be used for drain inlets requiring protection in areas that have been cleared and grubbed, and where exposed soil areas are subject to grading.
- Remove sediment from basin when the volume of the basin has been reduced by one-half.

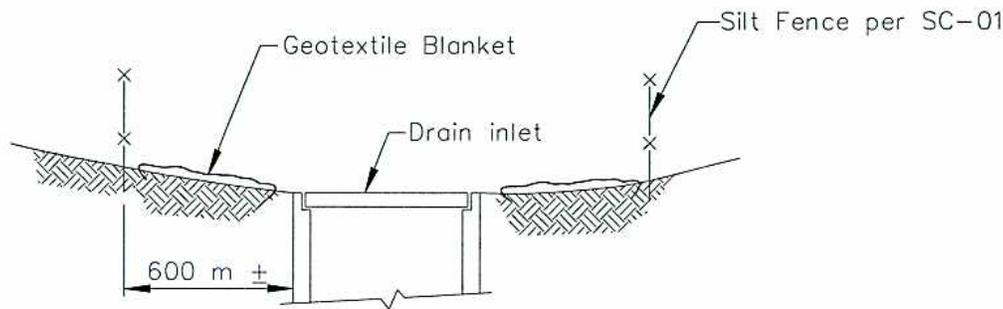
■ ***Type 3 - Gravel Bag Barrier***

- This method may be used for drain inlets surrounded by AC or paved surfaces.
- Inspect bags for holes, gashes, and snags.

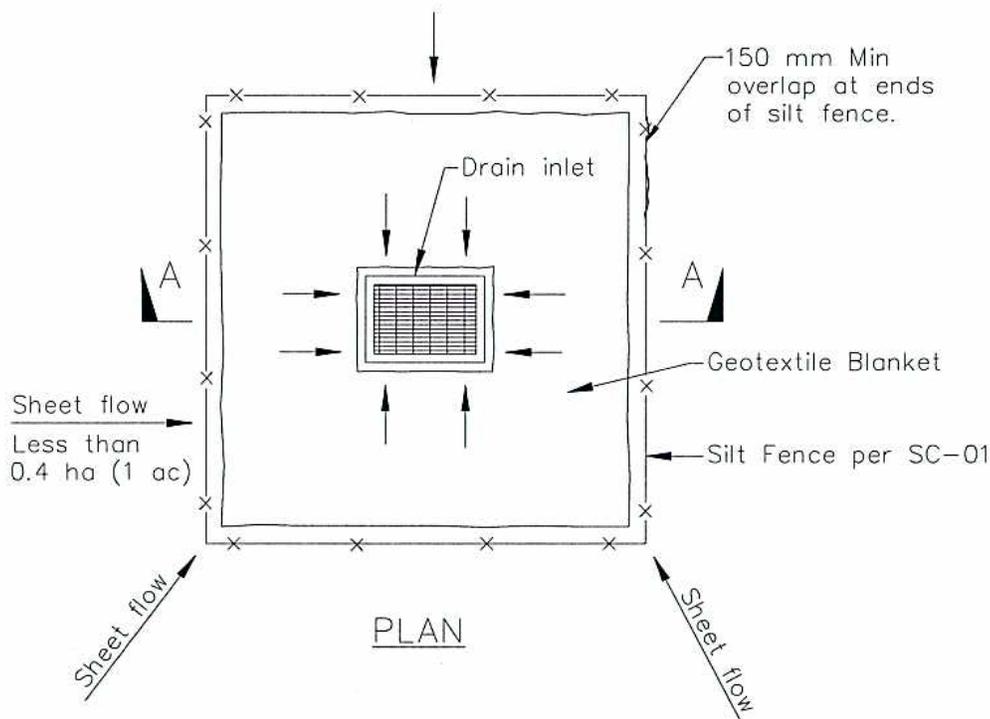
- Check gravel bags for proper arrangement and displacement. Remove the sediment behind the barrier when it reaches one-third the height of the barrier. Removed sediment shall be incorporated in the project at locations designated by the RE or disposed of outside the highway right-of-way in conformance with the Standard Specifications Section 7-1.13.

■ *Type 4 Foam Barriers and Fiber Rolls*

- This method may be used for drain inlets requiring protection in areas that have been cleared and grubbed, and where exposed soil areas subject to grading. RE or Construction Storm Coordinator approval is required.
- Check foam barrier or fiber roll 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

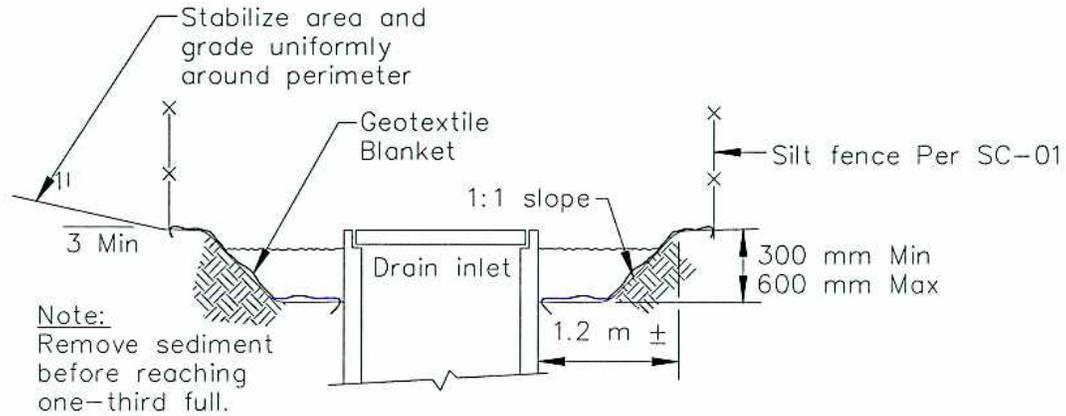


PLAN

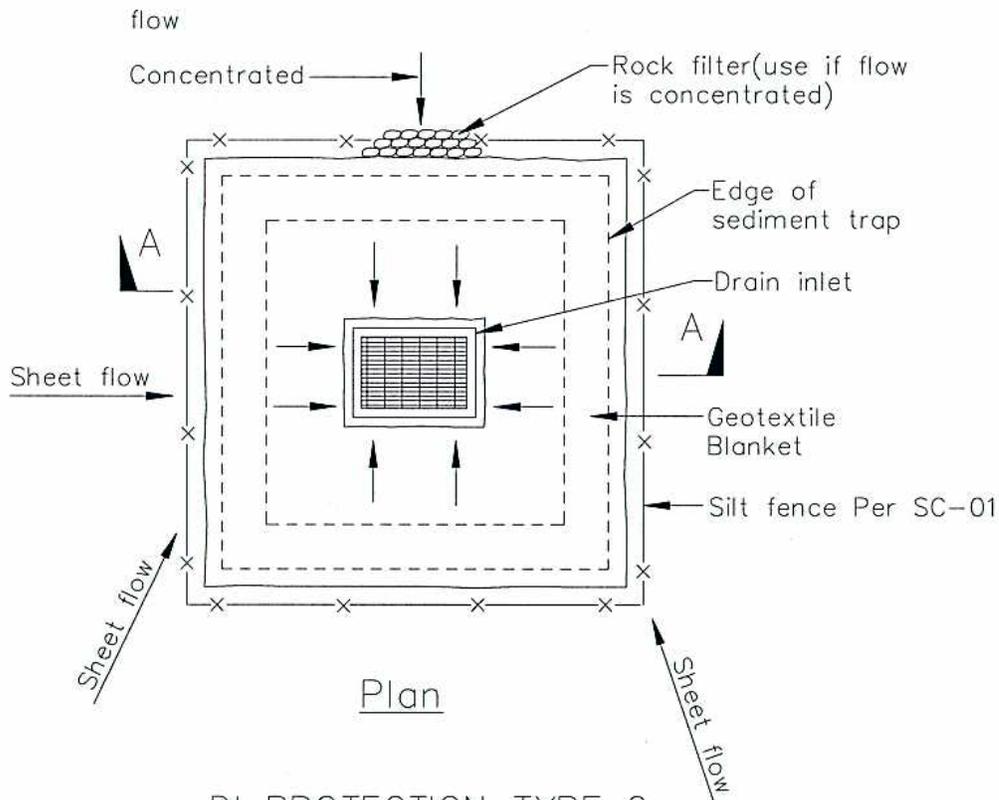
DI PROTECTION TYPE 1
NOT TO SCALE

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

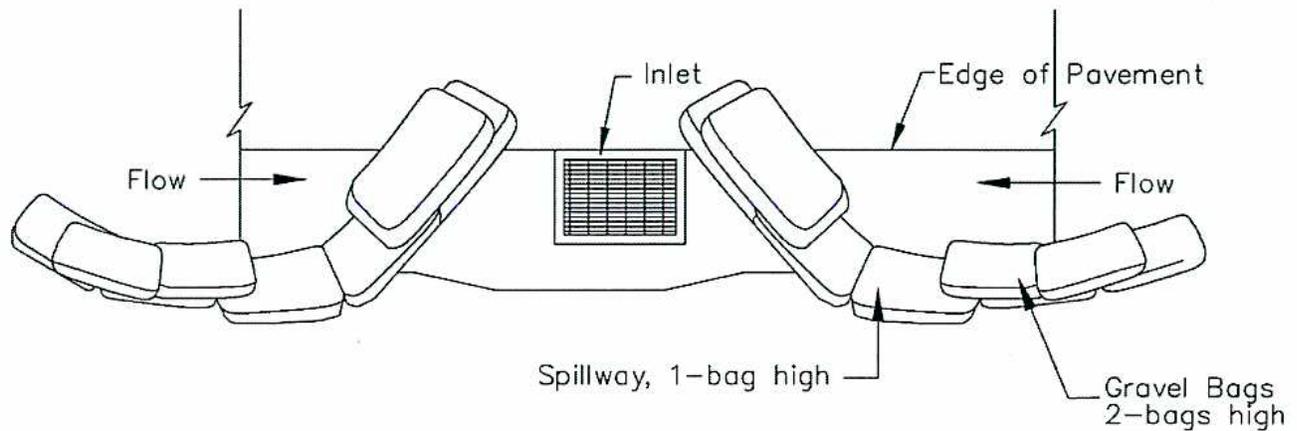


Plan

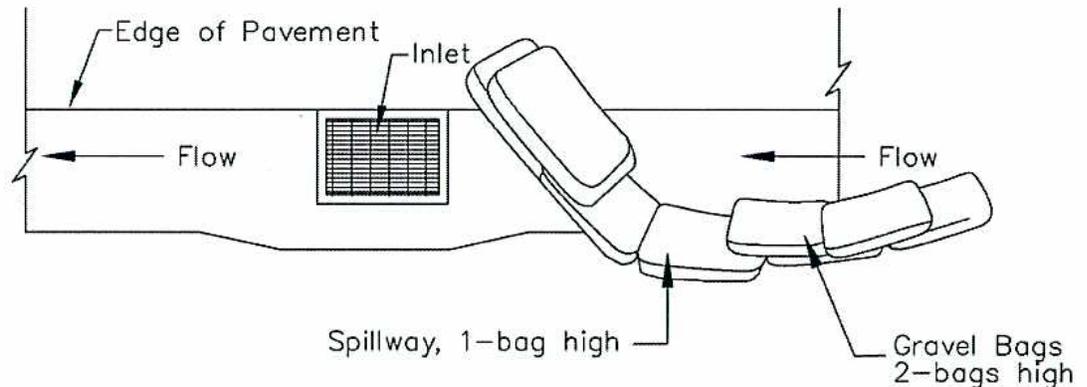
DI PROTECTION TYPE 2
NOT TO SCALE

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.



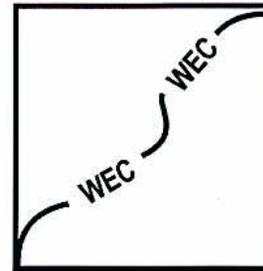
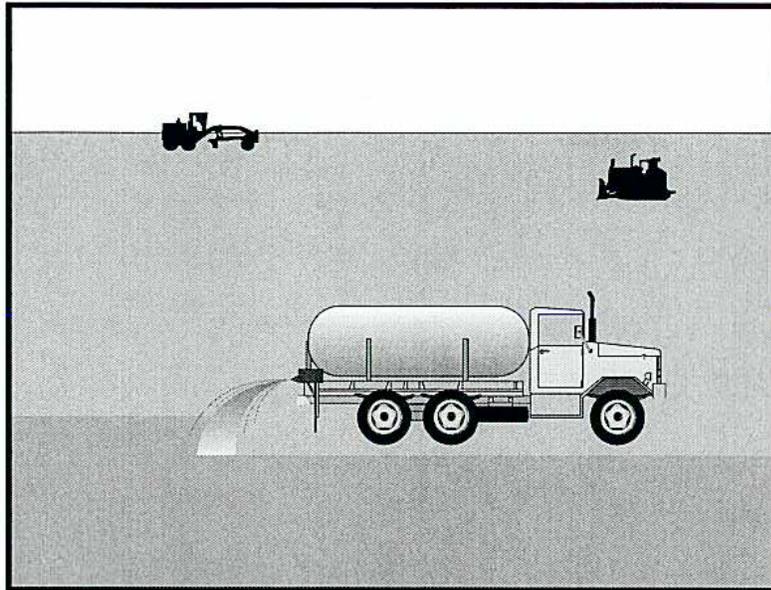
TYPICAL PROTECTION FOR INLET WITH OPPOSING FLOW DIRECTIONS



TYPICAL PROTECTION FOR INLET WITH SINGLE FLOW DIRECTION

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.



Standard Symbol

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

Definition and Purpose Wind erosion control consists of applying water and/or other dust palliatives as necessary to prevent or alleviate erosion by the forces of wind. Dust control shall be applied in accordance with Caltrans standard practices. Covering of small stockpiles or areas is an alternative to applying water or other dust palliatives.

Appropriate Applications Limitations

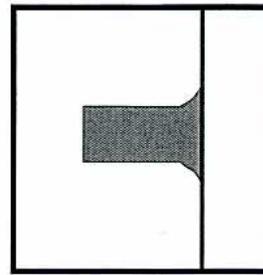
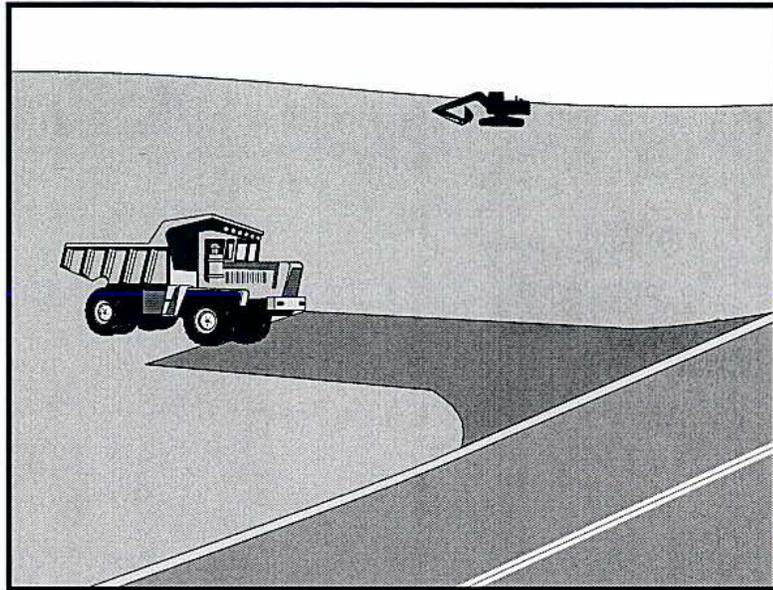
- This practice is implemented on all exposed soils subject to wind erosion.
- Effectiveness depends on soil, temperature, humidity and wind velocity.

Standards and Specifications

- Water shall be applied by means of pressure-type distributors or pipelines equipped with a spray system or hoses and nozzles that will ensure even distribution.
- All distribution equipment shall be equipped with a positive means of shutoff.
- Unless water is applied by means of pipelines, at least one mobile unit shall be available at all times to apply water or dust palliative to the project.
- If reclaimed water is used, the sources and discharge must meet California Department of Health Services water reclamation criteria and the Regional Water Quality Control Board requirements. Non-potable water shall not be conveyed in tanks or drain pipes that will be used to convey potable water and there shall be no connection between potable and non-potable supplies. Non-potable tanks, pipes and other conveyances shall be marked "NON-POTABLE WATER - DO NOT DRINK."
- Materials applied as temporary soil stabilizers and soil binders will also provide wind erosion control benefits.

Maintenance and Inspection

- Check areas that have been protected to ensure coverage.



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 stabilized construction access is defined by a 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 can be 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).

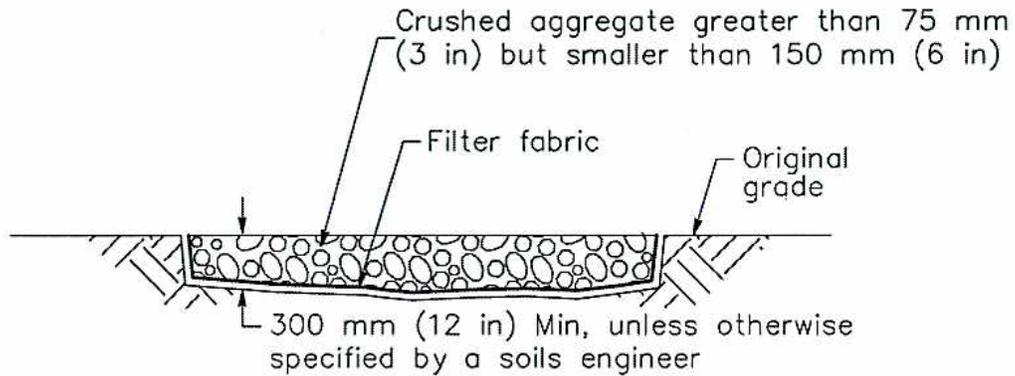
Limitations

- Site conditions will dictate design and need.

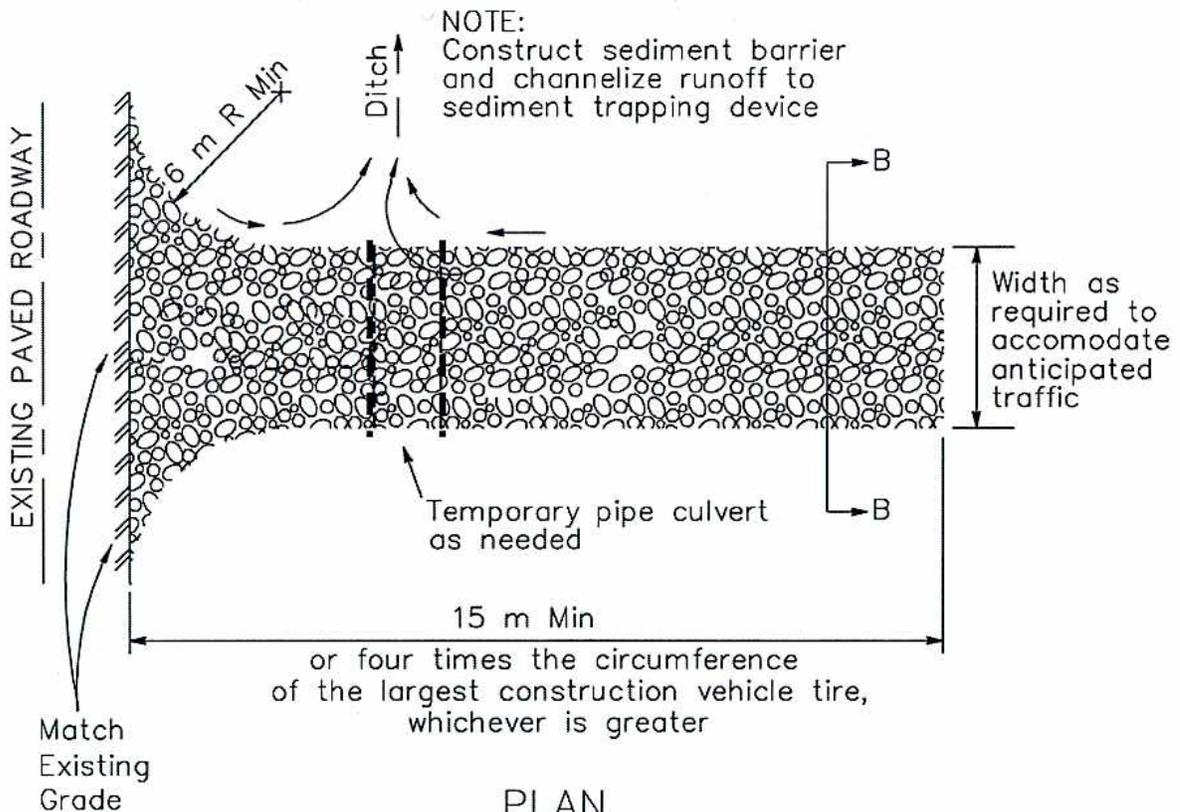
Standards and Specifications

- 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 the 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/manufactured steel plates with ribs for entrance/exit access is allowed with written approval from 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 the RE. Crushed aggregate greater than 75 mm (3 inches) and smaller than 150 mm (6 inches) shall be used.
 - Designate combination or single purpose entrances and exits to the construction site.
 - Implement BMP SC-7, "Street Sweeping and Vacuuming" as needed and as required.
 - Require all employees, subcontractors, and suppliers to utilize the stabilized construction access.
 - All exit locations intended to be used continuously and for a period of time shall have stabilized construction entrance/exit BMPs (TC-1 "Stabilized Construction Entrance/Exit" or TC-3 "Entrance/Outlet Tire Wash").
- Maintenance and Inspection
- Inspect routinely for damage and assess effectiveness of the BMP. Remove aggregate, separate and dispose of sediment if construction entrance/exit is clogged with sediment or as directed by the RE.
 - Keep all temporary roadway ditches clear.
 - Inspect for damage and repair as needed.

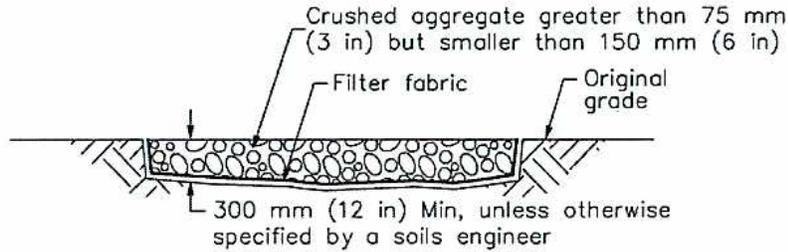


SECTION B-B
NTS

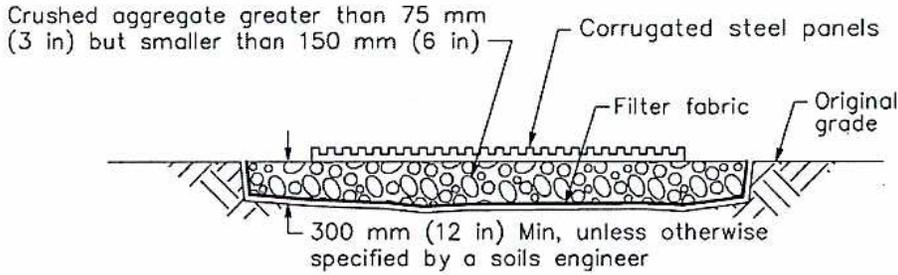


PLAN
NTS

Stabilized Construction Entrance/Exit (Type 1)

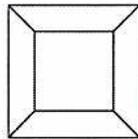


SECTION B-B
NTS

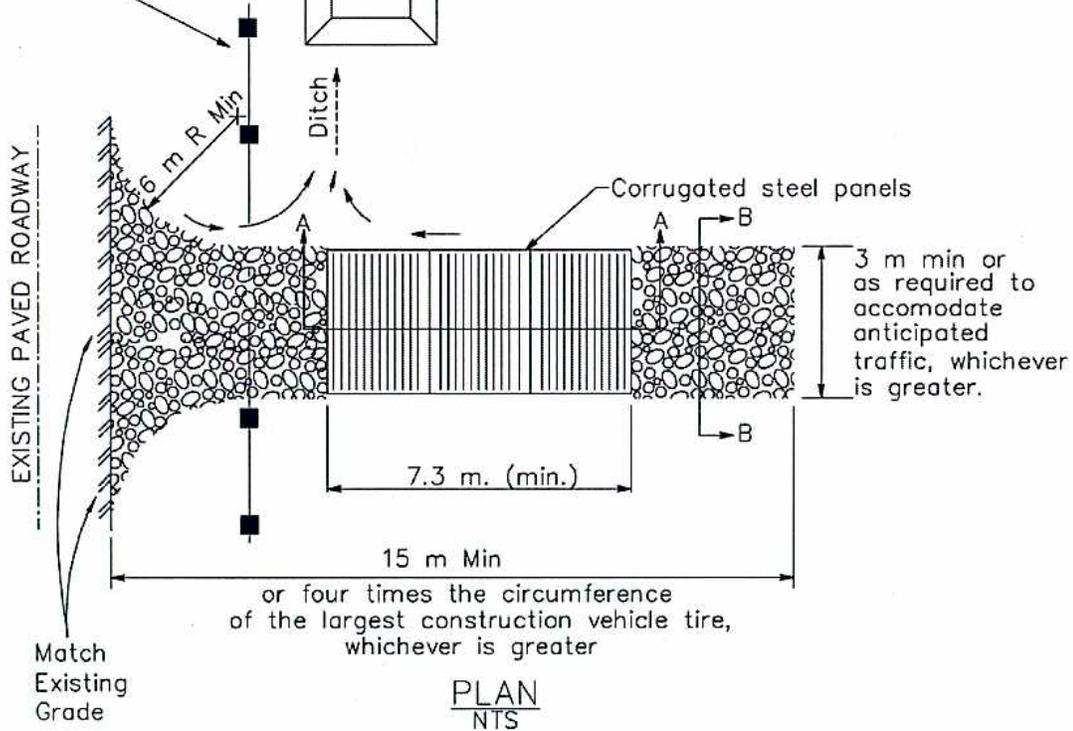


SECTION A-A
NOT TO SCALE

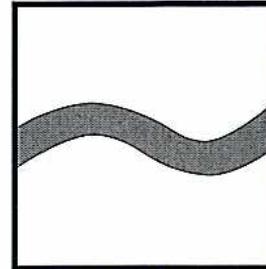
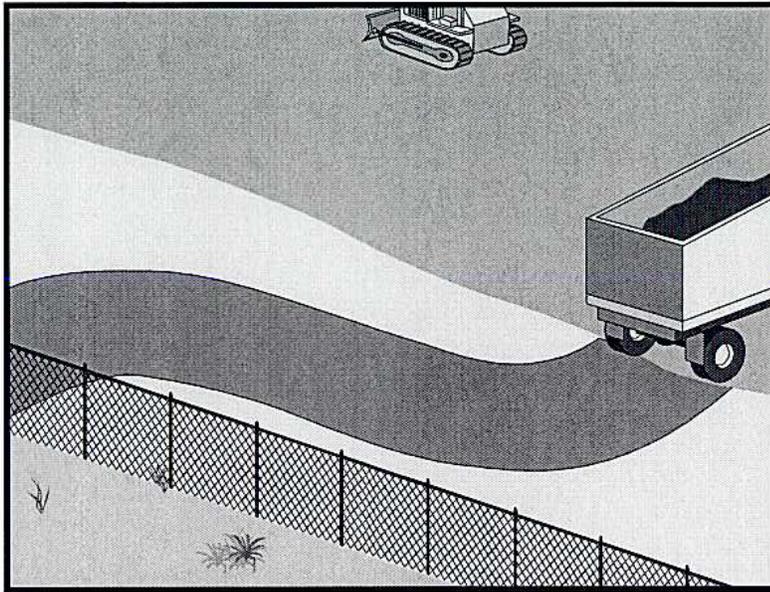
NOTE:
Construct sediment barrier and channelize runoff to sediment trapping device



Sediment trapping device



Stabilized Construction Entrance/Exit (Type 2)



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 stabilized construction roadway is a temporary access road. It is designed for the control of dust and erosion created by vehicular tracking.

Appropriate Applications

- Construction roadways and short-term detour roads:
 - Where mud tracking is a problem during wet weather.
 - Where dust is a problem during dry weather.
 - Adjacent to water bodies.
 - Where poor soils are encountered.
 - Where there are steep grades and additional traction is needed.

- 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

- Materials will likely need to be removed prior to final project grading and stabilization.
- Site conditions will dictate design and need.
- May not be applicable to very short duration projects.
- Limit speed of vehicles to control dust.

Standards and Specifications

- Properly grade roadway to prevent runoff from leaving the construction site.
- Design stabilized access to support the heaviest vehicles and equipment that will use it.
- Stabilize roadway using aggregate, asphalt concrete, or concrete based on longevity, required performance, and site conditions. The use of cold mix asphalt or asphalt concrete (AC) grindings for stabilized construction roadway is not allowed.
- Coordinate materials with those used for stabilized construction entrance/exit points.
- 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 the RE or Construction Storm Water Coordinator. Crushed aggregate greater than 75 mm (3 inches) and smaller than 150 mm (6 inches) shall be used.

Maintenance and Inspection

- Inspect routinely for damage and repair as needed, or as directed by the RE.
- Keep all temporary roadway ditches clear.
- When no longer required, remove stabilized construction roadway and re-grade and repair slopes.



Standard Symbol

BMP Objectives

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

Definition and Purpose Water conservation practices are activities that use water during the construction of a project in a manner that avoids causing erosion and/or the transport of pollutants off site.

Appropriate Applications

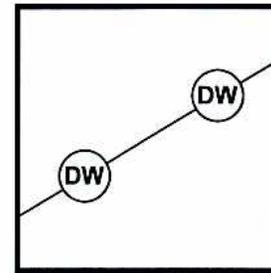
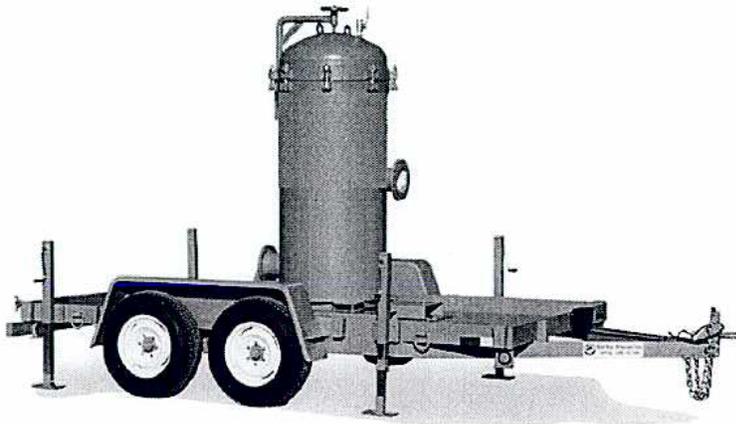
- Water conservation practices are implemented on all construction sites and wherever water is used.
- Applies to all construction projects.

Limitations ■ None identified.

Standards and Specifications

- Keep water equipment in good working condition.
- Stabilize water truck filling area.
- Repair water leaks promptly.
- Vehicles and equipment washing on the construction site is discouraged.
- Avoid using water to clean construction areas. Do not use water to clean pavement. Paved areas shall be swept and vacuumed.
- Direct construction water runoff to areas where it can infiltrate into the ground.
- Apply water for dust control in accordance with the Standard Specifications Section 10, and WE-1, "Wind Erosion Control."
- Report discharges to RE immediately.

- Maintenance and Inspection
- Inspect water equipment at least weekly.
 - Repair water equipment as needed.



Standard Symbol

BMP Objectives

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

Definition and Purpose Dewatering Operations are practices that manage the discharge of pollutants when non-storm water and accumulated precipitation (storm water) must be removed from a work location so that construction work may be accomplished.

- Appropriate Applications**
- These practices are implemented for discharges of non-storm water and storm water (accumulated rain water) from construction sites. Non-storm water includes, but is not limited to, groundwater, dewatering of piles, water from cofferdams, water diversions, and water used during construction activities that must be removed from a work area.
 - Practices identified in this section are also appropriate for implementation when managing the removal of accumulated precipitation (storm water) from depressed areas at a construction site.
 - Storm water mixed with non-storm water should be managed as non-storm water.

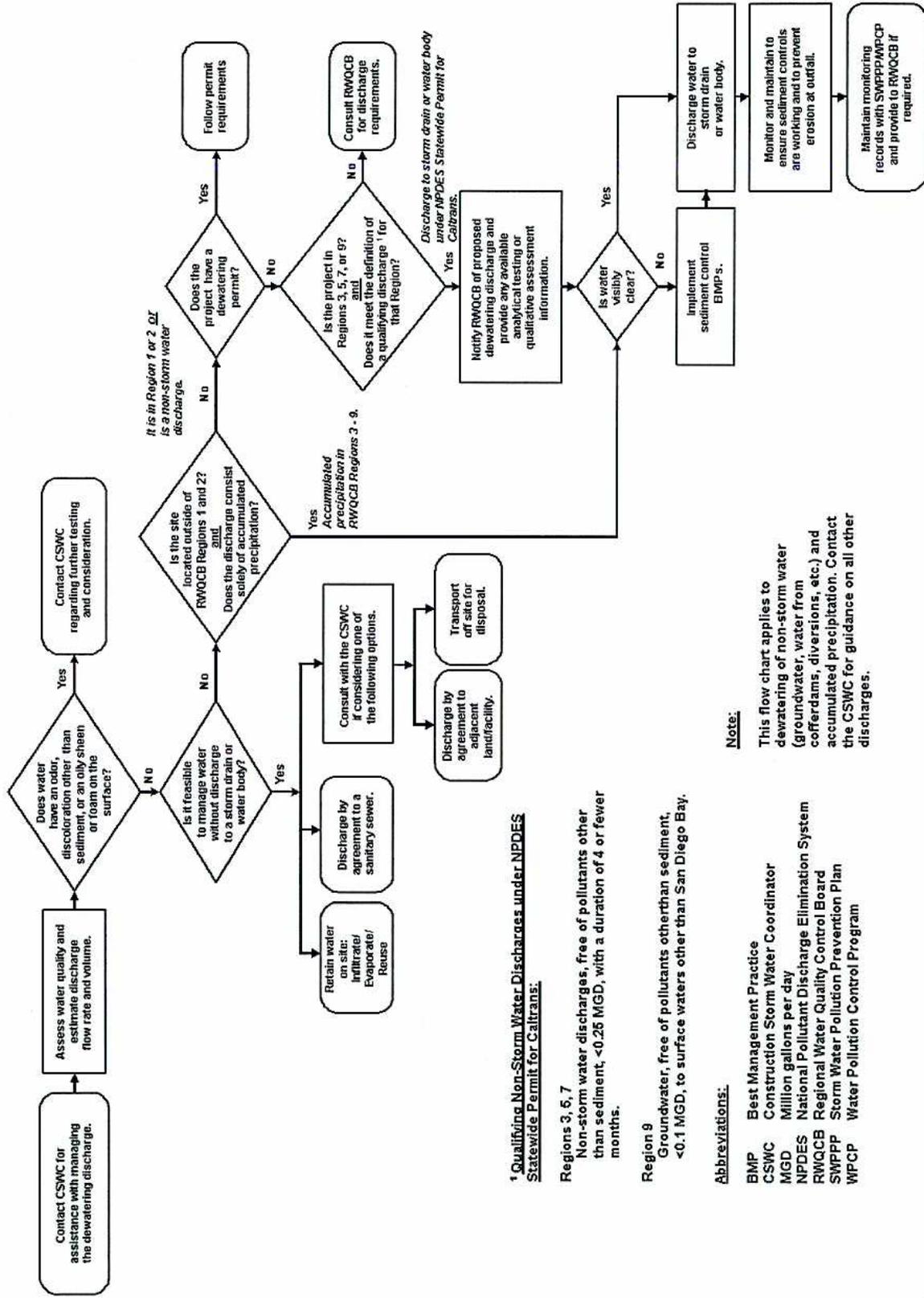
- Limitations**
- Dewatering operations for non-storm water will require, and must comply with, applicable local permits, project-specific permits, and regulations.
 - Site conditions will dictate design and use of dewatering operations.
 - A dewatering plan shall be submitted as part of the SWPPP/WPCP detailing the location of dewatering activities, equipment, and discharge point.
 - The controls discussed in this best management practice (BMP) address sediment only. If the presence of polluted water with hazardous substances is identified in the contract, the contractor shall implement dewatering pollution controls as required by the contract documents. If the quality of water to be removed by dewatering is not identified as polluted in the contract documents, but is later determined by observation or testing to be polluted, the contractor shall notify the Resident Engineer (RE) and comply with Standard Specifications Section 5-1.116, "Differing Site Conditions."

Standards and Specifications

- Avoid dewatering discharges where possible by using the water for dust control, by infiltration, etc.
- Dewatering shall be conducted in accordance with the Field Guide to Construction Site Dewatering, October 2001, CTSW-RT-01-010.
- Dewatering for accumulated precipitation (storm water) shall follow this BMP and use treatment measures specified herein.
- The RWQCB may require a separate NPDES permit prior to the dewatering discharge of non-storm water. These permits will have specific testing, monitoring, and discharge requirements and can take significant time to obtain.
- Except in RWQCB Regions 1 and 2, the discharge of accumulated precipitation (storm water) to a water body or storm drain is subject to the requirements of Caltrans NPDES permit. Sediment control and other appropriate BMPs (e.g., outlet protection/energy dissipation) must be employed when this water is discharged.
- RWQCB Regions 1 and 2 require notification and approval prior to any discharge of water from construction sites.
- In RWQCB Regions 3, 5, 7, and 9 non-storm water dewatering for discharges meeting certain conditions are allowed under an RWQCB general dewatering NPDES Permit. Notification and approval from the RWQCB is required prior to conducting these operations. This includes storm water that is mixed with groundwater or other non-storm water sources. Once the discharge is allowed, appropriate BMPs must be implemented to ensure that the discharge complies with all permit requirements. Conditions for potential discharge under an RWQCB general dewatering NPDES Permit include:
 - Regions 3, 5, 7: Non-storm water discharges, free of pollutants other than sediment, <0.25 MGD, with a duration of 4 or fewer months.
 - Region 9: Groundwater, free of pollutants other than sediment, <0.10 MGD, to surface waters other than San Diego Bay.
- The flow chart shown on Page 4 shall be utilized to guide dewatering operations.
- The RE will coordinate monitoring and permit compliance.
- Discharges must comply with regional and watershed-specific discharge requirements.
- Additional permits or permissions from other agencies may be required for dewatering cofferdams or diversions.
- Dewatering discharges must not cause erosion at the discharge point.

Maintenance and Inspection

- Dewatering records shall be maintained for a period of 3 years.
- Inspect all BMPs implemented to comply with permit requirements frequently and repair or replace to ensure the BMPs function as designed.
- Conduct water quality monitoring pursuant to the “Storm Water Dewatering Operations BMP Discharge Monitoring Forms”.
- Accumulated sediment removed during the maintenance of a dewatering device may 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.
- Accumulated sediment that is commingled with other pollutants must be disposed of in accordance with all applicable laws and regulations and as approved by the RE.



Sediment Treatment A variety of methods can be used to treat water during dewatering operations from the construction site. Several devices are presented in this section that provide options to achieve sediment removal. The size of particles present in the sediment and Permit or receiving water limitations on sediment are key considerations for selecting sediment treatment option(s); in some cases, the use of multiple devices may be appropriate.

Category 1: Constructed Settling Technologies

The devices discussed in this category are to be used exclusively for dewatering operations only.

Sediment/Desilting Basin (SC-2)

Description:

A desilting basin is a temporary basin with a controlled release structure that is formed by excavation and/or construction of an embankment to detain sediment-laden runoff and allow sediment to settle out before discharging.

Appropriate Applications:

- Effective for the removal of trash, gravel, sand, and silt and some metals that settle out with the sediment.

Implementation:

- Excavation and construction of related facilities is required.
- Temporary desilting basins must be fenced if safety is a concern.
- Outlet protection is required to prevent erosion at the outfall location.

Maintenance:

- Maintenance is required for safety fencing, vegetation, embankment, inlet and outfall structures, as well as other features.
- Removal of sediment is required when the storage volume is reduced by one-third.

Sediment Trap (SC-3)

Description:

A sediment trap is a temporary basin formed by excavation and/or construction of an earthen embankment across a waterway or low drainage area to detain sediment-laden runoff and allow sediment to settle out before discharging.

Appropriate Applications:

- Effective for the removal of large and medium sized particles (sand and gravel) and some metals that settle out with the sediment.

Implementation:

- Excavation and construction of related facilities is required.
- Trap inlets shall be located to maximize the travel distance to the trap outlet.
- Use rock or vegetation to protect the trap outlets against erosion.

Maintenance:

- Maintenance is required for vegetation, embankment, inlet and outfall structures, as well as other features.
- Removal of sediment is required when the storage volume is reduced by one-third.

Category 2: Mobile Settling Technologies

The devices discussed in this category are typical of tanks that can be used for sediment treatment of dewatering operations. A variety of vendors are available who supply these tanks.

Weir Tank

Description:

A weir tank separates water and waste by using weirs. The configuration of the weirs (over and under weirs) maximizes the residence time in the tank and determines the waste to be removed from the water, such as oil, grease, and sediments.

Appropriate Applications:

- The tank removes trash, some settleable solids (gravel, sand, and silt), some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

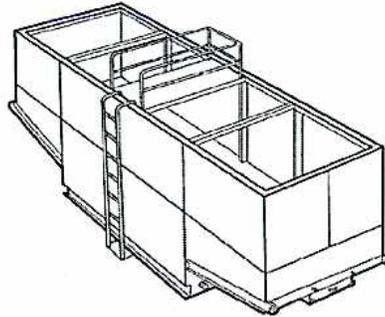
Implementation:

- Tanks are delivered to the site by the vendor, who can provide assistance with set-up and operation.
- Tank size will depend on flow volume, constituents of concern, and residency period required. Vendors shall be consulted to appropriately size tank.

Maintenance:

- Periodic cleaning is required based on visual inspection or reduced flow.
- Oil and grease disposal must be by licensed waste disposal company.

Schematic Diagrams:



Weir Tanks

Dewatering Tank

Description:

A dewatering tank removes debris and sediment. Flow enters the tank through the top, passes through a fabric filter, and is discharged through the bottom of the tank. The filter separates the solids from the liquids.

Appropriate Applications:

- The tank removes trash, gravel, sand, and silt, some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

Implementation:

- Tanks are delivered to the site by the vendor, who can provide assistance with set-up and operation.
- Tank size will depend on flow volume, constituents of concern, and residency period required. Vendors shall be consulted to appropriately size tank.

Maintenance:

- Periodic cleaning is required based on visual inspection or reduced flow.
- Oil and grease disposal must be by licensed waste disposal company.

Schematic Diagrams:



Dewatering Tanks

Category 3: Basic Filtration Technologies

Gravity Bag Filter

Description:

A gravity bag filter, also referred to as a dewatering bag, is a square or rectangular bag made of non-woven geotextile fabric that collects sand, silt, and fines.

Appropriate Applications:

- Effective for the removal of sediments (gravel, sand, and silt). Some metals are removed with the sediment.

