

# **SITE MANAGEMENT PLAN**

**Prepared for:**

**GREAT EXPECTATIONS, INC.  
APN 216-026-013**

WDID #1\_12CC419256  
Tier 2 – Moderate Risk Program

Lead Agency:

**State Water Resource Control Board**  
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August 2020

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As a condition of approval for enrollment into the Water Quality Order 2017-0023-DWQ for the cultivation, processing, manufacture, or distribution of cannabis, the owner or permittee shall indemnify and hold harmless PR Professional Services LLC and its agents and employees for any claims, damages, or injuries brought by affected property owners or other third parties due to the commercial cultivation, processing, manufacture, or distribution of cannabis for medicinal and recreational use and for any claims brought by any person for problems, injuries, damages, or liabilities of any kind that may arise out of the commercial cultivation, processing, manufacture, or distribution of cannabis for medicinal and recreational use. As the preparer, PR Professional Services LLC, is not responsible for any water quality violations.

I/we agree to be responsible to the stated terms and conditions of the Order, and release PR Professional Services, its employees, contractors, and consultants from any defense costs, including attorneys' fees or other loss connected with any legal challenge which may arise from implementation of said Order.

Landowner Printed Name (if different from discharger):

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Discharger Printed Name: Shane Pacheco

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Prepared by: PR Professional Services LLC  
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Site Management Plan prepared on: 06/01/2020

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## INTRODUCTION

This Site Management Plan (SMP) has been developed to satisfy conditions of the **Tier 2 Moderate Risk** designation enrollment requirements in the State Water Resource Control Board (SWRCB) Order No. WQ 2017-0023-DWQ (Order). The purpose of the Order is to implement the Cannabis Policy requirements for waste discharges associated with cannabis cultivation. The Policy provides a structure for managing water quality and instream flow impacts associated with cannabis cultivation. It also establishes criteria for personal use and site conditional exemptions and includes a tiered approach for permitting discharges of waste. All eligible dischargers developing land for cannabis cultivation activities are required to enroll in the program under the Order. Dischargers must implement Best Practical Treatment or Control (BPTC) measures and submit technical and monitoring reports to assure compliance with the Order. The SMP describes how the discharger is complying with the applicable BPTC measures listed in the Policy and how they are being implemented on the subject property.

## SITE INFORMATION

REGISTRANT: SHANE PACHECO  
1015 Evans Road  
McKinleyville, CA 95519

SITE ADDRESS: 8686 Bell Springs Road  
Harris, CA 95542

PARCEL: APN 216-026-013  
Lat/Long: 40.014881, -123.630754

ZONING: General Plan: Residential Agriculture (RA40)  
Zone: Unclassified (U)

ACRES: 83.40 Acres

DISTURBED AREA: 2.05 Acres (89,127 square feet)

LOCATION: From Eureka take US HWY 101 S to exit 639B Redwood Drive. Turn right on Redwood Drive. Turn right on Alderpoint Road. In approximately 8 miles, turn right onto Bell Springs Road. Follow Bell Springs Road for approximately 8.8 miles. Property entrance is located on the right.

## SITE DESCRIPTION

The project site is located in the Lower East Branch South Fork Eel subwatershed (#180101060202), approximately 18.5 miles southeast of Garberville, California. This watershed is characterized by high intensity rain fall in the winter, and warm arid summers. Annual mean rainfall is 87.5 inches (streamstats.usgs.gov). Project areas are located approximately 1,800 to 2,080 feet above mean sea level and drain towards Tom Long Creek near the center of the property.

The project area was historically used for mining and logging. The environment is characterized by flat, open, grassy clearings dominated by native and non-native forbs surrounded by mixed hardwood forests.

## TIER AND RISK DESIGNATION

The Cannabis Policy provides criteria for evaluating threats to water quality for cannabis cultivation sites based on three site characteristics: proximity to waterbody, total disturbed area, and slope of the disturbed area. Based on the site characteristics the subject property is designated as a **Tier 2 – Moderate Risk**. The total disturbed area is 89,127 square feet, which is equal to 2.05 acres.

Table 1: Disturbed Area Size, Slopes, and Setbacks

Disturbed Area Type	Area (ft)	Slope	Distance to Water Body (ft)	Waterbody Type
CA #1	14,289	<15%	143	Off-stream rainwater catchment pond
CA #2	13,604	<15%	33	Off-stream rainwater catchment pond
CA #3	4,319	<15%	103	Off-stream rainwater catchment pond
CA #4	10,385	<15%	315	Off-stream rainwater catchment pond
CA #5	36,457	<15%	181	Class II watercourse
Water tank farm	1,445	<15%	293	Off-stream rainwater catchment pond
Off-stream pond	8,628	<15%	--	--
<b>TOTAL</b>	<b>89,127</b>	--	--	--

## BEST PRACTICAL TREATMENT OR CONTROL (BPTC) MEASURES

BPTC measures are being utilized as part of the road maintenance program to protect water quality. The *Solid Waste Management, Construction Site Best Management Practices Manual* by the CA Department of Transportation (Caltrans) is referenced for the correct installation, maintenance, and monitoring of all applicable erosion control and sediment capture BPTC measures.

A schedule of BPTC measures to be implemented and maintained throughout the site is shown in Appendix C, and Appendix D includes specifications for BPTCs.

## 1. SEDIMENT DISCHARGE BPTC MEASURES

### 1.1. SITE CHARACTERISTICS

#### 1.1.1. SITE PLAN

The site map shows all relevant site features: streams, stream crossings, storage areas, roads, buildings, domestic wastewater treatment system, cultivation areas, and other disturbed areas related to cultivation activities. Erosion prevention and sediment control BPTC measures are identified on the map (see Appendix A).

#### 1.1.2. ACCESS ROAD CONDITIONS

The private access road, Dugan Mill Road, is approximately 1.3 miles long and is accessed from Bell Springs Road. The access road receives an average of three daily vehicle trips in the peak season (May - October) and less than one vehicle trips in the winter season. The road is constructed on a sloping gradient that ranges from relatively flat (<4% grade) to moderately steep (<16% grade).

The access roads are drained by inboard ditches and ditch relief culverts. The main driveway is surfaced with rock and free from ruts, rills, gullies. There is evidence of minor erosion on the lower section of Access Road #2 leading to Cultivation Area #5, but the road surface discharge is dispersed to a well-vegetated gently sloping area to the north and does not appear to have an impact of water quality. Road maintenance activities consist of recontouring and adding additional crushed angular rock as necessary. Additional road maintenance is prescribed in section 1.2.1.

Proposed road improvements include installation of rolling dips and critical dips to reduce hydrological connectivity at stream crossings.

Table 2: Access Roads and Trails

Roadway/ Ownership	Distance (miles)	Description	Condition	Improvements
Dugan Mill Road – Private	1.3	Permanent native earth and crushed angular rock road	Good-Fair	Critical dip Rolling dips
Main Driveway – Private	0.2	Permanent native earth and crushed angular rock road	Good-Fair	Rolling dips
West Driveway – Private	0.04	Permanent native earth and crushed angular rock road	Good-Fair	Rolling dips
Neighbor's Driveway 1 – Private	0.04	Permanent native earth and crushed angular rock road	Fair	Ditch relief culvert Critical dip Rolling dips
Neighbor's Driveway 2 – Private	0.1	Permanent native earth and crushed angular rock road	Fair	Critical dip Rolling dips
Access Road 1— Private	0.03	Seasonal native earth and crushed angular rock access road	Good	--

Access Road 2 — Private	0.4	Seasonal native earth and crushed angular rock access road	Fair	Water bars
West Driveway — Private	0.04	Seasonal native earth and crushed angular rock access road	Good	--
Pond Berm Road — Private	0.04	Seasonal native earth and crushed angular rock access road	Fair	Install additional rock armor below pond overflow outlet to protect fill slope.
Total Distance	2.19	--	--	--

Table 3: Ditch Relief Culverts

ID	Location	Size	Material	Notes
DRC-1	(40.014334, -123.627755)	12"	Corrugated HDPE	Routinely inspect and clear

#### 1.1.3. WATERCOURSES, WATER BODIES, AND STREAM CROSSINGS

There are eight watercourses and two ponds located on the project site. A domestic spring is located on the adjacent parcel, APN 216-021-007. An inventory of watercourses, waterbodies, and stream crossings can be found in Table 4 and 5.

Table 4: Watercourses, Water Bodies, and Stream Crossings

ID	Type	Notes
WC-1	Class II	Intermittent watercourse on the western edge of APN 216-026-013 draining southwest towards WC-2. STX-5 conveys WC-1 across Neighbor's Driveway 1.
WC-2	Class II	Intermittent watercourse located on the western section of APN 216-026-013. Tributary to Tom Long Creek. STX-3 conveys the watercourse across Dugan Mill Road.
WC-3	Class II	Intermittent watercourse west of APN 216-026-013. Tributary to Tom Long Creek. STX-4 conveys the watercourse across Neighbor's Driveway 2.
WC-4	Class I	Perennial watercourse that runs through APN 216-026-013. STX-1 conveys the watercourse across Dugan Mill Road.
WC-5	Class III	Intermittent watercourse. Tributary to Tom Long Creek. No crossings.
WC-6	Class III	Intermittent watercourse. Tributary to Tom Long Creek. Joins WC-7 at STX-6 and is conveyed across Dugan Mill Road.

WC-7	Class II	Intermittent watercourse. Tributary to Tom Long Creek. Joins WC-6 at STX-6 and is conveyed across Dugan Mill Road.
WC-8	Class II	Intermittent watercourse. Tributary to Tom Long Creek. Conveyed across Dugan Mill Road by STX-7.
PO-1	Off-stream rainwater catchment pond	Rain-fed pond located on the northern portion of APN 216-026-013. Pond is used for cannabis irrigation. The capacity of PO-1 is approximately 300,000 gallons.
PO-2	Off-stream rainwater catchment pond	Not in use.
POD-1	Spring	"Pat's Cow Spring" is located adjacent to Dugan Mill Road on APN 216-021-007 (offsite). The diversion (POD-1) is used exclusively for domestic use.

There are seven stream crossings on site. An inventory of all stream crossings can be found in Table 5. A Lake and Streambed Alteration Agreement (LSAA #1600-2019-0484-R1) has been filed with CDFW.

Table 5: Stream Crossings

ID	Location	Current Size	Proposed Size	Material	Notes
STX-1	(40.010760, -123.628938)	40' x 10'	--	Bridge	STX-1 is a bridge crossing Tom Long Creek (WC-5), a class II watercourse that supports anadromous salmonid populations. The bridge measures 40 feet long by 10 feet wide and is sized appropriately for the channel.
STX-2	(40.01384, -123.62836)	24"	42"	CMP	STX-2 is a 24-inch diameter metal culvert on a class III watercourse (WC-1). The culvert is installed high in the road fill with a shotgun outlet that is out of line with the natural stream channel. The culvert is not sized for the 100-year peak storm event and shall be replaced with a 36- inch diameter culvert installed at channel grade, at the base of the fill. The proposed culvert be sized for 100-year storm events and allow passage of aquatic organisms.
STX-3	(40.01341, -123.62827)	48"	54"	CMP	This 48-inch metal culvert conveys water from a class II stream (WC-2) across Dugan Mill Road. The culvert is not adequately sized for a 100-year peak flow event shall be upgraded to a 54-inch culvert.