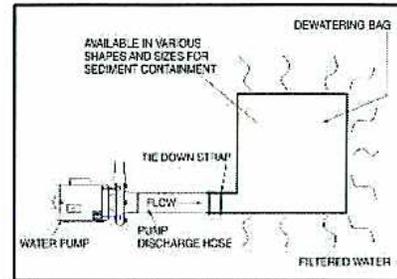
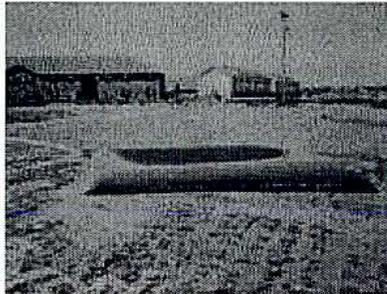
Implementation:

- Water is pumped into one side of the bag and seeps through the bottom and sides of the bag.
- A secondary barrier, such as a rock filter bed or straw/hay bale barrier, is placed beneath and beyond the edges of the bag to capture sediments that escape the bag.

Maintenance:

- Inspection of the flow conditions, bag condition, bag capacity, and the secondary barrier is required.
- Replace the bag when it no longer filters sediment or passes water at a reasonable rate.
- The bag is disposed off-site, or on-site as directed by the RE.

Schematic Diagrams:



Gravity Bag Filter

Category 4: Advanced Filtration Technologies

Sand Media Particulate Filter

Description:

Water is treated by passing it through canisters filled with sand media. Generally, sand filters provide a final level of treatment. They are often used as a secondary or higher level of treatment after a significant amount of sediment and other pollutants have been removed.

Appropriate Applications:

- Effective for the removal of trash, gravel, sand, and silt and some metals, as well as the reduction of biochemical oxygen demand (BOD) and turbidity.
- Sand filters can be used for standalone treatment or in conjunction with bag and cartridge filtration if further treatment is required.
- Sand filters can also be used to provide additional treatment to water treated via settling or basic filtration.

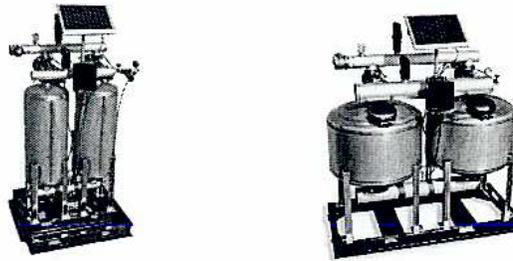
Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance with installation and operation.

Maintenance:

- The filters require monthly service to monitor and maintain the sand media.

Schematic Diagrams:



Sand Media Particulate Filters

Pressurized Bag Filter

Description:

A pressurized bag filter is a unit composed of single filter bags made from polyester felt material. The water filters through the unit and is discharged through a header, allowing for the discharge of flow in series to an additional treatment unit. Vendors provide pressurized bag filters in a variety of configurations. Some units include a combination of bag filters and cartridge filters for enhanced contaminant removal.

Appropriate Applications:

- Effective for the removal of sediment (sand and silt) and some metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Oil absorbent bags are available for hydrocarbon removal.
- Filters can be used to provide secondary treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance with installation and operation.

Maintenance:

- The filter bags require replacement when the pressure differential exceeds the manufacturer's recommendation.

Schematic Diagrams:



Pressurized Bag Filter

Cartridge Filter

Description:

Cartridge filters provide a high degree of pollutant removal by utilizing a number of individual cartridges as part of a larger filtering unit. They are often used as a secondary or higher (polishing) level of treatment after a significant amount of sediment and other pollutants are removed. Units come with various cartridge configurations (for use in series with pressurized bag filters) or with a larger single cartridge filtration unit (with multiple filters within).

Appropriate Applications:

- Effective for the removal of sediment (sand, silt, and some clays) and metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Hydrocarbons can effectively be removed with special resin cartridges.
- Filters can be used to provide secondary treatment to water treated via settling or basic filtration.

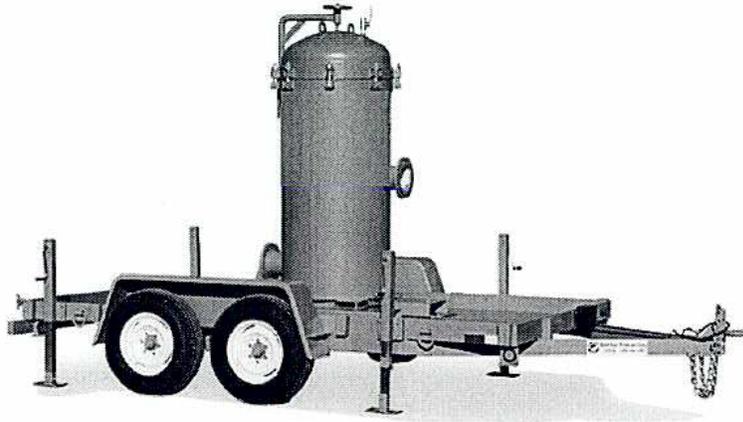
Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance.

Maintenance:

- The cartridges require replacement when the pressure differential exceeds the manufacturer's recommendation.

Schematic Designs:



Cartridge Filter

Dewatering Operations

NS-2

STORM WATER DEWATERING OPERATIONS BMP DISCHARGE MONITORING FORM ^d	
Central Valley Region (RWQCB 5) Sacramento River Basin and The San Joaquin River Basin For Inland Surface Waters ^b	
GENERAL INFORMATION	
Project Name	
Contract No.	
Contractor	
Sampler's Name	
Sampler's Signature	
Date Discharge Began	
Date of Sampling	

WATER SAMPLE LOG ^{c, d, e}			
Constituents	Units	Results	
		Effluent	Receiving Water ^f
			Upstream (R-1) Downstream (R-2)
pH	unitless		
Turbidity	NTUs		

DISCHARGE LIMITATIONS ^{g, h, i}			
Constituent	Units	EFFLUENT	RECEIVING WATER
		Daily Maximum	Daily Maximum
pH	unitless	--	Between 6.5 - 8.5
Turbidity	NTUs	--	1 NTU increase (Where Ambient is 0 - 5 NTUs)
			20% increase (Where Ambient is 5 - 50 NTUs)
			10 NTU increase (Where Ambient is 50 - 100 NTUs)
			10% increase (Where Ambient is > 100 NTUs)

NOTES:

Ambient - Upstream sample result (i.e., R-1)
 BMP - Best Management Practice
 NTUs - Nephelometric turbidity units

RWQCB - Regional Water Quality Control Board
 -- Not required
 > - Greater Than

a This form shall be used only for dewatering of storm water/accumulated precipitation. Dewatering non-storm water shall monitor constituents required in the applicable NPDES permit or Waste Discharge Requirements.

^b All surface waters in the Sacramento and San Joaquin River Basins, including the Delta. Based on the 1998 RWQCB 5a/5b Basin Plan.
 [http://www.swrcb.ca.gov/rwqcb5/available_documents/index.html#anchor615381]

^c Collect monthly samples. The first sample shall be collected at the start of the discharge and the last sample shall be collected at the completion of the discharge. Use the same sample collection criteria for discharges less than one month in duration for a total of two samples per discharge event.

^d Each constituent will be analyzed in the effluent and the two receiving water samples.

^e Turbidity and pH are required to be analyzed throughout the basin, however, bacteria, chemical constituents, dissolved oxygen, pesticides, radioactivity, salinity, and temperature shall be analyzed if the project lies in an area designated for a specific beneficial use or along a specific waterbody, as noted in the Basin Plan.

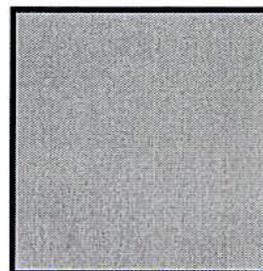
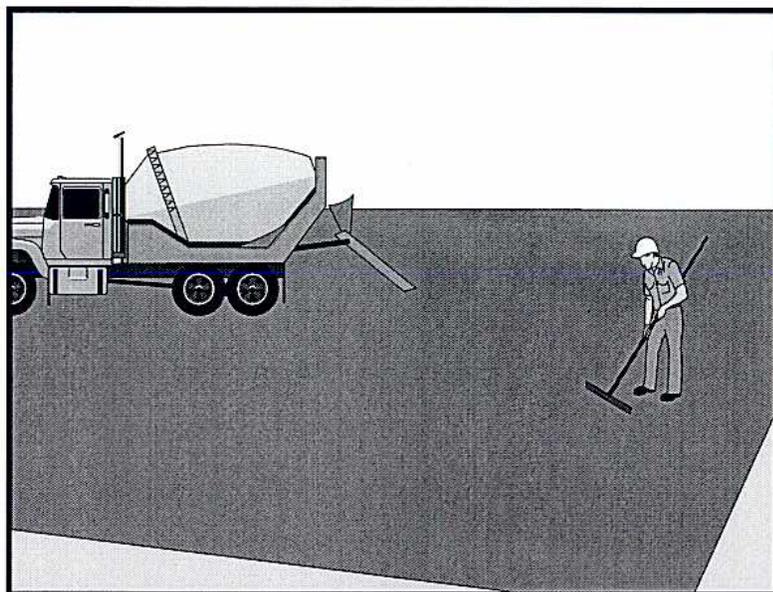
^f R-1 shall be collected 100 feet upstream from the closest point of discharge. R-2 shall be collected 100 feet downstream from the closest point of discharge.

^g If the results from receiving water sample exceed any of the discharge limits then discontinue dewatering activities to surface water

^h All discharge limitations are listed in the Water Quality Objectives Section of the Basin Plan

ⁱ Water shall not contain concentrations that cause nuisance or adversely affect beneficial uses of the following: Biostimulatory substances, color, floating material, oil and grease, sediment, settleable material, suspended material, tastes and odors, and toxicity.





Standard Symbol

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 conducting paving, saw cutting, and grinding operations to minimize the transport of pollutants to the storm drain system or receiving water body.
- Appropriate Applications** These procedures are implemented where paving, surfacing, resurfacing, grinding or sawcutting, may pollute storm water runoff or discharge to the storm drain system or watercourses.
- Limitations**
- Finer solids are not effectively removed by filtration systems.
 - Paving opportunities may be limited during wet weather.
- Standards and Specifications**
- Substances used to coat asphalt transport trucks, asphalt trucks, and asphalt spreading equipment shall not contain soap and shall be non-foaming and non-toxic.
 - Place plastic materials under asphaltic concrete (AC) paving equipment while not in use, to catch and/or contain drips and leaks. See also BMP WM-4, "Spill Prevention and Control."
 - When paving involves AC, the following steps shall be implemented to prevent the discharge of uncompacted or loose AC, tack coats, equipment cleaners, or other paving materials:
 - Minimize sand and gravel from new asphalt from getting into storm drains, streets, and creeks by sweeping.
 - Old or spilled asphalt must be recycled or disposed as approved by the Resident Engineer (RE).

- AC grindings, pieces, or chunks used in embankments or shoulder backing must not be allowed to enter any storm drain or watercourses. Install silt fence until structure is stabilized or permanent controls are in place.
 - Collect and remove all broken asphalt and recycle when practical; otherwise, dispose in accordance with Standard Specification 7-1.13.
 - Any AC chunks and pieces used in embankments must be placed above the water table and covered by at least 0.3 m (1 ft) of material.
 - During chip seal application and sweeping operations, petroleum or petroleum covered aggregate must not be allowed to enter any storm drain or water courses. Use silt fence until installation is complete.
 - Use only non-toxic substances to coat asphalt transport trucks and asphalt spreading equipment.
- Drainage inlet structures and manholes shall be covered with filter fabric during application of seal coat, tack coat, slurry seal, and/or fog seal.
 - Seal coat, tack coat, slurry seal, or fog seal shall not be applied if rainfall is predicted to occur during the application or curing period.
 - Paving equipment parked onsite shall be parked over plastic to prevent soil contamination.
 - Clean asphalt-coated equipment off-site whenever possible. When cleaning dry, hardened asphalt from equipment, manage hardened asphalt debris as described in BMP WM-5, “Solid Waste Management.” Any cleaning onsite shall follow BMP NS-8, “Vehicle and Equipment Cleaning.”
 - Do not wash sweepings from exposed aggregate concrete into a storm drain system. Collect and return to aggregate base stockpile, or dispose of properly.
 - Allow aggregate rinse to settle. Then, either allow rinse water to dry in a temporary pit as described in BMP WM-8, “Concrete Waste Management,” or dispose in accordance with Standard Specifications Section 7-1.13.
 - Do not allow saw-cut Portland Concrete Cement (PCC) slurry to enter storm drains or watercourses.

Pavement Grinding or Removal

- Residue from PCC grinding operations shall be picked up by means of a vacuum attachment to the grinding machine, shall not be allowed to flow across the pavement, and shall not be left on the surface of the pavement. See also BMP WM-8, “Concrete Waste Management;” and BMP WM-10, “Liquid Waste Management,” and Standard Specifications Section 42-2

“Grindings.”

- Collect pavement digout material by mechanical or manual methods. This material may be recycled if approved by the RE for use as shoulder backing or base material at locations approved by the RE.
- If digout material cannot be recycled, transport the material back to a maintenance facility or approved storage site.
- Digout activities shall not be conducted in the rain.
- When approved by the RE, stockpile material removed from roadways away from drain inlets, drainage ditches, and watercourses and stored consistent with BMP WM-3, “Stockpile Management.”
- Disposal or use of AC grindings shall be approved by the RE. See also BMP WM-8, “Concrete Waste Management.”

Thermoplastic Striping

- All thermoplastic striper and pre-heater equipment shutoff valves shall be inspected to ensure that they are working properly to prevent leaking thermoplastic from entering drain inlets, the storm water drainage system, or watercourses.
- The pre-heater shall be filled carefully to prevent splashing or spilling of hot thermoplastic. Leave six inches of space at the top of the pre-heater container when filling thermoplastic to allow room for material to move when the vehicle is deadheaded.
- Contractor shall not pre-heat, transfer, or load thermoplastic near drain inlets or watercourses.
- Clean truck beds daily of loose debris and melted thermoplastic. When possible recycle thermoplastic material. Thermoplastic waste shall be disposed of in accordance with Standard Specification 7-1.13.

Raised/Recessed Pavement Marker Application and Removal

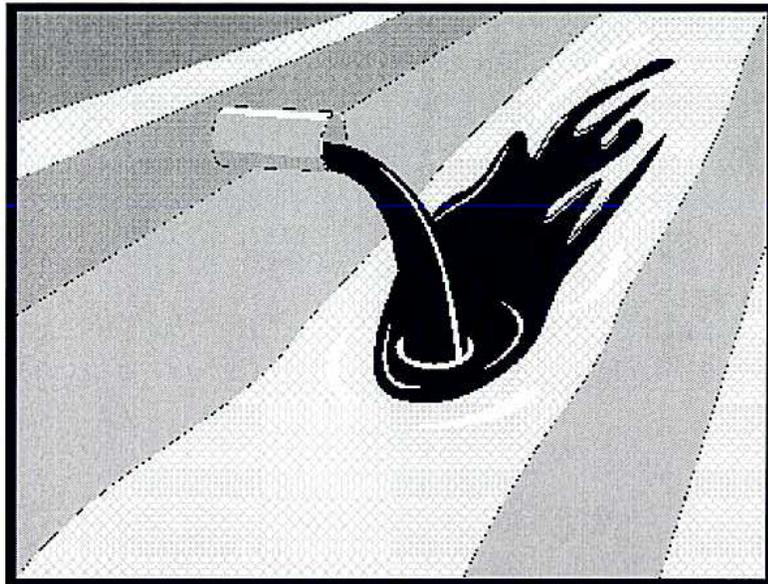
- Do not transfer or load bituminous material near drain inlets, the storm water drainage system or watercourses.
- Melting tanks shall be loaded with care and not filled to beyond six inches from the top to leave room for splashing when vehicle is deadheaded.
- When servicing or filling melting tanks, ensure all pressure is released before removing lids to avoid spills.
- On large scale projects, use mechanical or manual methods to collect excess

bituminous material from the roadway after removal of markers.

- Waste shall be disposed of in accordance with Standard Specification 7-1.13.
- Maintenance and Inspection
- Inspect and maintain machinery regularly to minimize leaks and drips.
 - Ensure that employees and subcontractors are implementing appropriate measures during paving operations.

Illicit Connection/Illegal Discharge Detection and Reporting

NS-6



Standard Symbol

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 designed for construction contractors to recognize illicit connections or illegally dumped or discharged materials on a construction site and report incidents to the Resident Engineer (RE).

Appropriate Applications

- Illicit connection/illegal discharge detection and reporting is applicable anytime an illicit connection or discharge is discovered or illegally dumped material is found on the construction site.

- This best management practice (BMP) applies to all construction projects.

Limitations

- Unlabeled or non-identifiable material shall be assumed to be hazardous.
- Illicit connections and illegal discharges or dumping, for the purposes of this BMP, refer to discharges and dumping caused by parties other than the contractor.

- Procedures and practices presented in this BMP are general. Contractor shall use extreme caution, immediately notify the RE when illicit connections or illegal dumping or discharges are discovered, and take no further action unless directed by the RE.

- If pre-existing hazardous materials or wastes are known to exist onsite, the contractor's responsibility will be detailed in separate special provisions.

Illicit Connection/Illegal Discharge Detection and Reporting

NS-6

Standards and Specifications

Planning

- Inspect site before beginning the job for evidence of illicit connections or illegal dumping or discharges.
- Inspect site regularly during project execution for evidence of illicit connections or illegal dumping or discharges.
- Observe site perimeter for evidence or potential of illicitly discharged or illegally dumped material, which may enter the job site.

Identification of illicit connections and illegal dumping or discharges.

- Solids - Look for debris, or rubbish piles. Solid waste dumping often occurs on roadways with light traffic loads or in areas not easily visible from the traveled way.
- Liquids – signs of illegal liquid dumping or discharge can include:
 - Visible signs of staining or unusual colors to the pavement or surrounding adjacent soils.
 - Pungent odors coming from the drainage systems.
 - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes.
 - Abnormal water flow during the dry weather season.
- Urban Areas - Evidence of illicit connections or illegal discharges is typically detected at storm drain outfall locations or at manholes. Signs of an illicit connection or illegal discharge can include:
 - Abnormal water flow during the dry weather season.
 - Unusual flows in subdrain systems used for dewatering.
 - Pungent odors coming from the drainage systems.
 - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes.
 - Excessive sediment deposits, particularly adjacent to or near active off-site construction projects.



Illicit Connection/Illegal Discharge Detection and Reporting

NS-6

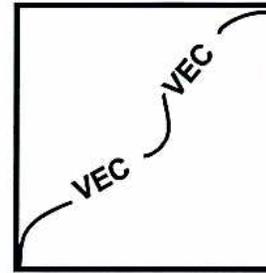
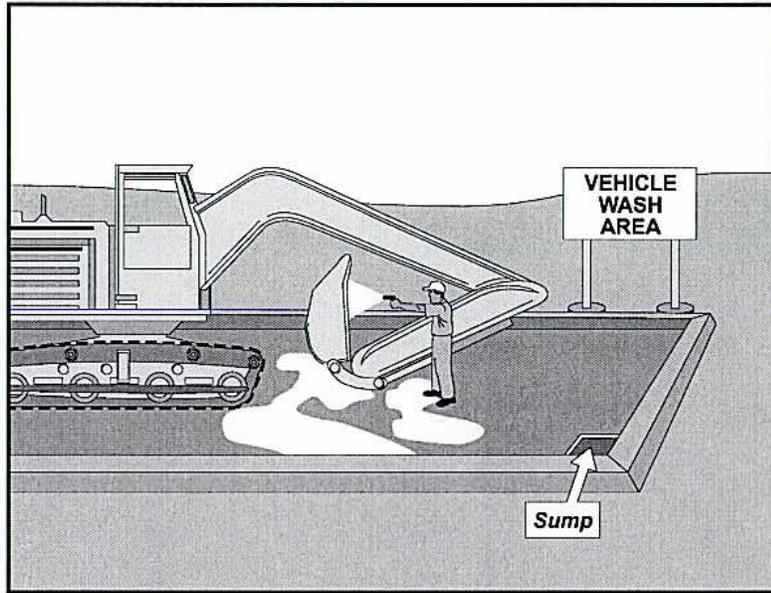
- Rural Areas - Illicit connections or illegal discharges involving irrigation drainage ditches are detected by visual inspections. Signs of an illicit discharge can include:
 - Abnormal water flow during the dry weather season.
 - Non-standard junction structures.
 - Broken concrete or other disturbances at or near junction structures.

Reporting

- Notify the RE of any illicit connections and illegal dumping or discharge incidents at the time of discovery. The RE will notify the District Construction Storm Water Coordinator and the Construction Hazmat Coordinator for reporting.

Cleanup and Removal The contractor is not responsible for investigation and clean up of illicit or illegal dumping or discharges not generated by the contractor. Caltrans may direct contractor to clean up non-hazardous dumped or discharged material on the construction site.





Standard Symbol

BMP Objectives

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

Definition and Purpose Vehicle and equipment cleaning procedures and practices are used to minimize or eliminate the discharge of pollutants from vehicle and equipment cleaning operations to storm drain system or to watercourses.

Appropriate Applications These procedures are applied on all construction sites where vehicle and equipment cleaning is performed.

Limitations ■ None.

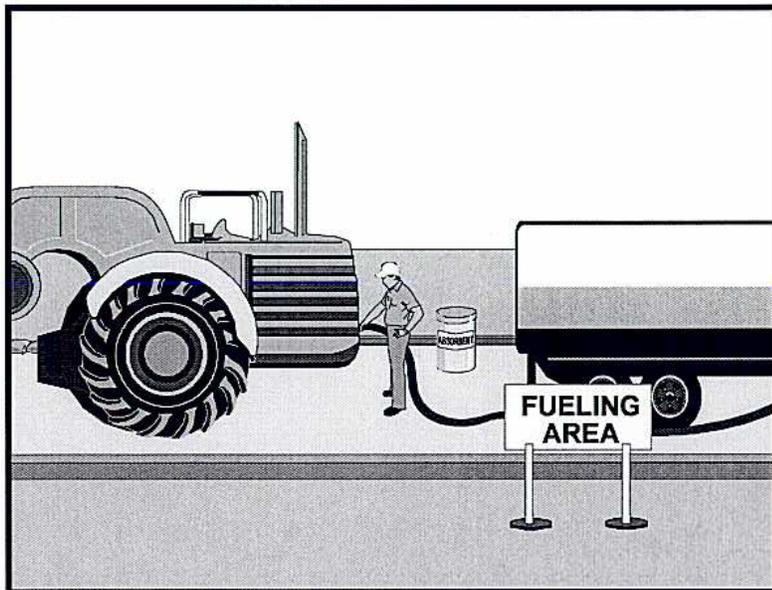
- Standards and Specifications**
- On-site vehicle and equipment washing is discouraged.
 - Cleaning of vehicles and equipment with soap, solvents or steam shall not occur on the project site unless the Resident Engineer (RE) has been notified in advance and the resulting wastes are fully contained and disposed of outside the highway right-of-way in conformance with the provisions in the Standard Specifications Section 7-1.13. Resulting wastes and by-products shall not be discharged or buried within the highway right-of-way, and must be captured and recycled or disposed according to the requirements of WM-10, "Liquid Waste Management" or WM-6, "Hazardous Waste Management," depending on the waste characteristics. Minimize use of solvents. The use of diesel for vehicle and equipment cleaning is prohibited.
 - Vehicle and equipment wash water shall be contained for percolation or evaporative drying away from storm drain inlets or watercourses and shall not be discharged within the highway right-of-way. Apply sediment control BMPs if applicable.
 - All vehicles/equipment that regularly enter and leave the construction site must be cleaned off-site.
 - When vehicle/equipment washing/cleaning must occur onsite, and the

operation cannot be located within a structure or building equipped with appropriate disposal facilities, the outside cleaning area shall have the following characteristics, and shall be arranged with the construction storm water coordinator:

- Located away from storm drain inlets, drainage facilities, or watercourses.
- Paved with concrete or asphalt and bermed to contain wash waters and to prevent run-on and runoff.
- Configured with a sump to allow collection and disposal of wash water.
- Wash waters shall not be discharged to storm drains or watercourses.
- Used only when necessary.
- When cleaning vehicles/equipment with water:
 - Use as little water as possible. High pressure sprayers may use less water than a hose, and shall be considered.
 - Use positive shutoff valve to minimize water usage.
 - Facility wash racks shall discharge to a sanitary sewer, recycle system or other approved discharge system and shall not discharge to the storm drainage system or watercourses.

Maintenance and Inspection

- The control measure shall be inspected at a minimum of once a week.
- Monitor employees and subcontractors throughout the duration of the construction project to ensure appropriate practices are being implemented.
- Inspect sump regularly and remove liquids and sediment as needed or as directed by the RE.



Standard Symbol

BMP Objectives

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

Definition and Purpose Vehicle and equipment fueling procedures and practices are designed to minimize or eliminate the discharge of fuel spills and leaks into storm drain systems or to watercourses.

Appropriate Applications These procedures are applied on all construction sites where vehicle and equipment fueling takes place.

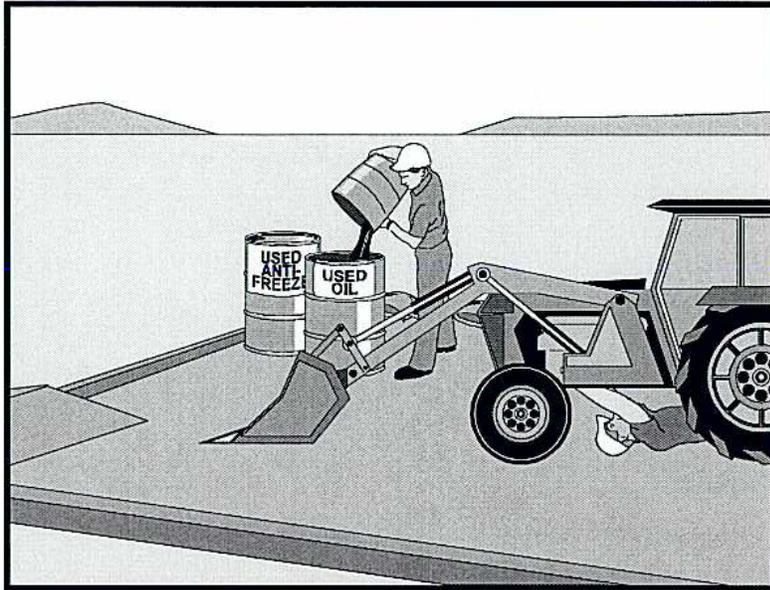
Limitations ■ Onsite vehicle and equipment fueling shall only be used where it's impractical to send vehicles and equipment off-site for fueling.

- Standards and Specifications**
- When fueling must occur onsite, the contractor shall select and designate an area to be used, subject to approval of the Resident Engineer (RE).
 - Absorbent spill clean-up materials and spill kits shall be available in fueling areas and on fueling trucks and shall be disposed of properly after use.
 - Drip pans or absorbent pads shall be used during vehicle and equipment fueling, unless the fueling is performed over an impermeable surface in a dedicated fueling area.
 - Dedicated fueling areas shall be protected from storm water run-on and runoff, and shall be located at least 15 m (50 ft) from downstream drainage facilities and watercourses. Fueling must be performed on level-grade areas.
 - Nozzles used in vehicle and equipment fueling shall be equipped with an automatic shut-off to control drips. Fueling operations shall not be left unattended.
 - Protect fueling areas with berms and/or dikes to prevent run-on, runoff, and to contain spills.

- Use vapor recovery nozzles to help control drips as well as air pollution where required by Air Quality Management Districts (AQMD). Ensure the nozzle is secured upright when not in use.
- Fuel tanks shall not be "topped-off."
- Vehicles and equipment shall be inspected on each day of use for leaks. Leaks shall be repaired immediately or problem vehicles or equipment shall be removed from the project site.
- Absorbent spill clean-up materials shall be available in fueling and maintenance areas and used on small spills instead of hosing down or burying techniques. The spent absorbent material shall be removed promptly and disposed of properly.
- Federal, state, and local requirements shall be observed for any stationary above ground storage tanks. Refer to WM-1, "Material Delivery and Storage."
- Mobile fueling of construction equipment throughout the site shall be minimized. Whenever practical, equipment shall be transported to the designated fueling area.

Maintenance and Inspection

- Fueling areas and storage tanks shall be inspected regularly.
- Keep an ample supply of spill cleanup material on the site.
- Immediately cleanup spills and properly dispose of contaminated soil and cleanup materials.



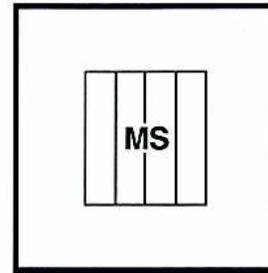
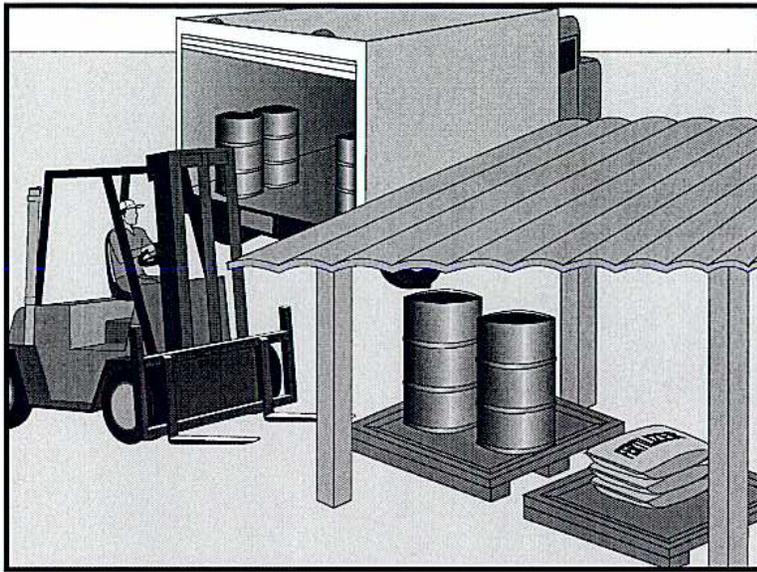
Standard Symbol

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 pollutants to the storm drain systems or to watercourses from vehicle and equipment maintenance procedures.
Appropriate Applications	These procedures are applied on all construction projects where an onsite yard area is necessary for storage and maintenance of heavy equipment and vehicles.
Limitations	<ul style="list-style-type: none"> ■ None identified.
Standards and Specifications	<ul style="list-style-type: none"> ■ Drip pans or absorbent pads shall be used during vehicle and equipment maintenance work that involves fluids, unless the maintenance work is performed over an impermeable surface in a dedicated maintenance area. ■ All maintenance areas are required to have spill kits and/or use other spill protection devices. ■ Dedicated maintenance areas shall be protected from storm water run-on and runoff, and shall be located at least 15 m (50 ft) from downstream drainage facilities and watercourses. ■ Drip Pans or plastic sheeting shall be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than one hour. ■ Absorbent spill clean-up materials shall be available in maintenance areas and shall be disposed of properly after use. Substances used to coat asphalt transport trucks and asphalt-spreading equipment shall be non-toxic. ■ Use off-site maintenance facilities whenever practical.

- For long-term projects, consider constructing roofs or using portable tents over maintenance areas.
 - Properly dispose of used oils, fluids, lubricants, and spill cleanup materials.
 - Do not dump fuels and lubricants onto the ground.
 - Do not place used oil in a dumpster or pour into a storm drain or watercourse.
 - Properly dispose or recycle used batteries.
 - Do not bury used tires.
 - Repair of fluid and oil leaks immediately.
 - Provide spill containment dikes or secondary containment around stored oil and chemical drums.
- Maintenance and Inspection
- Maintain waste fluid containers in leak proof condition.
 - Vehicle and equipment maintenance areas shall be inspected regularly.
 - Vehicles and equipment shall be inspected on each day of use. Leaks shall be repaired immediately or the problem vehicle(s) or equipment shall be removed from the project site.
 - Inspect equipment for damaged hoses and leaky gaskets routinely. Repair or replace as needed.



Standard Symbol

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:

- Hazardous chemicals such as:
 - Acids,
 - lime,
 - glues,
 - adhesives,
 - paints,
 - solvents, and
 - curing compounds.
- Soil stabilizers and binders.
- Fertilizers.
- Detergents.
- Plaster.
- Petroleum products such as fuel, oil, and grease.
- Asphalt and concrete components.
- Pesticides and herbicides.

- 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 stored in approved containers and drums and shall be placed in temporary containment facilities for storage.
- Throughout the rainy season, each temporary containment facility shall have a permanent cover and side wind protection or be covered during non-working days and prior to and during rain events.
- A temporary containment facility shall provide for a spill containment volume able to contain precipitation from a 24-hour, 25-year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest container within its boundary, whichever is greater.
- A temporary containment facility shall be impervious to the materials stored therein for a minimum contact time of 72 hours.
- A temporary containment facility shall be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills shall be collected and placed into drums. These liquids shall be handled as a hazardous waste unless testing determines them to be non-hazardous. All collected liquids or non-hazardous liquids shall be sent to an approved disposal site.
- 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.
- 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.

-
- 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).
- 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.

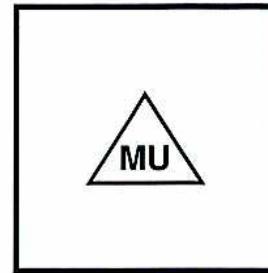
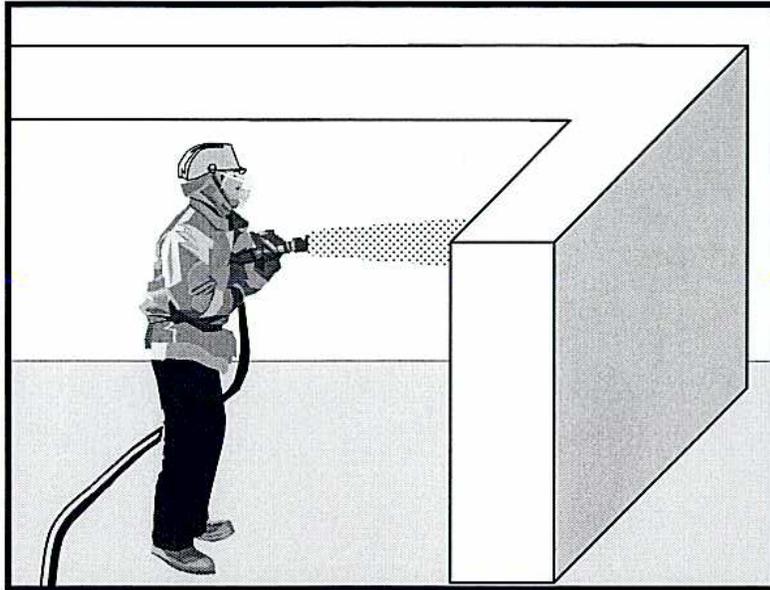
Material Delivery Practices

- 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. Collect and place into drums any spills or accumulated rainwater.



Standard Symbol

BMP Objectives

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

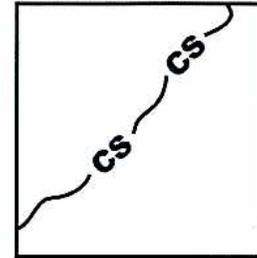
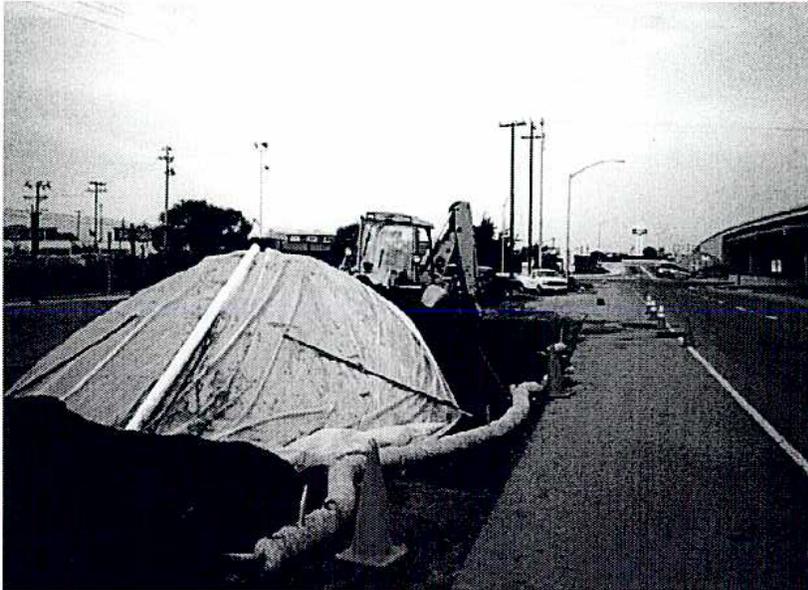
Definition and Purpose These are procedures and practices for use of construction material in a manner that minimizes or eliminates the discharge of these materials to the storm drain system or to watercourses.

Appropriate Applications This BMP applies to all construction projects. These procedures apply when the following materials are used or prepared on site:

- Hazardous chemicals such as:
 - Acids,
 - lime,
 - glues,
 - adhesives,
 - paints,
 - solvents, and
 - curing compounds.
- Soil stabilizers and binders.
- Fertilizers.
- Detergents.
- Plaster.
- Petroleum products such as fuel, oil, and grease.
- Asphalt and concrete components.
- Pesticides and herbicides.

Other materials that may be detrimental if released to the environment.

- Limitations ■ Safer alternative building and construction products may not be available or suitable in every instance.
- Standards and Specifications ■ Material Safety Data Sheets (MSDS) shall be supplied to the Resident Engineer (RE) for all materials.
- Latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths, when thoroughly dry and are no longer hazardous, may be disposed of with other construction debris.
 - Do not remove the original product label, it contains important safety and disposal information. Use the entire product before disposing of the container.
 - Mix paint indoors, or in a containment area. Never clean paintbrushes or rinse paint containers into a street, gutter, storm drain or watercourse. Dispose of any paint thinners, residue and sludge(s), that cannot be recycled, as hazardous waste.
 - For water-based paint, clean brushes to the extent practical, and rinse to a drain leading to a sanitary sewer where permitted, or into a concrete washout pit. For oil-based paints, clean brushes to the extent practical and filter and reuse thinners and solvents.
 - Use recycled and less hazardous products when practical. Recycle residual paints, solvents, non-treated lumber, and other materials.
 - Use materials only where and when needed to complete the construction activity. Use safer alternative materials as much as possible. Reduce or eliminate use of hazardous materials on-site when practical.
 - Do not over-apply fertilizers and pesticides. Prepare only the amount needed. Strictly follow the recommended usage instructions. Apply surface dressings in smaller applications, as opposed to large applications, to allow time for it to work in and to avoid excess materials being carried off-site by runoff.
 - Application of herbicides and pesticides shall be performed by a licensed applicator.
 - Contractors are required to complete the "Report of Chemical Spray Forms" when spraying herbicides and pesticides.
 - Keep an ample supply of spill clean up material near use areas. Train employees in spill clean up procedures.
 - Avoid exposing applied materials to rainfall and runoff unless sufficient time has been allowed for them to dry.
- Maintenance and Inspections ■ Spot check employees and subcontractors monthly throughout the job to ensure appropriate practices are being employed.



Standard Symbol

BMP Objectives

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

Definition and Purpose Stockpile management procedures and practices are designed to reduce or eliminate air and storm water pollution from stockpiles of soil, and paving materials such as portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate subbase or pre-mixed aggregate, asphalt binder (so called “cold mix” asphalt) and pressure treated wood.

Appropriate Applications Implemented in all projects that stockpile soil and other materials.

Limitations ■ None identified

- Standards and Specifications**
- Protection of stockpiles is a year-round requirement.
 - Locate stockpiles a minimum of 15 m (50 ft) away from concentrated flows of storm water, drainage courses, and inlets.
 - Implement wind erosion control practices as appropriate on all stockpiled material. For specific information see BMP WE-1, “Wind Erosion Control.”
 - Stockpiles of contaminated soil shall be managed in accordance with BMP WM-7, “Contaminated Soil Management.”
 - Bagged materials should be placed on pallets and under cover.

Protection of Non-Active Stockpiles

Non-active stockpiles of the identified materials shall be protected further as follows:

■ ***Soil stockpiles:***

- During the rainy seasons, soil stockpiles shall be covered or protected with soil stabilization measures and a temporary perimeter sediment barrier at all times.
- During the non-rainy season, soil stockpiles shall be covered and protected with a temporary perimeter sediment barrier prior to the onset of precipitation.

■ ***Stockpiles of portland cement concrete rubble, asphalt concrete, asphalt concrete rubble, aggregate base, or aggregate subbase:***

- During the rainy season, the stockpiles shall be covered or protected with a temporary perimeter sediment barrier at all times.
- During the non-rainy season, the stockpiles shall be covered or protected with a temporary perimeter sediment barrier prior to the onset of precipitation.

■ ***Stockpiles of “cold mix”:***

- During the rainy season, cold mix stockpiles shall be placed on and covered with plastic or comparable material at all times.
- During the non-rainy season, cold mix stockpiles shall be placed on and covered with plastic or comparable material prior to the onset of precipitation.

■ ***Stockpiles/Storage of pressure treated wood with copper, chromium, and arsenic or ammonical, copper, zinc, and arsenate:***

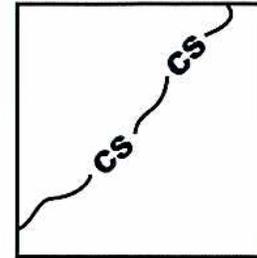
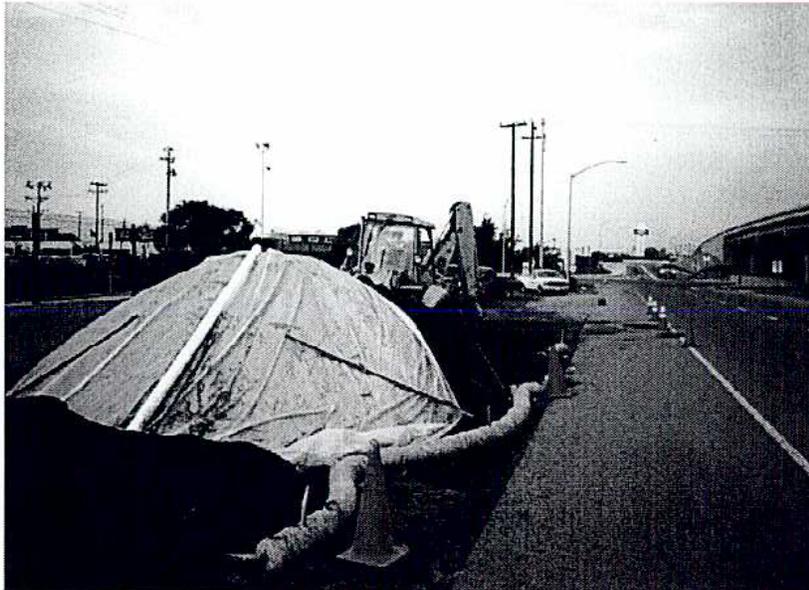
- During the rainy season, treated wood shall be covered with plastic or comparable material at all times.
- During the non-rainy season, treated wood shall be covered with plastic or comparable material and shall be placed on pallets prior to the onset of precipitation.