STX-4	(40.01023, 123.62787) -	36"	60"	CMP	STX-4 is an undersized metal culvert that conveys water from a class III stream (WC-3) across Neighbor's Driveway 2. The culvert shall be upgraded to a 60-inch metal culvert to meet 100-year peak storm flows.
STX-5	(40.01409, -123.62817)	30"	42"	HDPE CMP	This high-density polythene (HDPE) culvert on a class III stream (WC-1) at Neighbor's Driveway 1. The culvert is undersized and constructed of materials that are not resistant to wildfire. The culvert shall be replaced with a 42-inch corrugated metal pipe (CMP) sized for 100-year peak flow events. A critical dip shall be installed on the right side of the culvert.
STX-6	(40.01145, 123.63036) -	48"	72"	CMP	STX-6 is a 48-inch culvert that conveys a class II watercourse (WC-6) across Dugan Mill Road. The culvert sits high in the fill and does not allow for passage of aquatic organisms. The culvert shall be replaced with a 72-inch CMP set in line with the natural channel and sized for the 100-year peak streamflow. A critical dip shall be installed on the left hinge line of the road to prevent stream diversion.
STX-7	(40.01284, 123.63149) -	48"	48"	CMP	A 48-inch that conveys a class III watercourse (WC-8) across Dugan Mill Road. The culvert is sized appropriately for the 100-year storm event.

## 1.2. SEDIMENT EROSION PREVENTION AND SEDIMENT CAPTURE

### 1.2.1. EROSION PREVENTION AND BPTC MEASURES

#### 1.2.1.1. IMPLEMENTATION OF EROSION PREVENTION BPTC MEASURES

The following physical BPTC measures may be employed to prevent erosion: placement of straw mulch, plastic covers, slope stabilization, soil binders, culvert outfall armoring. Biological BPTC measures may include vegetation preservation/replacement, hydro seeding, etc. A detailed inventory of proposed erosion control measures is included in Table 7.

Refer to the "Road Handbook", and BPTC Measure Specifications in Appendix D for additional details. An Implementation Schedule is included in Appendix D.

Table 6: Erosion Prevention Measures

ID	Location	BPTC Measure	Implementation Date
CD-1	Right side of the culvert at STX-5	Critical dip	October 2021
CD-2	Left hinge line of the road at STX-6	Critical dip	October 2021

#### 1.2.1.2. DISTURBED AREAS

The project site consists of five cultivation areas. Other disturbed areas include an off-stream rainwater catchment pond (PO-1), two sheds used for drying, curing, and harvest storage, sheds for agricultural chemical storage, and a shed used for cannabis-related waste storage. All disturbed areas are located on natural slopes (<15%) or historical logging landings.

Refer to the "Road Handbook", and BPTC Measure Specifications in Appendix D for additional details. An Implementation Schedule is included in Appendix D.

Table 7: Existing and Proposed Disturbed Area Erosion Prevention Measures

ID	BPTC Measure	Existing or Implementation Date	Notes
Disturbed areas around cultivation areas	Revegetation	Existing	Erosion control seed mix and straw mulch applied to bare soil near cultivation beds.
Cut slopes around cultivation areas	Revegetation	Existing	Vegetation has been well established on slopes between flats in cultivation areas.
Soil pile	Tarping	Existing	Soil pile is located in an upland area away from watercourses and covered with weighted tarp when not in use.
Ditch relief culvert	Rock armor	Existing	DRC inlet and outlet are rocked to prevent erosion.
Pond overflow	Armored outfall	Existing	Outfall of pond overflow has been armored to prevent erosion in the event of pond discharge.
Disturbed area CA #3	Revegetation	Summer 2021	Slopes around cultivation flat need to be planted with erosion control seed and covered with straw mulch to prevent erosion.

#### **1.2.2. SEDIMENT CONTROL BPTC MEASURES**

##### 1.2.2.1. ROADS, STREAM CROSSINGS, AND SOIL DISTURBANCE

The cannabis cultivator shall use appropriate erosion control measures to minimize erosion of disturbed areas, potting soil, or bulk soil amendments to prevent discharges of waste. Fill soil shall not be placed where it may discharge into surface water. If used, weed-free straw mulch shall be applied at a rate of two tons per acre of exposed soils and, if warranted by site conditions, shall be secured to the ground.

An implementation schedule of physical and biological BPTCs is included in Appendix D.

#### **1.2.3. MAINTENANCE ACTIVITIES-EROSION PREVENTION AND SEDIMENT CONTROL**

##### 1.2.3.1. MONITORING

Discharger shall regularly inspect and maintain the condition of the installed erosion and sediment controls. All long-term and interim erosion prevention and

sediment capture BPTC measures that have been implemented will be monitored for effectiveness on a monthly basis at a minimum (Table 1.2.3.1). Any vegetation planted on previously disturbed areas will be monitored for success and replanted if necessary. The cultivator will monitor erosion and sediment control measures during and after each storm event that produces at least 0.5 in/day or 1 in/7 days of precipitation. In addition, winterization measures that are implemented will be monitored for effectiveness (inspected during the first major winter storm event) before the site is closed for the winter. See Appendix H for a log of monthly BPTC monitoring and maintenance records.

Table 8: BPTC Monitoring

Observations	Description	Frequency
Surface Water Runoff	Report any conditions of surface water runoff, including location, duration, source of runoff (irrigation water, storm water, etc.)	Monthly
Storm Water Runoff Constituents	Turbidity – collect sample once per calendar month when precipitation exceeds 0.25 in/day or when storm water runoff from the site is generated. pH – collect sample once per calendar month when precipitation amount is forecast to exceed 0.25 in/day.	Monthly until winterization procedures are completed
Soil Erosion Control	Report any indications of soil erosion (e.g. gullying, turbid water discharge, landslide, etc.)	Monthly
Sediment Capture	Report the status of sediment capture measures (e.g. silt fence, fiber rolls, settling basin, etc.)	Monthly
Erosion/Sediment Capture Maintenance	Report maintenance activities to maintain the effectiveness of erosion control and sediment capture measures (e.g. reinstallation of straw mulch, hydroseeding, tarp placement removal or stabilization of sediment captured, removal of settled sediment in a basin, etc.)	Monthly
Stabilization of Disturbed Area	Dischargers characterized as high risk (with any portion of the disturbed area within the setbacks)	Monthly
Materials Storage Erosion/Spills Prevention	Report materials delivered or stored at the site that could degrade water quality if discharged off-site (e.g. potting soil, manure, chemical fertilizer, gasoline, herbicides, pesticides, etc.)	Monthly
Septic, Holding Tank, or Chemical Toilet Servicing	Report the dates, activity, and name of the servicing company for servicing holding tanks or chemical toilets.	Monthly

#### **1.2.3.1. MAINTENANCE**

The discharger will maintain a Road and Drainage Feature Maintenance Log that includes sediment and erosion controls. This log is included in Appendix H.