Protection of Active Stockpiles

Active stockpiles of the identified materials shall be protected further as follows:

- All stockpiles shall be covered, stabilized, or protected with a temporary linear sediment barrier prior to the onset of precipitation.
- Stockpiles of “cold mix” shall be placed on and covered with plastic or comparable material prior to the onset of precipitation.

- Maintenance and Inspections
- Repair and/or replace perimeter controls and covers as needed, or as directed by the RE, to keep them functioning properly. Sediment shall be removed when sediment accumulation reaches one-third (1/3) of the barrier height.



Standard Symbol

BMP Objectives

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

Definition and Purpose Stockpile management procedures and practices are designed to reduce or eliminate air and storm water pollution from stockpiles of soil, and paving materials such as portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate subbase or pre-mixed aggregate, asphalt binder (so called “cold mix” asphalt) and pressure treated wood.

Appropriate Applications Implemented in all projects that stockpile soil and other materials.

Limitations ■ None identified

- Standards and Specifications**
- Protection of stockpiles is a year-round requirement.
 - Locate stockpiles a minimum of 15 m (50 ft) away from concentrated flows of storm water, drainage courses, and inlets.
 - Implement wind erosion control practices as appropriate on all stockpiled material. For specific information see BMP WE-1, “Wind Erosion Control.”
 - Stockpiles of contaminated soil shall be managed in accordance with BMP WM-7, “Contaminated Soil Management.”
 - Bagged materials should be placed on pallets and under cover.

Protection of Non-Active Stockpiles

Non-active stockpiles of the identified materials shall be protected further as follows:

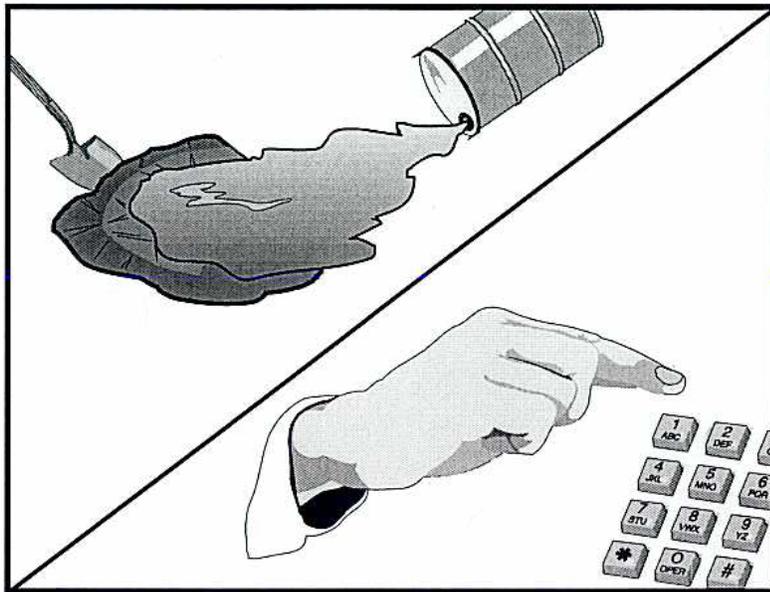
- ***Soil stockpiles:***
 - During the rainy seasons, soil stockpiles shall be covered or protected with soil stabilization measures and a temporary perimeter sediment barrier at all times.
 - During the non-rainy season, soil stockpiles shall be covered and protected with a temporary perimeter sediment barrier prior to the onset of precipitation.
- ***Stockpiles of portland cement concrete rubble, asphalt concrete, asphalt concrete rubble, aggregate base, or aggregate subbase:***
 - During the rainy season, the stockpiles shall be covered or protected with a temporary perimeter sediment barrier at all times.
 - During the non-rainy season, the stockpiles shall be covered or protected with a temporary perimeter sediment barrier prior to the onset of precipitation.
- ***Stockpiles of “cold mix”:***
 - During the rainy season, cold mix stockpiles shall be placed on and covered with plastic or comparable material at all times.
 - During the non-rainy season, cold mix stockpiles shall be placed on and covered with plastic or comparable material prior to the onset of precipitation.
- ***Stockpiles/Storage of pressure treated wood with copper, chromium, and arsenic or ammonical, copper, zinc, and arsenate:***
 - During the rainy season, treated wood shall be covered with plastic or comparable material at all times.
 - During the non-rainy season, treated wood shall be covered with plastic or comparable material and shall be placed on pallets prior to the onset of precipitation.

Protection of Active Stockpiles

Active stockpiles of the identified materials shall be protected further as follows:

- All stockpiles shall be covered, stabilized, or protected with a temporary linear sediment barrier prior to the onset of precipitation.
- Stockpiles of “cold mix” shall be placed on and covered with plastic or comparable material prior to the onset of precipitation.

- Maintenance and Inspections
- Repair and/or replace perimeter controls and covers as needed, or as directed by the RE, to keep them functioning properly. Sediment shall be removed when sediment accumulation reaches one-third (1/3) of the barrier height.



Standard Symbol

BMP Objectives

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

Definition and Purpose These procedures and practices are implemented to prevent and control spills in a manner that minimizes or prevents the discharge of spilled material to the drainage system or watercourses.

Appropriate Application This best management practice (BMP) applies to all construction projects. Spill control procedures are implemented anytime chemicals and/or hazardous substances are stored. Substances may include, but are not limited to:

- Soil stabilizers/binders.
- Dust Palliatives.
- Herbicides.
- Growth inhibitors.
- Fertilizers.
- Deicing/anti-icing chemicals.
- Fuels.
- Lubricants.
- Other petroleum distillates.

To the extent that the work can be accomplished safely, spills of oil, petroleum products, substances listed under 40 CFR parts 110, 117, and 302, and sanitary and septic wastes shall be contained and cleaned up immediately.

- Limitations
- This BMP only applies to spills caused by the contractor.
 - Procedures and practices presented in this BMP are general. Contractor shall identify appropriate practices for the specific materials used or stored on-site.

- Standards and Specifications
- To the extent that it doesn't compromise clean up activities, spills shall be covered and protected from storm water run-on during rainfall.
 - Spills shall not be buried or washed with water.
 - Used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose shall be stored and disposed of in conformance with the special provisions.
 - Water used for cleaning and decontamination shall not be allowed to enter storm drains or watercourses and shall be collected and disposed of in accordance with BMP WM-10, "Liquid Waste Management."
 - Water overflow or minor water spillage shall be contained and shall not be allowed to discharge into drainage facilities or watercourses.
 - Proper storage, clean-up and spill reporting instruction for hazardous materials stored or used on the project site shall be posted at all times in an open, conspicuous and accessible location.
 - Waste 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.

Education

- Educate employees and subcontractors on what a "significant spill" is for each material they use, and what is the appropriate response for "significant" and "insignificant" spills.
- Educate employees and subcontractors on potential dangers to humans and the environment from spills and leaks.
- Hold regular meetings to discuss and reinforce appropriate disposal procedures (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.
- The Contractor's Water Pollution Control Manager (WPCM) shall oversee and enforce proper spill prevention and control measures.

Cleanup and Storage Procedures

■ Minor Spills

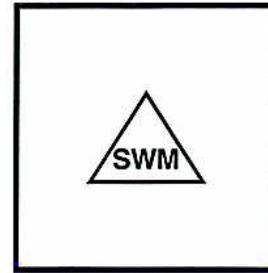
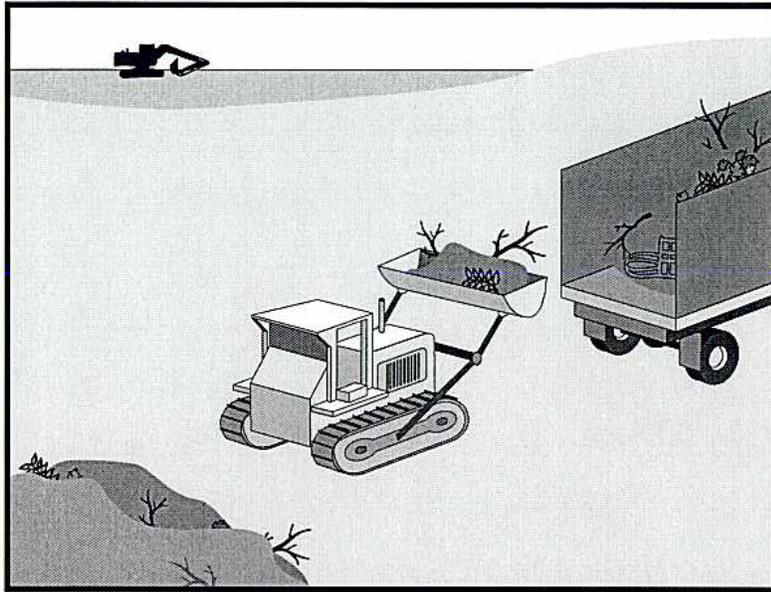
- Minor spills typically involve small quantities of oil, gasoline, paint, etc., which can be controlled by the first responder at the discovery of the spill.
- Use absorbent materials on small spills rather than hosing down or burying the spill.
- Remove the absorbent materials promptly and dispose of properly.
- The practice commonly followed for a minor spill is:
 - Contain the spread of the spill.
 - Recover spilled materials.
 - Clean the contaminated area and/or properly dispose of contaminated materials.

■ Semi-Significant Spills

- Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.
- Clean up spills immediately:
 - Notify the project foreman immediately. The foreman shall notify the Resident Engineer (RE).
 - Contain spread of the spill.
 - If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
 - If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
 - If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

- Significant/Hazardous Spills
 - For significant or hazardous spills that cannot be controlled by personnel in the immediate vicinity, the following steps shall be taken:
 - Notify the RE immediately and follow up with a written report.
 - Notify the local emergency response by dialing 911. In addition to 911, the contractor will notify the proper county officials. It is the contractor's responsibility to have all emergency phone numbers at the construction site.
 - Notify the Governor's Office of Emergency Services Warning Center, (805) 852-7550.
 - For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,119, and 302, the contractor shall notify the National Response Center at (800) 424-8802.
 - Notification shall first be made by telephone and followed up with a written report.
 - The services of a spills contractor or a Haz-Mat team shall be obtained immediately. Construction personnel shall not attempt to clean up the spill until the appropriate and qualified staff have arrived at the job site.
 - Other agencies which may need to be consulted include, but are not limited to, the Fire Department, the Public Works Department, the Coast Guard, the Highway Patrol, the City/County Police Department, Department of Toxic Substances, California Division of Oil and Gas, Cal/OSHA, RWQCB, etc.

- Maintenance and Inspection
 - Verify weekly that spill control clean up materials are located near material storage, unloading, and use areas.
 - Update spill prevention and control plans and stock appropriate clean-up materials whenever changes occur in the types of chemicals used or stored onsite.



Standard Symbol

BMP Objectives

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

Definition and Purpose Solid waste management procedures and practices are designed to minimize or eliminate the discharge of pollutants to the drainage system or to watercourses as a result of the creation, stockpiling, or removal of construction site wastes.

Appropriate Applications Solid waste management procedures and 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, sawdust, 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*

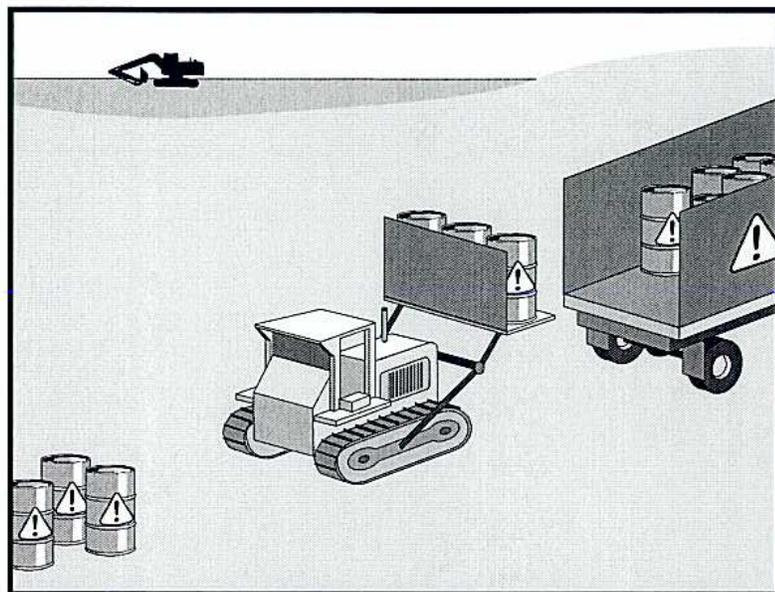
- The Contractor's Water Pollution Control Manager (WPCM) shall oversee and enforce proper solid waste procedures and practices.
- Instruct employees and subcontractors on identification of solid waste and hazardous waste.
- Educate employees and subcontractors on solid waste storage and disposal procedures.
- 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

- Dumpsters of sufficient size and number shall be provided to contain the solid waste generated by the project and properly serviced.
- 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.
- Construction debris and litter from work areas within the construction limits of the project site shall be collected and placed in watertight 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.
- 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 the Standard Specifications Section 7-1.13.
- Litter stored in collection areas and containers shall be handled and disposed of by trash hauling contractors.
- Construction debris and waste shall be removed from the site every two weeks or as directed by the RE.

- Construction material visible to the public shall be stored or stacked in an orderly manner to the satisfaction of the 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 from site surfaces.
- Solid waste storage areas shall be located at least 15 m (50 ft) 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 securely covered from wind and rain by covering the waste with tarps or plastic sheeting or protected in conformance with the applicable Disturbed Soil Area protection section.
- 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.
- Construction waste shall be stored in a designated area approved by the RE.
- Segregate potentially hazardous waste from non-hazardous construction site waste.
- Keep the site clean of litter debris.
- Make sure that toxic liquid wastes (e.g., used oils, solvents, and paints) and chemicals (e.g., 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 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 onsite solid waste storage and disposal procedures.
 - Police site for litter and debris.



Standard Symbol

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 systems 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,
 - Asphalt Products,
 - Concrete Curing Compounds,
 - Pesticides,
 - Acids,
 - Paints,
 - Stains,
 - Solvents,
 - Wood Preservatives,
 - 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 for a spill containment volume able to contain precipitation from a 24-hour, 25 year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest tank within its boundary, whichever is greater.

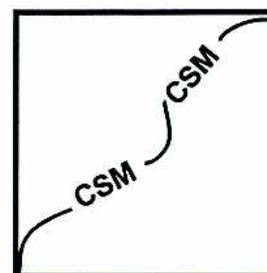
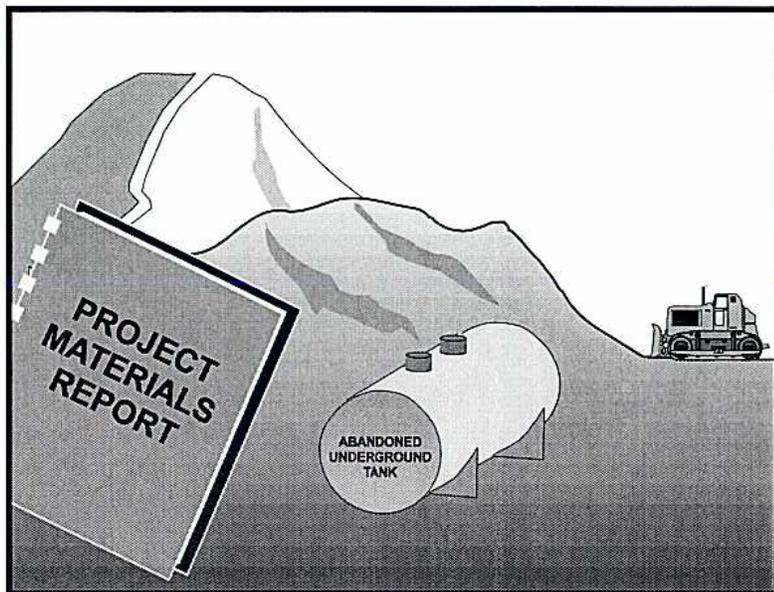
- Temporary containment facility shall be impervious to the materials stored there for a minimum contact time of 72 hours.
 - Temporary containment facilities shall be maintained free of accumulated rainwater and spills. In the event of spills or leaks accumulated rainwater and spills shall be placed into drums after each rainfall. These liquids shall be handled as a hazardous waste unless testing determines them to be non-hazardous. Non-hazardous liquids shall be sent to an approved disposal site.
 - 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, and prior to rain events. Covered facilities may include use of plastic tarps for small facilities or constructed roofs with overhangs. A storage facility having a solid cover and sides is preferred to a temporary tarp. Storage facilities shall be equipped with adequate ventilation.
- Drums shall not be overfilled and wastes shall not be mixed.
 - Unless watertight, containers of dry waste shall be stored on pallets.
 - 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.
- 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). 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 Hazardous Waste Manifest forms.
- A Department of Health Services (DHS) certified laboratory shall sample waste and classify it to determine the appropriate disposal facility.
- Make sure that toxic liquid wastes (e.g., used oils, solvents, and paints) and chemicals (e.g., 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
- A foreman and/or construction supervisor 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 the hazardous waste manifests shall be provided to the RE.



Standard Symbol

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 discharges of pollutants to the drainage system or to watercourses from contaminated soil.

- Appropriate Applications**
- Contaminated soil management is implemented on construction projects in highly urbanized or industrial areas where soil contamination may have occurred due to spills, illicit discharges, and leaks from underground storage tanks.
 - It may also apply to highway widening projects in older areas where median and shoulder soils may have been contaminated by aerially deposited lead (ADL).

- Limitations**
- The procedures and practices presented in this best management practice (BMP) are general. The contractor shall identify appropriate practices and procedures for the specific contaminants known to exist or discovered on site.

Standards and Specifications *Identifying Contaminated Areas*

- Contaminated soils are often identified during project planning and development with known locations identified in the plans and specifications. The contractor shall review applicable reports and investigate appropriate call-outs in the plans and specifications.
- The contractor may further identify contaminated soils by investigating:
 - Past site uses and activities.
 - Detected or undetected spills and leaks.
 - Acid or alkaline solutions from exposed soil or rock formations high in acid or alkaline forming elements.

- Look for contaminated soil as evidenced by discoloration, odors, differences in soil properties, abandoned underground tanks or pipes, or buried debris. Test suspected soils at a certified laboratory.

Education

- Prior to performing any excavation work at the locations containing material classified as hazardous, employees and subcontractors shall complete a safety training program which meets 29 CFR 1910.120 and 8 CCR 5192 covering the potential hazards as identified.
- Educate employees and subcontractors in identification of contaminated soil and on contaminated soil handling and disposal procedures.
- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).

Handling Procedures for Material with Aerially Deposited Lead (ADL)

- Materials from areas designated as containing (ADL) may, if allowed by the contract special provisions, be excavated, transported, and used in the construction of embankments and/or backfill.
- Excavation, transportation, and placement operations shall result in no visible dust.
- Use caution to prevent spillage of lead containing material during transport.
- Monitor the air quality during excavation of soils contaminated with lead.

Handling Procedures for Contaminated Soils

- To minimize on-site storage, contaminated soil shall be disposed of properly in accordance with all applicable regulations. All hazardous waste storage will comply with the requirements in Title 22, CCR, Sections 6626.250 to 66265.260.
- Test suspected soils at a DHS approved certified laboratory.
- If the soil is contaminated, work with the local regulatory agencies to develop options for treatment and/or disposal.
- Avoid temporary stockpiling of contaminated soils or hazardous material.
- If temporary stockpiling is necessary:
 - (1) Cover the stockpile with plastic sheeting or tarps.
 - (2) Install a berm around the stockpile to prevent runoff from leaving the area.
 - (3) Do not stockpile in or near storm drains or watercourses.

- Contaminated material and hazardous material on exteriors of transport vehicles shall be removed and placed either into the current transport vehicle or the excavation prior to the vehicle leaving the exclusion zone.
- Monitor the air quality continuously during excavation operations at all locations containing hazardous material.
- Procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the work, including registration for transporting vehicles carrying the contaminated material and the hazardous material.
- Collect water from decontamination procedures and treat and/or dispose of it at an appropriate disposal site.
- Collect non-reusable protective equipment, once used by any personnel, and dispose of at an appropriate disposal site.
- Install temporary security fence to surround and secure the exclusion zone. Remove fencing when no longer needed.
- Excavation, transport, and disposal of contaminated material and hazardous material shall be in accordance with the rules and regulations of the following agencies (the specifications of these agencies supersede the procedures outlined in this BMP):
 - United States Department of Transportation (USDOT).
 - United States Environmental Protection Agency (USEPA).
 - California Environmental Protection Agency (CAL-EPA).
 - California Division of Occupation Safety and Health Administration (CAL-OSHA).
 - Local regulatory agencies.

Procedures for Underground Storage Tank Removals

- Prior to commencing tank removal operations, obtain the required underground storage tank removal permits and approval from the federal, state, and local agencies, which have jurisdiction over such work.
- Arrange to have tested, as directed by the Resident Engineer (RE), any liquid or sludge found in the underground tank prior to its removal to determine if it contains hazardous substances.
- Following the tank removal, take soil samples beneath the excavated tank and perform analysis as required by the local agency representative(s).

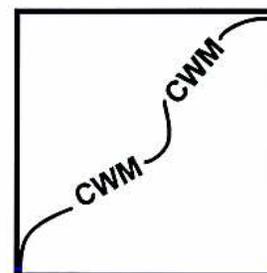
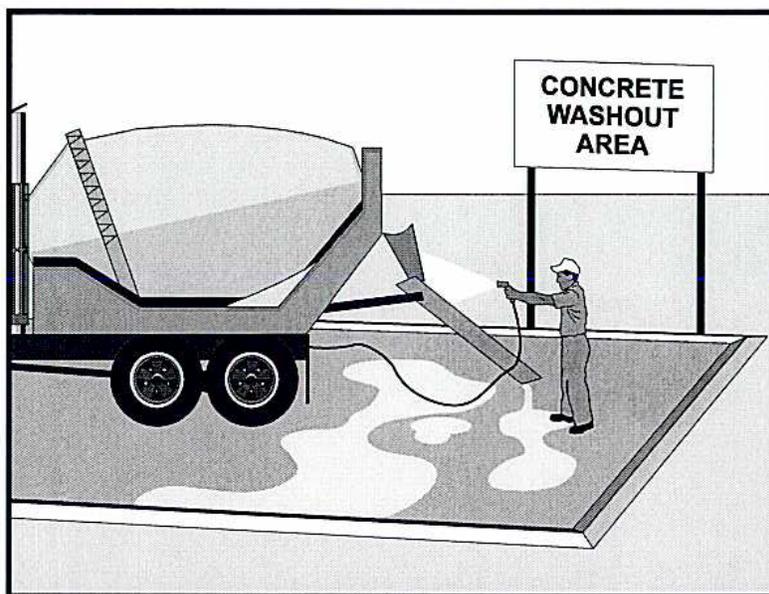
- The underground storage tank, any liquid and/or sludge found within the tank, and all contaminated substances and hazardous substances removed during the tank removal shall be transported to disposal facilities permitted to accept such waste.

Water Control

- Take all necessary precautions and preventive measures to prevent the flow of water, including ground water, from mixing with hazardous substances or underground storage tank excavations. Such preventative measures may consist of, but are not limited to: berms, cofferdams, grout curtains, freeze walls, and seal course concrete or any combination thereof.
- If water does enter an excavation and becomes contaminated, such water, when necessary to proceed with the work, shall be dewatered consistent with BMP NS-2, "Dewatering Operations."

Maintenance and Inspection

- The Contractor's Water Pollution Control Manager, foreman, and/or construction supervisor shall monitor on-site contaminated soil storage and disposal procedures.
- Monitor air quality continuously during excavation operations at all locations containing hazardous material.
- Coordinate contaminated soils and hazardous substances/waste management with the appropriate federal, state, and local agencies.
- Inspect hazardous waste receptacles and areas regularly.



Standard Symbol

BMP Objectives	
<input type="radio"/>	Soil Stabilization
<input type="radio"/>	Sediment Control
<input type="radio"/>	Tracking Control
<input type="radio"/>	Wind Erosion Control
<input checked="" type="radio"/>	Non-Storm Water Management
<input checked="" type="radio"/>	Materials and Waste Management

Definition and Purpose These are procedures and practices that are designed to minimize or eliminate the discharge of concrete waste materials to the storm drain systems or watercourses.

- Appropriate Applications**
- Concrete waste management procedures and practices are implemented on construction projects where concrete is used as a construction material or where concrete dust and debris result from 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 Demolition Wastes

- Stockpile concrete demolition wastes in accordance with BMP WM-3, "Stockpile Management."
- Disposal of hardened PCC and AC waste shall be in conformance with

Standard Specifications Section 7-1.13 or 15-3.02.

Concrete Slurry Waste Management and Disposal

- PCC and AC waste shall not be allowed to enter storm drainage systems or watercourses.
- A sign shall be installed adjacent to each temporary concrete washout facility to inform concrete equipment operators to utilize the proper facilities as shown on Page 7.
- A foreman and/or construction supervisor shall monitor onsite concrete working tasks, such as saw cutting, coring, grinding and grooving to ensure proper methods are implemented.
- Residue from saw cutting, coring and grinding operations shall be picked up by means of a vacuum device. Residue shall not be allowed to flow across the pavement and shall not be left on the surface of the pavement. See also BMP NS-3, "Paving and Grinding Operations."
- Vacuumed slurry residue shall be disposed in accordance with BMP WM-5, "Solid Waste Management" and Standard Specifications Section 7-1.13. Slurry residue shall be temporarily stored in a facility as described in "Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures" below), or within an impermeable containment vessel or bin approved by the Engineer.
- Collect and dispose of all residues from grooving and grinding operations in accordance with Standard Specifications Section 7-1.13, 42-1.02 and 42-2.02.

Onsite Temporary Concrete Washout Facility, Concrete 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 infeasible 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 Standard Specifications Section 56-2, Roadside Signs.
- 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 mixers, delivery trucks, and other delivery systems in designated areas only.
- Wash concrete only from mixer chutes into approved concrete washout facility. Washout may be collected in an impermeable bag or other impermeable containment devices for disposal.
- Pump excess concrete in concrete pump bin back into concrete mixer truck.
- Concrete washout from concrete pumper bins can be washed into concrete pumper trucks and discharged into designated washout area or properly disposed offsite.
- Once concrete wastes are washed into the designated area and allowed to harden, the concrete shall be broken up, removed, and disposed of in conformance with the provisions in Standard Specifications Section 7-1.13 or 15-3.02.

Temporary Concrete Washout Facility Type “Above Grade”

- Temporary concrete washout facility Type “Above Grade” shall be constructed as shown on Page 6 or 7, with a recommended minimum length and minimum width of 3 m (10 ft), 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 from 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 10-mil polyethylene sheeting and shall be free of holes, tears or other defects that compromise the impermeability of the material. Liner seams shall be installed in accordance with manufacturers’ recommendations.
- Portable delineators shall conform to the provisions in Standard Specifications Section 12-3.04, “Portable Delineators.” The delineator bases shall be cemented to the pavement in the same manner as provided for cementing pavement markers to pavement in Standard Specifications Section 85-1.06, “Placement.” 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 page 6, 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.

- Plastic lining material shall be a minimum of 10-mil polyethylene sheeting and shall be free of holes, tears or other defects that compromise the impermeability of the material. Liner seams shall be installed in accordance with manufacturers' recommendations.
- The soil base shall be prepared free of rocks or other debris that may cause tears or holes in the plastic lining material.

Removal of Temporary Concrete Washout Facilities

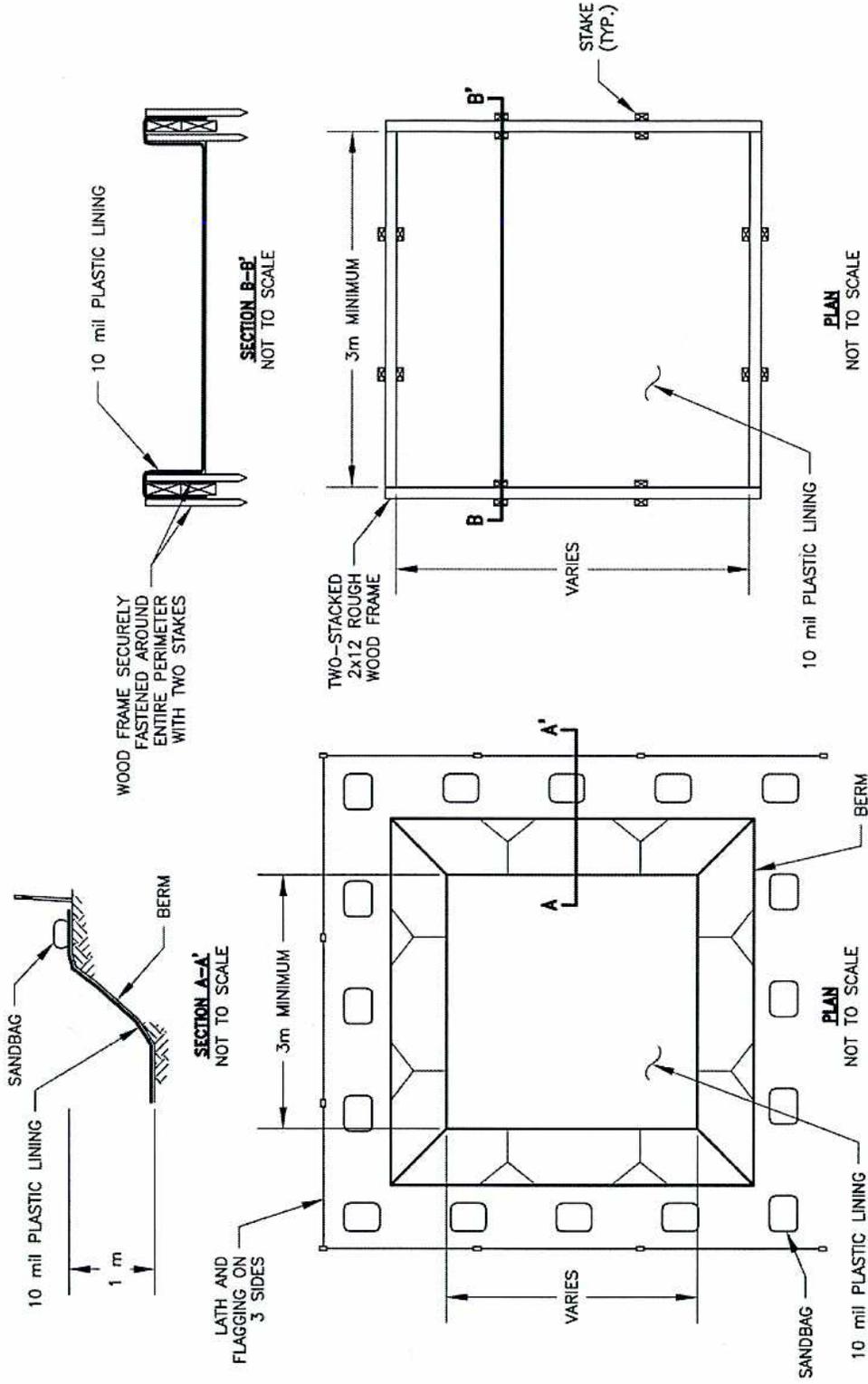
- When temporary concrete washout facilities are no longer required for the work, as determined by the RE, the hardened concrete shall be removed and disposed of in conformance with the provisions in Standard Specifications Section 7-1.13 or 15-3.02. Disposal of PCC dried residues, slurries or liquid waste shall be disposed of outside the highway right-of-way in conformance with provisions of Standard Specifications Section 7-1-13. 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 of the Standard Specifications, Section 7-1.13.
- 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 Standard Specifications Section 15-1.02, "Preservation of Property."

Maintenance and Inspection

- The Contractor's Water Pollution Control Manager (WPCM) shall monitor on site concrete waste storage and disposal procedures at least weekly or as directed by the RE.
- The WPCM shall monitor concrete working tasks, such as saw cutting, coring, grinding and grooving daily to ensure proper methods are employed or as directed by the RE.
- Temporary concrete washout facilities shall be maintained to provide adequate holding capacity with a minimum freeboard of 100 mm (4 inches) for above grade facilities and 300 mm (12 inches) 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 Standard Specifications Section 7-1.13 or 15-3.02.
- Existing facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is 75% full.
- Temporary concrete washout facilities shall be inspected for damage (i.e.

tears in polyethylene liner, missing sandbags, etc.). Damaged facilities shall be repaired.



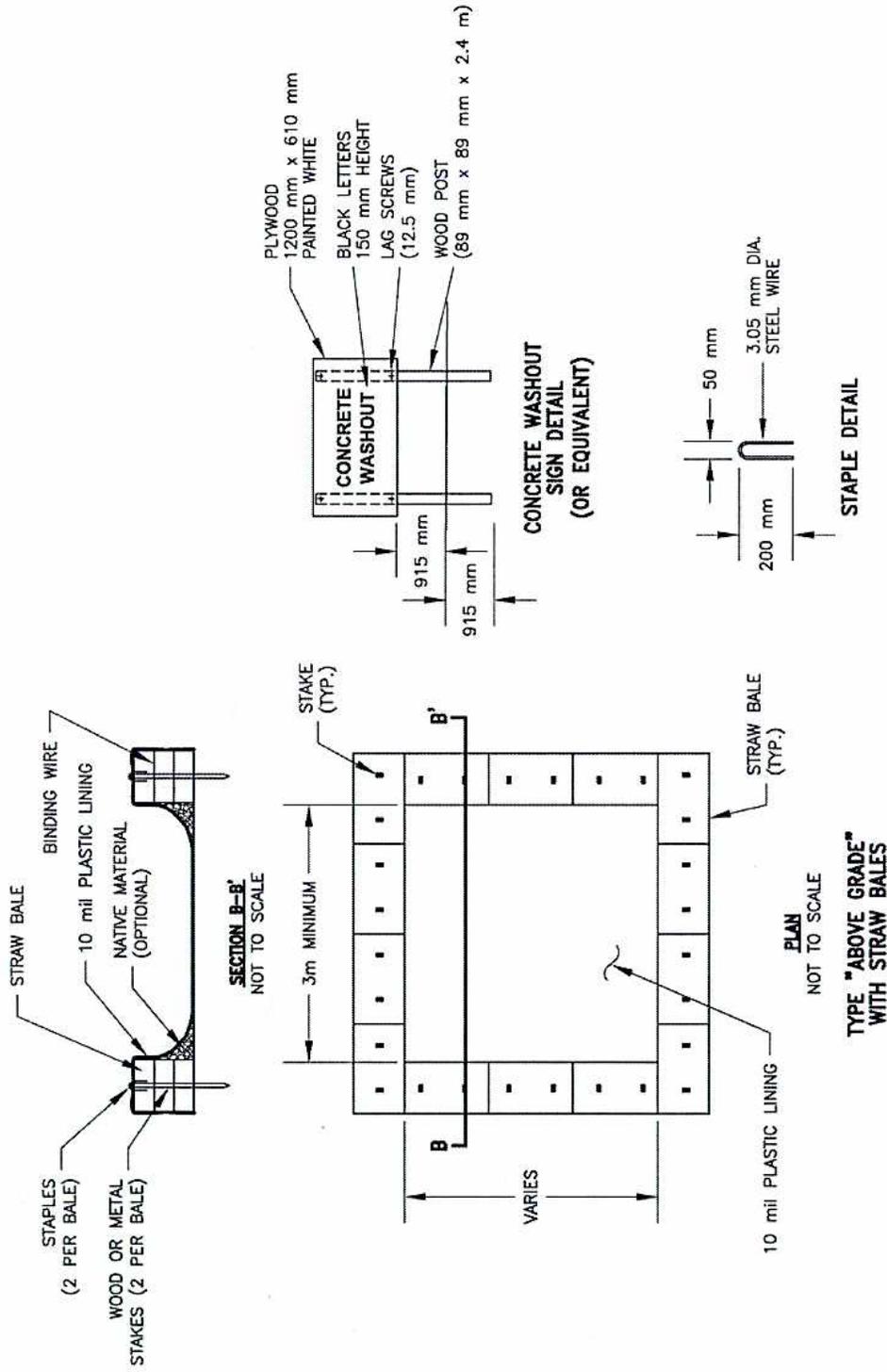


NOTES:

1. ACTUAL LAYOUT DETERMINED IN THE FIELD.
2. THE CONCRETE WASHOUT SIGN (SEE PAGE 6) SHALL BE INSTALLED WITHIN 10 m OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

Concrete Waste Management

WM-8

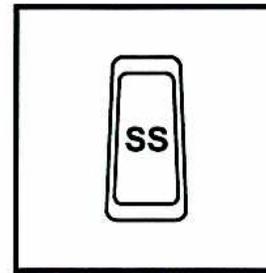
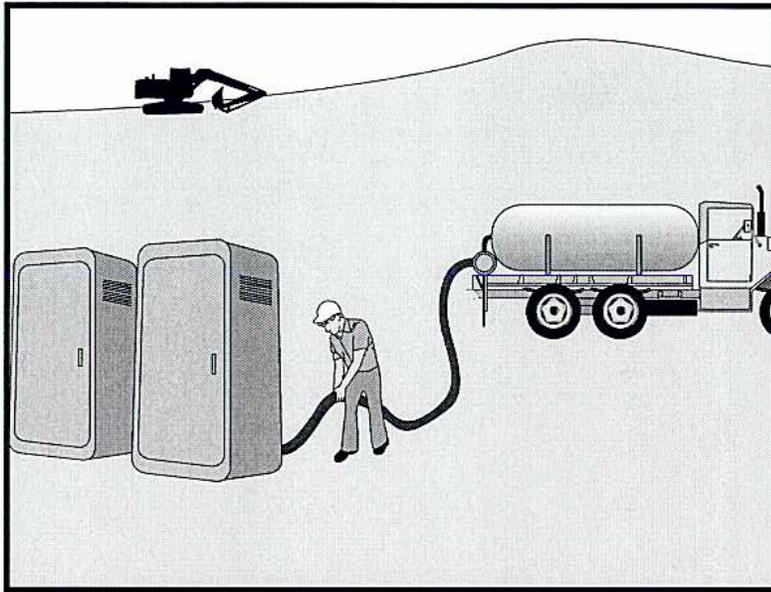


NOTES:

1. ACTUAL LAYOUT DETERMINED IN THE FIELD.
2. THE CONCRETE WASHOUT SIGN (SEE FIG. 4-15) SHALL BE INSTALLED WITHIN 10 m OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

CALTRANS/FC4-14.DWG SAC 8-14-02





Standard Symbol

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 ■ None identified.

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.

- 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, city, county, and sewer district requirements.
 - If using an on site disposal system, such as a septic system, comply with local health agency requirements.
 - Properly connect temporary sanitary facilities that discharge to the sanitary sewer system to avoid illicit discharges.
 - Ensure that sanitary/septic facilities are maintained in good working order by a licensed service.
 - Use only reputable, licensed sanitary/septic waste haulers.
- Maintenance and Inspection
- The Contractor's Water Pollution Control Manager (WPCM) shall monitor onsite sanitary/septic waste storage and disposal procedures at least weekly.

APPENDIX D

Contractor Certification

Contractor Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel prepared the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for preparing 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.

Signed

Position

Date

APPENDIX E

Authorized Contractors

APPENDIX F

Authorized Inspectors

List of Authorized Inspectors

Contractor	Designated Responsible Person	Telephone Number	Responsibilities

Storm Water Quality Construction Site Inspection Checklist

Caltrans Stormwater Quality Handbooks, March 2003

GENERAL INFORMATION				
Project Name				
Caltrans Contract No				
Contractor				
Inspector's Name				
Inspector's Title				
Signature				
Date of Inspection				
Inspection Type (Check Applicable)	<input type="checkbox"/> Prior to forecast rain		<input type="checkbox"/> After a rain event	
	<input type="checkbox"/> 24-hr intervals during extended rain		<input type="checkbox"/> Other _____	
Season (Check Applicable)	<input type="checkbox"/> Rainy		<input type="checkbox"/> Non-Rainy	
Storm Data	Storm Start Date & Time:		Storm Duration (hrs):	
	Time elapsed since last storm (Circle Applicable Units)	Min. Hr. Days	Approximate Rainfall Amount (mm)	

PROJECT AREA SUMMARY AND DISTURBED SOIL AREA (DSA) SIZE LIMITS FROM SPECIAL PROVISIONS				
Total Project Area	_____	Hectares	_____	Acres
Rainy Season DSA Limit	_____	Hectares	_____	Acres
Field Estimate of Non-Active DSAs	_____	Hectares	_____	Acres
Field Estimate of Active DSAs	_____	Hectares	_____	Acres

OTHER REQUIREMENTS				
Requirement	Yes	No	N/A	Corrective Action
Preservation of Existing Vegetation				
Is temporary fencing provided to preserve vegetation in areas where no construction activity is planned?				
Location:				
Temporary Soil Stabilization				
Does the applied temporary soil stabilization provide 100% coverage for the required areas?				
Are any non-vegetated areas that may require temporary soil stabilization?				
Is the area where temporary soil stabilization required free from visible erosion?				
Location:				
Temporary Linear Sediment Barriers				
Are temporary linear sediment barriers properly installed in accordance with the details, functional and maintained?				
Are temporary linear sediment barriers free of accumulated litter?				
Is the built-up sediment less than 1/3 the height of the barrier?				
Are cross barriers installed where necessary and properly spaced?				
Are fiber rolls installed and maintained on required slopes in accordance with the details, functional and maintained?				
Location:				
Storm Drain Inlet Protection				
Are storm drain inlets internal to the project properly protected with either Type 1, 2 or 3 inlet protection?				
Are storm drain inlet protection devices in working order and being properly maintained?				
Location:				

OTHER REQUIREMENTS				
Requirement	Yes	No	N/A	Corrective Action
Location:				
Desilting Basins				
Are basins maintained to provide the required retention/detention?				
Are basin controls (inlets, outlets, diversions, weirs, spillways, and racks) in working order?				
Location:				
Stockpiles				
Are all locations of temporary stockpiles, including soil, hazardous waste, and construction materials in approved areas?				
Are stockpiles protected from run-on, run-off from adjacent areas and from winds?				
Are stockpiles located at least 15 m from concentrated flows, downstream drainage courses and storm drain inlets?				
Are required covers and/or perimeter controls in place?				
Location:				
Concentrated Flows				
Are concentrated flow paths free of visible erosion?				
Location:				
Tracking Control				
Are points of ingress/egress to public/private roads inspected, swept, and vacuumed daily?				
Are all paved areas free of visible sediment tracking or other particulate matter?				
Location:				
Wind Erosion Control				
Is dust control implemented in conformance with Section 10 of the Standard Specifications?				

OTHER REQUIREMENTS				
Requirement	Yes	No	N/A	Corrective Action
Location:				
Dewatering Operations				
Is dewatering handled in conformance with the dewatering permit issued by the RWQCB?				
Is required treatment provided for dewatering effluent?				
Location:				
Vehicle & Equipment Fueling, Cleaning, and Maintenance				
Are vehicle and equipment fueling, cleaning and maintenance areas reasonably clean and free of spills, leaks, or any other deleterious material?				
Are vehicle and equipment fueling, cleaning and maintenance activities performed on an impermeable surface in dedicated areas?				
If no, are drip pans used?				
Are dedicated fueling, cleaning, and maintenance areas located at least 15 m away from downstream drainage facilities and watercourses, and protected from run-on and runoff?				
Is wash water contained for infiltration/ evaporation and disposed of outside the highway right of way?				
Is on-site cleaning limited to washing with water (no soap, soaps substitutes, solvents, or steam)?				
On each day of use, are vehicles and equipment inspected for leaks and if necessary, repaired?				
Location:				
Waste Management & Materials Pollution Control				
Are material storage areas and washout areas protected from run-on and runoff, and located at least 15 m from concentrated flows and downstream drainage facilities?				
Are all material handling and storage areas clean; organized; free of spills, leaks, or any other deleterious material; and stocked with appropriate clean-up supplies?				
Are liquid materials, hazardous materials, and hazardous wastes stored in temporary containment facilities?				
Are bagged and boxed materials stored on pallets?				