## **2. FERTILIZER, PESTICIDE, HERBICIDE, AND RODENTICIDE BPTC MEASURES**

## 2.1. CULTIVATION PRODUCT STORAGE, USE AND DISPOSAL

### 2.1.1. STORAGE

Appropriate BPTC measures shall be utilized when storing, handling, mixing, applying, and disposing of all fertilizers, pesticides, herbicides, and rodenticides. Each year an inventory is conducted prior to the beginning of the grow season and necessary products are delivered to the site as needed. See Appendix G for a list of nutrients and agricultural chemicals used onsite.

Dry soil amendments are stored in a two designated ag chem storage areas located behind the drying shed associated with Cultivation Area 2. Pallets of soil amendments are delivered to the ag chem storage area and immediately mixed into the growing medium. Fertilizers are stored in secondary containment on-site during the growing season and applied at agronomic rates as needed. No rodenticides are currently being used on site. Insecticide and fungicide are brought on site as needed, applied to plants, and removed from the site. Liquid fertilizers are brought on sites, used as needed, and removed from the site. No agricultural chemicals are stored on site long term.

Table 9: Inventory of Agricultural Chemicals

Product Name	Product Type	Storage Method	Storage Location	Description of Use
Compost	Soil Amendment	In covered compost area	Compost Area	Applied to soil at agronomic rates once per year prior to planting
Earthworm Castings	Soil Amendment	Manufacturer's container	Ag Chem Storage Area	Applied to soil at agronomic rates once per year prior to planting
Dr. Earth 4-4-4	Soil Amendment	Manufacturer's container	Ag Chem Storage Area	Applied to soil at agronomic rates once per year prior to planting
Perfect Blend 4-4-4	Soil Amendment	Manufacturer's container	Ag Chem Storage Area	Applied to soil at agronomic rates once per year prior to planting
Glacial Rock Dust	Soil Amendment	Manufacturer's container	Ag Chem Storage Area	Applied to soil at agronomic rates once per year prior to planting
Bat Guano	Soil Amendment	Manufacturer's container	Ag Chem Storage Area	Applied to soil at agronomic rates once per year prior to planting
Sea Green	Fertilizer	Manufacturer's container	Ag Chem Storage Area	Applied at agronomic

				rates as needed throughout the growing season
Max Sea Triple 16	Fertilizer	Manufacturer's container	Ag Chem Storage Area	Applied at agronomic rates as needed throughout the growing season
Grow More 4-26-26	Fertilizer	Manufacturer's container	Ag Chem Storage Area	Applied at agronomic rates as needed throughout the growing season
Grow More 4-26-26	Fertilizer	Manufacturer's container	Ag Chem Storage Area	Applied at agronomic rates as needed throughout the growing season
Bud Load	Fertilizer	Manufacturer's container	Ag Chem Storage Area	Applied at agronomic rates as needed throughout the growing season
Carbo Candy	Fertilizer	Manufacturer's container	Ag Chem Storage Area	Applied at agronomic rates as needed throughout the growing season
Cal Mag	Fertilizer	Manufacturer's container	Ag Chem Storage Area	Applied at agronomic rates as needed throughout the growing season
Sulphur	Integrated pest management	Manufacturer's container	Ag Chem Storage Area	Applied at agronomic rates as needed throughout the growing season

Sulphur	Integrated pest management	Manufacturer's container	Ag Chem Storage Area	Applied as needed throughout the growing season
Plant Therapy	Integrated pest management	Manufacturer's container	Ag Chem Storage Area	Applied as needed throughout the growing season
Aza Pro	Integrated pest management	Manufacturer's container	Ag Chem Storage Area	Applied as needed throughout the growing season
Companion ( <i>bacillus subtilis</i> )	Integrated pest management	Manufacturer's container	Ag Chem Storage Area	Applied as needed throughout the growing season
Safer Inspect Soap	Integrated pest management	Manufacturer's container	Ag Chem Storage Area	Applied as needed throughout the growing season
Grandevol	Integrated pest management	Manufacturer's container	Ag Chem Storage Area	Applied at agronomic rates as needed throughout the growing season

### **2.1.2. APPLICATION**

The application of any agricultural chemical product will be conducted according the manufacturer's recommendation. Agricultural chemicals shall not be applied within 48 hours of a predicted rainfall event of 0.25 inches or greater with a probability greater than 50%. Cultivators should apply amendments at agronomic rates to reduce runoff.

### **2.1.3. DISPOSAL AND SPILL PREVENTION/CLEANUP**

Empty nutrient containers shall be removed from the site once a month and recycled at the Eel River Transfer Station. Open nutrient bottles shall be kept in secondary containment to prevent spillage.

The landowner shall keep absorbent materials designated for spill containment and spill cleanup equipment onsite for use in an accidental spill of fertilizers, pesticides, herbicides, hazardous materials, and other substances which may degrade waters of the state. The cannabis cultivator shall immediately notify the California Office of Emergency Services at 1-800-852-7550 and immediately initiate cleanup activities for all spills that could enter a waterbody or degrade groundwater.