OTHER REQUIREMENTS				
Requirement	Yes	No	N/A	Corrective Action
Are hazardous materials and wastes stored in appropriate, labeled containers?				
Are proper storage, clean-up, and spill-reporting procedures for hazardous materials and wastes posted in open, conspicuous and accessible locations adjacent to storage areas?				
Are temporary containment facilities free of spills and rainwater?				
Are temporary containment facilities and bagged/boxed materials covered?				
Are temporary concrete washout facilities designated and being used?				
Are temporary concrete washout facilities functional for receiving and containing concrete waste and are concrete residues prevented from entering the drainage system?				
Do temporary concrete washout facilities provide sufficient volume and freeboard for planned concrete operations?				
Are the temporary concrete washout facilities' PVC liners free from punctures and holes?				
Are concrete wastes, including residues from cutting and grinding, contained and disposed of off-site or in concrete washout facilities?				
Are spills from mobile equipment fueling and maintenance properly contained and cleaned up?				
Is the site free of litter?				
Are trash receptacles provided in the Contractor's yard, field trailer areas, and at locations where workers congregate for lunch and break periods?				
Is litter from work areas within the construction limits of the project site collected and placed in watertight dumpsters?				
Are waste management receptacles free of leaks?				
Are the contents of waste management receptacles properly protected from contact with storm water or from being dislodged by winds?				
Are waste management receptacles filled at or beyond capacity?				
Location:				
Temporary Water Body Crossing or Encroachment				
Are temporary water body crossings and encroachments constructed as shown on the plans or as approved by the engineer?				
Does the project conform to the requirements of the 404 permit and/or 1601 agreement?				
Location:				
Location:				
Location:				

OTHER REQUIREMENTS				
Requirement	Yes	No	N/A	Corrective Action
Location:				
Illicit Connection/Illegal Discharge Detection and Reporting				
Is there any evidence of illicit discharges or illegal dumping on the project site?				
If yes, has the Engineer been notified?				
Location:				
Discharge Points				
Are discharge points and discharge flows free from noticeable pollutants?				
Are discharge points free of any significant erosion or sediment transport?				
Location:				
WPCP/SWPPP Update				
Do the WPCP/SWPPP, Project Schedule/Water Pollution Control Schedule and WPCDs adequately reflect the current site conditions and contractor operations?				
Are all BMPs shown on the WPCDs installed in the proper location(s) and according to the details for the plan?				
Location:				
General				
Are there any other potential water pollution control concerns at the site?				
Location:				
Storm Water Monitoring				
Does storm water discharge directly to an water body listed as impaired for sediment/sedimentation or turbidity in the General Construction Activity Permit?				

OTHER REQUIREMENTS

Requirement	Yes	No	N/A	Corrective Action
If yes, were samples for sediment/sedimentation or turbidity collected pursuant to the sampling and analysis plan, if required, during rain events?				
Were there any BMPs not properly implemented, or breaches, malfunctions, leakages or spills observed, which could result in the discharge of pollutants to surface waters that would not be visually detectable in storm water?				
If yes, were samples for non-visually detectable pollutants collected pursuant to the sampling and analysis plan during rain events?				
Were soil amendments (e.g., gypsum) used on the project?				
If yes, were samples for non-visually detectable pollutants collected pursuant to the sampling and analysis plan during rain events?				
Did storm water contact stored materials or waste and resulted in a discharge from the construction site? (Materials not in watertight containers, etc.)				
If yes, were samples for non-visually detectable pollutants collected pursuant to the sampling and analysis plan during rain events?				

APPENDIX G

SWPPP Inspection Form

Storm Water Quality Construction Site Inspection Checklist

Caltrans Stormwater Quality Handbooks, March 2003

GENERAL INFORMATION				
Project Name				
Caltrans Contract No				
Contractor				
Inspector's Name				
Inspector's Title				
Signature				
Date of Inspection				
Inspection Type (Check Applicable)	<input type="checkbox"/> Prior to forecast rain		<input type="checkbox"/> After a rain event	
	<input type="checkbox"/> 24-hr intervals during extended rain		<input type="checkbox"/> Other _____	
Season (Check Applicable)	<input type="checkbox"/> Rainy		<input type="checkbox"/> Non-Rainy	
Storm Data	Storm Start Date & Time:		Storm Duration (hrs):	
	Time elapsed since last storm (Circle Applicable Units)	Min. Hr. Days	Approximate Rainfall Amount (mm)	

PROJECT AREA SUMMARY AND DISTURBED SOIL AREA (DSA) SIZE LIMITS FROM SPECIAL PROVISIONS				
Total Project Area	_____	Hectares	_____	Acres
Rainy Season DSA Limit	_____	Hectares	_____	Acres
Field Estimate of Non-Active DSAs	_____	Hectares	_____	Acres
Field Estimate of Active DSAs	_____	Hectares	_____	Acres

OTHER REQUIREMENTS				
Requirement	Yes	No	N/A	Corrective Action
Preservation of Existing Vegetation				
Is temporary fencing provided to preserve vegetation in areas where no construction activity is planned?				
Location:				
Temporary Soil Stabilization				
Does the applied temporary soil stabilization provide 100% coverage for the required areas?				
Are any non-vegetated areas that may require temporary soil stabilization?				
Is the area where temporary soil stabilization required free from visible erosion?				
Location:				
Temporary Linear Sediment Barriers				
Are temporary linear sediment barriers properly installed in accordance with the details, functional and maintained?				
Are temporary linear sediment barriers free of accumulated litter?				
Is the built-up sediment less than 1/3 the height of the barrier?				
Are cross barriers installed where necessary and properly spaced?				
Are fiber rolls installed and maintained on required slopes in accordance with the details, functional and maintained?				
Location:				
Storm Drain Inlet Protection				
Are storm drain inlets internal to the project properly protected with either Type 1, 2 or 3 inlet protection?				
Are storm drain inlet protection devices in working order and being properly maintained?				
Location:				

OTHER REQUIREMENTS				
Requirement	Yes	No	N/A	Corrective Action
Location:				
Desilting Basins				
Are basins maintained to provide the required retention/detention?				
Are basin controls (inlets, outlets, diversions, weirs, spillways, and racks) in working order?				
Location:				
Stockpiles				
Are all locations of temporary stockpiles, including soil, hazardous waste, and construction materials in approved areas?				
Are stockpiles protected from run-on, run-off from adjacent areas and from winds?				
Are stockpiles located at least 15 m from concentrated flows, downstream drainage courses and storm drain inlets?				
Are required covers and/or perimeter controls in place?				
Location:				
Concentrated Flows				
Are concentrated flow paths free of visible erosion?				
Location:				
Tracking Control				
Are points of ingress/egress to public/private roads inspected, swept, and vacuumed daily?				
Are all paved areas free of visible sediment tracking or other particulate matter?				
Location:				
Wind Erosion Control				
Is dust control implemented in conformance with Section 10 of the Standard Specifications?				

OTHER REQUIREMENTS				
Requirement	Yes	No	N/A	Corrective Action
Location:				
Dewatering Operations				
Is dewatering handled in conformance with the dewatering permit issued by the RWQCB?				
Is required treatment provided for dewatering effluent?				
Location:				
Vehicle & Equipment Fueling, Cleaning, and Maintenance				
Are vehicle and equipment fueling, cleaning and maintenance areas reasonably clean and free of spills, leaks, or any other deleterious material?				
Are vehicle and equipment fueling, cleaning and maintenance activities performed on an impermeable surface in dedicated areas?				
If no, are drip pans used?				
Are dedicated fueling, cleaning, and maintenance areas located at least 15 m away from downstream drainage facilities and watercourses, and protected from run-on and runoff?				
Is wash water contained for infiltration/ evaporation and disposed of outside the highway right of way?				
Is on-site cleaning limited to washing with water (no soap, soaps substitutes, solvents, or steam)?				
On each day of use, are vehicles and equipment inspected for leaks and if necessary, repaired?				
Location:				
Waste Management & Materials Pollution Control				
Are material storage areas and washout areas protected from run-on and runoff, and located at least 15 m from concentrated flows and downstream drainage facilities?				
Are all material handling and storage areas clean; organized; free of spills, leaks, or any other deleterious material; and stocked with appropriate clean-up supplies?				
Are liquid materials, hazardous materials, and hazardous wastes stored in temporary containment facilities?				
Are bagged and boxed materials stored on pallets?				

OTHER REQUIREMENTS				
Requirement	Yes	No	N/A	Corrective Action
Are hazardous materials and wastes stored in appropriate, labeled containers?				
Are proper storage, clean-up, and spill-reporting procedures for hazardous materials and wastes posted in open, conspicuous and accessible locations adjacent to storage areas?				
Are temporary containment facilities free of spills and rainwater?				
Are temporary containment facilities and bagged/boxed materials covered?				
Are temporary concrete washout facilities designated and being used?				
Are temporary concrete washout facilities functional for receiving and containing concrete waste and are concrete residues prevented from entering the drainage system?				
Do temporary concrete washout facilities provide sufficient volume and freeboard for planned concrete operations?				
Are the temporary concrete washout facilities' PVC liners free from punctures and holes?				
Are concrete wastes, including residues from cutting and grinding, contained and disposed of off-site or in concrete washout facilities?				
Are spills from mobile equipment fueling and maintenance properly contained and cleaned up?				
Is the site free of litter?				
Are trash receptacles provided in the Contractor's yard, field trailer areas, and at locations where workers congregate for lunch and break periods?				
Is litter from work areas within the construction limits of the project site collected and placed in watertight dumpsters?				
Are waste management receptacles free of leaks?				
Are the contents of waste management receptacles properly protected from contact with storm water or from being dislodged by winds?				
Are waste management receptacles filled at or beyond capacity?				
Location:				
Temporary Water Body Crossing or Encroachment				
Are temporary water body crossings and encroachments constructed as shown on the plans or as approved by the engineer?				
Does the project conform to the requirements of the 404 permit and/or 1601 agreement?				
Location:				
Location:				
Location:				

OTHER REQUIREMENTS				
Requirement	Yes	No	N/A	Corrective Action
Location:				
Illicit Connection/Illegal Discharge Detection and Reporting				
Is there any evidence of illicit discharges or illegal dumping on the project site?				
If yes, has the Engineer been notified?				
Location:				
Discharge Points				
Are discharge points and discharge flows free from noticeable pollutants?				
Are discharge points free of any significant erosion or sediment transport?				
Location:				
WPCP/SWPPP Update				
Do the WPCP/SWPPP, Project Schedule/Water Pollution Control Schedule and WPCDs adequately reflect the current site conditions and contractor operations?				
Are all BMPs shown on the WPCDs installed in the proper location(s) and according to the details for the plan?				
Location:				
General				
Are there any other potential water pollution control concerns at the site?				
Location:				
Storm Water Monitoring				
Does storm water discharge directly to an water body listed as impaired for sediment/sedimentation or turbidity in the General Construction Activity Permit?				

OTHER REQUIREMENTS

Requirement	Yes	No	N/A	Corrective Action
If yes, were samples for sediment/sedimentation or turbidity collected pursuant to the sampling and analysis plan, if required, during rain events?				
Were there any BMPs not properly implemented, or breaches, malfunctions, leakages or spills observed, which could result in the discharge of pollutants to surface waters that would not be visually detectable in storm water?				
If yes, were samples for non-visually detectable pollutants collected pursuant to the sampling and analysis plan during rain events?				
Were soil amendments (e.g., gypsum) used on the project?				
If yes, were samples for non-visually detectable pollutants collected pursuant to the sampling and analysis plan during rain events?				
Did storm water contact stored materials or waste and resulted in a discharge from the construction site? (Materials not in watertight containers, etc.)				
If yes, were samples for non-visually detectable pollutants collected pursuant to the sampling and analysis plan during rain events?				

APPENDIX H

SWPPP Amendments

APPENDIX I

Relevant Permits



Dan Skopec
*Acting Secretary for
Environmental
Protection*

State Water Resources Control Board

Division of Water Quality

1001 I Street • Sacramento, California 95814 • (916) 341-5537
Mailing Address: P.O. Box 1977 • Sacramento, California • 95812-1977
FAX (916) 341-5543 • Internet Address: <http://www.waterboards.ca.gov/stormwtr/index.html>



Arnold Schwarzenegger
Governor

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR
STORM WATER DISCHARGES ASSOCIATED WITH
CONSTRUCTION ACTIVITY (GENERAL PERMIT)
WATER QUALITY ORDER 99-08-DWQ

TABLE OF CONTENTS

Click on the items below to view Section

1. CHECKLIST FOR SUBMITTING A NOTICE OF INTENT
2. FACT SHEET
3. FACT SHEET AMENDMENTS

APPENDIX A WATER QUALITY OBJECTIVES FOR SUSPENDED
MATERIALS, SETTEABLE MATERIALS, SEDIMENT AND TURBIDITY
4. WASTE DISCHARGE REQUIREMENTS (GENERAL PERMIT)
5. ATTACHMENT 1: SWRCB AND RWQCB CONTACT LIST
6. GENERAL INSTRUCTIONS
7. NOTICE OF INTENT-LINE-BY-LINE INSTRUCTIONS
8. ATTACHMENT 2: NOTICE OF INTENT FORM
9. ATTACHMENT 3: 303d LISTED WATER BODIES FOR SEDIMENTATION
10. ATTACHMENT 4: CHANGE OF INFORMATION (COI) FORM



Dan Skopec
Acting Secretary for
Environmental
Protection

State Water Resources Control Board

Division of Water Quality

1001 I Street • Sacramento, California 95814 • (916) 341-5537
Mailing Address: P.O. Box 1977 • Sacramento, California • 95812-1977
FAX (916) 341-5543 • Internet Address: <http://www.waterboards.ca.gov/stormwtr/index.html>



Arnold Schwarzenegger
Governor

CHECKLIST FOR SUBMITTING A NOTICE OF INTENT

In order for the State Water Resources Control Board to expeditiously process your Notice of Intent (NOI), the following items must be submitted to either of the addresses indicated below:

1. _____ NOI (please keep a copy for your files) with all applicable sections completed and original signature of the landowner or signatory agent;
2. _____ Check made out to the "State Water Resources Control Board"
Fee is (\$200 + \$20/acre) plus 18.5% surcharge. See reverse for listing of fees by acre. The fee is based on the "Total Acres to be Disturbed" for the life of the project.
3. _____ Site Map of the facility (see NOI instructions). **DO NOT SEND BLUEPRINTS**

U.S. Postal Service Address

State Water Resources Control Board
Division of Water Quality
Attn: Storm Water Section
P.O. Box 1977
Sacramento, CA 95812-1977

Overnight Mailing Address

State Water Resources Control Board
Division Of Water Quality
Attn: Storm Water, 15th Floor
1001 I Street
Sacramento, CA 95814

NOIs are processed in the order they are received. A NOI receipt letter will be mailed to the land owner within approximately two weeks. Incomplete NOI submittals will be returned to the landowner's address within the same timeframe and will specify the reason(s) for return. If you need a receipt letter by a specific date (for example, to provide to a local agency), we advise that you submit your NOI thirty (30) days prior to the date the receipt letter is needed.

Please do not call us to verify your NOI status. A copy of your NOI receipt letter will be available on our web page within twenty-four (24) hours of processing. Go to: <http://www.waterboards.ca.gov/stormwtr/databases.html> to retrieve an electronic copy of your NOI receipt letter. If you have any questions regarding this matter, please contact us at (916) 341-5537.

<u>Acres</u>	<u>Fee</u>	<u>18.5% Surcharge</u>	<u>Total Fee</u>	<u>Acres</u>	<u>Fee</u>	<u>18.5% Surcharge</u>	<u>Total Fee</u>
0	\$200.00	\$37	\$237	51	\$1,220.00	\$226	\$1,446
1	\$220.00	\$41	\$261	52	\$1,240.00	\$229	\$1,469
2	\$240.00	\$44	\$284	53	\$1,260.00	\$233	\$1,493
3	\$260.00	\$48	\$308	54	\$1,280.00	\$237	\$1,517
4	\$280.00	\$52	\$332	55	\$1,300.00	\$241	\$1,541
5	\$300.00	\$56	\$356	56	\$1,320.00	\$244	\$1,564
6	\$320.00	\$59	\$379	57	\$1,340.00	\$248	\$1,588
7	\$340.00	\$63	\$403	58	\$1,360.00	\$252	\$1,612
8	\$360.00	\$67	\$427	59	\$1,380.00	\$255	\$1,635
9	\$380.00	\$70	\$450	60	\$1,400.00	\$259	\$1,659
10	\$400.00	\$74	\$474	61	\$1,420.00	\$263	\$1,683
11	\$420.00	\$78	\$498	62	\$1,440.00	\$266	\$1,706
12	\$440.00	\$81	\$521	63	\$1,460.00	\$270	\$1,730
13	\$460.00	\$85	\$545	64	\$1,480.00	\$274	\$1,754
14	\$480.00	\$89	\$569	65	\$1,500.00	\$278	\$1,778
15	\$500.00	\$93	\$593	66	\$1,520.00	\$281	\$1,801
16	\$520.00	\$96	\$616	67	\$1,540.00	\$285	\$1,825
17	\$540.00	\$100	\$640	68	\$1,560.00	\$289	\$1,849
18	\$560.00	\$104	\$664	69	\$1,580.00	\$292	\$1,872
19	\$580.00	\$107	\$687	70	\$1,600.00	\$296	\$1,896
20	\$600.00	\$111	\$711	71	\$1,620.00	\$300	\$1,920
21	\$620.00	\$115	\$735	72	\$1,640.00	\$303	\$1,943
22	\$640.00	\$118	\$758	73	\$1,660.00	\$307	\$1,967
23	\$660.00	\$122	\$782	74	\$1,680.00	\$311	\$1,991
24	\$680.00	\$126	\$806	75	\$1,700.00	\$315	\$2,015
25	\$700.00	\$130	\$830	76	\$1,720.00	\$318	\$2,038
26	\$720.00	\$133	\$853	77	\$1,740.00	\$322	\$2,062
27	\$740.00	\$137	\$877	78	\$1,760.00	\$326	\$2,086
28	\$760.00	\$141	\$901	79	\$1,780.00	\$329	\$2,109
29	\$780.00	\$144	\$924	80	\$1,800.00	\$333	\$2,133
30	\$800.00	\$148	\$948	81	\$1,820.00	\$337	\$2,157
31	\$820.00	\$152	\$972	82	\$1,840.00	\$340	\$2,180
32	\$840.00	\$155	\$995	83	\$1,860.00	\$344	\$2,204
33	\$860.00	\$159	\$1,019	84	\$1,880.00	\$348	\$2,228
34	\$880.00	\$163	\$1,043	85	\$1,900.00	\$352	\$2,252
35	\$900.00	\$167	\$1,067	86	\$1,920.00	\$355	\$2,275
36	\$920.00	\$170	\$1,090	87	\$1,940.00	\$359	\$2,299
37	\$940.00	\$174	\$1,114	88	\$1,960.00	\$363	\$2,323
38	\$960.00	\$178	\$1,138	89	\$1,980.00	\$366	\$2,346
39	\$980.00	\$181	\$1,161	90	\$2,000.00	\$370	\$2,370
40	\$1,000.00	\$185	\$1,185	91	\$2,020.00	\$374	\$2,394
41	\$1,020.00	\$189	\$1,209	92	\$2,040.00	\$377	\$2,417
42	\$1,040.00	\$192	\$1,232	93	\$2,060.00	\$381	\$2,441
43	\$1,060.00	\$196	\$1,256	94	\$2,080.00	\$385	\$2,465
44	\$1,080.00	\$200	\$1,280	95	\$2,100.00	\$389	\$2,489
45	\$1,100.00	\$204	\$1,304	96	\$2,120.00	\$392	\$2,512
46	\$1,120.00	\$207	\$1,327	97	\$2,140.00	\$396	\$2,536
47	\$1,140.00	\$211	\$1,351	98	\$2,160.00	\$400	\$2,560
48	\$1,160.00	\$215	\$1,375	99	\$2,180.00	\$403	\$2,583
49	\$1,180.00	\$218	\$1,398	>100	\$2,200.00	\$407	\$2,607
50	\$1,200.00	\$222	\$1,422				

FACT SHEET
FOR
WATER QUALITY ORDER 99-08-DWQ

STATE WATER RESOURCES CONTROL BOARD (SWRCB)
901 P STREET, SACRAMENTO, CALIFORNIA 95814

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR
STORM WATER DISCHARGES ASSOCIATED WITH
CONSTRUCTION ACTIVITY (GENERAL PERMIT)

BACKGROUND

In 1972, the Federal Water Pollution Control Act (also referred to as the Clean Water Act [CWA]) was amended to provide that the discharge of pollutants to waters of the United States from any point source is unlawful unless the discharge is in compliance with an NPDES permit. The 1987 amendments to the CWA added Section 402(p) which establishes a framework for regulating municipal and industrial storm water discharges under the NPDES Program. On November 16, 1990, the U.S. Environmental Protection Agency (USEPA) published final regulations that establish storm water permit application requirements for specified categories of industries. The regulations provide that discharges of storm water to waters of the United States from construction projects that encompass five (5) or more acres of soil disturbance are effectively prohibited unless the discharge is in compliance with an NPDES Permit. Regulations (Phase II Rule) that became final on December 8, 1999 expand the existing NPDES program to address storm water discharges from construction sites that disturb land equal to or greater than one (1) acre and less than five (5) acres (small construction activity). The regulations require that small construction activity, other than those regulated under an individual or Regional Water Quality Control Board General Permit, must be permitted no later than March 10, 2003.

While federal regulations allow two permitting options for storm water discharges (individual permits and General Permits), the SWRCB has elected to adopt only one statewide General Permit at this time that will apply to all storm water discharges associated with construction activity, except from those on Tribal Lands, in the Lake Tahoe Hydrologic Unit, and those performed by the California Department of Transportation (Caltrans). Construction on Tribal Lands is regulated by an USEPA permit, the Lahontan Regional Water Control Board adopted a separate NPDES permit for the Lake Tahoe Hydrologic Unit, and the SWRCB adopted a separate NPDES permit for Caltrans projects. This General Permit requires all dischargers where construction activity disturbs one acre or more, to:

1. Develop and implement a Storm Water Pollution Prevention Plan (SWPPP) which specifies Best Management Practices (BMPs) that will prevent all construction pollutants from contacting storm water and with the intent of keeping all products of erosion from moving off site into receiving waters.

2. Eliminate or reduce nonstorm water discharges to storm sewer systems and other waters of the nation.
3. Perform inspections of all BMPs.

This General Permit shall be implemented and enforced by the nine California Regional Water Quality Control Boards (RWQCBs).

The General Permit accompanying this fact sheet regulates storm water runoff from construction sites. Regulating many storm water discharges under one permit will greatly reduce the otherwise overwhelming administrative burden associated with permitting individual storm water discharges. Dischargers shall submit a Notice of Intent (NOI) to obtain coverage under this General Permit. It is expected that as the storm water program develops, the RWQCBs may issue General Permits or individual permits containing more specific permit provisions. When this occurs, those dischargers will no longer be regulated by this General Permit.

On August 19, 1999, the State Water Resources Control Board (SWRCB) reissued the General Construction Storm Water Permit (Water Quality Order 99-08-DWQ referred to as "General Permit"). The San Francisco BayKeeper, Santa Monica BayKeeper, San Diego BayKeeper, and Orange Coast Keeper filed a petition for writ of mandate challenging the General Permit in the Superior Court, County of Sacramento. The Court issued a judgment and writ of mandate on September 15, 2000. The Court directed the SWRCB to modify the provisions of the General Permit to require permittees to implement specific sampling and analytical procedures to determine whether Best Management Practices (BMPs) implemented on a construction site are: (1) preventing further impairment by sediment in storm waters discharged directly into waters listed as impaired for sediment or silt, and (2) preventing other pollutants, that are known or should be known by permittees to occur on construction sites and that are not visually detectable in storm water discharges, from causing or contributing to exceedances of water quality objectives. The monitoring provisions in the General Permit have been modified pursuant to the court order.

TYPES OF CONSTRUCTION ACTIVITY COVERED BY THIS GENERAL PERMIT

Construction activity subject to this General Permit includes clearing, grading, disturbances to the ground such as stockpiling, or excavation that results in soil disturbances of at least one acre of total land area. Construction activity that results in soil disturbances of less than one acre is subject to this General Permit if the construction activity is part of a larger common plan of development that encompasses one or more acres of soil disturbance or if there is significant water quality impairment resulting from the activity. Construction activity does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility, nor does it include emergency construction activities required to protect public health and safety. Dischargers should confirm with the local RWQCB whether or not a particular routine maintenance activity is subject to this General Permit.

A construction project which includes a dredge and/or fill discharge to any jurisdictional surface water (e.g., wetland, channel, pond, or marine water) will also need a CWA Section 404 permit

from the U.S. Army Corps of Engineers and a CWA Section 401 Water Quality Certification from the RWQCB/SWRCB. Storm water discharges from dredge spoil placement which occurs outside of Corps jurisdiction (upland sites) and are part of construction activity which disturbs one or more acres of land are covered by this general permit. Proponents of construction projects which disturb one or more acres of land within the jurisdictional boundaries of a CWA Section 404 permit should contact the local RWQCB to determine the applicability of this permit to the project.

NOTIFICATION REQUIREMENTS

It is the responsibility of the landowner to obtain coverage under this General Permit prior to commencement of construction activities. To obtain coverage, the landowner must file an NOI with a vicinity map and the appropriate fee with the SWRCB. In addition, coverage under this permit shall not occur until the applicant develops an adequate SWPPP for the project. Section A of the General Permit outlines the required contents of a SWPPP. For proposed construction activity on easements or on nearby property by agreement or permission, the entity responsible for the construction activity shall file an NOI and filing fee and shall be responsible for development of the SWPPP, all of which must occur prior to commencement of construction activities.

A separate NOI shall be submitted to the SWRCB for each construction site. Owners of new construction shall file an NOI prior to the commencement of construction. Owners of an ongoing construction site that is covered under the previous General Construction Permit (WQ Order No.92-08-DWQ) (1) shall continue to implement their existing SWPPP and monitoring program and (2) shall implement any necessary revisions to their SWPPP in a timely manner but in no case later than 90-calender days from adoption of this General Permit in accordance with Section A of this General Permit.

The NOI requirements of the General Permit are intended to establish a mechanism which can be used to clearly identify the responsible parties, locations, and scope of operations of dischargers covered by the General Permit and to document the discharger's knowledge of the requirements for a SWPPP.

The NOI must be sent to the following address:

State Water Resources Control Board
Division of Water Quality
Storm Water Permit Unit
P.O. Box 1977
Sacramento, CA 95812-1977

The total annual fee is the current base fee plus applicable surcharges.

When construction is complete or ownership has been transferred, dischargers shall file a Notice of Termination with the RWQCB certifying that all State and local requirements have been met in accordance with Special Provisions for Construction Activity, C.7, of the General Permit.

Dischargers who fail to obtain coverage under this General Permit for storm water discharges to surface waters will be in violation of the CWA and the California Water Code.

CONSTRUCTION ACTIVITY NOT COVERED BY THIS GENERAL PERMIT

This General Permit does not apply to storm water discharges from (1) those areas on Tribal Lands; (2) the Lake Tahoe Hydrologic Unit; (3) construction under one acre, unless part of a larger common plan of development or sale; (4) projects covered by an individual NPDES Permit for storm water discharges associated with construction activity; and (5) landfill construction that is subject to the general industrial permit.

Storm water discharges in the Lake Tahoe Hydrologic Unit are regulated by a separate permit(s) adopted by the California Regional Water Quality Control Board, Lahontan Region (LRWQCB). USEPA regulates storm water discharges on Tribal Lands. Permit applications for storm water discharges that will be conducted in the Lake Tahoe Hydrologic Unit must be submitted directly to the LRWQCB.

DESCRIPTION OF GENERAL PERMIT CONDITIONS

The following is a brief description of the major provisions of the General Permit and the basis for the General Permit.

Prohibitions

This General Permit authorizes the discharge of storm water to surface waters from construction activities that result in the disturbance of one or more acres of land. It prohibits the discharge of materials other than storm water and authorized non-storm water discharges and all discharges which contain a hazardous substance in excess of reportable quantities established at 40 Code of Federal Regulations (CFR) 117.3 or 40 CFR 302.4 unless a separate NPDES Permit has been issued to regulate those discharges. In addition, this General Permit contains provisions that uphold discharge prohibitions contained in water quality control plans, as implemented through the nine RWQCBs.

Effluent Limitations

Permits for storm water discharges associated with construction activity shall meet all applicable provisions of Sections 301 and 402 of the CWA. These provisions require controls of pollutant discharges that utilize best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT) to reduce pollutants and any more stringent controls necessary to meet water quality standards.

It is not feasible at this time for the SWRCB to establish numeric effluent limitations. The reasons why it is not feasible to establish numeric effluent limitations are discussed in detail in SWRCB Order Nos. WQ 91-03 and WQ 91-04. Therefore, the effluent limitations contained in this General Permit are narrative and include the requirement to implement appropriate BMPs.

The BMPs shall primarily emphasize source controls such as erosion control and pollution prevention methods. The discharger shall also install structural controls, as necessary, such as sediment control which will constitute BAT and BCT and will achieve compliance with water quality standards. The narrative effluent limitations constitute compliance with the requirements of the CWA.

Elimination or reduction of nonstorm water discharges is a major goal of this General Permit. Nonstorm water discharges include a wide variety of sources, including improper dumping, spills, or leakage from storage tanks or transfer areas. Nonstorm water discharges may contribute a significant pollutant load to receiving waters. Measures to control spills, leakage, and dumping and to prevent illicit connections during construction shall be addressed through structural as well as non-structural BMPs.

This General Permit prohibits the discharge of materials other than storm water and authorized nonstorm water discharges. It is recognized that certain nonstorm water discharges may be necessary for the completion of construction projects. Such discharges include, but are not limited to irrigation of vegetative erosion control measures, pipe flushing and testing, street cleaning, and dewatering. Such discharges are allowed by this General Permit provided they are not relied upon to clean up failed or inadequate construction or post-construction BMPs designed to keep materials onsite. These authorized nonstorm water discharges shall (1) be infeasible to eliminate, (2) comply with BMPs as described in the SWPPP, and (3) not cause or contribute to a violation of water quality standards. Additionally, these discharges may be required to be permitted by the local RWQCB (e.g., some RWQCBs have adopted General Permits for dewatering discharges). This General Permit is performance-based to the extent that it prohibits the discharge of storm water that causes or threatens to cause pollution, contamination, or nuisance; but it also allows the owner/developer to determine the most economical, effective, and possibly innovative BMPs.

The requirements of this General Permit are intended to be implemented on a year-round basis, not just during the part of the year when there is a high probability of a precipitation event which results in storm water runoff. The permit should be implemented at the appropriate level and in a proactive manner during all seasons while construction is ongoing.

Weather and storm predictions or weather information concerning the 10-year, 6-hour storm event and mean annual rainfall can be obtained by calling the Western Regional Climate Center at 775-674-7010 or via the internet at www.wrcc.dri.edu/precip.html and/or www.wrcc.dri.edu/pcpnfreq.html.

Receiving Water Limitations Language

The receiving water limitations language is fundamentally different from the language adopted in the SWRCB General Industrial Activities Storm Water Permit on April 17, 1997. Construction related activities which cause or contribute to an exceedance of water quality standards must be corrected immediately and cannot wait for the RWQCB to approve a plan of action to correct. The dynamic nature of construction activity allows the discharger the ability to more quickly identify and correct the source of the exceedances. Therefore, the owner is

required to take immediate corrective action and to provide a report to the appropriate RWQCB within 14-calendar days of the violation describing the corrective action.

Storm Water Pollution Prevention Plan (SWPPP)

This General Permit requires development and implementation of a SWPPP. This document emphasizes the use of appropriately selected, correctly installed and maintained pollution reduction BMPs. This approach provides the flexibility necessary to establish BMPs which can effectively address source control of pollutants during changing construction activities.

All dischargers shall prepare and implement a SWPPP prior to disturbing a site. The SWPPP must be implemented at the appropriate level to protect water quality at all times throughout the life of the project. Nonstorm water BMPs must be implemented year round. The SWPPP shall remain on the site while the site is under construction, commencing with the initial mobilization and ending with the termination of coverage under the permit.

The SWPPP has two major objectives: (1) to help identify the sources of sediment and other pollutants that affect the quality of storm water discharges and (2) to describe and ensure the implementation of BMPs to reduce or eliminate sediment and other pollutants in storm water as well as nonstorm water discharges. The SWPPP shall include BMPs which address source control and, if necessary, shall also include BMPs which address pollutant control.

Required elements of a SWPPP include: (1) site description addressing the elements and characteristics specific to the site, (2) descriptions of BMPs for erosion and sediment controls, (3) BMPs for construction waste handling and disposal, (4) implementation of approved local plans, (5) proposed post-construction controls, including description of local post-construction erosion and sediment control requirements, and (6) nonstorm water management.

To ensure that the preparation, implementation, and oversight of the SWPPP is sufficient for effective pollution prevention, individuals responsible for creating, revising, overseeing, and implementing the SWPPP should participate in applicable training programs and document such training in the SWPPP.

SWPPPs are reports that are available to the public under Section 308(b) of the CWA and will be made available by the RWQCB upon request.

Monitoring Program

Another major feature of the General Permit is the development and implementation of a monitoring program. All dischargers are required to conduct inspections of the construction site prior to anticipated storm events and after actual storm events. During extended storm events, inspections must be made during each 24-hour period. The goals of these inspections are (1) to identify areas contributing to a storm water discharge; (2) to evaluate whether measures to reduce pollutant loadings identified in the SWPPP are adequate and properly installed and functioning in accordance with the terms of the General Permit; and (3) whether additional control practices or corrective maintenance activities are needed. Equipment, materials, and

workers must be available for rapid response to failures and emergencies. All corrective maintenance to BMPs shall be performed as soon as possible, depending upon worker safety.

Each discharger shall certify annually that the construction activities are in compliance with the requirements of this General Permit. Dischargers who cannot certify annual compliance shall notify the appropriate RWQCB. A well-developed monitoring program will provide a good method for checking the effectiveness of the SWPPP.

Retention of Records

The discharger is required to retain records of all monitoring information, copies of all reports required by this General Permit, and records of all data used to complete the NOI for all construction activities to be covered by the General Permit for a period of at least three years from the date generated. This period may be extended by request of the SWRCB and/or RWQCB. With the exception of reporting noncompliance to the appropriate RWQCB, dischargers are not required to submit the records, except upon specific request by the RWQCB.

FACT SHEET
FOR
WATER QUALITY ORDER 99-08-DWQ

STATE WATER RESOURCES CONTROL BOARD (SWRCB)
1001 I STREET, SACRAMENTO, CALIFORNIA 95814

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR
STORM WATER DISCHARGES ASSOCIATED WITH
CONSTRUCTION ACTIVITY (GENERAL PERMIT): Sampling and Analysis

Contents

1.0 Introduction

- 1.1 Organization
- 1.2 Background
 - 1.2.1 Water Quality Standards or Objectives
 - 1.2.2 Non-Visible Pollutant Sampling
 - 1.2.3 Sediment-Impaired Water Bodies
- 1.3 Purpose of Sampling and Analysis

2.0 Sampling Program for Pollutants Not Visually Detectable in Storm Water

- 2.1 What the Permit Says About Sampling
- 2.2 Deciding When to Sample
- 2.3 Deciding What Constituents to Sample For: What are Pollutants Which are “Known or Should be Known” to Occur on a Construction Site?
- 2.4 Deciding Where to Sample
- 2.5 Types of Test Methods?
- 2.6 Deciding How Often to Sample
- 2.7 Identification of Pollutant Sources
- 2.8 Examples of When Sampling and Analysis for Non-Visible Pollutants is Not Required
- 2.9 Examples of When Sampling and Analysis is Required
- 2.10 Do I need to Sample Storm Water Flows Diverted Around My Project for Non-Visible Pollutants?
- 2.11 Deciding How to Sample
- 2.12 How to Use Your Sampling Data
 - 2.12.1 How to Analyze your Data
 - 2.12.2 Coordinating Visual Observations With Sampling Results
 - 2.12.3 What to Do If The Data Show a Potential Problem
- 2.13 Retention of Data

3.0 Sampling Program for Sedimentation/Siltation

- 3.1 What the Permit Says About Sampling

- 3.2 Deciding When to Sample
 - 3.3 Deciding What Constituent(s) Require Sampling
 - 3.4 Deciding Where to Sample
 - 3.5 What are the Applicable Water Quality Standards
 - 3.6 Deciding How to Sample
 - 3.7 How to Use Your Data
 - 3.7.1 How to Analyze Your Data
 - 3.7.2 Sources of Sediment, Silt and Turbidity In a Construction Discharge
 - 3.7.3 What to Do If Your Data Shows a Statistically Significant Increase Downstream of the Discharge
 - 3.8 Retention of Data
 - 4.0 Sampling Procedures**
 - 5.0 Definitions**
 - 6.0 Sources of Further Assistance**
 - 7.0 Explanation of Sampling and Analysis Requirements**
 - 7.1 Requirement for Compliance with Water Quality Standards
 - 7.2 Background Contamination
 - 7.3 Parameters to Sample for to Determine the Presence of Non-Visible Pollutants in Runoff
 - 7.4 The Watershed Approach to Storm Water Permitting
 - 7.5 References and Record for this Guidance Document
- List of Figures**
- 1.1 Evaluating Your Site for Sediment Sampling
 - 1.2 Evaluating Your Site for Non-Visible Pollutant Sampling
 - 1.2.1 Evaluating Your Site for Historical Pollutants
 - 1.2.2 Evaluating Your Site for Non-Visible Pollutant Run-on
 - 1.2.3 Evaluating Your Site for Construction Non-Visible Pollutants
 - 4-1 Outline for a Typical Storm Water Sampling and Analysis Plan
- Appendices**
- A Water Quality Objectives for Suspended Materials, Settable Materials, Sediment and Turbidity

1.0 Introduction

This document is an amendment to the Fact Sheet to the State Water Resources Control Board's (SWRCB) National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated With Construction Activity (CGP). This Permit was modified in 2001 by Resolution No. 2001-046, "*Modification of Water Quality Order 99-08-DWQ State Water Resources Control Board (SWRCB) National Pollutant Discharge Elimination System (NPDES) General Permit For Storm Water Discharges Associated With Construction Activity (CGP)*". The modifications to the CGP require that a sampling and analysis strategy and sampling schedule for certain discharges from construction activity be developed and kept with the project's Storm Water Pollution Prevention Plan (SWPPP). The sampling and analysis requirements are found in Section B, paragraphs 7 and 8, of the CGP. Paragraph 7 concerns monitoring for sedimentation/siltation or turbidity and Paragraph 8 concerns monitoring for pollutants that are not visually detectable in storm water. Where required, a sampling and analysis strategy and sampling schedule must be developed regardless of the time of the year that construction occurs.

This document only addresses the modifications and is intended to facilitate the proper implementation of the sampling and analysis requirements. It provides information on when sampling and analysis is required, how to perform sampling and analysis, what conclusions may be drawn from the sampling and analysis results, and it explains the rationale for the required sampling.

SWRCB staff developed this document with consideration of comments from interested persons, including the California Stormwater Quality Association, the Building Industry Legal Defense Foundation, the California Building Industry Association, the San Francisco BayKeeper, the Santa Monica BayKeeper, the San Diego BayKeeper, and the Orange County CoastKeeper. It is based on the CGP, two orders issued by the Sacramento Superior Court in response to a challenge to the CGP, Clean Water Act provisions, regulations, guidance documents and permits issued by the federal Environmental Protection Agency, and other documents submitted by interested persons. A full record has been compiled and is available for inspection or copying upon request. A draft guidance document was circulated for public comment and a hearing was held prior to issuance of this final guidance document.

Although sampling and analysis will be required at many construction sites, it will not be required at all construction sites. It is the responsibility of dischargers to evaluate the construction project and, where required, to develop a site-specific sampling and analysis strategy in compliance with the CGP requirements. For further guidance please contact your local Regional Water Quality Control Board (RWQCB).

The sampling and analysis requirements supplement, but do not replace, the visual monitoring program required by Section B of the CGP. All construction projects must continue the visual monitoring program including inspections before predicted rain events, during extended rain events, and following rain events that produce runoff.

This document provides guidance on complying with the sampling and analysis requirements of the CGP. It does not in any way change these requirements or guarantee compliance with the CGP. The permit has many other requirements such as development of a SWPPP,

implementation of Best Management Practices (BMP) programs, and visual monitoring that are not addressed in this document.

1.1 Organization

Section 1: general information and background on the sampling and requirements.

Section 2: non-visible pollutant sampling and analysis.

Section 3: sediment, silt and turbidity sampling and analysis.

Section 4: sampling and analysis procedures.

Section 5: definitions.

Section 6: contact list and additional sources of information.

Section 7: general explanation of and rationale for the sampling and analysis requirements; citations to other documents that form the basis for the SWRCB's conclusions.

1.2 Background

The SWRCB adopted the CGP on August 19, 1999. The CGP is an NPDES permit that implements section 402(p)(2)(B) of the federal Clean Water Act. The San Francisco BayKeeper, Santa Monica BayKeeper, San Diego BayKeeper, and Orange County CoastKeeper filed a petition for writ of mandate challenging numerous aspects of the CGP in the Superior Court, County of Sacramento.

On September 15, 2000, the Court issued a judgment and writ of mandate that upheld most provisions of the CGP, but directed the SWRCB to modify the provisions of the CGP to require permittees to implement specific sampling and analytical procedures to determine whether BMPs implemented on a construction site are:

(1) preventing further impairment by sediment in storm waters discharged directly into waters listed as impaired (Clean Water Act Section 303(d) List [303(d) List]) for sediment, silt, or turbidity; and

(2) preventing other pollutants that are known or should be known by permittees to occur on construction sites and that can not be visually observed or detected in storm water discharges, from causing or contributing to exceedances of water quality objectives.

The monitoring, sampling and analysis provisions in the CGP were modified pursuant to the court order and issued as Resolution No. 2001-046, adopted by the SWRCB on April 26, 2001.

On December 27, 2001, the Court issued an Order Enforcing Writ of Mandate. In that order, the Court acknowledged that the permit had been modified, but required further actions by the SWRCB. Issuance of this fact sheet amendment is intended to respond to the Court's further instructions. In general, the Court expressed concern that certain aspects of the modifications might be ambiguous and might result in misinterpretation by dischargers. This amendment is

intended to avoid such potential ambiguities and misinterpretations and to help explain the requirements and provide suggestions for compliance.