### 3. PETROLEUM PRODUCT BPTC MEASURES

#### 3.1. PETROLEUM PRODUCT BPTC MEASURES

Table 10: Petroleum Product Storage and Use

Petroleum Product	Storage Methods	Storage Location	Associated Equipment
Gasoline	5-gallon gas containers	Shed adjacent to main residence	Generators
Propane	7-gallon propane tanks	Shed adjacent to main residence	Propane heaters

##### 3.1.1. STORAGE

Table 11 lists all of the petroleum products stored on-site. All petroleum products shall be stored in a manner that prevents them from entering riparian setbacks or waters of the State. The designated storage area for petroleum products is in the shed adjacent to the main residence. Petroleum products shall be stored separately from agricultural chemicals. All petroleum product usage is in accordance with the label instructions. Gasoline containers shall be stored in secondary containers to prevent spills. Generators have protection from rainfall but lack secondary containment. Generators shall be placed in a containment structure that exceeds the capacity of the generator fuel and oil tanks.

##### 3.1.2. APPLICATION

Vehicles are refueled and serviced off-site. Generators are refueled and serviced on-site, outside of riparian setbacks. Cultivator shall monitor and inspect all equipment using oil, hydraulic fluid, or petroleum products for leaks prior to use and repair leaks immediately to prevent spillage of petroleum products.

##### 3.1.3. DISPOSAL AND SPILL PREVENTION/CLEANUP

Empty petroleum product containers that are not intended to be refilled shall be disposed of per label instructions. Until proper disposal, empty containers will be stored in secondary containment in the designated fuel storage area near the main residence.

The landowner shall keep absorbent materials designated for spill containment, and spill cleanup equipment onsite for use in an accidental spill of fertilizers, pesticides, herbicides, hazardous materials, and other substances which may degrade waters of the state. The discharger shall immediately notify the California Office of Emergency Services at 1-800-852-7550 and immediately initiate cleanup activities for all spills that could enter a waterbody or degrade groundwater.

### 4. TRASH/REFUSE AND DOMESTIC WASTEWATER BPTC MEASURES

#### 4.1. HOUSEHOLD TRASH AND CULTIVATION RELATED WASTE

Cultivation-related waste is stored in enclosed in containers with secure lids in the designated waste storage shed near the main residence to prevent surface water contamination and wildlife intrusion. Cultivation-related waste, excess soil, and organic materials not slated to be reused or mulched will be disposed of properly at the Eel River Transfer Station once a week. All refuse, empty product containers, and other recycling

will be transported to Eel River once per month. Domestic waste is generated by the three residences on the property. Waste and recycling is bagged and temporarily stored in the residences and the designated waste storage shed until being hauled to the Eel River Transfer Station.

## 4.2. RESIDENTS, EMPLOYEES AND VISITORS

### 4.2.1. DOMESTIC WASTEWATER – GENERATION & DISPOSAL

Table 11: Inventory of Wastewater Sources on Site

Wastewater Source	Treatment Type	Location	Notes
Residence #1	Septic	North of residence	If not currently permitted, owner shall begin process to permit the existing system.
Residence #2	Septic	North of residence	If not currently permitted, owner shall begin process to permit the existing system.
Residence #3	Septic	South of residence	If not currently permitted, owner shall begin process to permit the existing system.

## 5. WINTERIZATION BPTC MEASURES

### 5.1. ACTIVITIES AND MAINTENANCE

Discharger shall implement all applicable Erosion Control, Soil Disposal, and Spoils Management Requirements in addition to the Winterization Requirements below by November 1<sup>st</sup>. In preparation for the winter season, the discharger shall perform the following corrective actions:

Table 12: Winterization Requirements

ID	ACTIVITIES AND MAINTENANCE
STX-1	Routinely inspect and clear culvert of sediment or debris. Apply rock armor as needed to prevent scour.
STX-2	Routinely inspect and clear culvert of sediment or debris. Apply rock armor as needed to prevent scour.
STX-3	Routinely inspect and clear culvert of sediment or debris. Apply rock armor as needed to prevent scour.
STX-4	Routinely inspect and clear culvert of sediment or debris. Apply rock armor as needed to prevent scour.
STX-5	Routinely inspect and clear culvert of sediment or debris. Apply rock armor as needed to prevent scour.
STX-6	Routinely inspect and clear culvert of sediment or debris. Apply rock armor as needed to prevent scour.

STX-7	Routinely inspect and clear culvert of sediment or debris. Apply rock armor as needed to prevent scour.
CD-1	Install critical dip to prevent stream diversion.
CD-2	Install critical dip to prevent stream diversion.
DRC-1	Routinely inspect and clear culvert of sediment or debris. Apply rock armor as needed to prevent scour.
Inboard ditches	Routinely inspect, clear, and rock armor inside ditches as needed.
CA-3	Erosion control seed and mulch.
Pond	Inspect pond overflow and apply additional rock armor as needed.
Water tanks	Install float valves and water meters. Routinely inspect all water lines for leaks.
Generators	Place generators in secondary containment.
Cultivation Areas	Plant cover crop or secure tarps over cultivation beds and Smart Pots prior to the winter season.
Agricultural Chemicals	Remove all agricultural chemicals from the project site during the winter season or store in secondary containment within a secure shed.
Cultivation Waste	Remove all empty pots, soil bags, root balls, branches, and other cultivation-related items from the project site before the onset of the winter season, or store in a secure shed.

### **5.1.1. ROADS AND STREAM CROSSINGS**

Discharger shall block or otherwise close any temporary access roads to all motorized vehicles no later than the onset of the winter period each year (November 1). Heavy machinery, land disturbing activities, and maintenance shall not take place during the winter period (November 1 – April 1). Culverts shall be inspected routinely and cleared of sediment and debris before the onset of fall and when winter precipitation is forecast to exceed 0.5 in/day or 1.0 in/week. Any sediment or debris found to be blocked culverts shall be removed and appropriately stored in the designated trash and recycling storage area until it can be transported offsite to Eel River Transfer Station.

### **5.1.2. DISTURBED AREAS**

All disturbed areas and construction entrances and exits shall be stabilized to control erosion and sediment discharges from land disturbance. To ensure sediment and erosion control measures are functioning as intended the cultivator shall perform the following maintenance during the wet season:

- Plant cover crops, or tarp used potting soil to prevent runoff.
- Seed and mulch any disturbed area that contains bare soil.
- Fortify areas of excessive scour or flow with gravel, fiber rolls, or straw bales.