1.2.1 Water Quality Standards or Objectives

The Receiving Water Limitations in the CGP require the SWPPP be designed and implemented so that storm water discharges and authorized non-storm water discharges do not cause or contribute to an exceedance of any applicable water quality standard. (CGP, Receiving Water Limitation B.2.) The modifications to the monitoring program require sampling and analysis procedures to help determine whether BMPs installed and maintained in accordance with the SWPPP are preventing pollutants in discharges from the construction site from causing or contributing to exceedance of water quality standards. In making these determinations, it is necessary to understand what are the applicable water quality standards.

Water quality standards consist of the designation of beneficial uses of surface waters and the adoption of ambient criteria necessary to protect those uses. (40 CFR §131.3(i)) When adopted by the SWRCB or a RWQCB, the criteria are termed “water quality objectives.” (Water Code §13241; the terms are used interchangeably here.) If storm water runoff from construction sites contains pollutants, there is a risk that those pollutants could enter surface waters and cause or contribute to exceedance of water quality standards. For that reason, dischargers should be aware of the applicable water quality standards in their receiving waters. (The best method to ensure compliance with receiving water limitations is to implement BMPs that prevent pollutants from contact with storm water or from leaving the construction site in runoff).

In California, water quality standards are published in the Basin Plans adopted by each RWQCB, the California Toxics Rule (CTR), the National Toxics Rule (NTR), and the Ocean Plan. One way to determine the applicable standards for the receiving water for your runoff is to contact staff from the appropriate RWQCB. (See the contact list in Section 6 of this guidance.)

The SWRCB intends in the future to augment its internet site to further facilitate access to water quality standards. In the interim, dischargers can determine the applicable water quality standards by contacting RWQCB staff or from one of the following sources. The actual plans that contain the water quality standards can be viewed at the site of the appropriate RWQCB for Basin Plans (<http://www.waterboards.ca.gov/regions.html>), the SWRCB site for statewide plans (<http://www.waterboards.ca.gov/plnspols/index.html>), or the US Environmental Protection Agency (USEPA) regulations for the NTR and CTR (40 CFR Title 131). Basin Plans and statewide plans are also available by mail from the appropriate RWQCB or the SWRCB. The USEPA regulations are available at <http://www.epa.gov/>. Additional information concerning Water Quality Standards can be accessed through http://www.waterboards.ca.gov/stormwtr/gen_const.html

1.2.2 Non-Visible Pollutant Sampling

The monitoring requirements in the CGP require sampling and analysis for pollutants that are not visually detectable in storm water discharges, which are or should be known to occur on the construction site, and which could cause or contribute to an exceedance of water quality objectives. As is explained below, the situations where non-visible pollutants may occur in runoff from a construction site are limited. Where such non-visible pollutants are known or

should be known to be present and have the potential to contact runoff and to contribute to an exceedance of a water quality objective, sampling and analysis is required.

A variety of materials are used in construction or are present on construction sites. Examples of such materials include soil stabilizers, paint, and fluids from vehicles. Any of these materials can end up in the storm water runoff and contain pollutants that pose a threat to water quality. Some of these potential pollutants will leave a visible trace. For example, sediment turns water brown and oil and grease leave a sheen. Other pollutants will discolor the runoff or leave a residue or film. For pollutants that are visible in runoff, the CGP requires the discharger to perform visual monitoring of the site and does not require sampling and analysis. The sampling and analysis requirements only apply to pollutants that do not leave a visible trace or are not associated with a visible tracer. Examples of such potential non-visible pollutants include increased pH, pesticides, and nutrients such as nitrogen or phosphorus.

The presence or use of a material on the construction site does not always mean that dischargers must sample for it in runoff. The CGP requires sampling and analysis when non-visible pollutants could "cause or contribute to an exceedance of water quality objectives in the receiving water." The most effective way to avoid the sampling and analysis requirements, and to ensure permit compliance, is to avoid the exposure of construction materials to precipitation and storm water runoff. Materials that are not exposed do not have the potential to enter storm water runoff, and therefore do not need to be sampled for in runoff. Preventing contact between storm water and construction materials is one of the most important BMPs at any construction site. Manage any potential pollutants on the site in such a way that the exposure of the pollutant to rainfall or storm water is minimized or eliminated.

Elimination of exposure of pollutants at construction sites is not always possible. Some materials, such as soil amendments, are designed to be used in a manner that will result in exposure to storm water. In these cases, it is important to make sure that these materials are applied according to the manufacturer's instructions at a time when they are unlikely to be washed away. Other materials can be exposed when storage, waste disposal or application are not done in a manner protective of water quality or through accidental spillage. For these situations, sampling is required unless there is capture and containment of all storm water that has been exposed to pollutants. In cases where construction materials may be exposed to storm water but the storm water is contained, and is not allowed to run off the site, then sampling only needs to occur when inspections show the containment failed or is breached and there is potential for exposure or discharge.

Many common good housekeeping BMPs already limit exposure to most materials. Improving these practices to prevent exposure is a better approach to preventing pollution of runoff and will limit the amount of sampling and analysis. Improved BMPs may be less costly than an ongoing sampling and analysis program.

The first step in managing potential pollutants at a construction site is the implementation of well thought out BMP programs that are designed to minimize the mobilization of pollutants such as sediment and to minimize the exposure of storm water to pollutants. The next important step is an aggressive program of inspections both on a regular basis and before and after storms. The inspection program must also be accompanied by an equally aggressive BMP maintenance

program. The receiving water is protected when appropriate BMPs are implemented, inspected and maintained. The role of sampling is to support the visual inspection of the site when necessary.

1.2.3 Sediment-Impaired Water Bodies

Certain lakes, streams, rivers, creeks and other bodies of water in California have been determined by the SWRCB to be impaired by one or more pollutants. (This listing is required by Clean Water Act section 303(d).) One of the pollutants that can trigger a listing is sediment, termed variously as sedimentation, siltation, sediment, or turbidity. The water bodies listed for sediment in California are included in Attachment 3 to the CGP. Additional discharges of sediment to a sediment-impaired water body-could contribute to the exceedance of a water quality standard for that pollutant. Following listing of impaired waters, RWQCBs adopt total maximum daily loads (TMDLs) that may include waste load allocations for the impairing pollutant. Effluent limitations in NPDES permits must be consistent with the assumptions and requirements of waste load allocations (40 CFR section 122.44(d)(1)(vii)(B)), and adoption of TMDLs could result in specific requirements in the CGP or an individual or watershed-wide construction permit. Pending completion of TMDLs for sediment-impaired waters, it is necessary to ensure that sediment discharges from construction sites do not cause or contribute to exceedances of water quality. To that end, the modifications require sampling and analysis of discharges from construction activity that directly enters a water body listed in Attachment 3 to the CGP as impaired for sediment. This requirement is generally only applicable to a handful of construction projects each year.

To obtain the latest list of 303(d) water bodies, visit the SWRCB's Web site at <http://www.waterboards.ca.gov/>.

1.3 Purpose of Sampling and Analysis

The primary method of determining compliance with the CGP is visual inspections. The permit requires regular inspections as well as pre-storm and post-storm inspections to determine if there are areas where storm water can be or has been exposed to pollutants. It is possible to see if there is erosion and movement of soil, or if construction materials, chemicals and waste are exposed. This is the best way to determine if the site is in compliance. In some cases, verification of this compliance through sampling and analysis is appropriate. The purpose of the sampling and analysis requirements is to support the visual observation program and to provide information that can be used to help determine whether the BMPs employed on a construction site are effective in preventing construction site pollutants from causing or contributing to exceedances of water quality objectives in the receiving waters. The modifications to the CGP contain two categories of sampling and analysis requirements, which are illustrated in Figures 1-1 and 1.2.1-4:

Monitoring for non-visible pollutants at any site where the relevant triggering conditions occur. This monitoring is required at any site where there is exposure and where a discharge can cause or contribute to exceedance of a water quality objective, not just those that discharge to water bodies that are listed for a particular pollutant; and

Monitoring for sediment in storm water discharged directly to water bodies listed as impaired for sediment/siltation, sediment, or turbidity on the SWRCB's 303(d) list of water bodies.

The sampling and analysis results are not conclusive proof of compliance or non compliance with the permit. Specifically, Receiving Water Limitations in the CGP provide that the SWPPP must be designed and implemented so that storm water discharges shall not cause or contribute to exceedance of any applicable water quality standards. These provisions also require implementation of corrective measures, and revision of the SWPPP and monitoring requirements if storm water discharges do cause or contribute to an exceedance of an applicable water quality standard. USEPA has pointed out the difficulties and limitations of using sampling in storm water permits as a measure of compliance. (57 Fed. Reg. 11394, 11402) While sampling and analysis, as required by the CGP, may be a useful tool in pointing to areas of concern, it is of limited use in the storm water context and must be used as a diagnostic tool rather than as conclusive evidence of compliance or non-compliance with the CGP.

Determine if You Must Perform Sampling and Analysis for Sediment, Silt, or Turbidity

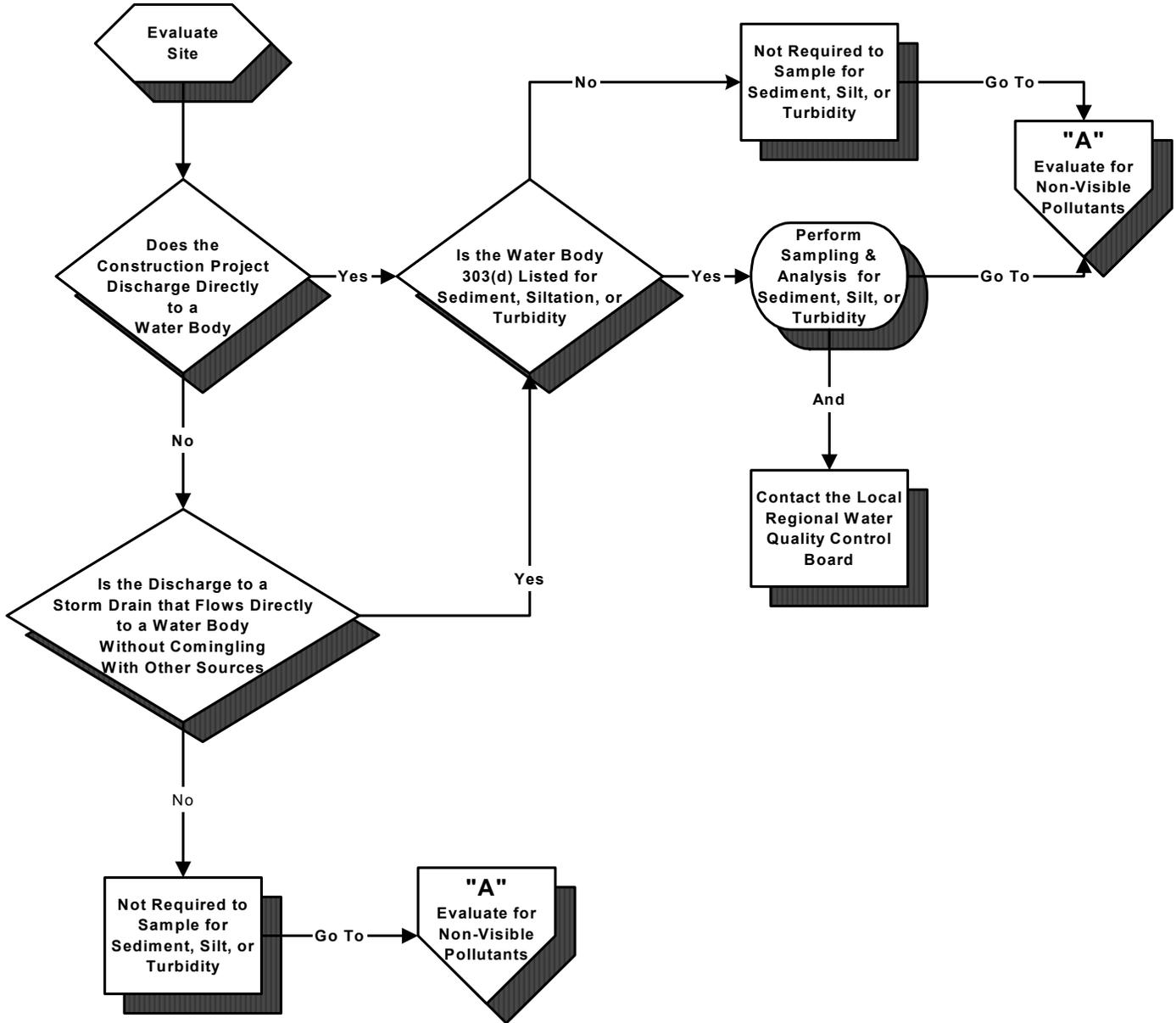


Figure 1.1

**Evaluate Site for Non-Visible Pollutants
and Determine if You Must Perform
Sampling & Analysis for Non-Visible Pollutants**

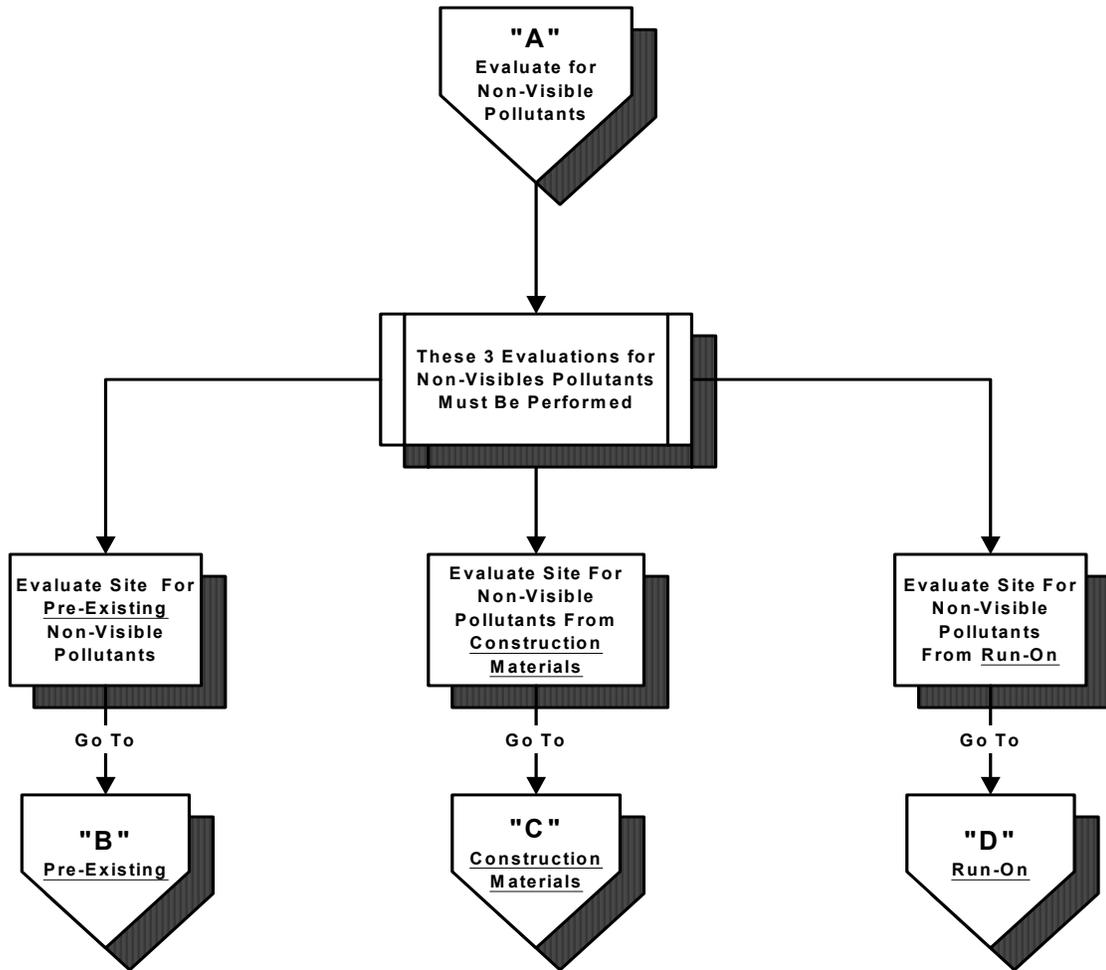


Figure 1.2

**Determine If You Must Perform Sampling and Analysis (S&A) for
Pre-Existing Non-Visible Pollutants**

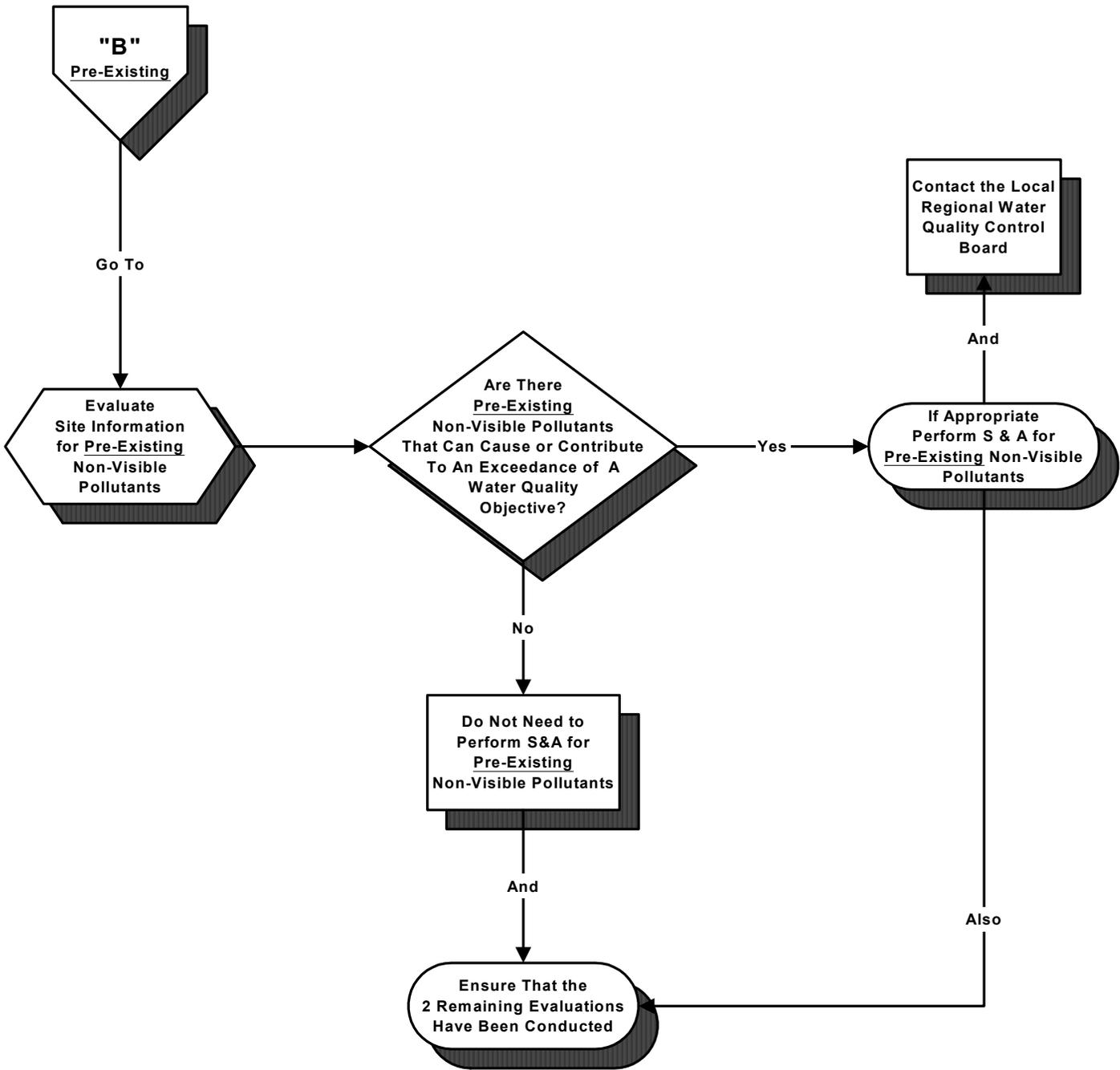


Figure 1.2.1

**Determine If You Must Perform Sampling and Analysis (S&A)
for Non-Visible Pollutants
From Construction Material**

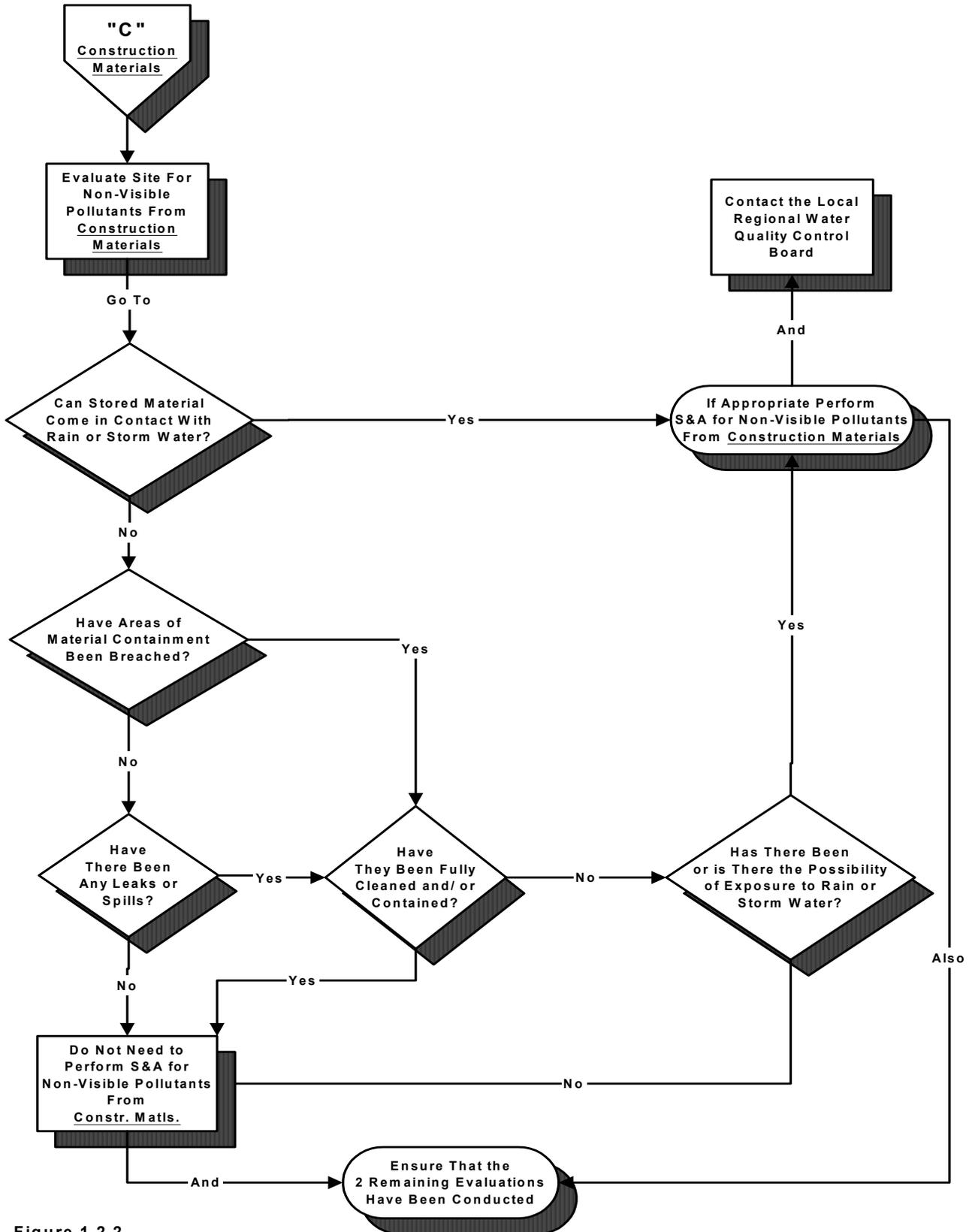


Figure 1.2.2

**Determine If You Must Perform Sampling and Analysis (S&A)
for Non-Visible Pollutants
From Run-On**

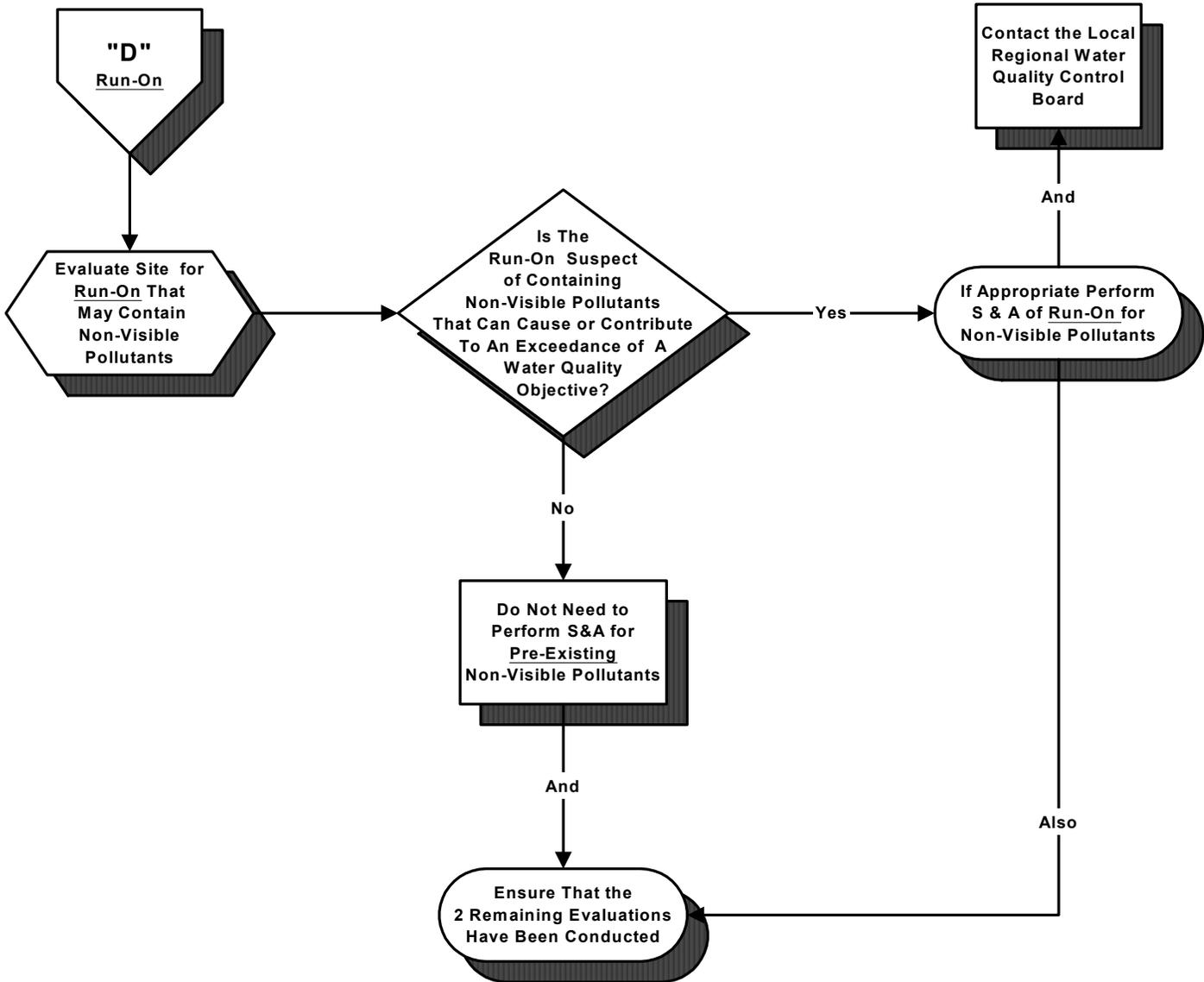


Figure 1.2.3

2.0 Sampling Program for Pollutants Not Visually Detectable in Storm Water

The CGP requires sampling and analysis for pollutants not visually detectable in runoff, but which could cause or contribute to an exceedance of water quality objectives in the receiving water. Sample for a constituent if there is reason to expect that it may be in the discharge, regardless of whether or not it is causing or contributing to an exceedance of a water quality objective. First attempt to eliminate the exposure of construction materials to prevent pollution of storm water and thus to limit the requirement for sampling and analysis. Many construction materials, including soil amendments, fertilizers, pesticides, and even things like fencing and wood products, are intended for use outdoors. For such materials, minimize pollutant discharge through implementation of appropriate BMPs. If exposure to these products can contribute pollutants to the runoff at levels that could cause or contribute to exceedance of a water quality objective, then sampling is still required, even if they are used correctly.

2.1 What the Permit Says about Sampling

The CGP requires that a sampling and analysis program be developed and conducted for pollutants which:

- Are not visually detectable in storm water discharges,
- Are known or should be known to occur on the construction site, and
- Could cause or contribute to an exceedance of water quality objectives in the receiving water.

Include all pollutants identified in this way in this sampling and analysis strategy and identify them in the SWPPP (as required by Sections A. 5. b. and A. 5. c. of the CGP). The CGP states that the SWPPP must identify a strategy for conducting the sampling and analysis, including the frequency and location(s) at which sampling will be conducted.

Sample for pollutants that would not be visible in runoff if:

- Visual inspections (required before, during and after storm events) indicate that there has been a breach, malfunction, leakage or spill from a BMP that could result in the discharge of pollutants in storm water and the pollutants would not be visually detectable; or
- Storm water comes into contact with soil amendments, other exposed materials, or other on site sources of pollution.

2.2 Deciding When to Sample

Conduct proper inspections throughout the duration of the project to make sure that appropriately selected BMPs have been implemented, are being maintained, and are effective. Sample if non-visible pollutants that are known or should be known to occur on the construction site “could cause or contribute to an exceedance of water quality objectives in the receiving water.” As discussed in this document, there are numerous receiving water standards found in different documents, including narrative water quality objectives in basin plans. For that reason,

and because of the difficulties associated with linking a discharge from a construction site to exceedance of water quality standards in the receiving waters, conduct sampling and analysis whenever the above conditions are met.

If a determination is made that sampling is needed, collect storm water runoff samples regardless of the time of year, status of the construction site, or day of the week. Collect samples during the first two hours of runoff (during daylight hours). Storm water inspections and sample collections are required even during non-working days (including weekends and holidays).

2.3 Deciding What Constituents to Sample for: What are Pollutants Which are “Known or Should be Known ” to Occur on a Construction Site?

Pollutants can be considered to be known or should be known to occur on the construction site if they are currently in use or are present as a result of previous land uses. This includes materials that:

- are being used in the construction activities
- are stored on the construction site
- were spilled during construction operations and not cleaned up
- were stored (or used) in a manner that presented the potential for a release of the materials during past land use activities
- were spilled during previous land use activities and not cleaned up
- were applied to the soil as part of past land use activities.

Construction material inventories and the project SWPPP should provide adequate information on materials currently in use or proposed for use on the construction site.

Develop a list of potential pollutants based on a review of potential sources identified in your SWPPP (required by CGP sections A.5.b. and A.5.c.), which will include construction related materials, soil amendments, soil treatments, and historic contamination. Review existing environmental and real estate documentation to determine the potential for pollutants to be present on the construction site as a result of past land use activities. Good sources of information on previously existing pollution and past land uses include Environmental Assessments, Initial Studies, Environmental Impact Reports or Environmental Impact Statements prepared under the requirements of the National Environmental Policy Act or the California Environmental Quality Act, and Phase 1 Assessments prepared for property transfers. In some instances, the results of soil chemical analyses may be available and can provide additional information on potential contamination.

Identify from this list those pollutants that would not be visible in storm water discharges. These are the constituents that you will likely have to sample for in runoff if the materials are

exposed to storm water. Consult with your analytical laboratory or water quality chemist to determine if there are field tests or indicator parameters that can be used.

2.4 Deciding Where to Sample

Sample at all discharge locations that drain the areas from which the pollutants may have entered the runoff and at locations that have not come in contact with the pollutants (reference sampling). This allows a comparison of reference samples with the sample(s) collected from storm water suspected of containing construction-related pollutants. The collection of this sample is important in the interpretation of the potentially contaminated sample because it provides information on the characteristics of the storm water without the exposure. For example, if storm water were to come in contact with hydrated lime products, the indicator parameter for pollution would be an elevated pH. The storm water could also be polluted with other materials or minerals, but the elevated pH will provide information necessary for the discharger to make further determinations as to the cause. In this case, a sample of storm water from the same storm event that did *not* come in contact with the hydrated lime would provide an understanding of what the pH of the uncontaminated storm water was in relation to the polluted storm water.

A more accurate background sample would have also contacted the soil and vegetation of the area, further isolating the lime as the source of the elevated pH. This gives the discharger the necessary information to take immediate steps to detain the polluted storm water or to

minimize or eliminate the exposure. Describe the sampling procedure, location and rationale for obtaining the reference sample of storm water in the SWPPP.

Identify sampling locations that provide information on both the runoff quality that is affected by material storage, historic contamination or other exposed potential pollutants, and the background runoff quality (i.e., reference sample). Material storage may be confined to a small area of the project while historic contamination or exposed materials, such as soil amendments, may be widespread throughout the construction site. For this reason, the sampling locations identified for these two types of potential pollutants may be different.

- Collect samples at locations identified in your SWPPP and in areas identified by visual observations/inspections where there has been a BMP failure or breach and which can be safely accessed.
- Collect samples from a location that is not affected by material storage activities or by runoff as a background or reference location.
- For a widespread potential pollutant, select sampling locations at the perimeter of your site, where storm water is unaffected by your activities and compare this to areas that are affected by your activities on the site. Describe the sampling procedure, the location, and the rationale for selecting these locations in the SWPPP.

If the “reference sample” is taken from on-site and it turns out to be carrying a high level of pollutants this should trigger an evaluation of this drainage area. Are there previously

undetected sources of pollutants? It may turn out that additional BMPs may be necessary on this portion of the site or that the discharge must be managed or contained.

If the “reference sample” is taken from off site and it turns out to be carrying a high level of pollutants take a sample on site to determine if the same pollutants are on site and must be managed.

2.5 Types of Test Methods?

The CGP requires sampling of non-visible pollutants that “could cause or contribute to an exceedance of water quality objectives in the receiving waters”. Unlike sediment, for which there are a limited number of applicable water quality objectives, the applicable water quality standards for “non-visible” pollutants will depend on the material and its chemical makeup. This guidance document contains information on what pollutants may occur on construction sites and which water quality standards may be associated with those pollutants. The best assurance of complying with the receiving water limitations is to prevent or reduce runoff of all polluting substances from construction sites through implementation of effective BMPs.

The sampling and analysis language recognizes that sampling and laboratory analysis, in and of itself, does not protect water quality. Rather, field identification and detection of the source of pollution, followed by timely action is ultimately what will protect the receiving waters. Because of the short-term nature of construction, and the use of different materials during the construction period, laboratory sampling will not generally provide the information needed in an adequate time frame. It is preferable to use field-sampling techniques that can provide immediate information and allow a timely solution.

For this reason, the sampling and analysis language for non-visible pollutants contemplates field sampling using indicator parameters. The correct indicator parameter can provide a quick and immediate indication of contamination of storm water to known materials stored or used on a construction site. Field test kits and devices have been commercially available for decades and widely used for water quality applications. As an example, test strips to evaluate for ammonia, phosphate, chlorine, copper, iron, nitrate, nitrite, and low and high range pH are readily commercially available. Manufacturers and distributors provide technical support as well as training to their customers.

2.6 Deciding How Often to Sample

Determine the frequency of sampling for non-visible pollutants based on the exposure of pollutant sources. Sample runoff when BMPs do not effectively prevent or reduce exposure of a non-visible pollutant source to storm water. Sample runoff when inspections identify a BMP failure, which exposed pollutants to storm water. If spills are thoroughly cleaned up and the contaminated material is isolated, eliminating exposure to storm water runoff, sampling is not required. For instances when the potential for previously existing pollution is identified, perform laboratory screening analysis during the first one or two storm events of the season to determine if the potential pollutant is running off the construction site. If construction activity will disturb or mobilize such potential pollutant sources, take samples to determine if the pollutants are being mobilized by the construction activity.

2.7 Identification of Pollutant Sources

Information about various construction pollutant sources can be viewed by following the instructions posted on the swrcb.ca.gov web site. In addition, various discharger groups have also produced information that may be useful for determining pollutant sources and sampling parameters for runoff from construction activity. These include a “Pollutant Testing Guidance Table” that lists construction materials, describes whether they would be visible in runoff, and lists pollutant indicators, which will be available on the swrcb.ca.gov/stormwtr/gen_const.html web site

2.8 Examples of When Sampling and Analysis for Non-Visible Pollutants Is Not Required

Sampling and analysis is not required under the following conditions. However, a contingency sampling strategy should be prepared in the event of an accidental discharge.

- Where construction takes place entirely during a period of time when there are no rainfall events. Timing construction to occur outside of the rainy season is the most effective BMP.
- Where a construction project is “self-contained”, meaning that the project generates no runoff or any potential discharges containing pollutants, including no potential for tracking sediment off-site from vehicle tires, and no potential for discharging products of wind erosion.
- Where construction materials and compounds are kept or used so that they are not in contact with storm water (e.g., in water-tight containers, under a water-tight roof, inside a building, etc.).
- Where for specific pollutants, the BMPs implemented at the construction site fully contain the exposed pollutants (e.g., bermed concrete washout area).
- For building, landscaping and BMP materials that are in their final constructed or in-place form or are designed for exposure (e.g., fence materials, support structures and equipment that will remain exposed at the completion of the project, etc.).
- Where pollutants may have been spilled or released on site, but have been properly cleaned-up and storm water exposure has been eliminated prior to a storm event.
- For stockpiles of construction materials for which both cover and/or containment BMPs have been properly implemented to protect them from run-on and from contributing pollutants to storm water .

2.9 Examples of When Sampling and Analysis Is Required

Sampling and analysis is required when non-visible pollutants have the potential to contact storm water and run off the construction site into a storm drainage system or water body at levels that may cause or contribute to exceedance of water quality standards. Some examples of this situation are:

- Where construction materials and compounds are stored or applied such that they may come in contact with storm water runoff.
- For construction projects that utilize soil amendments or soil treatments that can come in contact with storm water runoff. (If you have independent test data available that demonstrates that the soil amendments cannot result in concentration levels in storm water discharges that will cause or contribute to exceedance of applicable water quality standards, sampling and analysis may not be required. Contact the appropriate RWQCB to determine acceptable concentration(s) of the material(s) in question.)
- When a leak or spill occurs that is not fully contained and cleaned prior to a storm event.
- When a leak or spill occurs, during a storm event, and it cannot immediately be isolated and/or cleaned-up, and the possibility of an off-site discharge exists.
- When, during regular inspections, it is discovered that cover and containment BMPs have been compromised and storm water comes in contact with materials resulting in runoff discharging into a storm drain system or water body.
- When material storage BMPs have been compromised, breached, or have failed.

2.10 Do I Sample Storm Water Flows Diverted Around My Project for Non-Visible Pollutants?

Dischargers may be faced with a situation where the disturbed area of their construction site is adjacent to a large area that historically has drained across their site. This happens most frequently in foothill situations where schools or commercial development is undertaken alongside an existing roadway, adjacent to a large undisturbed area. In such a situation, calculate the anticipated volume of the flow in order to size a diversion structure to divert the (usually) clean storm water around or through the site. (CGP section A.5.b.1.) It is unwise to allow a large volume of water to wash across a disturbed area. Not only would the run-on cause erosion and remove the soil from the project, but also the discharge would be turbid and violate the Permit requirements. To the extent that the discharger does allow run-on of polluted water to flow across the site, and contaminants in the run-on are not visible, the sampling and analysis requirements apply. Additionally, the CGP (section A. 5. b.) requires that the RWQCB be contacted in the above situation.

The requirement to divert run-on does not authorize the creation of a new point source of pollutants, however. If the run-on contains pollutants from pre-existing pollution in the watershed, the discharger is responsible to determine this before planning the diversion. Should a discharger divert contaminated water around the site and allow it to enter surface waters, this permit does not authorize such discharge and the discharger should be aware that a separate NPDES permit may be required. (See, *Committee to Save Mokelumne River v. East Bay Municipal Utility District* (9th Cir. 1993) 13 F.3d 305, 309.) If you are planning on diverting flows from entering your site and you suspect that they contain pollutants, contact your local RWQCB for advice.

2.11 Deciding How to Sample

- Only personnel trained in water quality sampling procedures should collect storm water samples.
- Determine sampling methods and locations in advance of the runoff event in order to provide sufficient time to gather the supplies and equipment necessary to sample and plan for safe access by the sampling personnel.
- General guidance for sampling procedures is provided in Section 4 of this document.

2.12 How to Use Your Sampling Data

2.12.1 How to Analyze Your Data

Initiate corrective action where non-visible pollutant sample test results indicate presence of pollutants in the construction site storm water runoff. This can be determined by comparing your construction site's storm water test results with the background sample. BMPs must be used to control offsite discharge of any pollutant (e.g., pesticides) that is not naturally occurring, regardless of background levels of that pollutant.

Where your site's storm water test concentrations for naturally occurring substances are considerably above (or, in the case of pH, considerably above or below) the background concentrations, or where other pollutants are found, evaluate the BMPs to determine the cause. Initiate corrective action by repairing, replacing or supplementing the BMPs on your site. Conduct additional sampling during the next runoff event after corrective actions are implemented to demonstrate and document that the problems have been corrected.

This permit does not contain benchmarks. However, method of data analysis for naturally occurring substances employs a similar concept: determining whether the results are "considerably above" the background levels. The term "considerably above" is based upon guidance contained in USEPA's Multi-Sector General Permit, which does use benchmarks. These benchmarks are not numeric storm water effluent limits, are not related or necessarily protective of any specific receiving water, and exceedances of these benchmarks are not automatically considered permit violations. When sample results exceed one or more of the benchmarks, the USEPA recommends dischargers reevaluate the effectiveness of their BMPs and develop, when appropriate, additional BMPs. The use of such benchmark values is a scientifically valid indicator of the presence of pollutants associated with construction activity in the runoff. Since the non-visual pollutants that may occur on construction sites may be similar in type and cause to those on industrial sites, it is valid to use USEPA's approach here. Where a parameter in a sample is being evaluated, and a benchmark is available, the benchmark may be used for comparison purposes. (USEPA does not require any sampling and analysis in its construction permits, and therefore does not have benchmarks for construction activities.)

2.12.2 Coordinating Visual Observations with Sampling Results

If visual inspection of storm water BMPs used to contain or otherwise manage (i.e., filter or treat) non-visible pollutants at a construction site indicates that a BMP has failed or been compromised, then field monitoring of any impacted storm water from the site for non-visible pollutants is required. Of course, immediately repair or replace any BMP that has been visually inspected and found breached or compromised. If feasible, contain the polluted discharge and prevent it from being discharged off site. After taking steps to correct the failed BMP, conduct field monitoring in the vicinity of the BMP to verify that pollutants are no longer in the storm water.

The intent of conducting field monitoring for non-visible pollutants is to obtain an immediate indication if storm water that is discharging from a site has been polluted. An immediate indication of a polluted discharge requires an immediate response in the form of backtracking from the point of discharge to find the source and take appropriate measures to prevent a recurrence of a polluted discharge.