### **5.1.3. STORAGE AND STOCKPILED MATERIALS**

#### **5.1.3.1. CULTIVATION RELATED PRODUCTS AND WASTE**

Any fertilizers, pesticides, herbicides, and rodenticides will be removed from the site at the end of the growing season. Cultivation and domestic waste, spent agricultural chemical containers, woody debris, and soil not intended to be reused will be transported offsite to Eel River Transfer Station prior to the onset of the rainy season (November 1). Soil or construction materials that will be reused are to be stored on stable upland areas outside of riparian setbacks or covered and enclosed in such a way that they will not be transported to waters of the state or ensnare wildlife.

#### **5.1.3.2. VEHICLES, MACHINES AND PETROLEUM PRODUCTS/WASTE**

No vehicles, machines, or petroleum products/waste are stored on the project site during the winter season.

#### **5.1.3.3. STOCKPILED MATERIALS**

Prior to the onset of winter, any stockpiled materials shall be covered and stabilized with tarps, berms, and fiber rolls in secure upland areas outside of riparian setbacks or stored in enclosed storage sheds where materials cannot be transported to surface waters or pose a hazard to wildlife.

## 6. APPENDICES

- APPENDIX A : SITE MAP
- APPENDIX B : DISTURBED AREA MAP
- APPENDIX C : BPTC IMPLEMENTATION/MAINTENANCE SCHEDULE
- APPENDIX D : BPTC MEASURE SPECIFICATIONS
- APPENDIX E : SITE PHOTOS
- APPENDIX F : WATER USE RECORDS
- APPENDIX G : FERTILIZER, PESTICIDE PRODUCT LIST AND USAGE REPORTING
- APPENDIX H : MONTHLY BPTC MONITORING AND MAINTENANCE RECORDS
- APPENDIX I : MONTHLY TURBIDITY AND pH RECORDS
- APPENDIX J : REFERENCES

## APPENDIX A: SITE MAP

## APPENDIX B: DISTURBED AREA MAP

# Disturbed Area Map

Total Area = 89, 217 square feet

## Legend

 Disturbed Area



Google Earth

Image © 2020 Maxar Technologies

N

500 ft

## APPENDIX C: BPTC IMPLEMENTATION/MAINTENANCE SCHEDULE

## CULTIVATION ACTIVITIES SCHEDULE

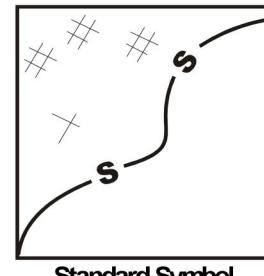
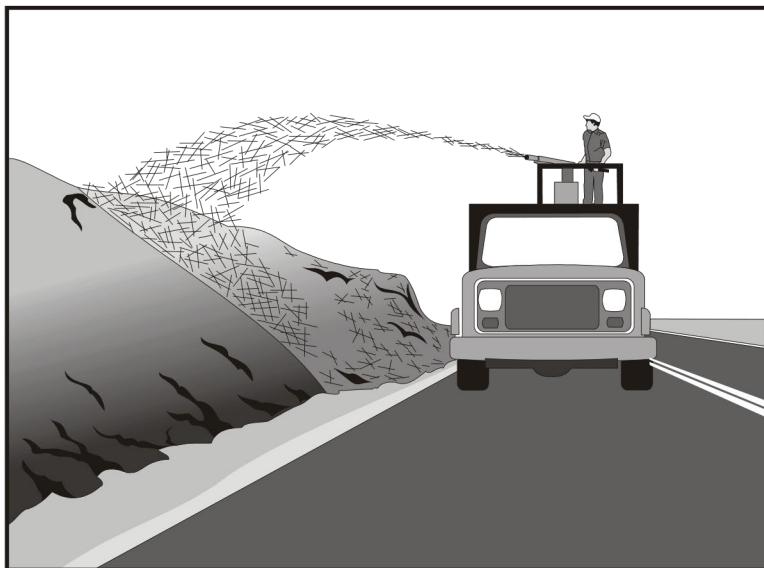
Highlight or check off the months when the following activities will take place.

## BPTC IMPLEMENTATION & MAINTENANCE SCHEDULE

## APPENDIX D: BPTC MEASURE SPECIFICATIONS

# Straw Mulch

**SS-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

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.

### Limitations

- Also typically used in combination with temporary and/or permanent seeding strategies to enhance plant establishment.
- 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.



# Straw Mulch

SS-6

## 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.



# Straw Mulch

**SS-6**

- 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.”

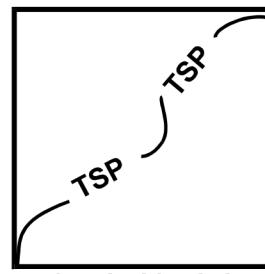
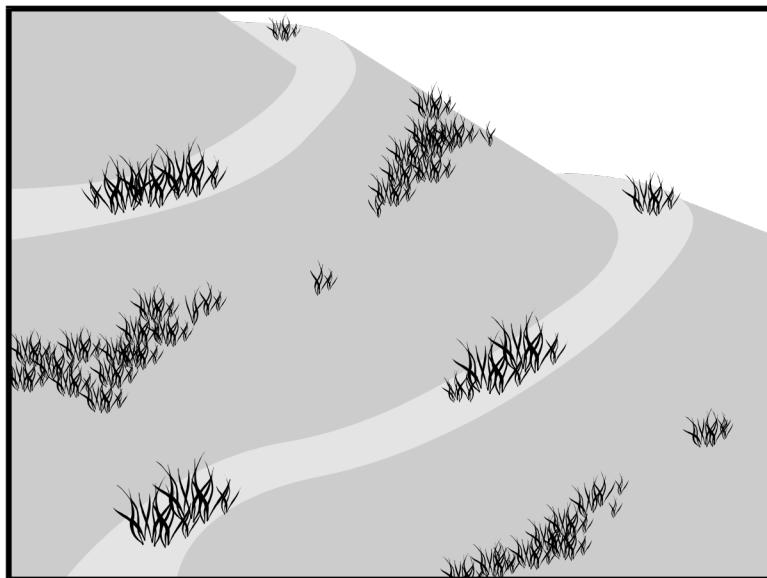
## Maintenance and Inspections

- 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.



# Hydroseeding

**SS-4**



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

**Limitations** must be re-disturbed following an extended period of inactivity.

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.
- Hydroseeding may be used alone only when there is sufficient time in the



# Hydroseeding

**SS-4**

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

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



# Hydroseeding

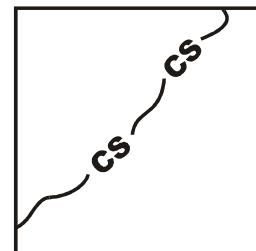
**SS-4**

- Commercial fertilizer shall conform to the requirements of the California Food and Agricultural Code. Fertilizer shall be pelleted or granular form.
  
- 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.
  
- Maintenance and Inspection**
  - 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.



# Stockpile Management

WM-3



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	<ul style="list-style-type: none"> <li>■ None identified</li> </ul>
Standards and Specifications	<ul style="list-style-type: none"> <li>■ Protection of stockpiles is a year-round requirement.</li> <li>■ Locate stockpiles a minimum of 15 m (50 ft) away from concentrated flows of storm water, drainage courses, and inlets.</li> <li>■ Implement wind erosion control practices as appropriate on all stockpiled material. For specific information see BMP WE-1, "Wind Erosion Control."</li> <li>■ Stockpiles of contaminated soil shall be managed in accordance with BMP WM-7, "Contaminated Soil Management."</li> <li>■ Bagged materials should be placed on pallets and under cover.</li> </ul>

### ***Protection of Non-Active Stockpiles***

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



# Stockpile Management

WM-3

■ ***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.



# Stockpile Management

WM-3

- Stockpiles of “cold mix” shall be placed on and covered with plastic or comparable material prior to the onset of precipitation.

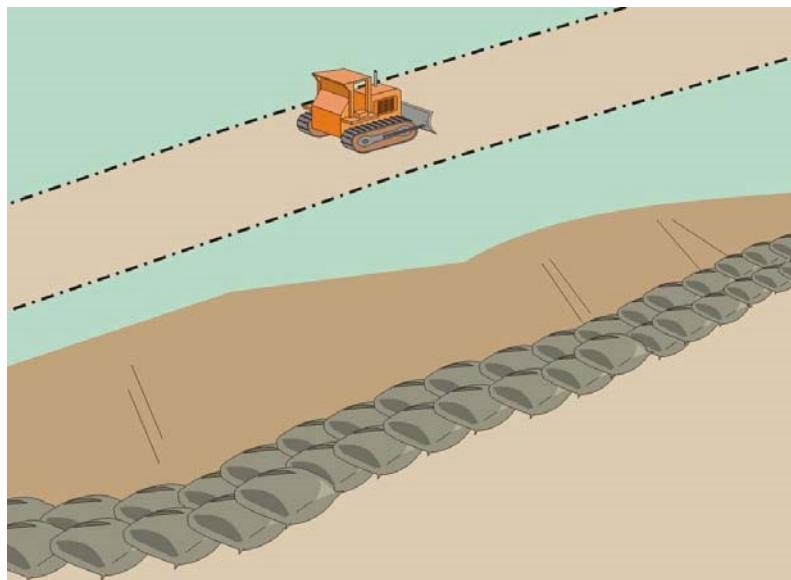
Maintenance and ■ Repair and/or replace perimeter controls and covers as needed, or as directed

Inspections by the RE, to keep them functioning properly. Sediment shall be removed when sediment accumulation reaches one-third (1/3) of the barrier height.

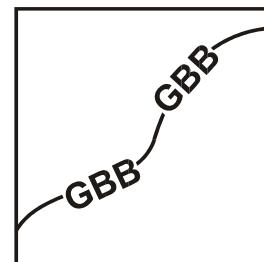


# Gravel Bag Berm

SC-6



Standard Symbol



## BMP Objectives

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

## Appropriate Applications

### 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.

- 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.



# Gravel Bag Berm

**SC-6**

- 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.



# Gravel Bag Berm

**SC-6**

## Standards and Specifications

### **Materials**

- **Bag Material:** Bags shall be woven polypropylene, polyethylene or polyamide fabric, minimum unit weight 135 g/m<sup>2</sup> (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.
- Inspect gravel bag berms before and after each rainfall event, and weekly throughout the rainy season.

## Maintenance and Inspection



# Gravel Bag Berm

**SC-6**

- 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.



# Fiber Rolls

**SC-5****Standard Symbol****BMP Objectives**

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

**Definition and Purpose**

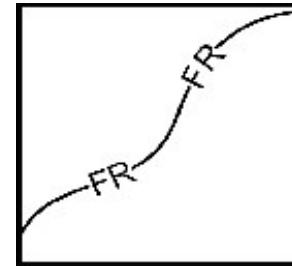
A fiber roll consists of wood excelsior, rice or wheat straw, or coconut fibers that is rolled or bound into a tight tubular roll and placed on the toe and face of slopes to intercept runoff, reduce its flow velocity, release the runoff as sheet flow and provide removal of sediment from the runoff. Fiber rolls may also be used for inlet protection and as check dams under certain situations.



# Fiber Rolls

**SC-5**

- **Appropriate Applications** This BMP may be implemented on a project-by-project basis with other



BMPs when determined necessary and feasible by the RE.

- slopes Along the toe, top, face, and at grade breaks of exposed and erodible to shorten slope length and spread runoff as sheet flow.

- Below the toe of exposed and erodible slopes.