2.12.3 What To Do If The Data Show a Potential Problem

If your data shows a problem, follow the reporting requirements as shown in the CGP Receiving Water Limitations. In addition, take the following steps as soon as possible:

- Identify the source
- Repair or replace any BMP that has failed
- Maintain any BMP that is not functioning properly due to lack of maintenance
- Evaluate whether additional or alternative BMPs should be implemented

If sampling and analysis during subsequent storm events shows that there is still a problem, then repeat the steps above until the analytical results of “upstream” and “downstream” samples are relatively comparable.

Where your site’s storm water results show test concentrations considerably above (or below) background concentrations, evaluate the BMPs to determine what is causing the difference. Possible solutions may include repairing the existing BMPs, evaluating alternative BMPs that could be implemented, and/or implementing additional BMPs (cover and/or containment) which further limit or eliminate contact between storm water and non-visible pollutant sources at your site. Where contact cannot be reduced or eliminated, retain storm water that has come in contact with the non-visible pollutant source on-site and do not allow it to discharge to the storm drainage system or to a water body. Contact your RWQCB to determine whether it is permissible to discharge the retained storm water. Conduct additional sampling during the next runoff event after corrective actions are implemented to demonstrate and document that the problems have been corrected.

2.13 Retention of Data

Keep results of field measurements and laboratory analyses with the SWPPP, which is required to be kept on the project site until the Notice of Termination (NOT) is filed and approved by the

appropriate RWQCB. Keep field training logs, Chain-Of-Custody (COC) forms and other documentation relating to sampling and analysis with the project's SWPPP. Records of all inspections, compliance certifications, and noncompliance reporting must be retained for a period of at least three years from the date generated or after project completion.

3.0 Sampling Program for Sedimentation/Siltation

3.1 What the Permit Says About Sampling

Soils, sediments, and fine (suspended) particles that result from grading and earthwork activities and soil erosion from disturbed, un-stabilized land areas are potentially significant sources of storm water pollution at construction sites. The CGP requires construction sites to develop, implement and maintain an effective combination of erosion control and sediment control BMPs to prevent soils, sediments, debris and solids fine enough to remain suspended from leaving the construction site and moving into receiving waters at levels above preconstruction levels.

The CGP requires that a visual survey of the site be done before, during and after a storm. If the visual survey indicates either the potential for a discharge of sediment laden water or that sediment is being discharged, steps must be taken to repair or augment the BMPs to prevent the discharge as soon as possible. Discharge of sediment above predevelopment levels is not allowed.

The CGP requires sampling and analysis for sediment/silt or turbidity when the construction site runoff discharges directly into a water body that is impaired by sedimentation/siltation, sediment, or turbidity (that is, the water body is on the 303(d) list for one or more of these pollutants.) A key point is that the discharge of storm water runoff must directly enter the impaired water body or impaired segment of a water body. Construction site runoff that flows through a tributary or storm drainage system and is commingled with other sources of flow, is not considered a direct discharge even if the flow eventually enters an impaired water body. (See the definition of direct discharge in Section 5 for further details.)

The CGP requires that the SWPPP identify a strategy for conducting the sampling and analysis, including the frequency at which sampling will be conducted. The SWPPP must also describe:

- the location(s) of direct discharges from construction activities to a water body listed on the SWRCB's 303(d) list for sedimentation/siltation, sediment and/or turbidity;
- the designated sampling location(s) in the listed water body representing the prevailing conditions up-stream of the discharge; and
- the designated sampling location(s) in the listed water body representing the prevailing conditions down-stream of the discharge.
- the sampling design which describes the sampling devices used; the sample size; the number of samples to be taken at each location, the laboratory protocol employed; and, if applicable, the statistical test used to determine if the upstream/downstream samples differ to a statistically significant degree.

3.2 Deciding When to Sample

- Dischargers must perform sampling if the storm water runoff directly discharges from the construction site to a 303(d) listed water body.
- Dischargers must collect samples during the first two hours of discharge (runoff) from storm events which result in a direct discharge to any 303(d) listed water body. But samples need only be collected during daylight hours (sunrise to sunset).
- Dischargers must collect samples regardless of the time of year, status of the construction site, or day of the week. Samples should be taken during the first two hours of a storm event. Storm water inspections and sample collections are required even during non-working days (including weekends and holidays). Samples must be taken from the same storm event for comparison, concentrations are not comparable across storm events.
- Dischargers do not need to perform upstream/downstream sample collection for more than four (4) rain events per month.

3.3. Deciding What Constituent(s) Require Sampling

- If the water body is listed as impaired for sedimentation or siltation, analyze samples for Setteable Solids (mL/L) and Total Suspended Solids (mg/L) according to USEPA 160.2 and USEPA 160.5, respectively. Samples may be analyzed for suspended sediment concentration (SSC) according to ASTM D3977-97 instead of or in addition to Total Suspended Solids and Setteable Solids.
- If the water body is listed as impaired for turbidity, analyze samples for turbidity per USEPA 180.1 or analyze in the field using a correctly calibrated turbidity meter.
- It is very important that consistent sampling and analysis methods are used for all sampling locations.

Table 3-1 shows general sample handling and laboratory requirements for sediment sampling.

Table 3-1

LABORATORY REQUIREMENTS¹ FOR STORM WATER MONITORING OF SEDIMENT, SILTATION AND/OR TURBIDITY

Parameters	Analytical Method	Target Method Detection Limit	Minimum Sample Volume ²	Container	Preservative	Holding Time
Total Suspended Solids (TSS) ²	EPA 160.2	1 mg/L	100 mL	500 mL polypropylene	Store in ice or refrigerator at 4°C (39.2°F)	7 days
Settleable Solids (SS)	EPA 160.5	0.1 mL/L/hour	1 liter	1 liter mL polypropylene	Store in ice or refrigerator at 4°C (39.2°F)	48 hours
Suspended Sediment Concentration (SSC) ³	ASTM D 3977-97	Contact Laboratory	200 mL	Contact Laboratory	Store in ice or refrigerator at 4°C (39.2°F)	7 days
Turbidity	EPA 180.1	1 NTU	100 mL	500 mL polypropylene or glass	Store in ice or refrigerator at 4°C (39.2°F), Dark	48 hours

¹ The data in this table is a summary of recommended laboratory requirements. For specific USEPA regulatory requirements, consult the sampling and analysis requirements found in 40 CFR 136.

² Minimum sample volume recommended. Specific volume requirements will vary by laboratory; please check with your laboratory when setting up bottle orders.

³ Use either TSS or SSC, or both, for suspended solids analysis. Upstream and downstream samples should be analyzed by the same method.

3.4 Deciding Where to Sample

In-stream sampling is required, both upstream and downstream of the discharge. The CGP does not require that the effluent be sampled. However, effluent sampling is recommended. Take both upstream and downstream samples within the actual flow of the waterbody. Collect samples at the following locations:

- Sample the 303(d) listed water body upstream of the construction site discharge in a location representative of the sediment load present in the water body before it is impacted by discharge from the construction site.
- Sample the 303(d) listed water body at a point immediately downstream of the last point of discharge from the construction site.

Additionally, for the purpose of interpreting the results of the samples collected from the 303(d) listed water body, collect and analyze samples of the actual discharge from the construction site (effluent sample) prior to it being commingled in the receiving water. This sample can be used to verify whether the source of the sediment in-stream is emanating from the construction discharge. Remember that samples should only be collected from safely accessible locations.

In general, sample away from the bank in or near the main current. Avoid collecting samples directly from ponded, sluggish, or stagnant water. Be careful when collecting water upstream or downstream of confluences or point sources to minimize problems caused by backwater effects or poorly mixed flows. Note that samples collected directly downstream from a bridge can be contaminated from the bridge structure or runoff from the road surface.

Choose the upstream location in water that appears to represent the nature of the flow in the stream.

Downstream samples should represent the receiving water mixed with flow from the construction site. For instance if the flow from the site can be observed by either a color or a flow difference, collect the downstream sample from within the affected water.

3.5 What Are the Applicable Water Quality Standards

The CGP requires sampling of runoff from construction sites that discharge directly to 303(d) listed water bodies to demonstrate that discharges do not contribute to the impairment of the receiving water. Each of the listed waters is subject to water quality objectives in a RWQCB Basin Plan for sediments and solids or for turbidity. The applicable water quality objectives for each RWQCB are listed in Appendix A to this guidance document.

3.6 Deciding How to Sample

- Only personnel trained in water quality sampling procedures should collect storm water samples.

- Determine sampling methods and locations in advance of the runoff event in order to provide sufficient time to gather the supplies and equipment necessary to sample and plan for safe access by the sampling crew(s) and document them in the SWPPP.
- General guidance for sampling procedures is provided in Section 4 of this document.

3.7 How to Use Your Data

3.7.1 How to Analyze Your Data

While it is desirable for sediment concentrations from a site to be as low as possible, the amount that a site can contribute is determined by a TMDL analysis and in the absence of an implemented TMDL, the instream concentrations below the point of discharge cannot be significantly different from the upstream concentrations.

In order to allow for meaningful analysis of the data, it is necessary to establish a statistical framework for it. When sampling a body of water, it is unlikely that two samples, even taken next to each other, will have the same concentration of a pollutant. This is referred to as variability. Concentrations will vary from sample to sample, but the difference between them may not be meaningful. In order to obtain a statistically meaningful set of samples, it is necessary to determine how many samples will be necessary, the greater the variability between samples, the larger the number of samples (N) will be required. This may require that the water body be sampled before the start of construction to determine the variability. Collect sufficient numbers of samples (N) during each storm event monitored to represent the prevailing conditions of both locations (upstream and downstream). Depending upon which statistical test is used, and the variability between the samples, N will usually be more than a single sample. When comparing samples from a single storm event, a range of readings will be obtained. Almost all samples from that source will fall into that range. The likely range of readings can be expressed through the use of a statistical confidence interval for the parameter being sampled. Confidence intervals are expressed as probabilities, such as 95% confidence or 97% confidence. The size of a confidence interval will be determined by the variability in the samples from the single source and the number of samples collected.

Once the sampling is completed and results returned from the laboratory, compare the concentration of the appropriate parameter (see Section 2.3 Deciding What Constituents to Sample for)) derived from the upstream samples to the concentration of the same parameter from the downstream samples (from the same storm event). It is expected that every sample will be different. (This would be true even if there were not construction activities, in light of the variability of stream conditions, explained above.) Rather, compare the samples to see if there is a statistically significant difference between the central tendency (arithmetic mean, geometric mean, median, etc.) of the upstream samples and the downstream samples.

Estimate the magnitude of the difference in the central tendency between the upstream and downstream concentration values. The null hypothesis to be tested is: The difference between the downstream central tendency and the upstream central tendency is less than or equal to zero. The minimum acceptable confidence interval shall be 90%. Using the data, calculate a one-sided lower confidence limit (LCL) on the difference in central tendencies. If the numeric value of zero

is contained within the confidence interval (LCL), then you cannot reject the null hypothesis, and you would conclude that no impairment has occurred. If, however, the data indicates that the downstream central tendencies are significantly higher than the upstream, you cannot accept the null hypothesis. In this case there is the presumption that the discharges are contributing to the existing impairment.

If you did take samples of the effluent, and those samples are not consistent with the conclusion that the discharge is contributing to the existing impairment, take steps to determine what other source(s) is causing the increase in the downstream sampling. If you can show that there is a different source than your discharge, you should contact the appropriate RWQCB.

The hypothesis, sampling methodology, confidence interval, and statistical tests and assumptions must be defensible to the RWQCB. Since construction sites that discharge *directly* into impaired water bodies are not common in California, the local RWQCB will likely ask to review the SWPPP and the sampling and analysis strategy prior to construction activity.

3.7.2 Sources of sediment, silt and turbidity in a construction discharge

Conditions or areas on a site that may be causing sediment, silt, and/or turbidity in your storm water runoff may include:

- Exposed soil areas with inadequate erosion control measures
- Active grading areas
- Poorly stabilized slopes
- Lack of perimeter sediment controls
- Areas of concentrated flow on unprotected soils
- Poorly maintained erosion and sediment control measures
- Unprotected soil stockpiles
- Failure of an erosion or sediment control measure
- Unprotected Clayey soils

3.7.3 What To Do If Your Data Shows a Statistically Significant Increase Downstream of the Discharge

The CGP requires that BMPs be implemented on the construction site to prevent a net increase of sediment load in storm water discharges relative to pre-construction levels. Although the upstream reference (background) sample may not be representative of pre-construction levels at your site, it will provide a basis for comparison with the sample taken downstream of the construction site.

If the statistical tests of the upstream and downstream samples indicate an increase in silt, sediment and/or turbidity, follow the reporting requirements as shown in the Receiving Water Limitations of the CGP. If you have collected samples of the discharge from your site, use these results to help identify if it is your project that is discharging sediment into the receiving water. It is recommended that the following steps be taken as soon as possible.

- Identify the source of the silt, sediment or turbidity
- Review effectiveness of existing erosion control BMPs. The sediment may be coming from locations at the construction site where existing erosion control BMPs have been reduced in effectiveness. These BMPs should be evaluated to determine whether they are in need of maintenance.
- Review effectiveness of existing sediment control BMPs. The sediment may be coming from locations at the construction site where existing sediment control BMPs have been reduced in effectiveness. These BMPs should be evaluated to determine whether they are in need of maintenance.
- Look for evidence that there are too few sediment and erosion control BMPs. In inspecting the site, sources of sediment that either do not have BMPs or for which the BMPs appear to be insufficient in number or type may be identified.
- Repair or replace any BMP that has failed or is in need of maintenance
- Evaluate whether additional or alternative BMPs should be implemented to provide an effective combination of erosion and sediment control measures on the site. Do not rely solely on perimeter sediment controls, particularly where there are fine-grained soils (such as silts or clays) on the site. Implement erosion controls (source controls) that keep the soil in place, even on temporary slopes and rough graded areas, wherever possible and as necessary to prevent sediment from leaving the site.

If sampling and analysis during subsequent storm events shows that there is still a statistically significant difference, then repeat the steps above until the analytical results of the upstream concentration samples are within the confidence interval.

3.8 Retention of Data

Keep results of field measurements and laboratory analyses with the SWPPP, which is required to be kept on the project site until the NOT is filed and approved by the appropriate RWQCB. Keep training logs, Chain-Of-Custody (COC) forms and other documentation relating to sampling and analysis with the project's SWPPP. All records of all inspections, compliance certifications, and noncompliance reporting must be retained for a period of at least three years from the date generated or after project completion.

4.0 Sampling Procedures

The collection and handling of storm water runoff samples requires care to ensure the integrity and validity of the samples. A Chain of Custody (COC) form, must follow the sample from the

collection through the analysis process. Additional documentation to track other information of interest, e.g. field conditions, or required field measurements may also be used. This type of information is recorded on a field tracking form.

Collect all samples with care to ensure that the sample is representative of the runoff being tested, use the correct type of container, preserve samples in accordance with the test method's specifications, and store at the appropriate temperature until delivered to an analytical laboratory. Some types of samples have very short holding times and must be analyzed before this holding time is exceeded. Sample handling requirements and documentation form the basis of your sampling quality assurance program.

Before starting any sampling program, contact the analytical laboratory that you plan to use to analyze your samples. Make sure to select a laboratory that will provide you with the support that you need, such as, properly cleaned and preserved sampling containers and COC forms. Some laboratories can assist in identifying courier services available to transport samples to the laboratory, or may be able to provide sampling service for you. Work out all of these details in advance of sample collection. Consult the analytical laboratory on what additional samples will be required for quality assurance and quality control purposes.

Both field and/or analytical analysis methods can be used to meet the Permit requirements. Field techniques have the advantage of providing immediate results, however, there are only a limited number of analyses that can be done in the field. Analytical laboratories can analyze for a wide range of parameters, but the data may take several weeks or longer to get back.

Some constituents (e.g. pH) can be evaluated in the field with special equipment. Field samples must be collected and analyzed according to the specifications of the manufacturer of the sampling devices employed. Field equipment must be used by trained staff and the equipment must be calibrated and maintained according to the manufacturer's specifications.

Laboratory analyses should be conducted by a laboratory that is currently accredited by the California Department of Health Services Environmental Laboratory Accreditation Program (ELAP). Analyses must be conducted in accordance with 40 CFR Part 136.

You may refer to the California Department of Transportation (Caltrans) *Guidance Manual: Stormwater Monitoring Protocols (Second Edition), July 2000* to assist you in developing a sampling and analysis program. This document may be downloaded from the Caltrans Website, at

<http://www.dot.ca.gov/hq/construc/stormwater/SamplingGuidanceManual.pdf>

Figure 4-1 is an outline for a typical comprehensive storm water sampling and analysis plan. As some laboratories may have specific requirements for sample collection and handling, specific information or requirements on your samples should be checked with your laboratory.

- 1 PROJECT OVERVIEW/DESCRIPTION
 - 1.1 Description of why the project is being conducted
 - 1.2 Description of who is conducting the project
 - 1.3 General scope of monitoring activities
 - 1.4 Project organization/roles and responsibilities
 - 2 MONITORING SITES
 - 2.1 Site location (map)
 - 2.2 Written driving directions
 - 2.3 Site access instructions (gates, locks, keys, combinations)
 - 2.4 Notification procedures
 - 3 ANALYTICAL CONSTITUENTS
 - 3.1 List of constituents for sampling and analysis (including sample collection methods, container type, volume required, preservation and laboratory performing analysis)
 - 4 DATA QUALITY OBJECTIVES (DQOs)
 - 4.1 Analytical reporting limits
 - 4.2 Analytical precision, accuracy and completeness
 - 5 FIELD EQUIPMENT MAINTENANCE
 - 5.1 Equipment calibration
 - 5.2 Equipment maintenance
 - 5.3 Equipment cleaning (bottles/lids/tubing)
 - 6 MONITORING PREPARATION AND LOGISTICS
 - 6.1 Weather tracking
 - 6.2 Storm selection criteria
 - 6.3 Storm action levels
 - 6.4 Communications/notification procedures
 - 6.5 Sample bottle order
 - 6.6 Sample bottle labeling
 - 6.7 Field equipment preparation
 - 7 SAMPLE COLLECTION, PRESERVATION AND DELIVERY
 - 7.1 Sample collection methods
 - 7.2 Field measurement methods
 - 7.3 Field equipment list
 - 7.4 Sample containers, preservation and handling
 - 7.5 QA/QC sample collection methods
 - 7.6 Sample labeling (site names, codes, etc.)
 - 7.7 Composite sample splitting
 - 7.8 Forms and procedures for documenting sample collection and field measurements
 - 7.9 Laboratory communication procedures
 - 7.10 Sample shipping/delivery, chain-of-custody
 - 8 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)
 - 8.1 Field procedures for QA/QC sample collection
 - 9 LABORATORY SAMPLE PREPARATION AND ANALYTICAL METHODS
 - 9.1 Laboratory sample preparation procedures
 - 9.2 Analytical constituent table (including analytical methods, holding times and reporting limits)
 - 10 DATA MANAGEMENT AND REPORTING PROCEDURES
 - 10.1 Analytical data validation
 - 10.2 Electronic data transfer
 - 10.3 Filing of electronic and hard copy data
 - 10.4 Reports
- APPENDICES
- A Clean Sampling Techniques
 - B Health and Safety Plan

Figure 4-1 Outline for a Typical Storm Water Sampling and Analysis Plan

5.0 Definitions

Chain of Custody (COC) Form

The COC Form is a form used to track sample handling as samples progress from sample collection to the analytical laboratory. The COC is then used to track the resulting analytical data from the laboratory to the client. COC forms can be obtained from an analytical laboratory upon request.

Direct Discharge

Direct discharge means storm water runoff that flows from a construction site directly into a 303(d) water body listed for sedimentation, siltation, or turbidity. Storm water runoff from the construction site is considered a direct discharge to a 303(d) listed water body unless it first flows through:

- 1) A municipal separate storm sewer system (MS4) that has been formally accepted by and is under control and operation of a municipal entity;
- 2) A separate storm water conveyance system where there is co-mingling of site storm water with off-site sources; or
- 3) A tributary or segment of a water body that is not listed on the 303d list before reaching the 303d listed water body or segment.

Discharger

The discharger is the person or entity subject to the CGP.

Electrical Conductivity (EC)

EC is a measure of the ability of water to carry an electric current. This ability depends on the presence of ions, their concentration, valence, mobility and temperature. EC measurements can give an estimate of the variations in the dissolved mineral content of storm water in relation to receiving waters.

Field Measurements

Field measurements refers to water quality testing performed in the field with portable field-testing kits or meters.

Field Tracking Form (FTF)

The FTF is a form that serves as a guide to sampling crews to obtain sampling information and to prescribe and document sample collection information in the field. The FTF usually contains sample identifiers, sampling locations, requested analyses, Quality Control (QC) sample identifiers, special instructions, and field notes.

Holding Time

Holding time is specified by the analytical method and is the elapsed time between the time the sample is collected and the time the analysis must be initiated.

pH

The pH is universally used to express the intensity of the acid or alkaline condition of a water sample. The pH of natural waters tends to range between 6 and 9, with neutral being 7. Extremes of pH can have deleterious effects on aquatic systems.

Reference Sample

A sample taken from an undisturbed part of the construction site or from an undisturbed site immediately upstream from a construction site. The reference sample is used for comparison with samples taken from the active construction site. It is the same set of samples that is referred to as an uncontaminated sample in the Permit.

Sampling and Analysis Plan

A document that describes how the samples will be collected and under what conditions, where and when the samples will be collected, what the sample will be tested for, what test methods and detection limits will be used, and what methods/procedures will be maintained to ensure the integrity of the sample during collection, storage, shipping and testing (i.e., quality assurance/quality control protocols).

Sediment

Sediment is solid particulate matter, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity, or ice and has come to rest on the earth's surface either above or below sea level.

Sedimentation/Siltation

Sedimentation/siltation is the process of sediment/silt deposition.

Settleable Solids

The settleable solids (SS) test measures the solid material that can be settled within a water column during a specified time frame. This typically is tested by placing a water sample into an Imhoff settling cone and allowing the solids to settle by gravity. Results are reported either as a volume (mL/L) or a weight (mg/L).

Silt

Silt are soil particles between 0.05mm and 0.002mm in size. (For the purposes of its use here, it also includes clay, which is categorized by a particle size less than 0.002mm.)

Soil Amendment

Any material that is added to the soil to change its chemical properties, engineering properties, or erosion resistance that could become mobilized by storm water. Certain soil amendments may not be visible in site runoff. Soil amendments likely to fall in this category include lime, cementitious binders, chlorides, emulsions, polymers, soil stabilizers, and tackifiers applied as a stand-alone treatment (i.e., without mulch). Even some of these products may bind with the soil, and thus be visible. In contrast, plant fibers (such as straw or hay), wood and recycled paper fibers (such as mulches and matrices), bark or wood chips, green waste or composted organic materials, and biodegradable or synthetic blanket fibers are soil amendments that are likely to be visible in storm water runoff.

Suspended Sediment Concentration (SSC)

The suspended sediment concentration (SSC) test measures the concentration of suspended solid material in a water sample by measuring the dry weight of all of the solid material from a known volume of a collected water sample. Results are reported in mg/L.

Total Suspended Solids (TSS)

Suspended solids in a water sample include inorganic substances, such as soil particles and organic substances, such as algae, aquatic plant/ animal waste, particles related to industrial/sewage waste, etc. The total suspended solids test (TSS) test measures the concentration of suspended solids in water by measuring the dry weight of a solid material contained in a known volume of a sub-sample of a collected water sample. Results are reported in mg/L.

Turbidity

Cloudiness of water quantified by the degree to which light traveling through a water column is scattered by the suspended organic and inorganic particles it contains. The scattering of light increases with a greater suspended load. Turbidity is commonly measured in Nephelometric Turbidity Units (NTU).

6.0 Sources of Further Assistance

Regional Water Quality Control Boards

Regional Water Quality Control Board	Address	Contact Name E-mail	Telephone/Fax
NORTH COAST REGION	5550 Skylane Blvd., Suite A Santa Rosa, CA 95403	John Short shorj@rb1.swrcb.ca.gov	(707) 576-2065 FAX: (707) 523-0135
SAN FRANCISCO BAY REGION	1515 Clay St., Suite 1400 Oakland, CA 94612	Mark Johnson stu36@rb2.swrcb.ca.gov	(510) 622-2493 FAX: (510) 622-2460
CENTRAL COAST REGION	895 Aerovista Place., Suite 101 San Luis Obispo, CA 93401	Jennifer Bitting jbitting@rb3.swrcb.ca.gov	(805) 549-3334 FAX: (805) 543-0397
LOS ANGELES REGION	320 W. 4th St., Suite 200 Los Angeles, CA 90013	Ejigu Soloman (Ventura County) esoloman@rb4.swrcb.ca.gov	213) 576-6727 FAX: (213) 576-6686
CENTRAL VALLEY REGION Sacramento Office	11020 Sun Center Drive, #200 Rancho Cordova, CA 95670	Sue McConnell mconns@rb5s.swrcb.ca.gov George Day DayG@rb5s.swrcb.ca.gov Dannas Berchtold BerchtD@rb5s.swrcb.ca.gov Rich Muhl MuhlR@rb5s.swrcb.ca.gov	(916) 464-4798 FAX: (916) 464-4681 (916) 464-6404 FAX: (916) 464-4681 (916) 464-4683 FAX: (916) 464-4681 (916) 464-4749 FAX: (916) 464-4681
CENTRAL VALLEY REGION Fresno Branch Office	E. Street Fresno, CA 93706	Brian Erlandsen ErlandsenB@rb5f.swrcb.ca.gov	(559) 445-6046 FAX: (559) 445-5910
CENTRAL VALLEY REGION Redding Branch Office	415 Knollcrest Dr. Redding, CA 96002	Carole Crowe crowec@rb5r.swrcb.ca.gov	(530) 224-4849 FAX: (530) 224-4857
LAHONTAN REGION South Lake Tahoe Office	2501 Lake Tahoe Blvd. South Lake Tahoe, CA 96150	Jason Churchill jchurchill@rb6s.swrcb.ca.gov	(530) 542-5571 FAX: (530) 544-2271
LAHONTAN REGION Victorville Office	15428 Civic Dr., Suite 100 Victorville, CA 92392	Doug Feay Dfeay@rb6v.swrcb.ca.gov Ted Saari Tsaari@rb6v.swrcb.ca.gov	(760) 241-7353 FAX: (760) 241-7308 (760) 241-7407

Regional Water Quality Control Board	Address	Contact Name E-mail	Telephone/Fax
COLORADO RIVER BASIN REGION	73-720 Fred Waring Dr., Suite 100 Palm Desert, CA 92260	Abdi Haile haila@rb7.swrcb.ca.gov	(760) 776-8939 FAX: (760) 341-6820
		Rosalyn Fleming flemr@rb7.swrcb.ca.gov	(760) 776-8939 FAX: (760) 341-6820
SANTA ANA REGION	3737 Main St., Suite 500 Riverside, CA 92501-3339	Michael Roth (Riverside County) mroth@rb8.swrcb.ca.gov	(909) 320-2027 FAX: (909) 781-6288
		Aaron Buck (Orange County) abuck@rb8.swrcb.ca.gov	(909) 782-4469 FAX: (909) 781-6288
		Muhammad Bashir (San Bernardino County) mbashir@rb8.swrcb.ca.gov	(909) 320-6396 FAX: (909) 781-6288
SAN DIEGO REGION	9174 SkyPark Court, Suite 100 San Diego, CA 92123	Benjamin Tobler Toblb@rb9.swrcb.ca.gov	(858) 467-3272
		Eric Becker Becke@rb9.swrcb.ca.gov	(858) 492-1785
		Ben Neill Neilb@rb9.swrcb.ca.gov	(858) 467-2983 FAX: (858) 571-6972

State Water Resources Control Board
Division of Water Quality
Storm Water Permit Section
P.O. Box 1977
Sacramento, CA 95812-1977
Construction Inquiry Line: (916) 341-5537
Web Site: <http://www.waterboards.ca.gov/>
e-mail: stormwater@waterboards.ca.gov

How to Obtain a List of State Certified Laboratories

http://www.dhs.ca.gov/ps/ls/elap/html/lablist_county.htm

Other Useful Web Sites

California Stormwater Quality Association <http://www.casqa.org/>

California Department of Transportation

Environmental Program <http://www.dot.ca.gov/hq/env/index.htm>

Storm Water Management Program <http://www.dot.ca.gov/hq/env/stormwater/>

7.0 Explanation of Sampling and Analysis Requirements

The sampling and analysis provisions were added to the CGP in response to the writ of mandate issued in *San Francisco BayKeeper v. California State Water Resources Control Board* (Sacramento County Superior Court, No. 99CS01929). The SWRCB has now been directed to provide explanation and direction for dischargers subject to the sampling and analysis requirements. One issue that is at the heart of this direction is that the SWRCB must explain how dischargers should interpret the results of the required sampling and analysis in deciding whether they are in compliance with the permit's receiving water limitations requirements. In essence, can the sampling and analysis results be used to provide a reliable answer to the question whether the discharge is causing or contributing to exceedance of water quality standards? As is explained below, the answer is a qualified "yes," in that the results must be used in concert with other information and in accordance with a logical process exercising best professional judgment. The results from the sampling and analysis will provide information regarding whether or not the BMPs are effective, and may provide some evidence of causing or contributing to exceedance of water quality standards. But the sampling and analysis requirements in a storm water permit are ultimately a diagnostic tool, and are not a guaranteed method of determining compliance with the receiving water limitations.

7.1 Requirement for Compliance With Water Quality Standards

The SWRCB is well aware of the requirement that it must issue industrial storm water permits, including the CGP, with requirements that require "strict compliance" with water quality standards. (CWA §402(p)(3)(A).) It is also aware that USEPA has concluded that in general it is not appropriate or legally required to include numeric, water quality-based effluent limitations in storm water permits. (40 CFR 122.44(k)(2).) In addition, we note that USEPA does not require sampling and analysis in industrial storm water permits (40 CFR §122.44(i)(4)) and it has elected not to include any sampling or analysis requirements in its own recently issued general construction permit. (See, <http://cfpub.epa.gov/npdes/stormwater/cgp.cfm>.) USEPA has explained the limitations of sampling and analysis in industrial storm water permits. (See, 57 Fed. Reg. 11394 et seq. (1992).)

USEPA has addressed the relationship between BMPs and water quality standards, and has determined that almost all storm water discharges can be adequately controlled to meet water quality standards through BMPs. (NPDES Storm Water Program Questions and Answers, 1/21/04.) USEPA states that to evaluate effectiveness, NPDES permits may at the discretion of the permitting authority require visual inspections, evaluation of environmental indicators or measurable goals, effluent monitoring, or in-stream monitoring. (*Id.*) USEPA has made clear, both in its regulations and its guidance documents, that monitoring requirements are not necessary to enforce compliance with water quality standards. (In fact, neither EPA nor any state we are aware of has chosen to include monitoring requirements equivalent to, or more robust than, those already in place in the CGP.) Certainly, there is no legal requirement that the permitting authority must "prove" that a specific monitoring result is conclusive evidence of exceedance of a water quality standard. USEPA has conducted studies and modeling showing that existing permit programs as of 2003 were already capable of controlling approximately 80-90% of sediment runoff from construction sites, and that more stringent rules would remove

only 1% more. (USEPA Withdrawal of Proposed Effluent Limitation Guideline for Construction Industry, Volume 69, Federal Register 22472 et seq., April 26, 2004.) In conducting its state equivalency analysis, USEPA evaluated all states' programs, including California's, and determined that these were adequate and that further requirements were not mandated for compliance with federal law.

In USEPA's analysis of monitoring for construction (EPA-821-R-02-007), it concludes that planning monitoring for storm water is not possible because the flows are highly variable and temporarily stochastic. USEPA also notes that several of the criteria that could be used have special measurement problems because they are based on trapping efficiency, which is very difficult to measure. The most commonly used measurements, such as TSS, also have problems because to measure average or peak TSS it is necessary to measure TSS in the effluent over the duration of the outflow hydrograph as well as the flow rate. This requires that multiple samples be taken and that the samples be centered around the peak discharge. This is time consuming and difficult since the timing of an event and the timing of the peak discharge are not known beforehand. The average concentration is a weighted concentration, using flow rate as a weighting function.

USEPA also conducted an extensive evaluation of the literature to identify pollutants present in storm water discharges from construction sites. They found that while the literature contains extensive information on pollutants present in storm water discharges from urban areas, there were little data available on pollutants present in storm water discharges from construction sites during the active construction phase, other than for sediment, TSS and turbidity. USEPA was not able to identify sufficient data in the literature to warrant development of controls specific to pollutants other than sediment, TSS and turbidity in storm water discharges from construction sites. Some literature suggests that pollutants adhere to sediment, so that regulating TSS should also act as a control for other pollutants.

USEPA also evaluated the inclusion of organics, pesticides, and bacteria as potential pollutants of concern, but the literature indicated that control of these pollutants through conventional storm water management strategies is potentially much more difficult, and that there are little data linking their presence in storm water discharges directly with new land development activities. Source control (implementation of BMPs) may factor greatly into controlling these pollutant sources.

Permit compliance is based on the degree of control that can be achieved using various levels of pollution control technology (BMPs), a visual inspection requirement, coupled with parameter sampling in the instances where exposure has been determined. A storm water sample for non-visible pollutants indicating contamination is not conclusive proof of either a receiving water violation or of compliance with the Permit. But, it should give the discharger enough information to eliminate the source, detain the discharge, improve the BMPs, or take whatever action is necessary to abate the problem.

In the case of a direct discharge of sediment to a water body listed as impaired by sediment, sampling downstream of the discharge that shows a statistically significant increase in sediment over the upstream monitoring is strong evidence that the discharge from the construction site is causing or contributing to the impairment. We have suggested, however, that dischargers who

conduct such sampling should also sample the effluent. They may use the results of such sampling to overcome this presumption should the effluent sampling not be consistent with the downstream results. The case of a direct discharge of sediment to a water body impaired by sediment is a far simpler case than discharges that are indirect, that contain pollutants for which there may be assimilative capacity, or that contain pollutants that may be diluted in the receiving water. In those cases there is no simple way to conclude from sampling and analysis whether an applicable water quality standard is impacted by the storm water discharge. Instead, the data are most useful in alerting the discharger to the need to review BMPs and source control and should trigger a visual inspection.

The final determination as to whether discharges are in compliance with water quality standards will be made by RWQCBs through enforcement and other compliance activities. The sampling and analysis results are relevant, as is visual inspection and evaluation of BMPs. This method of assessment is known as “best professional judgment” and is consistent with USEPA’s approach to regulating storm water discharges. This is the appropriate and lawful method of regulation pending adoption of effluent limitation guidelines by USEPA. (CWA §301.) USEPA proposed such guidelines for construction sites, but decided against adopting effluent limitation guidelines for storm water discharges associated with construction activity. (Effluent Guidelines Construction and Development Fact Sheet: Final Action – Selection of Non-Regulatory Option; EPA 821-F-04-001; March 2004; final action is at Volume 69, Federal Register 22472 et seq., April 26, 2004.) In taking this Final Action, USEPA concluded that the current system that allows states to develop their own programs is adequate and will result in “significant improvements in water quality and in the control of discharges of construction site stormwater runoff.” In conducting its investigation of existing programs, USEPA found that every state already has regulations and programs in place that incorporate most of the provisions that USEPA considered in its most stringent proposal. USEPA further states that the following components of a construction program are: (1) Require preparation of a SWPPP; (2) Require site inspections by dischargers on a regular basis; (3) Require a combination of erosion and sediment controls; and (3) Require stabilization of soils after construction. USEPA decided that the existing programs (which do not require monitoring) are adequate and that any further regulatory requirements imposed by USEPA would be too costly and “would provide only marginal environmental improvements over regulations already in place.” USEPA further concluded that additional controls would make housing unaffordable. Even when USEPA initially proposed adopting an effluent limitation guideline, it rejected even considering any monitoring requirements. In discussing the option of requiring monitoring in construction permits, USEPA listed several concerns, including that a national monitoring requirement would be impractical and that monitoring receiving waters at most construction sites is infeasible. (Effluent Limitation Guidelines and New Source Performance Standards for the Construction and Development Category: Proposed Rule, 67 Federal Register 42644, 42658-9 (6/24/02).) USEPA concluded that: “All of these factors would add significant expense to the construction process, with little or no added assurance in the effectiveness of control measures or expected environmental benefits.” (*Id.*)

7.2 Background Contamination

The Court asked the SWRCB to explain the need for background (reference) sampling for non-visual pollutants. In essence, the Court question is why is it relevant whether the construction activity “increased” the level of pollutants in the runoff if pre-existing pollutants in runoff could also be of concern. There are several responses to this question. First, the CGP is intended to be a permit for storm water discharges associated with construction activity. (CWA §402(p); construction that disturbs greater than one acre is considered an industrial activity (40 CFR §122.26(b)(14)(x) and (15).) At this time, Congress has determined that it is not appropriate to regulate storm water runoff in general, and that only specified types of storm water discharges are subject to permitting. In fact, even at industrial sites, only the portions of the site that are used for industrial activities are subject to permitting. (40 CFR §122.26(b)(14).) Second, the focus of the CGP is on BMPs, and assuring that they are effective in preventing pollutants associated with construction activity from entering receiving waters. Where there are pollutants entering receiving waters, the required action is, through the iterative process in the Receiving Water Limitations, to evaluate and improve BMPs. Eliminating the source of contamination is the most direct and desirable approach to regulating construction runoff.

Regardless of whether a construction site owner *could* be held liable for historical contaminants running off the site, the purpose of the “reference” sample is clear: the permit does not contain numeric effluent limitations and is based on the BMP approach.¹ The two samples compare whether the BMPs that have been installed to prevent the non-visible pollutants associated with construction activity from entering receiving waters are effective. If “control samples” were not taken, the use of sampling to help determine permit compliance would be thwarted. If BMPs, including good housekeeping (source control) BMPs, are properly installed and maintained, they will effectively control the transportation of most pollutants. The background sampling will verify this fact. It is noted that the permit does require identification of historical pollutants, including pollutants that are the result of past usage. (CGP section A.5.b.3.) Sampling for these pollutants is required if the construction activity (e.g., disturbance of soil impacted by prior use) result in the mobilization and runoff of these pollutants.

The Court stated that USEPA documents indicate that reference sample collection and comparison may be unsuitable for persistent bio-accumulative pollutants. (The court cited USEPA’s Water Quality Guidance for the Great Lakes System: Supplementary Information Document (GLSID), at p. 63.) A California Court of Appeal recently had occasion to discuss the appropriate regulation of persistent bio-accumulative pollutants in NPDES permits. In *Communities for a Better Environment v. SWRCB* (2003) 109 Cal. App. 4th 1089 (hrg. denied), the court upheld a permit for a refinery that did not include final numeric effluent limitations for dioxins, which are bio-accumulative pollutants. The court upheld an approach relying on BMPs and a watershed approach to dealing with persistent bio-accumulative pollutants through other methods, such as a TMDL. The GLSID adopted by USEPA describes a watershed approach to controlling and eliminating persistent pollutants, which will include adoption of TMDLs. (See, GLSID at p. 247) It is not limited to adoption of NPDES permits, and does not even address

¹ The Court has upheld this approach. See, Ruling on Submitted Matter, *San Francisco BayKeeper v. California SWRCB*, p. 5-6.

construction storm water permits in the region. The reference on page 63 concerns the appropriate approaches for TMDLs, not for construction storm water permits. USEPA concludes in the GLSID that the TMDL process is the appropriate means of effectively addressing persistent bio-accumulative pollutants.

Pollutants such as the Persistent Bio-accumulative and Toxic chemicals (PBT) currently being addressed under USEPA's PBT initiative ² are not closely associated with modern day construction activity. The listed pesticides could possibly be found, however, as historic pollutants in the soil if the construction site had been used for agriculture prior to the 1970s (the 1990s in the case of toxaphene). Information about PBTs can be found through http://www.waterboards.ca.gov/stormwtr/gen_const.html Persistent bio-accumulative pollutants are strongly associated with soils and soil particles, so an aggressive erosion and sediment control program combined with visual inspections is the most understandable and cost-effective approach to controlling the discharge of such pollutants from construction activity.

If the area that the construction site is located in has prior contamination from PBTs, such issues should be dealt with on a watershed-based approach, such as a TMDL for the particular pollutant. The Construction CGP is not intended to address such issues. On the other hand, the permit does require all dischargers to control soil erosion and the movement of products of erosion off the site via the storm water discharge. Mobilization of pesticide residue by construction activity may trigger sampling and analysis requirements.

7.3 Parameters to Sample for to Determine the Presence of Non-Visible Pollutants in Runoff

It has been suggested that construction dischargers should consult the CTR, and then design a sampling strategy to sample their discharge for all non-visible CTR pollutants based on the numerical values provided. The CTR pollutants and numerical limits, however, have limited relevance to construction activity or storm water pollution from construction sites. The CTR pollutants currently known to be used and commonly found on construction sites can be found through http://www.waterboards.ca.gov/stormwtr/gen_const.html.

Of greater concern for construction discharges are the pollutants found in materials used in large quantities throughout California and exposed throughout the rainy season such as cement, fly-ash, and other recycled materials or by-products of combustion. (But many of these materials may be visible in runoff, affecting color for example.) The water quality standards for these materials will depend on their composition. Some of the more common storm water pollutants from construction activity such as glyphosate (herbicides), diazinon and chlopyrifos (pesticides), nutrients (fertilizers), and molybdenum (lubricants) are not CTR pollutants. The use of diazinon and chlopyrifos is a common practice among landscaping professionals and may trigger sampling and analysis requirements if applications come into contact with storm water.

Other more common storm water contamination problems resulting from construction activity such as high pH values from cement and gypsum, high pH and TSS from wash waters and

² <http://www.epa.gov/opptintr/pbt/aboutpbt.htm>

chemical and fecal contamination from portable toilets are also not CTR pollutants. Some of these constituents do have numeric water quality objectives in individual Basin Plans, but many do not and are subject to narrative water quality standards such as not causing toxicity. This Fact Sheet provides direction on how to ascertain the applicable water quality standards for the receiving water. Of more use will be information the SWRCB will distribute upon completion of a contract with the University of California, which will list the most common pollutants, describe which construction materials they are associated with, and suggest parameters for sampling. At this time, dischargers are encouraged to discuss these issues with RWQCB staff and their own knowledgeable representative or Storm Water Quality Professionals..

7.4 The Watershed Approach to Storm Water Permitting

USEPA has endorsed a watershed approach to storm water permitting that focuses on BMPs in lieu of numeric effluent limitations and visual inspection and indicator monitoring in lieu of sampling for individual pollutant parameters. (Questions and Answers Regarding Implementation of an Interim Permitting Approach for Water Quality-Based Effluent Limitations in Storm Water Permits, 61 Fed. Reg. 57424 (11/6/96)). In a memorandum dated November 22, 2002, USEPA issued guidance on the interaction between storm water permits and TMDLs. The memorandum explains that, even in the case where a TMDL has been finalized and a wasteload allocation established for storm water discharges, the inclusion of numeric effluent limitations will be “rare.” The memorandum therefore discusses monitoring requirements in BMP-based permits. It states that the monitoring should assess the effectiveness of the BMPs (i.e., appropriate monitoring is visual inspection) and *if monitoring for storm water is required*, it should be consistent with the state’s watershed approach.

7.5 References and Record for this Guidance Document

In preparing this guidance document, the SWRCB has relied upon numerous background materials including federal statutes, regulations and guidance materials. These materials include Clean Water Act sections 303(d) and 402(p) and federal regulations implementing section 402(p) including 40 CFR sections 122.26, 122.44, 122.48, and Part 131. The SWRCB has also relied several guidance documents from USEPA. These include the preambles to the various storm water regulatory actions: 55 Fed. Reg. 47990 et seq. (11/16/90), 57 Fed. Reg. 11394 et seq. (4/2/92), and 64 Fed. Reg. 68722 et seq. The SWRCB has relied on the Porter-Cologne Water Quality Control Act (Water Code section 13000 et seq.), and implementing state regulations at Title 23, California Code of Regulations. The SWRCB has also relied on relevant court decisions, including: *Communities for a Better Environment v. SWRCB* (2003) 109 Cal. App. 4th 1089 (hrg. denied) (Water Boards have broad discretion in adopting effluent limitations for impaired waters). The SWRCB has also reviewed the recently-adopted USEPA general construction permit, published at <http://cfpub.epa.gov/npdes/stormwater/cgp.cfm>. and USEPA’s decision not to adopt effluent limitations guidelines for storm water discharges from construction activities (Volume 69, Federal Register 22472 et seq., April 26, 2004) The SWRCB has also reviewed the USEPA multi-sector general permit for industrial activities (65 Fed. Reg. 64746 et seq. (10/30/00) and a general construction permit issued by USEPA Region IV (65 Fed. Reg. 25122 et seq. (4/28/00)). The record also contains submittals received by the SWRCB from

interested persons including the Keepers organizations, the Building Industry Legal Defense Foundation and the California Building Industry Association.

APPENDIX A

WATER QUALITY OBJECTIVES FOR SUSPENDED MATERIALS, SETTEABLE MATERIALS, SEDIMENT AND TURBIDITY

Below is a compilation of the water quality objectives for suspended materials, settleable material, sediment and turbidity as of August 2003 for each of the Regional Water Quality Control Boards. The water quality objectives are found in chapter 3 (unless otherwise noted) of the RWQCB's Basin Water Quality Control Plan (Basin Plan). Some of the weblinks go directly to Chapter 3 and others will go to the Basin Plan.

North Coast Regional Water Quality Control Board – Region 1

<http://www.waterboards.ca.gov/rwqcb1/down/032202basin-plan.pdf>

Suspended Material

Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.

Settleable Material

Waters shall not contain substances in concentrations that result in deposition of material that causes nuisance or adversely affect beneficial uses.

Sediment

The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

Turbidity

Turbidity shall not be increased more than 20 percent above naturally occurring background levels. Allowable zones of dilution within which higher percentages can be tolerated may be defined for specific discharges upon the issuance of discharge permits or waiver thereof.

San Francisco Bay Regional Water Quality Control Board – Region 2

http://www.waterboards.ca.gov/rwqcb2/Basin Plan/chap_3_bp.pdf

Sediment

The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses. Controllable water quality factors shall not cause a detrimental increase in the concentrations of toxic pollutants in sediments or aquatic life.

Settleable Material

Waters shall not contain substances in concentrations that result in the deposition of material that cause nuisance or adversely affect beneficial uses.

Suspended Material

Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.

Turbidity

Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases from normal background light penetration or turbidity related to waste discharge shall not be greater than 10 percent in areas where natural turbidity is greater than 50 NTU.

Central Coast Regional Water Quality Control Board - Region 3

http://www.waterboards.ca.gov/rwqcb3/BasinPlan/BP_text%5Cchapter_3%5CChapter3.htm

Suspended Material

Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.

Settleable Material

Waters shall not contain settleable material in concentrations that result in deposition of material that causes nuisance or adversely affects beneficial uses.

Sediment

The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

Turbidity

Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses.

Increase in Turbidity attributable to controllable factors shall not exceed the following limits:

1. Where natural turbidity is between 0 and 50 Jackson Turbidity Units (JTU), increases shall not exceed 20 percent.
2. Where natural turbidity is between 50 and 100 JTU, increases shall not exceed 10 JTU
3. Where natural turbidity is greater than 100 JTU, increases shall not exceed 10 percent.

Allowable zones of dilution within which higher concentrations will be tolerated will be defined for each discharge in discharge permits.

Los Angeles Regional Water Quality Control Board - Region 4

[http://www.waterboards.ca.gov/rwqcb4/html/meetings/tmdl/Basin_plan/el_doc/BP3 Water Quality Objectives.pdf](http://www.waterboards.ca.gov/rwqcb4/html/meetings/tmdl/Basin_plan/el_doc/BP3%20Water%20Quality%20Objectives.pdf)

Solid, Suspended, or Settleable Materials

Waters shall not contain suspended or settleable material in concentrations that cause nuisance or adversely affect beneficial uses.

Turbidity

Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in natural turbidity attributable to controllable factors shall not exceed the following limits:

Where natural turbidity is between 0 and 50 NTU, increases shall not exceed 20%.

Where natural turbidity is greater than 50 NTU, increases shall not exceed 10%.

Allowable zones of initial dilution within which higher concentrations will be tolerated may be defined for each discharge in specific Waste Discharge Requirements.

Central Valley Regional Water Quality Control Board – Region 5

Sacramento River and San Joaquin River Basins

http://www.waterboards.ca.gov/rwqcb5/available_documents/basin_plans/bsnplnab.pdf

Sediment

The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

Settleable Material

Waters shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.

Suspended Material

Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.

Turbidity

Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in turbidity attributable to controllable water quality factors shall not exceed the following limits:

- Where natural turbidity is between 0 and 5 Nephelometric Turbidity Units (NTUs), increases shall not exceed 1 NTU.
- Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent.
- Where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs.
- Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.

In determining compliance with the above limits, appropriate averaging periods may be applied provided that beneficial uses will be fully protected.

Exceptions to the above limits will be considered when a dredging operation can cause an increase in turbidity. In those cases, an allowable zone of dilution within which turbidity in excess of the limits may be tolerated will be defined for the operation and prescribed in a discharge permit.

For Folsom Lake (50) and American River (Folsom Dam to Sacramento River) (51), except for periods of storm runoff, the turbidity shall be less than or equal 10 NTUs. To the extent of any conflict with the general turbidity objective, the more stringent applies.

For Delta waters, the general objectives for turbidity apply subject to the following: except for periods of storm runoff, the turbidity of Delta waters shall not exceed 50 NTUs in the waters of the Central Delta and 150 NTUs in other Delta waters. Exceptions to the Delta specific objectives will be considered when a dredging operation can cause an increase in turbidity. In this case, an allowable zone of dilution within which turbidity in excess of limits can be tolerated will be defined for the operation and prescribed in a discharge permit.

Tulare Lake Basin

http://www.waterboards.ca.gov/rwqcb5/available_documents/basin_plans/bsnpln5c.pdf

Sediment

The suspended sediment load and suspended sediment discharge rate of waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

Settleable Material

Waters shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.

Suspended Material

Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.

Turbidity

Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in turbidity attributable to controllable water quality factors shall not exceed the following limits:

- Where natural turbidity is between 0 and 5 Nephelometric Turbidity Units (NTUs), increases shall not exceed 1 NTU.
- Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent.
- Where natural turbidity is equal to or between 50 and 100 NTUs, increases shall not exceed 10 NTUs.
- Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.

In determining compliance with the above limits, the Regional Water Board may prescribe appropriate averaging periods provided that beneficial uses will be fully protected.

Lahontan Regional Water Quality Control Board - Region 6

<http://www.waterboards.ca.gov/rwqcb6/BPlan/Bplantxt.pdf>

Sediment

The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect the water for beneficial uses.

Setteable Materials

Waters shall not contain substances in concentrations that result in deposition of material that causes nuisance or that adversely affects the water for beneficial uses. For natural high quality waters, the concentration of setteable materials shall not be raised by more than 0.1 milliliter per liter.

Suspended Materials

Waters shall not contain suspended materials in concentrations that cause nuisance or that adversely affects the water for beneficial uses. For natural high quality waters, the concentration of total suspended materials shall not be altered to the extent that such alterations are discernible at the 10 percent significance level.

Turbidity

Waters shall be free of changes in turbidity that cause nuisance or adversely affect the water for beneficial uses. Increases in turbidity shall not exceed natural levels by more than 10 percent.

Colorado River Basin Regional Water Quality Control Board – Region 7

<http://www.waterboards.ca.gov/rwqcb7/documents/RB7Plan.pdf>

Suspended Solids and Setteable Solids

Discharges of wastes or wastewater shall not contain suspended or setteable solids in concentrations which increase the turbidity of receiving waters, unless it can be demonstrated to the satisfaction of the RWQCB that such alteration in turbidity does not adversely affect beneficial uses.

Sediment

The suspended sediment load and suspended sediment discharge rate to surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

Turbidity

Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses.

Santa Ana River Regional Water Quality Control Board – Region 8

<http://www.waterboards.ca.gov/~rwqcb8/pdf/R8BPlan.pdf>

(See Chapter 4)

Solids, Suspended and Setteable

Enclosed bays and estuaries shall not contain suspended or setteable solids in amounts which cause a nuisance or adversely affect beneficial uses as a result of controllable water quality factors.

Turbidity

Increases in turbidity which result from controllable water quality factors shall comply with the following:

<u>Natural Turbidity</u>	<u>Maximum Increase</u>
0-50 NTU	20%
50-100 NTU	10 NTU
Greater than 100 NTU	10%

All enclosed bay and estuaries of the region shall be free of changes in turbidity which adversely affect beneficial uses

San Diego Regional Water Quality Control Board - Region 9

[http://www.waterboards.ca.gov/rwqcb9/programs/Chapter 3 Water Quality Objectives.pdf](http://www.waterboards.ca.gov/rwqcb9/programs/Chapter%203%20Water%20Quality%20Objectives.pdf)

Sediment

The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

Suspended and Settleable Solids

Water shall not contain suspended and settleable solids in concentrations of solids that cause nuisance or adversely affect beneficial uses.

Turbidity

Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses.

Inland surface water shall not contain turbidity in excess of the numerical objectives described in Table 3-2. (This is reference to the Basin Plan; this table can be found via the weblink to the Region 9 Basin Plan).

Ground waters shall not contain turbidity in excess of the numerical objectives described in Table 3-3. (This is reference to the Basin Plan; this table can be found via the weblink to the Region 9 Basin Plan.)

The transparency of waters in lagoons and estuaries shall not be less than 50% of the depth at locations where measurement is made by means of a standard Secchi disk, except where lesser transparency is caused by rainfall runoff from undisturbed areas and dredging projects conducted in conformance with waste discharge requirements of the RWQCB. With these two exceptions, increases in turbidity attributable to controllable water quality factors shall not exceed the following limits:

<u>Natural Turbidity</u>	<u>Maximum Increase</u>
0- 50 NTU	20% over natural turbidity level
50 - 100 NTU	10 NTU
Greater than 100 NTU	10% over natural turbidity level

In addition, within San Diego Bay, the transparency of bay waters, insofar as it may be influenced by any controllable factor, either directly or through induced conditions, shall not be less than 8 feet in more than

20 percent of the readings in any zone, as measured by standard Secchi disk. Wherever the water is less than 10 feet deep, the Secchi disk reading shall not be less than 80 percent of the depth in more than 20 percent of the readings in any zone.

STATE WATER RESOURCES CONTROL BOARD (SWRCB)
ORDER NO. 99 - 08 - DWQ
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT NO. CAS000002

WASTE DISCHARGE REQUIREMENTS (WDRS)
FOR
DISCHARGES OF STORM WATER RUNOFF ASSOCIATED WITH
CONSTRUCTION ACTIVITY

The State Water Resources Control Board finds that:

1. Federal regulations for controlling pollutants in storm water runoff discharges were promulgated by the U.S. Environmental Protection Agency (USEPA) on November 16, 1990 (40 Code of Federal Regulations (CFR) Parts 122, 123, and 124). The regulations require discharges of storm water to surface waters associated with construction activity including clearing, grading, and excavation activities (except operations that result in disturbance of less than five acres of total land area and which are not part of a larger common plan of development or sale) to obtain an NPDES permit and to implement Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) to reduce or eliminate storm water pollution.

On December 8, 1999 federal regulations promulgated by USEPA (40CFR Parts 9, 122, 123, and 124) expanded the NPDES storm water program to include storm water discharges from municipal separate storm sewer systems (MS4s) and construction sites that were smaller than those previously included in the program. Federal regulation 40 CFR § 122.26(b)(15) defines small construction activity as including clearing, grading, and excavating that result in land disturbance of equal to or greater than one acre or less than five acres or is part of a larger common plan of development or sale. Permit applications for small construction activities are due by March 10, 2003.

2. This General Permit regulates pollutants in discharges of storm water associated with construction activity (storm water discharges) to surface waters, except from those areas on Tribal Lands; Lake Tahoe Hydrologic Unit; construction projects which disturb less than one acre, unless part of a larger common plan of development or sale; and storm water discharges which are determined ineligible for coverage under this General Permit by the California Regional Water Quality Control Boards (RWQCBs). Attachment 1 contains addresses and telephone numbers of each RWQCB office.
3. This General Permit does not preempt or supersede the authority of local storm water management agencies to prohibit, restrict, or control storm water discharges to separate storm sewer systems or other watercourses within their jurisdiction, as allowed by State and Federal law.

4. To obtain authorization for proposed storm water discharges to surface waters, pursuant to this General Permit, the landowner (discharger) must submit a Notice of Intent (NOI) with a vicinity map and the appropriate fee to the SWRCB prior to commencement of construction activities. In addition, coverage under this General Permit shall not occur until the applicant develops a Storm Water Pollution Prevention Plan (SWPPP) in accordance with the requirements of Section A of this permit for the project. For proposed construction activity conducted on easements or on nearby property by agreement or permission, or by an owner or lessee of a mineral estate (oil, gas, geothermal, aggregate, precious metals, and/or industrial minerals) entitled to conduct the activities, the entity responsible for the construction activity must submit the NOI and filing fee and shall be responsible for development of the SWPPP.
5. If an individual NPDES Permit is issued to a discharger otherwise subject to this General Permit or if an alternative General Permit is subsequently adopted which covers storm water discharges regulated by this General Permit, the applicability of this General Permit to such discharges is automatically terminated on the effective date of the individual permit or the date of approval for coverage under the subsequent General Permit.
6. This action to adopt an NPDES permit is exempt from the provisions of the California Environmental Quality Act (Public Resources Code Section 21100, et seq.) in accordance with section 13389 of the California Water Code.
7. The SWRCB adopted the California Ocean Plan, and the RWQCBs have adopted and the SWRCB has approved Water Quality Control Plans (Basin Plans). Dischargers regulated by this General Permit must comply with the water quality standards in these Basin Plans and subsequent amendments thereto.
8. The SWRCB finds storm water discharges associated with construction activity to be a potential significant sources of pollutants. Furthermore, the SWRCB finds that storm water discharges associated with construction activities have the reasonable potential to cause or contribute to an excursion above water quality standards for sediment in the water bodies listed in Attachment 3 to this permit.
9. It is not feasible at this time to establish numeric effluent limitations for pollutants in storm water discharges from construction activities. Instead, the provisions of this General Permit require implementation of Best Management Practices (BMPs) to control and abate the discharge of pollutants in storm water discharges.
10. Discharges of non-storm water may be necessary for the completion of certain construction projects. Such discharges include, but are not limited to: irrigation of vegetative erosion control measures, pipe flushing and testing, street cleaning, and dewatering. Such discharges are authorized by this General Permit as long as they (a) do comply with Section A.9 of this General Permit, (b) do not cause or contribute to violation of any water quality standard, (c) do not violate any other provision of this

General Permit, (d) do not require a non-storm water permit as issued by some RWQCBs, and (e) are not prohibited by a Basin Plan. If a non-storm water discharge is subject to a separate permit adopted by a RWQCB, the discharge must additionally be authorized by the RWQCB permit.

11. Following adoption of this General Permit, the RWQCBs shall enforce the provisions herein including the monitoring and reporting requirements.
12. Following public notice in accordance with State and Federal laws and regulations, the SWRCB in a public meeting on June 8, 1998, heard and considered all comments. The SWRCB has prepared written responses to all significant comments.
13. This Order is an NPDES permit in compliance with section 402 of the Clean Water Act (CWA) and shall take effect upon adoption by the SWRCB provided the Regional Administrator of the USEPA has no objection. If the USEPA Regional Administrator objects to its issuance, the General Permit shall not become effective until such objection is withdrawn.
14. This General Permit does not authorize discharges of fill or dredged material regulated by the U.S. Army Corps of Engineers under CWA section 404 and does not constitute a waiver of water quality certification under CWA section 401.
15. The Monitoring Program and Reporting Requirements are modified in compliance with a judgment in the case of San Francisco BayKeeper, et al. v. State Water Resources Control Board. The modifications include sampling and analysis requirements for direct discharges of sediment to waters impaired due to sediment and for pollutants that are not visually detectable in runoff that may cause or contribute to an exceedance of water quality objectives.
16. Storm water discharges associated with industrial activity that are owned or operated by municipalities serving populations less than 100,000 people are no longer exempt from the need to apply for or obtain a storm water discharge permit. A temporary exemption, which was later extended by USEPA, was provided under section 1068(c) of the Intermodal Surface Transportation and Efficiency Act (ISTEA) of 1991. Federal regulation 40 CFR § 122.26(e)(1)(ii) requires the above municipalities to submit permit application by March 10, 2003.
17. This permit may be reopened and modified to include different monitoring requirements for small construction activity than for construction activity over five (5) acres.

IT IS HEREBY ORDERED that all dischargers who file an NOI indicating their intention to be regulated under the provisions of this General Permit shall comply with the following:

A. DISCHARGE PROHIBITIONS:

1. Authorization pursuant to this General Permit does not constitute an exemption to applicable discharge prohibitions prescribed in Basin Plans, as implemented by the nine RWQCBs.
2. Discharges of material other than storm water which are not otherwise authorized by an NPDES permit to a separate storm sewer system (MS4) or waters of the nation are prohibited, except as allowed in Special Provisions for Construction Activity, C.3.
3. Storm water discharges shall not cause or threaten to cause pollution, contamination, or nuisance.
4. Storm water discharges regulated by this General Permit shall not contain a hazardous substance equal to or in excess of a reportable quantity listed in 40 CFR Part 117 and/or 40 CFR Part 302.

B. RECEIVING WATER LIMITATIONS:

1. Storm water discharges and authorized nonstorm water discharges to any surface or ground water shall not adversely impact human health or the environment.
2. The SWPPP developed for the construction activity covered by this General Permit shall be designed and implemented such that storm water discharges and authorized nonstorm water discharges shall not cause or contribute to an exceedance of any applicable water quality standards contained in a Statewide Water Quality Control Plan and/or the applicable RWQCB's Basin Plan.
3. Should it be determined by the discharger, SWRCB, or RWQCB that storm water discharges and/or authorized nonstorm water discharges are causing or contributing to an exceedance of an applicable water quality standard, the discharger shall:
 - a. Implement corrective measures immediately following discovery that water quality standards were exceeded, followed by notification to the RWQCB by telephone as soon as possible but no later than 48 hours after the discharge has been discovered. This notification shall be followed by a report within 14-calendar days to the appropriate RWQCB, unless otherwise directed by the RWQCB, describing (1) the nature and cause of the water quality standard exceedance; (2) the BMPs currently being implemented; (3) any additional BMPs which will be implemented to

prevent or reduce pollutants that are causing or contributing to the exceedance of water quality standards; and (4) any maintenance or repair of BMPs. This report shall include an implementation schedule for corrective actions and shall describe the actions taken to reduce the pollutants causing or contributing to the exceedance.

- b. The discharger shall revise its SWPPP and monitoring program immediately after the report to the RWQCB to incorporate the additional BMPs that have been and will be implemented, the implementation schedule, and any additional monitoring needed.
- c. Nothing in this section shall prevent the appropriate RWQCB from enforcing any provisions of this General Permit while the discharger prepares and implements the above report.

C. SPECIAL PROVISIONS FOR CONSTRUCTION ACTIVITY:

- 1. All dischargers shall file an NOI and pay the appropriate fee for construction activities conducted at each site as required by Attachment 2: Notice of Intent--General Instructions.
- 2. All dischargers shall develop and implement a SWPPP in accordance with Section A: Storm Water Pollution Prevention Plan. The discharger shall implement controls to reduce pollutants in storm water discharges from their construction sites to the BAT/BCT performance standard.
- 3. Discharges of non-storm water are authorized only where they do not cause or contribute to a violation of any water quality standard and are controlled through implementation of appropriate BMPs for elimination or reduction of pollutants. Implementation of appropriate BMPs is a condition for authorization of non-storm water discharges. Non-storm water discharges and the BMPs appropriate for their control must be described in the SWPPP. Wherever feasible, alternatives which do not result in discharge of nonstorm water shall be implemented in accordance with Section A.9. of the SWPPP requirements.
- 4. All dischargers shall develop and implement a monitoring program and reporting plan in accordance with Section B: Monitoring Program and Reporting Requirements.
- 5. All dischargers shall comply with the lawful requirements of municipalities, counties, drainage districts, and other local agencies regarding discharges of storm water to separate storm sewer systems or other watercourses under their jurisdiction, including applicable requirements in municipal storm water management programs developed to comply with NPDES permits issued by the RWQCBs to local agencies.

6. All dischargers shall comply with the standard provisions and reporting requirements contained in Section C: Standard Provisions.
7. The discharger may terminate coverage for a portion of the project under this General Permit when ownership of a portion of this project has been transferred or when a phase within this multi-phase project has been completed. When ownership has transferred, the discharger must submit to its RWQCB a Change of Information Form (COI) Attachment 4 with revised site map and the name, address and telephone number of the new owner(s). Upon transfer of title, the discharger should notify the new owner(s) of the need to obtain coverage under this General Permit. The new owner must comply with provisions of Sections A. 2. (c) and B. 2. (b) of this General Permit. To terminate coverage for a portion of the project when a phase has been completed, the discharger must submit to its RWQCB a COI with a revised map that identifies the newly delineated site.
8. The discharger may terminate coverage under this General Permit for a complete project by submitting to its RWQCB a Notice of Termination Form (NOT), and the post-construction BMPs plan according to Section A.10 of this General Permit. Note that a construction project is considered complete only when all portions of the site have been transferred to a new owner; or the following conditions have been met:
 - a. There is no potential for construction related storm water pollution,
 - b. All elements of the SWPPP have been completed,
 - c. Construction materials and waste have been disposed of properly,
 - d. The site is in compliance with all local storm water management requirements, and
 - e. A post-construction storm water management plan is in place as described in the site's SWPPP.
9. This General Permit expires five years from the date of adoption.

D. REGIONAL WATER QUALITY CONTROL BOARD (RWQCB) AUTHORITIES:

1. RWQCBs shall:
 - a. Implement the provisions of this General Permit. Implementation of this General Permit may include, but is not limited to requesting the submittal of SWPPPS, reviewing SWPPPs, reviewing monitoring reports, conducting compliance inspections, and taking enforcement actions.
 - b. Issue permits as they deem appropriate to individual dischargers, categories of dischargers, or dischargers in a geographic area. Upon issuance of such permits by a RWQCB, the affected dischargers shall no longer be regulated by this General Permit.
2. RWQCBs may require, on a case-by-case basis, the inclusion of an analysis of potential downstream impacts on receiving waterways due to the permitted construction.
3. RWQCBs may provide information to dischargers on the development and implementation of SWPPPs and monitoring programs and may require revisions to SWPPPs and monitoring programs.
4. RWQCBs may require dischargers to retain records for more than three years.
5. RWQCBs may require additional monitoring and reporting program requirements including sampling and analysis of discharges to water bodies listed in Attachment 3 to this permit. Additional requirements imposed by the RWQCB should be consistent with the overall monitoring effort in the receiving waters.
6. RWQCBs may issue individual NPDES permits for those construction activities found to be ineligible for coverage under this permit.

CERTIFICATION

The undersigned, Administrative Assistant to the Board, does hereby certify that the foregoing is a full, true, and correct copy of an order duly and regularly adopted at a meeting of the State Water Resources Control Board held on August 19, 1999.

AYE: James M. Stubchaer
Mary Jane Forster
John W. Brown
Arthur G. Baggett, Jr.

NO: None

ABSENT: None

ABSTAIN: None

/s/
Maureen Marché
Administrative Assistant to the Board

SECTION A: STORM WATER POLLUTION PREVENTION PLAN

1. Objectives

A Storm Water Pollution Prevention Plan (SWPPP) shall be developed and implemented to address the specific circumstances for each construction site covered by this General Permit. The SWPPP shall be certified in accordance with the signatory requirements of section C, Standard Provision for Construction Activities (9). The SWPPP shall be developed and amended or revised, when necessary, to meet the following objectives:

- a. Identify all pollutant sources including sources of sediment that may affect the quality of storm water discharges associated with construction activity (storm water discharges) from the construction site, and
- b. Identify non-storm water discharges, and
- c. Identify, construct, implement in accordance with a time schedule, and maintain Best Management Practices (BMPs) to reduce or eliminate pollutants in storm water discharges and authorized nonstorm water discharges from the construction site during construction, and
- d. Develop a maintenance schedule for BMPs installed during construction designed to reduce or eliminate pollutants after construction is completed (post-construction BMPs).
- e. Identify a sampling and analysis strategy and sampling schedule for discharges from construction activity which discharge directly into water bodies listed on Attachment 3. (Clean Water Act Section 303(d) [303(d)] Water Bodies listed for Sedimentation).
- f. For all construction activity, identify a sampling and analysis strategy and sampling schedule for discharges that have been discovered through visual monitoring to be potentially contaminated by pollutants not visually detectable in the runoff.

2. Implementation Schedule

- a. For construction activity commencing on or after adoption of this General Permit, the SWPPP shall be developed prior to the start of soil-disturbing activity in accordance with this Section and shall be implemented concurrently with commencement of soil-disturbing activities.
- b. Existing permittees engaging in construction activities covered under the terms of the previous General Construction Permit SWPPP (WQ Order No.92-08-DWQ) shall continue to implement their existing SWPPP and shall implement any

necessary revisions to their SWPPP in accordance with this Section of the General Permit in a timely manner, but in no case more than 90-calender days from the date of adoption of this General Permit.

- c. For ongoing construction activity involving a change of ownership of property, the new owner shall review the existing SWPPP and amend if necessary, or develop a new SWPPP within 45-calender days.
- d. Existing permittees shall revise their SWPPP in accordance with the sampling and analysis modifications prior to August 1, 2001. For ongoing construction activity involving a change of ownership the new owner shall review the existing SWPPP and amend the sampling and analysis strategy, if required, within 45 days. For construction activity commencing after the date of adoption, the SWPPP shall be developed in accordance with the modification language adopted.

3. Availability

The SWPPP shall remain on the construction site while the site is under construction during working hours, commencing with the initial construction activity and ending with termination of coverage under the General Permit.

4. Required Changes

- a. The discharger shall amend the SWPPP whenever there is a change in construction or operations which may affect the discharge of pollutants to surface waters, ground waters, or a municipal separate storm sewer system (MS4). The SWPPP shall also be amended if the discharger violates any condition of this General Permit or has not achieved the general objective of reducing or eliminating pollutants in storm water discharges. If the RWQCB determines that the discharger is in violation of this General Permit, the SWPPP shall be amended and implemented in a timely manner, but in no case more than 14-calendar days after notification by the RWQCB. All amendments should be dated and directly attached to the SWPPP.
- b. The RWQCB or local agency with the concurrence of the RWQCB may require the discharger to amend the SWPPP.

5. Source Identification

The SWPPP shall include: (a) project information and (b) pollutant source identification combined with an itemization of those BMPs specifically chosen to control the pollutants listed.

- a. Project Information

- (1) The SWPPP shall include a vicinity map locating the project site with respect to easily identifiable major roadways, geographic features, or landmarks. At a minimum, the map must show the construction site perimeter, the geographic features surrounding the site, and the general topography.
- (2) The SWPPP shall include a site map(s) which shows the construction project in detail, including the existing and planned paved areas and buildings.
 - (a) At a minimum, the map must show the construction site perimeter; existing and proposed buildings, lots, roadways, storm water collection and discharge points; general topography both before and after construction; and the anticipated discharge location(s) where the storm water from the construction site discharges to a municipal storm sewer system or other water body.
 - (b) The drainage patterns across the project area must clearly be shown on the map, and the map must extend as far outside the site perimeter as necessary to illustrate the relevant drainage areas. Where relevant drainage areas are too large to depict on the map, map notes or inserts illustrating the upstream drainage areas are sufficient.
 - (c) Temporary on-site drainages to carry concentrated flow shall be selected to comply with local ordinances, to control erosion, to return flows to their natural drainage courses, and to prevent damage to downstream properties.
3. Information presented in the SWPPP may be represented either by narrative or by graphics. Where possible, narrative descriptions should be plan notes. Narrative descriptions which do not lend themselves to plan notes can be contained in a separate document which must be referenced on the plan.

b. Pollutant Source and BMP Identification

The SWPPP shall include a description of potential sources which are likely to add pollutants to storm water discharges or which may result in nonstorm water discharges from the construction site. Discharges originating from off-site which flow across or through areas disturbed by construction that may contain pollutants should be reported to the RWQCB.

The SWPPP shall:

- (1) Show drainage patterns and slopes anticipated after major grading activities are completed. Runoff from off-site areas should be prevented from flowing through areas that have been disturbed by construction unless appropriate conveyance systems are in place. The amount of anticipated storm water run-on must be considered to determine the appropriateness of the BMPs chosen. Show all calculations for anticipated storm water run-on, and describe all BMPs implemented to divert off-site drainage described in section A. 5 a. (2) (c) around or through the construction project.
- (2) Show the drainage patterns into each on-site storm water inlet point or receiving water. Show or describe the BMPs that will protect operational storm water inlets or receiving waters from contaminated discharges other than sediment discharges, such as, but not limited to: storm water with elevated pH levels from contact with soil amendments such as lime or gypsum; slurry from sawcutting of concrete or asphalt ;washing of exposed aggregate concrete; concrete rinse water; building washing operations; equipment washing operations; minor street washing associated with street delineation; and/or sealing and paving activities occurring during rains.
- (3) Show existing site features that, as a result of known past usage, may contribute pollutants to storm water, (e.g., toxic materials that are known to have been treated, stored, disposed, spilled, or leaked onto the construction site). Show or describe the BMPs implemented to minimize the exposure of storm water to contaminated soil or toxic materials.
- (4) Show areas designated for the (a) storage of soil or waste, (b) vehicle storage and service areas, (c) construction material loading, unloading, and access areas, (d) equipment storage, cleaning, and maintenance areas.
- (5) Describe the BMPs for control of discharges from waste handling and disposal areas and methods of on-site storage and disposal of construction materials and construction waste. Describe the BMPs designed to minimize or eliminate the exposure of storm water to construction materials, equipment, vehicles, waste storage areas, or service areas. The BMPs described shall be in compliance with Federal, State, and local laws, regulations, and ordinances.
- (6) Describe all post-construction BMPs for the project, and show the location of each BMP on the map. (Post-construction BMPs consist of permanent features designed to minimize pollutant discharges, including sediment, from the site after construction has been completed.) Also, describe the agency or parties to be the responsible party for long-term maintenance of these BMPs.

- (7) Show the locations of direct discharge from the construction site into a Section 303(d) list water body. Show the designated sampling locations in the receiving waters, which represent the prevailing conditions of the water bodies upstream of the construction site discharge and immediately downstream from the last point of discharge.
- (8) Show the locations designated for sampling the discharge from areas identified in Section A. 5. b. (2), (3), and (4) and Section A. 5. c. (1) and (2). Samples shall be taken should visual monitoring indicate that there has been a breach, malfunction, leakage, or spill from a BMP which could result in the discharge in storm water of pollutants that would not be visually detectable, or if storm water comes into contact with soil amendments or other exposed materials or contamination and is allowed to be discharged. Describe the sampling procedure, location, and rationale for obtaining the uncontaminated sample of storm water.

c. Additional Information

- (1) The SWPPP shall include a narrative description of pollutant sources and BMPs that cannot be adequately communicated or identified on the site map. In addition, a narrative description of preconstruction control practices (if any) to reduce sediment and other pollutants in storm water discharges shall be included.
- (2) The SWPPP shall include an inventory of all materials used and activities performed during construction that have the potential to contribute to the discharge of pollutants other than sediment in storm water. Describe the BMPs selected and the basis for their selection to eliminate or reduce these pollutants in the storm water discharges.
- (3) The SWPPP shall include the following information regarding the construction site surface area: the size (in acres or square feet), the runoff coefficient before and after construction, and the percentage that is impervious (e.g., paved, roofed, etc.) before and after construction.
- (4) The SWPPP shall include a copy of the NOI, and the Waste Discharge Identification (WDID) number. Should a WDID number not be received from the SWRCB at the time construction commences, the discharger shall include proof of mailing of the NOI, e.g., certified mail receipt, copy of check, express mail receipt, etc.
- (5) The SWPPP shall include a construction activity schedule which describes all major activities such as mass grading, paving, lot or parcel

improvements at the site and the proposed time frame to conduct those activities.

- (6) The SWPPP shall list the name and telephone number of the qualified person(s) who have been assigned responsibility for prestorm, poststorm, and storm event BMP inspections; and the qualified person(s) assigned responsibility to ensure full compliance with the permit and implementation of all elements of the SWPPP, including the preparation of the annual compliance evaluation and the elimination of all unauthorized discharges.

6. Erosion Control

Erosion control, also referred to as “soil stabilization” is the most effective way to retain soil and sediment on the construction site. The most efficient way to address erosion control is to preserve existing vegetation where feasible, to limit disturbance, and to stabilize and revegetate disturbed areas as soon as possible after grading or construction. Particular attention must be paid to large mass-graded sites where the potential for soil exposure to the erosive effects of rainfall and wind is great. Mass graded construction sites may be exposed for several years while the project is being built out. Thus, there is potential for significant sediment discharge from the site to surface waters.

At a minimum, the discharger/operator must implement an effective combination of erosion and sediment control on all disturbed areas during the rainy season. These disturbed areas include rough graded roadways, slopes, and building pads. Until permanent vegetation is established, soil cover is the most cost-effective and expeditious method to protect soil particles from detachment and transport by rainfall. Temporary soil stabilization can be the single-most important factor in reducing erosion at construction sites. The discharger shall consider measures such as: covering with mulch, temporary seeding, soil stabilizers, binders, fiber rolls or blankets, temporary vegetation, permanent seeding, and a variety of other measures.

The SWPPP shall include a description of the erosion control practices, including a time schedule, to be implemented during construction to minimize erosion on disturbed areas of a construction site. The discharger must consider the full range of erosion control BMPs. The discharger must consider any additional site-specific and seasonal conditions when selecting and implementing appropriate BMPs. The above listed erosion control measures are examples of what should be considered and are not exclusive of new or innovative approaches currently available or being developed.

- a. The SWPPP shall include:

- (1) An outline of the areas of vegetative soil cover or native vegetation onsite which will remain undisturbed during the construction project.
 - (2) An outline of all areas of soil disturbance including cut or fill areas which will be stabilized during the rainy season by temporary or permanent erosion control measures, such as seeding, mulch, or blankets, etc.
 - (3) An outline of the areas of soil disturbance, cut, or fill which will be left exposed during any part of the rainy season, representing areas of potential soil erosion where sediment control BMPs are required to be used during construction.
 - (4) A proposed schedule for the implementation of erosion control measures.
- b. The SWPPP shall include a description of the BMPs and control practices to be used for both temporary and permanent erosion control measures.
 - c. The SWPPP shall include a description of the BMPs to reduce wind erosion at all times, with particular attention paid to stock-piled materials.

7. Stabilization

- (1) All disturbed areas of the construction site must be stabilized. Final stabilization for the purposes of submitting a NOT is satisfied when:
 - All soil disturbing activities are completed AND EITHER OF THE TWO FOLLOWING CRITERIA ARE MET:
 - A uniform vegetative cover with 70 percent coverage has been established OR:
 - equivalent stabilization measures have been employed. These measures include the use of such BMPs as blankets, reinforced channel liners, soil cement, fiber matrices, geotextiles, or other erosion resistant soil coverings or treatments.
- (2) Where background native vegetation covers less than 100 percent of the surface, such as in arid areas, the 70 percent coverage criteria is adjusted as follows: If the native vegetation covers 50 percent of the ground surface, 70 percent of 50 percent ($.70 \times .50 = .35$) would require 35 percent total uniform surface coverage.

8. Sediment Control

The SWPPP shall include a description or illustration of BMPs which will be implemented to prevent a net increase of sediment load in storm water discharge relative to preconstruction levels. Sediment control BMPs are required at appropriate locations along the site perimeter and at all operational internal inlets to the storm drain system at all times during the rainy season. Sediment control practices may include filtration devices and barriers (such as fiber rolls, silt fence, straw bale barriers, and gravel inlet filters) and/or settling devices (such as sediment traps or basins). Effective filtration devices, barriers, and settling devices shall be selected, installed and maintained properly. A proposed schedule for deployment of sediment control BMPs shall be included in the SWPPP. These are the most basic measures to prevent sediment from leaving the project site and moving into receiving waters. Limited exemptions may be authorized by the RWQCB when work on active areas precludes the use of sediment control BMPs temporarily. Under these conditions, the SWPPP must describe a plan to establish perimeter controls prior to the onset of rain.

During the nonrainy season, the discharger is responsible for ensuring that adequate sediment control materials are available to control sediment discharges at the downgrade perimeter and operational inlets in the event of a predicted storm. The discharger shall consider a full range of sediment controls, in addition to the controls listed above, such as straw bale dikes, earth dikes, brush barriers, drainage swales, check dams, subsurface drain, sandbag dikes, fiber rolls, or other controls. At a minimum, the discharger/operator must implement an effective combination of erosion and sediment control on all disturbed areas during the rainy season.

If the discharger chooses to rely on sediment basins for treatment purposes, sediment basins shall, at a minimum, be designed and maintained as follows:

Option 1: Pursuant to local ordinance for sediment basin design and maintenance, provided that the design efficiency is as protective or more protective of water quality than Option 3.

OR

Option 2: Sediment basin(s), as measured from the bottom of the basin to the principal outlet, shall have at least a capacity equivalent to 3,600 cubic feet of storage per acre draining into the sediment basin. The length of the basin shall be more than twice the width of the basin. The length is determined by measuring the distance between the inlet and the outlet; and the depth must not be less than three feet nor greater than five feet for safety reasons and for maximum efficiency.

OR

Option 3: Sediment basin(s) shall be designed using the standard equation:

$$A_s = 1.2Q/V_s$$

Where: A_s is the minimum surface area for trapping soil particles of a certain size; V_s is the settling velocity of the design particle size chosen; and $Q = C \times I \times A$ where Q is the discharge rate measured in cubic feet per second; C is the runoff coefficient; I is the precipitation intensity for the 10-year, 6-hour rain event and A is the area draining into the sediment basin in acres. The design particle size shall be the smallest soil grain size determined by wet sieve analysis, or the fine silt sized (0.01mm) particle, and the V_s used shall be 100 percent of the calculated settling velocity.

The length is determined by measuring the distance between the inlet and the outlet; the length shall be more than twice the dimension as the width; the depth shall not be less than three feet nor greater than five feet for safety reasons and for maximum efficiency (two feet of storage, two feet of capacity). The basin(s) shall be located on the site where it can be maintained on a year-round basis and shall be maintained on a schedule to retain the two feet of capacity;

OR

- Option 4: The use of an equivalent surface area design or equation, provided that the design efficiency is as protective or more protective of water quality than Option 3.

A sediment basin shall have a means for dewatering within 7-calendar days following a storm event. Sediment basins may be fenced if safety (worker or public) is a concern.

The outflow from a sediment basin that discharges into a natural drainage shall be provided with outlet protection to prevent erosion and scour of the embankment and channel.

The discharger must consider any additional site-specific and seasonal conditions when selecting and designing sediment control BMPs. The above listed sediment control measures are examples of what should be considered and are not exclusive of new or innovative approaches currently available or being developed.

The SWPPP shall include a description of the BMPs to reduce the tracking of sediment onto public or private roads at all times. These public and private roads shall be inspected and cleaned as necessary. Road cleaning BMPs shall be discussed in the SWPPP and will not rely on the washing of accumulated sediment or silt into the storm drain system.

9. Non-Storm Water Management

Describe all non-storm water discharges to receiving waters that are proposed for the construction project. Non-storm water discharges should be eliminated or reduced to the extent feasible. Include the locations of such discharges and descriptions of all BMPs designed for the control of pollutants in such discharges. Onetime discharges shall be monitored during the time that such discharges are occurring. A qualified person should be assigned the responsibility for ensuring that no materials other than storm water are discharged in quantities which will have an adverse effect on receiving waters or storm drain systems (consistent with BAT/BCT), and the name and contact number of that person should be included in the SWPPP document.

Discharging sediment-laden water which will cause or contribute to an exceedance of the applicable RWQCB's Basin Plan from a dewatering site or sediment basin into any receiving water or storm drain without filtration or equivalent treatment is prohibited.

10. Post-Construction Storm Water Management

The SWPPP shall include descriptions of the BMPs to reduce pollutants in storm water discharges after all construction phases have been completed at the site (Post-Construction BMPs). Post-Construction BMPs include the minimization of land disturbance, the minimization of impervious surfaces, treatment of storm water runoff using infiltration, detention/retention, biofilter BMPs, use of efficient irrigation systems, ensuring that interior drains are not connected to a storm sewer system, and appropriately designed and constructed energy dissipation devices. These must be consistent with all local post-construction storm water management requirements, policies, and guidelines. The discharger must consider site-specific and seasonal conditions when designing the control practices. Operation and maintenance of control practices after construction is completed shall be addressed, including short-and long-term funding sources and the responsible party.

11. Maintenance, Inspection, and Repair

The SWPPP shall include a discussion of the program to inspect and maintain all BMPs as identified in the site plan or other narrative documents throughout the entire duration of the project. A qualified person will be assigned the responsibility to conduct inspections. The name and telephone number of that person shall be listed in the SWPPP document. Inspections will be performed before and after storm events and once each 24-hour period during extended storm events to identify BMP effectiveness and implement repairs or design changes as soon as feasible depending upon field conditions. Equipment, materials, and workers must be available for rapid response to failures and emergencies. All corrective maintenance to BMPs shall be performed as soon as possible after the conclusion of each storm depending upon worker safety.

For each inspection required above, the discharger shall complete an inspection checklist. At a minimum, an inspection checklist shall include:

- a. Inspection date.

- b. Weather information: best estimate of beginning of storm event, duration of event, time elapsed since last storm, and approximate amount of rainfall (inches).
- c. A description of any inadequate BMPs.
- d. If it is possible to safely access during inclement weather, list observations of all BMPs: erosion controls, sediment controls, chemical and waste controls, and non-storm water controls. Otherwise, list result of visual inspection at relevant outfall, discharge point, or downstream location and projected required maintenance activities.
- e. Corrective actions required, including any changes to SWPPP necessary and implementation dates.
- f. Inspectors name, title, and signature.

The dischargers shall prepare their inspection checklists using the inspection checklist form provided by the SWRCB or RWQCB or on forms that contain the equivalent information.

12. Training

Individuals responsible for SWPPP preparation, implementation, and permit compliance shall be appropriately trained, and the SWPPP shall document all training. This includes those personnel responsible for installation, inspection, maintenance, and repair of BMPs. Those responsible for overseeing, revising, and amending the SWPPP shall also document their training. Training should be both formal and informal, occur on an ongoing basis when it is appropriate and convenient, and should include training/workshops offered by the SWRCB, RWQCB, or other locally recognized agencies or professional organizations.

13. List of Contractors/Subcontractors

The SWPPP shall include a list of names of all contractors, (or subcontractors) and individuals responsible for implementation of the SWPPP. This list should include telephone numbers and addresses. Specific areas of responsibility of each subcontractor and emergency contact numbers should also be included.

14. Other Plans

This SWPPP may incorporate by reference the appropriate elements of other plans required by local, State, or Federal agencies. A copy of any requirements incorporated by reference shall be kept at the construction site.

15. Public Access

The SWPPP shall be provided, upon request, to the RWQCB. The SWPPP is considered a report that shall be available to the public by the RWQCB under section 308(b) of the Clean Water Act.

16. Preparer Certification

The SWPPP and each amendment shall be signed by the landowner (discharger) or his representative and include the date of initial preparation and the date of each amendment.

SECTION B: MONITORING PROGRAM AND REPORTING REQUIREMENTS

1. Required Changes

The RWQCB may require the discharger to conduct additional site inspections, to submit reports and certifications, or perform sampling and analysis.

2. Implementation

- a. The requirements of this Section shall be implemented at the time of commencement of construction activity (see also Section A. 2. Implementation Schedule). The discharger is responsible for implementing these requirements until construction activity is complete and the site is stabilized.
- b. For ongoing construction activity involving a change in ownership of property covered by this General Permit, the new owner must complete a NOI and implement the requirements of this Section concurrent with the change of ownership. For changes of information, the owner must follow instructions in C. 7. Special Provisions for Construction Activity of the General Permit.

3. Site Inspections

Qualified personnel shall conduct inspections of the construction site prior to anticipated storm events, during extended storm events, and after actual storm events to identify areas contributing to a discharge of storm water associated with construction activity. The name(s) and contact number(s) of the assigned inspection personnel shall be listed in the SWPPP. Pre-storm inspections are to ensure that BMPs are properly installed and maintained; post-storm inspections are to assure that the BMPs have functioned adequately. During extended storm events, inspections shall be required each 24-hour period. Best Management Practices (BMPs) shall be evaluated for adequacy and proper implementation and whether additional BMPs are required in accordance with the terms of the General Permit (see language in Section A. 11. Maintenance, Inspection, and Repair). Implementation of nonstorm water discharge BMPs shall be verified and their

effectiveness evaluated. One time discharges of non-storm water shall be inspected when such discharges occur.

4. Compliance Certification

Each discharger or qualified assigned personnel listed by name and contact number in the SWPPP must certify annually that construction activities are in compliance with the requirements of this General Permit and the SWPPP. This Certification shall be based upon the site inspections required in Item 3 of this Section. The certification must be completed by July 1 of each year.

5. Noncompliance Reporting

Dischargers who cannot certify compliance, in accordance with Item 4 of this Section and/or who have had other instances of noncompliance excluding exceedances of water quality standards as defined in section B. 3. Receiving Water Limitations Language, shall notify the appropriate RWQCB within 30 days. Corrective measures should be implemented immediately following discovery that water quality standards were exceeded. The notifications shall identify the noncompliance event, including an initial assessment of any impact caused by the event; describe the actions necessary to achieve compliance; and include a time schedule subject to the modifications by the RWQCB indicating when compliance will be achieved. Noncompliance notifications must be submitted within 30-calendar days of identification of noncompliance.

6. Monitoring Records

Records of all inspections, compliance certifications, and noncompliance reporting must be retained for a period of at least three years from the date generated. With the exception of noncompliance reporting, dischargers are not required to submit these records.

7. Monitoring Program for Sedimentation/Siltation

Dischargers of storm water associated with construction activity that directly enters a water body listed in Attachment 3 shall conduct a sampling and analysis program for the pollutants (sedimentation/siltation or turbidity) causing the impairment. The discharger shall monitor for the applicable parameter. If the water body is listed for sedimentation or siltation, samples should be analyzed for Settleable Solids (ml/l) and Total Suspended Solids (mg/l). Alternatively or in addition, samples may be analyzed for suspended sediment concentration according to ASTM D3977-97. If the water body is listed for turbidity, samples should be analyzed for turbidity (NTU). Discharges that flow through tributaries that are not listed in Attachment 3 or that flow into Municipal Separate Storm Sewer Systems (MS4) are not subject to these sampling and analysis requirements. The sampling and analysis parameters and procedures must be designed to determine whether the BMPs installed and maintained prevent discharges of sediment from contributing to impairment in receiving waters.

Samples shall be collected during the first two hours of discharge from rain events which result in a direct discharge to any water body listed in Attachment 3. Samples shall be collected during daylight hours (sunrise to sunset). Dischargers need not collect more than four (4) samples per month. All samples shall be taken in the receiving waters and shall be representative of the prevailing conditions of the water bodies. Samples shall be collected from safely accessible locations upstream of the construction site discharge and immediately downstream from the last point of discharge.

For laboratory analysis, all sampling, sample preservation, and analyses must be conducted according to test procedures under 40 CFR Part 136. Field samples shall be collected and analyzed according to the specifications of the manufacturer of the sampling devices employed. Portable meters shall be calibrated according to manufacturer's specification. All field and/or laboratory analytical data shall be kept in the SWPPP document, which is to remain at the construction site at all times until a Notice of Termination has been submitted and approved.

8. Monitoring Program for Pollutants Not Visually Detectable in Storm Water

A sampling and analysis program shall be developed and conducted for pollutants which are not visually detectable in storm water discharges, which are or should be known to occur on the construction site, and which could cause or contribute to an exceedance of water quality objectives in the receiving water. Pollutants that should be considered for inclusion in this sampling and analysis program are those identified in Sections A.5.b. and A.5.c.

Construction materials and compounds that are not stored in water-tight containers under a water-tight roof or inside a building are examples of materials for which the discharger may have to implement sampling and analysis procedures. The goal of the sampling and analysis is to determine whether the BMPs employed and maintained on site are effective in preventing the potential pollutants from coming in contact with storm water and causing or contributing to an exceedance of water quality objectives in the receiving waters. Examples of construction sites that may require sampling and analysis include: sites that are known to have contaminants spilled or spread on the ground; sites where construction practices include the application of soil amendments, such as gypsum, which can increase the pH of the runoff; or sites having uncovered stockpiles of material exposed to storm water. Visual observations before, during, and after storm events may trigger the requirement to collect samples. Any breach, malfunction, leakage, or spill observed which could result in the discharge of pollutants to surface waters that *would* not be visually detectable in storm water shall trigger the collection of a sample of discharge. Samples shall be collected at all discharge locations which drain the areas identified by the visual observations and which can be safely accessed. For sites where sampling and analysis is required, personnel trained in water quality sampling procedures shall collect storm water samples. A sufficiently large sample of storm water that has not come in contact with the disturbed soil or the materials stored or used on-site

(uncontaminated sample) shall be collected for comparison with the discharge sample. Samples shall be collected during the first two hours of discharge from rain events that occur during daylight hours and which generate runoff.

The uncontaminated sample shall be compared to the samples of discharge using field analysis or through laboratory analysis. Analyses may include, but are not limited to, indicator parameters such as: pH, specific conductance, dissolved oxygen, conductivity, salinity, and TDS.

For laboratory analysis, all sampling, sample preservation, and analyses must be conducted according to test procedures under 40 CFR Part 136. Field discharge samples shall be collected and analyzed according to the specifications of the manufacturer of the sampling devices employed. Portable meters shall be calibrated according to manufacturer's specification. All field and/or analytical data shall be kept in the SWPPP document, which is to remain at the construction site at all times until a *Notice of Termination* has been submitted and approved.

SECTION C: STANDARD PROVISIONS FOR CONSTRUCTION ACTIVITY

1. Duty to Comply

The discharger must comply with all of the conditions of this General Permit. Any permit noncompliance constitutes a violation of the Clean Water Act (CWA) and the Porter-Cologne Water Quality Control Act and is grounds for enforcement action and/or removal from General Permit coverage.

The discharger shall comply with effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if this General Permit has not yet been modified to incorporate the requirement.

2. General Permit Actions

This General Permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the discharger for a General Permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not annul any General Permit condition.

If any toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under Section 307(a) of the CWA for a toxic pollutant which is present in the discharge and that standard or prohibition is more stringent than any limitation on the pollutant in this General Permit, this General Permit shall be modified or revoked and reissued to conform to the toxic effluent standard or prohibition and the dischargers so notified.

3. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this General Permit.

4. Duty to Mitigate

The discharger shall take all responsible steps to minimize or prevent any discharge in violation of this General Permit, which has a reasonable likelihood of adversely affecting human health or the environment.

5. Proper Operation and Maintenance

The discharger shall at all times properly operate and maintain any facilities and systems of treatment and control (and related appurtenances) which are installed or used by the discharger to achieve compliance with the conditions of this General Permit and with the requirements of Storm Water Pollution Prevention Plans (SWPPP). Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. Proper operation and maintenance may require the operation of backup or auxiliary facilities or similar systems installed by a discharger when necessary to achieve compliance with the conditions of this General Permit.

6. Property Rights

This General Permit does not convey any property rights of any sort or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor does it authorize any infringement of Federal, State, or local laws or regulations.

7. Duty to Provide Information

The discharger shall furnish the RWQCB, State Water Resources Control Board, or USEPA, within a reasonable time, any requested information to determine compliance with this General Permit. The discharger shall also furnish, upon request, copies of records required to be kept by this General Permit.

8. Inspection and Entry

The discharger shall allow the RWQCB, SWRCB, USEPA, and/or, in the case of construction sites which discharge through a municipal separate storm sewer, an authorized representative of the municipal operator of the separate storm sewer system receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

- a. Enter upon the discharger's premises at reasonable times where a regulated construction activity is being conducted or where records must be kept under the conditions of this General Permit;
- b. Access and copy at reasonable times any records that must be kept under the conditions of this General Permit;
- c. Inspect at reasonable times the complete construction site, including any off-site staging areas or material storage areas, and the erosion/sediment controls; and
- d. Sample or monitor at reasonable times for the purpose of ensuring General Permit compliance.

9. Signatory Requirements

- a. All Notice of Intents (NOIs), Notice of Terminations (NOTs), SWPPPs, certifications, and reports prepared in accordance with this Order submitted to the SWRCB shall be signed as follows:
 - (1) For a corporation: by a responsible corporate officer. For the purpose of this Section, a responsible corporate officer means: (a) a president, secretary, treasurer, or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or (b) the manager of the construction activity if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;
 - (2) For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or
 - (3) For a municipality, State, Federal, or other public agency: by either a principal executive officer, ranking elected official, or duly authorized representative. The principal executive officer of a Federal agency includes the chief executive officer of the agency or the senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of USEPA).
- b. All SWPPPs, reports, certifications, or other information required by the General Permit and/or requested by the RWQCB, SWRCB, USEPA, or the local storm water management agency shall be signed by a person described above or by a duly authorized representative. A person is a duly authorized representative if:
 - (1) The authorization is made in writing by a person described above and retained as part of the SWPPP; or

- (2) The authorization specifies either an individual or a position having responsibility for the overall operation of the construction activity, such as the position of manager, operator, superintendent, or position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position).
- c. If an authorization is no longer accurate because a different individual or position has responsibility for the overall operation of the construction activity, a new authorization must be attached to the SWPPP prior to submittal of any reports, information, or certifications to be signed by the authorized representative.

10. Certification

Any person signing documents under Section C, Provision 9 above, shall make the following certification:

"I certify under 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, to the best of my knowledge and belief, the information submitted is, 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."

11. Anticipated Noncompliance

The discharger will give advance notice to the RWQCB and local storm water management agency of any planned changes in the construction activity which may result in noncompliance with General Permit requirements.

12. Penalties for Falsification of Reports

Section 309(c)(4) of the CWA provides that any person who knowingly makes any false material statement, representation, or certification in any record or other document submitted or required to be maintained under this General Permit, including reports of compliance or noncompliance shall upon conviction, be punished by a fine of not more than \$10,000 or by imprisonment for not more than two years or by both.

13. Oil and Hazardous Substance Liability

Nothing in this General Permit shall be construed to preclude the institution of any legal action or relieve the discharger from any responsibilities, liabilities, or penalties to which the discharger is or may be subject to under Section 311 of the CWA.

14. Severability

The provisions of this General Permit are severable; and, if any provision of this General Permit or the application of any provision of this General Permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this General Permit shall not be affected thereby.

15. Reopener Clause

This General Permit may be modified, revoked and reissued, or terminated for cause due to promulgation of amended regulations, receipt of USEPA guidance concerning regulated activities, judicial decision, or in accordance with 40 Code of Federal Regulations (CFR) 122.62, 122.63, 122.64, and 124.5.

16. Penalties for Violations of Permit Conditions

- a. Section 309 of the CWA provides significant penalties for any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the CWA or any permit condition or limitation implementing any such section in a permit issued under Section 402. Any person who violates any permit condition of this General Permit is subject to a civil penalty not to exceed \$27,500 per calendar day of such violation, as well as any other appropriate sanction provided by Section 309 of the CWA.
- b. The Porter-Cologne Water Quality Control Act also provides for civil and criminal penalties which in some cases are greater than those under the CWA.

17. Availability

A copy of this General Permit shall be maintained at the construction site during construction activity and be available to operating personnel.

18. Transfers

This General Permit is not transferable. A new owner of an ongoing construction activity must submit a NOI in accordance with the requirements of this General Permit to be authorized to discharge under this General Permit. An owner who sells property covered

by this General Permit shall inform the new owner of the duty to file a NOI and shall provide the new owner with a copy of this General Permit.

19. Continuation of Expired Permit

This General Permit continues in force and effect until a new General Permit is issued or the SWRCB rescinds this General Permit. Only those dischargers authorized to discharge under the expiring General Permit are covered by the continued General Permit.

SWRCB AND RWQCB CONTACT LIST

Division of Water Quality

P.O. Box 1977

Sacramento, CA 95812-1977

(916) 341-5537 FAX: (916) 341-5543

Web Page: <http://www.waterboards.ca.gov/stormwtr/index.html>

Email: stormwater@waterboards.ca.gov

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARDS

NORTH COAST REGION (1)
 5550 Skylane Blvd, Ste. A
 Santa Rose, CA 95403
 (707) 576-2220 FAX: (707)523-0135
<http://www.waterboards.ca.gov/rwqcb1>

SAN FRANCISCO BAY REGION (2)
 1515 Clay Street, Ste. 1400
 Oakland, CA 94612
 (510) 622-2300 FAX: (510) 622-2640
<http://www.waterboards.ca.gov/rwqcb2>

CENTRAL COAST REGION (3)
 895 Aerovista Place, Ste 101
 San Luis Obispo, CA 93401
 (805) 549-3147 FAX: (805) 543-0397
<http://www.waterboards.ca.gov/rwqcb3>

LOS ANGELES REGION (4)
 320 W. 4th Street, Ste. 200
 Los Angeles, CA 90013
 (213) 576-6600 FAX: (213) 576-6640
<http://www.waterboards.ca.gov/rwqcb4>

LAHONTAN REGION (6 SLT)
 2501 Lake Tahoe Blvd.
 South Lake Tahoe, CA 96150
 (530) 542-5400 FAX: (530) 544-2271
<http://www.waterboards.ca.gov/rwqcb6>

VICTORVILLE OFFICE (6V)
 15428 Civic Drive, Ste. 100
 Victorville, CA 92392-2383
 (760) 241-6583 FAX: (760) 241-7308
<http://www.waterboards.ca.gov/rwqcb6>

CENTRAL VALLEY REGION (5S)
 11020 Sun Center Dr., #200
 Rancho Cordova, CA 95670-6114
 (916) 464-3291 FAX: (916) 464-4645
<http://www.waterboards.ca.gov/rwqcb5>

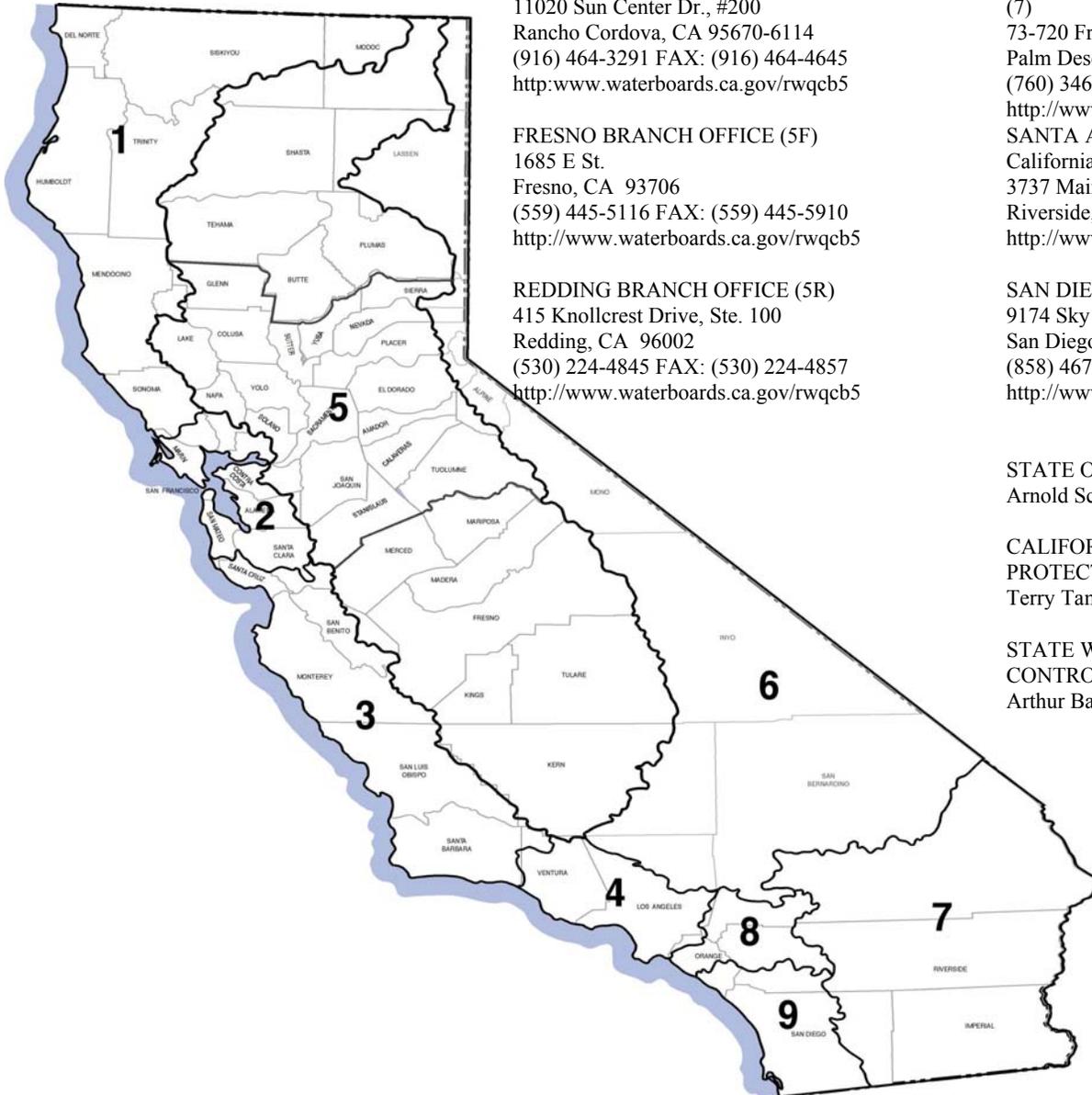
FRESNO BRANCH OFFICE (5F)
 1685 E St.
 Fresno, CA 93706
 (559) 445-5116 FAX: (559) 445-5910
<http://www.waterboards.ca.gov/rwqcb5>

REDDING BRANCH OFFICE (5R)
 415 Knollcrest Drive, Ste. 100
 Redding, CA 96002
 (530) 224-4845 FAX: (530) 224-4857
<http://www.waterboards.ca.gov/rwqcb5>

COLORADO RIVER BASIN REGION (7)
 73-720 Fred Waring Dr., Ste. 100
 Palm Desert, CA 92260
 (760) 346-7491 FAX: (760) 341-6820
<http://www.waterboards.ca.gov/rwqcb7>

SANTA ANA REGION (8)
 California Tower
 3737 Main Street, Ste. 500
 Riverside, CA 92501-3339
<http://www.waterboards.ca.gov/rwqcb8>

SAN DIEGO REGION (9)
 9174 Sky Park Court, Ste. 100
 San Diego, CA 92123-4340
 (858) 467-2952 FAX: (858) 571-6972
<http://www.waterboards.ca.gov/rwqcb9>



STATE OF CALIFORNIA
 Arnold Schwarzenegger, Governor

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
 Terry Tamminen, Secretary

STATE WATER RESOURCES CONTROL BOARD
 Arthur Baggett Jr., Chairman

NOTICE OF INTENT (NOI) TO COMPLY WITH THE TERMS
OF THE GENERAL PERMIT TO DISCHARGE STORM WATER
ASSOCIATED WITH CONSTRUCTION ACTIVITY

GENERAL INSTRUCTIONS

Who Must Submit

Discharges of storm water associated with construction that results in the disturbance of one acre or more of land must apply for coverage under the General Construction Activities Storm Water Permit (General Permit). Construction activity which is a part of a larger common area of development or sale must also be permitted. (For example, if 4 acres of a 20-acre subdivision is disturbed by construction activities, and the remaining 16 acres is to be developed at a future date, the property owner must obtain a General Storm Water Permit for the 4-acre project). Construction activity includes, but is not limited to: clearing, grading, demolition, excavation, construction of new structures, and reconstruction of existing facilities involving removal and replacement that results in soil disturbance. This includes construction access roads, staging areas, storage areas, stockpiles, and any off-site areas which receive run-off from the construction project such as discharge points into a receiving water. Construction activity does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility.

The owner of the land where the construction activity is occurring is responsible for obtaining a permit. Owners may obtain coverage under the General Permit by filing a NOI in accordance with the following instructions. Coverage for construction activity conducted on easements (e.g., pipeline construction) or on nearby properties by agreement or permission, or by an owner or lessee of a mineral estate (oil, gas, geothermal, aggregate, precious metals, and/or industrial minerals) entitled to conduct the activities, shall be obtained by the entity responsible for the construction activity. Linear construction projects which will have construction activity occurring in one or more than one Region should contact the State Water Resources Control Board at the number listed below prior to submitting an NOI application for specific information related to the use of the NOI form.

Construction Activity Not Covered By This General Permit

Storm water discharges in the Lake Tahoe Hydrologic Unit will be regulated by a separate permit(s) adopted by the California Regional Water Quality Control Board, Lahontan Region, and will not be covered under the State Water Resources Control Board's (SWRCB) General Permit. Storm water discharges on Indian Lands will be regulated by the U.S. Environmental Protection Agency.

Where to Apply

The NOI form, vicinity map, and appropriate fee must be mailed to the SWRCB at the following address:

State Water Resources Control Board
Division of Water Quality
Attn: Storm Water Permit Unit
P.O. Box 1977
Sacramento, CA 95812-1977

When to Apply

Property owners proposing to conduct construction activities subject to this General Permit must file a Notice of Intent prior to the commencement of construction activity.

Fees

The total annual fee is the current base fee plus applicable surcharges for all construction sites submitting an NOI. Checks should be made payable to: SWRCB.

Completing the Notice of Intent (NOI)

The submittal to obtain coverage under the General Permit must include a completed NOI Form (Notice of Intent, attached), a vicinity map, and the appropriate annual fee. The NOI must be completely and accurately filled out; the vicinity map and annual fee must be included with the NOI or the submittal is considered incomplete and will be rejected. A construction site is considered to be covered by the General Permit upon filing a complete NOI submittal, and implementation of a defensible Storm Water Pollution Prevention Plan (SWPPP). Upon receipt of a complete NOI submittal, each discharger will be sent a receipt letter containing the waste discharger's identification (WDID) number.

Questions?

If you have any questions on completing the NOI please call the SWRCB at (916) 341-5537.

NOI-LINE-BY-LINE INSTRUCTIONS

Please type or print when completing the NOI Form and vicinity map.

SECTION I--NOI STATUS

Mark one of the two boxes at the top portion of the NOI. Check box 1 if the NOI is being completed for new construction. Check box 2 if the NOI is being submitted to report changes for a construction site already covered by the General Permit. An example of a change that warrants a resubmittal of the NOI is a change of total area of the construction site. The permit is non-transferable, a change of ownership requires a Notice of Termination (NOT) submittal and a new NOI. Complete only those portions of the NOI that apply to the changes (the NOI must always be signed). If box 2 is checked, the WDID number must be included.

SECTION II--PROPERTY OWNER

Enter the construction site owner's official or legal name and address; contact person (if other than owner), title, and telephone number.

SECTION III--DEVELOPER / CONTRACTOR INFORMATION

Enter the name of the developer's (or general contractor's) official or legal name, address, contact person, title, and telephone number. The contact person should be someone who is familiar with the construction site and is responsible for compliance and oversight of the general permit.

SECTION IV-CONSTRUCTION PROJECT INFORMATION

Enter the project name, site address, county, city, (or nearest city if construction is occurring in an unincorporated area), zip code, and telephone number (if any) of the construction site. Include an emergency contact telephone or pager number. Construction site information should include latitude and longitude designations, tract numbers, and/or mile post markers, if applicable. The site contact person should be someone who is familiar with the project, site plans, SWPPP, and monitoring program. All NOIs must be accompanied by a vicinity map.

Part A: Enter the total size in acres of all areas associated with construction activity, including all access roads.

Part B: Enter the total size in acres of the area to be disturbed by construction activity and the percentage of the area listed in Part A above that this represents.

Part C: Enter the percentage of the site that is impervious (areas where water cannot soak into the ground, such as concrete, asphalt, rooftops, etc.) before and after construction.

Part D: Include tract numbers, if available.

- Part E: Enter the mile post marker number at the project site location.
- Part F: Indicate whether the construction site is part of a larger common plan of development or sale. For example, if the construction activity is occurring on a two-acre site which is within a development that is one acre or greater, answer yes.
- Part G: Enter the name of the development (e.g. "Quail Ridge Subdivision", "Orange Valley Estates", etc.).
- Part H: Indicate when construction will begin (month, day, year). When a NOI is being submitted due to a change in ownership, the commencement date should be the date the new ownership took effect.
- Part I: Indicate the percentage of the total project area to be mass graded.
- Part J: Enter the estimated completion dates for the mass grading activities and for the project completion.
- Part K: Indicate the type(s) of construction taking place. For example, "Transportation" should be checked for the construction of roads; "Utility" should be checked for installation of sewer, electric, or telephone systems. Include a description of the major construction activities, (e.g., 20 single family homes, a supermarket, an office building, a factory, etc.)

SECTION V--BILLING ADDRESS

To continue coverage under the General Permit, the annual fee must be paid. Indicate where the annual fee invoice should be mailed by checking one of the following boxes:

Owner: sent to the owners address as it appears in Section II.

Developer/Contractor: sent to the developer's address as it appears in Section III.

Other: sent to a different address and enter that address in the spaces provided.

SECTION VI--REGULATORY STATUS

Indicate whether or not the site is subject to local erosion/sediment control ordinances. Indicate whether the erosion/sediment control plan designed to comply with the ordinance addresses the construction of infrastructure and structures in addition to grading. Identify the name and telephone number of the local agency, if applicable.

SECTION VII--RECEIVING WATER INFORMATION

Part A: Indicate whether the storm water runoff from the construction site discharges indirectly to waters of the United States, directly to waters of the United States, or to a separate storm drain system.

Indirect discharges include discharges that may flow overland across adjacent properties or rights-of-way prior to discharging into waters of the United States.

Enter the name of the owner/operator of the relevant storm drain system, if applicable. Storm water discharges directly to waters of the United States will typically have an outfall structure directly from the facility to a river, lake, creek, stream, bay, ocean, etc. Discharges to separate storm sewer systems are those that discharge to a collection system operated by municipalities, flood control districts, utilities, or similar entities.

Part B: Enter the name of the receiving water. Regardless of point of discharge, the owner must determine the receiving water for the construction site's storm water discharge. Enter the name of the receiving water.

SECTION VIII--IMPLEMENTATION OF NPDES PERMIT REQUIREMENTS

Part A: Indicate the status of the SWPPP, date prepared, or availability for review. Also indicate if a tentative construction schedule has been included in the SWPPP (the inclusion of a construction activity schedule is a mandatory SWPPP requirement).

Part B: Provide information concerning the status of the development of a monitoring program, a component of the SWPPP which outlines an inspection and maintenance schedule for the proposed Best Management Practices (BMPs). Provide name and phone number of program preparer.

Part C: Provide the name and phone numbers of the responsible party or parties designated to insure compliance with all elements of the General Permit and SWPPP.

SECTION IX--VICINITY MAP AND FEE

Provide a "to scale" or "to approximate scale" drawing of the construction site and the immediate surrounding area. Whenever possible, limit the map to an 8.5" x 11' or 11" x 17" sheet of paper. At a minimum, the map must show the site perimeter, the geographic features surrounding the site, and general topography, and a north arrow. The map must also include the location of the construction project in relation to named streets, roads, intersections, or landmarks. A NOI containing a map which does not clearly indicate the location of the construction project will be rejected. Do not submit blueprints unless they meet the above referenced size limits.

SECTION X--CERTIFICATIONS

This section must be completed by the owner or signatory agent of the construction site*. The certification provides assurances that the NOI and vicinity map were completed in an accurate and complete fashion and with the knowledge that penalties exist for providing false information. Certification also requires the owner to comply with the provisions in the General Permit.

* For a corporation: a responsible corporate officer (or authorized individual). For a partnership or sole proprietorship: a general partner or the proprietor, respectively. For a municipality, State, Federal, or other public agency: either a principal executive officer, ranking elected official, or duly authorized representative.



State Water Resources Control Board

NOTICE OF INTENT

TO COMPLY WITH THE TERMS OF THE
GENERAL PERMIT TO DISCHARGE STORM WATER
ASSOCIATED WITH CONSTRUCTION ACTIVITY (WQ ORDER No. 99-08-DWQ)



I. NOI STATUS (SEE INSTRUCTIONS)

MARK ONLY ONE ITEM	1. <input type="checkbox"/> New Construction	2. <input type="checkbox"/> Change of Information for WDID#	<input type="text"/>
--------------------	--	---	----------------------

II. PROPERTY OWNER

Name		Contact Person		
Mailing Address		Title		
City	State	Zip	Phone	
Owner Type (check one) 1. <input type="checkbox"/> Private Individual 2. <input type="checkbox"/> Business 3. <input type="checkbox"/> Municipal 4. <input type="checkbox"/> State 5. <input type="checkbox"/> Federal 6. <input type="checkbox"/> Other				

III. DEVELOPER/CONTRACTOR INFORMATION

Developer/Contractor		Contact Person		
Mailing Address		Title		
City	State	Zip	Phone	

IV. CONSTRUCTION PROJECT INFORMATION

Site/Project Name		Site Contact Person		
Physical Address/Location		Latitude _____°	Longitude _____°	County
City (or nearest City)		Zip	Site Phone Number	Emergency Phone Number
A. Total size of construction site area: _____ Acres	C. Percent of site imperviousness (including rooftops): Before Construction: _____% After Construction: _____%		D. Tract Number(s): _____, _____	
B. Total area to be disturbed: _____ Acres (% of total _____)			E. Mile Post Marker: _____	
F. Is the construction site part of a larger common plan of development or sale? <input type="checkbox"/> YES <input type="checkbox"/> NO		G. Name of plan or development:		
H. Construction commencement date: ____/____/____		J. Projected construction dates: Complete grading: ____/____/____ Complete project: ____/____/____		
I. % of site to be mass graded: _____				
K. Type of Construction (Check all that apply): 1. <input type="checkbox"/> Residential 2. <input type="checkbox"/> Commercial 3. <input type="checkbox"/> Industrial 4. <input type="checkbox"/> Reconstruction 5. <input type="checkbox"/> Transportation 6. <input type="checkbox"/> Utility Description: _____ 7. <input type="checkbox"/> Other (Please List): _____				

V. BILLING INFORMATION

SEND BILL TO: <input type="checkbox"/> OWNER (as in II. above)	Name	Contact Person	
<input type="checkbox"/> DEVELOPER (as in III. above)	Mailing Address	Phone/Fax	
<input type="checkbox"/> OTHER (enter information at right)	City	State	Zip

VI. REGULATORY STATUS

A. Has a local agency approved a required erosion/sediment control plan?..... YES NO
 Does the erosion/sediment control plan address construction activities such as infrastructure and structures?..... YES NO
 Name of local agency: _____ Phone: _____

B. Is this project or any part thereof, subject to conditions imposed under a CWA Section 404 permit of 401 Water Quality Certification?..... YES No
 If yes, provide details: _____

VII. RECEIVING WATER INFORMATION

A. Does the storm water runoff from the construction site discharge to (Check all that apply):

1. Indirectly to waters of the U.S.

2. Storm drain system - Enter owner's name: _____

3. Directly to waters of U.S. (e.g. , river, lake, creek, stream, bay, ocean, etc.)

B. Name of receiving water: (river, lake, creek, stream, bay, ocean): _____

VIII. IMPLEMENTATION OF NPDES PERMIT REQUIREMENTS

A. STORM WATER POLLUTION PREVENTION PLAN (SWPPP) (check one)

A SWPPP has been prepared for this facility and is available for review: Date Prepared: ____/____/____ Date Amended: ____/____/____

A SWPPP will be prepared and ready for review by (enter date): ____/____/____

A tentative schedule has been included in the SWPPP for activities such as grading, street construction, home construction, etc.

B. MONITORING PROGRAM

A monitoring and maintenance schedule has been developed that includes inspection of the construction BMPs before anticipated storm events and after actual storm events and is available for review.

If checked above: A qualified person has been assigned responsibility for pre-storm and post-storm BMP inspections to identify effectiveness and necessary repairs or design changes..... YES NO

Name: _____ Phone: _____

C. PERMIT COMPLIANCE RESPONSIBILITY

A qualified person has been assigned responsibility to ensure full compliance with the Permit, and to implement all elements of the Storm Water Pollution Prevention Plan including:

1. Preparing an annual compliance evaluation..... YES NO
 Name: _____ Phone: _____

2. Eliminating all unauthorized discharges..... YES NO

IX. VICINITY MAP AND FEE (must show site location in relation to nearest named streets, intersections, etc.)

Have you included a vicinity map with this submittal? YES NO

Have you included payment of the annual fee with this submittal?..... YES NO

X. CERTIFICATIONS

"I certify under penalty of law that this document and all attachments were prepared under my direction and 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 or imprisonment. In addition, I certify that I have read the entire General Permit, including all attachments, and agree to comply with and be bound by all of the provisions, requirements, and prohibitions of the permit, including the development and implementation of a Storm Water Pollution Prevention Plan and a Monitoring Program Plan will be complied with."

Printed Name: _____

Signature: _____ Date: _____

Title: _____

303d Listed Water Bodies for Sedimentation

REGION	WATER BODY NAME	CODE	POLLUTANT
1	MATTOLE RIVER	1100	Sedimentation/Siltation
1	TRINITY RIVER, SOUTH FORK	1100	Sedimentation/Siltation
1	REDWOOD CREEK	1100	Sedimentation/Siltation
1	MAD RIVER	1100	Sedimentation/Siltation
1	ELK RIVER	1100	Sedimentation/Siltation
1	EEL RIVER, SOUTH FORK	1100	Sedimentation/Siltation
1	EEL RIVER, NORTH FORK	1100	Sedimentation/Siltation
1	TRINITY RIVER	1100	Sedimentation/Siltation
1	EEL RIVER, MIDDLE FORK	1100	Sedimentation/Siltation
1	MAD RIVER	2500	Turbidity
1	TEN MILE RIVER	1100	Sedimentation/Siltation
1	NOYO RIVER	1100	Sedimentation/Siltation
1	BIG RIVER	1100	Sedimentation/Siltation
1	ALBION RIVER	1100	Sedimentation/Siltation
1	NAVARRO RIVER	1100	Sedimentation/Siltation
1	GARCIA RIVER	1100	Sedimentation/Siltation
1	GUALALA RIVER	1100	Sedimentation/Siltation
1	RUSSIAN RIVER	1100	Sedimentation/Siltation
1	TOMKI CREEK	1100	Sedimentation/Siltation
1	VAN DUZEN RIVER	1100	Sedimentation/Siltation
1	EEL RIVER DELTA	1100	Sedimentation/Siltation
1	EEL RIVER, MIDDLE MAIN FORK	1100	Sedimentation/Siltation
1	ESTERO AMERICANO	1100	Sedimentation/Siltation
1	NAVARRO RIVER DELTA	1100	Sedimentation/Siltation
1	EEL RIVER, UPPER MAIN FORK	1100	Sedimentation/Siltation
1	FRESHWATER CREEK	1100	Sedimentation/Siltation
1	SCOTT RIVER	1100	Sedimentation/Siltation
2	TOMALES BAY	1100	Sedimentation/Siltation
2	NAPA RIVER	1100	Sedimentation/Siltation
2	SONOMA CREEK	1100	Sedimentation/Siltation
2	PETALUMA RIVER	1100	Sedimentation/Siltation
2	LAGUNITAS CREEK	1100	Sedimentation/Siltation
2	WALKER CREEK	1100	Sedimentation/Siltation
2	SAN GREGORIO CREEK	1100	Sedimentation/Siltation

2	SAN FRANCISQUITO CREEK	1100	Sedimentation/Siltation
2	PESCADERO CREEK (REG 2)	1100	Sedimentation/Siltation
2	BUTANO CREEK	1100	Sedimentation/Siltation
3	MORRO BAY	1100	Sedimentation/Siltation
3	SAN LORENZO RIVER ESTUARY	1100	Sedimentation/Siltation
3	SHINGLE MILL CREEK	1100	Sedimentation/Siltation
3	MOSS LANDING HARBOR	1100	Sedimentation/Siltation
3	WATSONVILLE SLOUGH	1100	Sedimentation/Siltation
3	SAN LORENZO RIVER	1100	Sedimentation/Siltation
3	ELKHORN SLOUGH	1100	Sedimentation/Siltation
3	SALINAS RIVER LAGOON (NORTH)	1100	Sedimentation/Siltation
3	GOLETA SLOUGH/ESTUARY	1100	Sedimentation/Siltation
3	CARPINTERIA MARSH (EL ESTERO MARSH)	1100	Sedimentation/Siltation
3	LOMPICO CREEK	1100	Sedimentation/Siltation
3	MORO COJO SLOUGH	1100	Sedimentation/Siltation
3	VALENCIA CREEK	1100	Sedimentation/Siltation
3	PAJARO RIVER	1100	Sedimentation/Siltation
3	RIDER GULCH CREEK	1100	Sedimentation/Siltation
3	LLAGAS CREEK	1100	Sedimentation/Siltation
3	SAN BENITO RIVER	1100	Sedimentation/Siltation
3	SALINAS RIVER	1100	Sedimentation/Siltation
3	CHORRO CREEK	1100	Sedimentation/Siltation
3	LOS OSOS CREEK	1100	Sedimentation/Siltation
3	SANTA YNEZ RIVER	1100	Sedimentation/Siltation
3	SAN ANTONIO CREEK (SANTA BARBARA COUNTY)	1100	Sedimentation/Siltation
3	CARBONERA CREEK	1100	Sedimentation/Siltation
3	SOQUEL LAGOON	1100	Sedimentation/Siltation
3	APTOS CREEK	1100	Sedimentation/Siltation
4	MUGU LAGOON	1100	Sedimentation/Siltation
5	HUMBUG CREEK	1100	Sedimentation/Siltation
5	PANOCHÉ CREEK	1100	Sedimentation/Siltation
5	FALL RIVER (PIT)	1100	Sedimentation/Siltation
6	BEAR CREEK (R6)	1100	Sedimentation/Siltation
6	MILL CREEK (3)	1100	Sedimentation/Siltation
6	HORSESHOE LAKE (2)	1100	Sedimentation/Siltation
6	BRIDGEPORT RES	1100	Sedimentation/Siltation
6	TOPAZ LAKE	1100	Sedimentation/Siltation
6	LAKE TAHOE	1100	Sedimentation/Siltation

6	PINE CREEK (2)	1100	Sedimentation/Siltation
6	TRUCKEE RIVER	1100	Sedimentation/Siltation
6	CLEARWATER CREEK	1100	Sedimentation/Siltation
6	GRAY CREEK (R6)	1100	Sedimentation/Siltation
6	WARD CREEK	1100	Sedimentation/Siltation
6	BLACKWOOD CREEK	1100	Sedimentation/Siltation
6	GOODALE CREEK	1100	Sedimentation/Siltation
6	EAST WALKER RIVER	1100	Sedimentation/Siltation
6	HEAVENLY VALLEY CREEK	1100	Sedimentation/Siltation
6	WOLF CREEK (1)	1100	Sedimentation/Siltation
6	WEST WALKER RIVER	1100	Sedimentation/Siltation
6	HOT SPRINGS CANYON CREEK	1100	Sedimentation/Siltation
6	BRONCO CREEK	1100	Sedimentation/Siltation
6	SQUAW CREEK	1100	Sedimentation/Siltation
7	IMPERIAL VALLEY DRAINS	1100	Sedimentation/Siltation
7	NEW RIVER (R7)	1100	Sedimentation/Siltation
7	ALAMO RIVER	1100	Sedimentation/Siltation
8	SAN DIEGO CREEK, REACH 1	1100	Sedimentation/Siltation
8	RATHBONE (RATHBUN) CREEK	1100	Sedimentation/Siltation
8	SAN DIEGO CREEK, REACH 2	1100	Sedimentation/Siltation
8	UPPER NEWPORT BAY ECOLOGICAL RESERVE	1100	Sedimentation/Siltation
8	BIG BEAR LAKE	1100	Sedimentation/Siltation
8	ELSINORE, LAKE	1100	Sedimentation/Siltation
9	SAN ELIJO LAGOON	1100	Sedimentation/Siltation
9	LOS PENASQUITOS LAGOON	1100	Sedimentation/Siltation
9	AGUA HEDIONDA LAGOON	1100	Sedimentation/Siltation
9	BUENA VISTA LAGOON	1100	Sedimentation/Siltation

**NEW OWNER INFORMATION AND
CHANGE OF INFORMATION (COI) FORM FOR THE
GENERAL CONSTRUCTION PERMIT NO. CAS000002**

Owners Name: _____
 WDID No.: _____
 Prepared By: _____

Date: _____
 Date of Last NOI Change: _____
 Signature of Preparer: _____

	Area Transferred (acres)¹ column 1	Area Remaining (acres)² column 2	Lot/Tract Numbers Transferred	Contact Person and Company Name of NewOwner(s)	Address(es) of the New Owner(s)	Phone # of New Owner	Is Const/Post Construction Complete? Yes/No	Date of Ownership Transfer
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

¹Use approximate area (in acres) if no exact figure is available.

²Calculate running total in this column as follows:

Enter in column 2, line 1, the area from NOI minus the area in column 1.

Enter in column 2, line 2, the area in column 2, line 1, minus the area in line 2, column 1.

Enter in column 2, line 3, the area in column 2, line 2, minus the area in line 3, column 1, and so forth.