- the (refer to Fiber rolls may be used as check dams in unlined ditches if approved by Resident Engineer (RE) or the District Construction Storm Water Coordinator SC-4 "Check Dams").

- or the Inlet Fiber rolls may be used for drain inlet protection if approved by the RE District Construction Storm Water Coordinator (refer to SC-10 "Storm Drain Protection").

- Down-slope of exposed soil areas.
- Around temporary stockpiles.
- Along the perimeter of a project.



# Fiber Rolls

SC-5

**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.



# Fiber Rolls

**SC-5**

- 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.

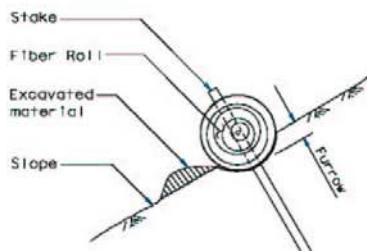
## ***Removal***

- 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.
- 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 at 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.

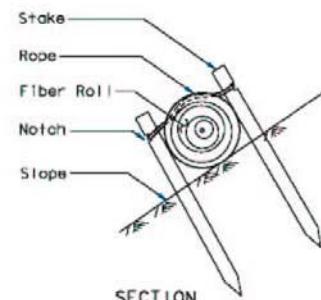
## Maintenance and Inspection



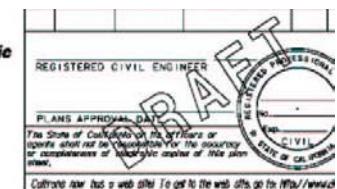
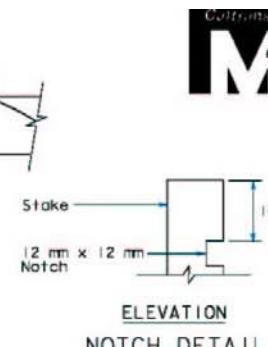
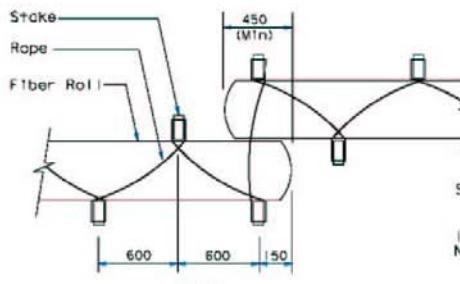
SC-5

**Fiber Rolls**

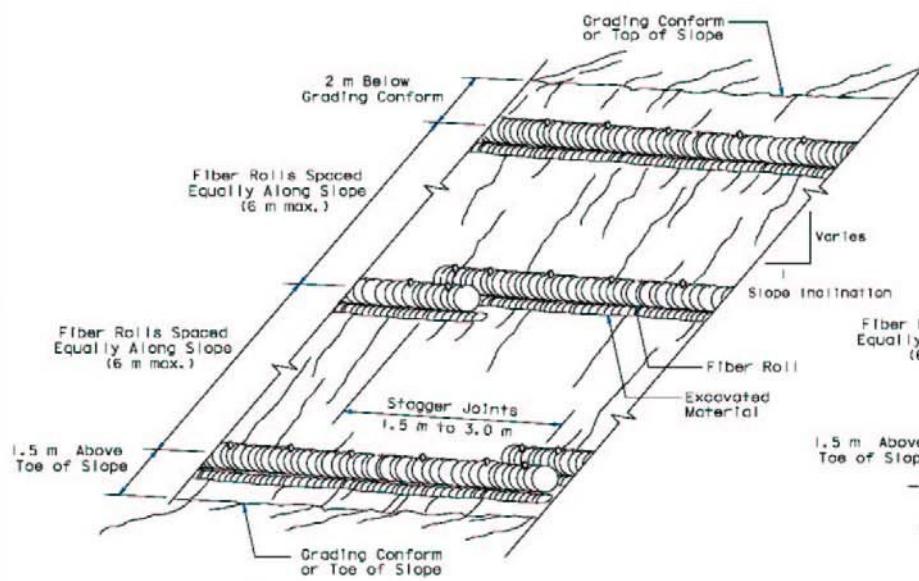
SECTION  
**TEMPORARY FIBER ROLL  
(TYPE 1)**



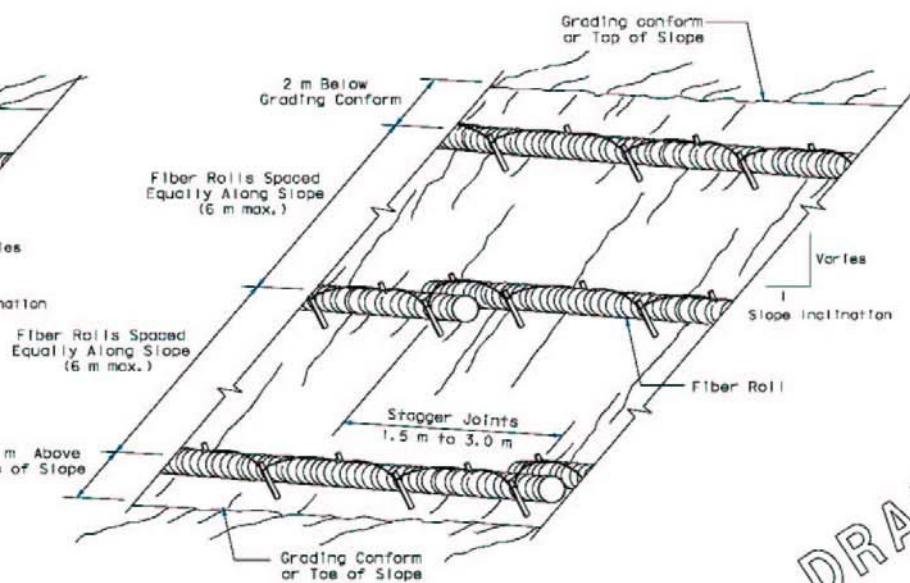
SECTION  
**TEMPORARY FIBER ROLL  
(TYPE 2)**



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



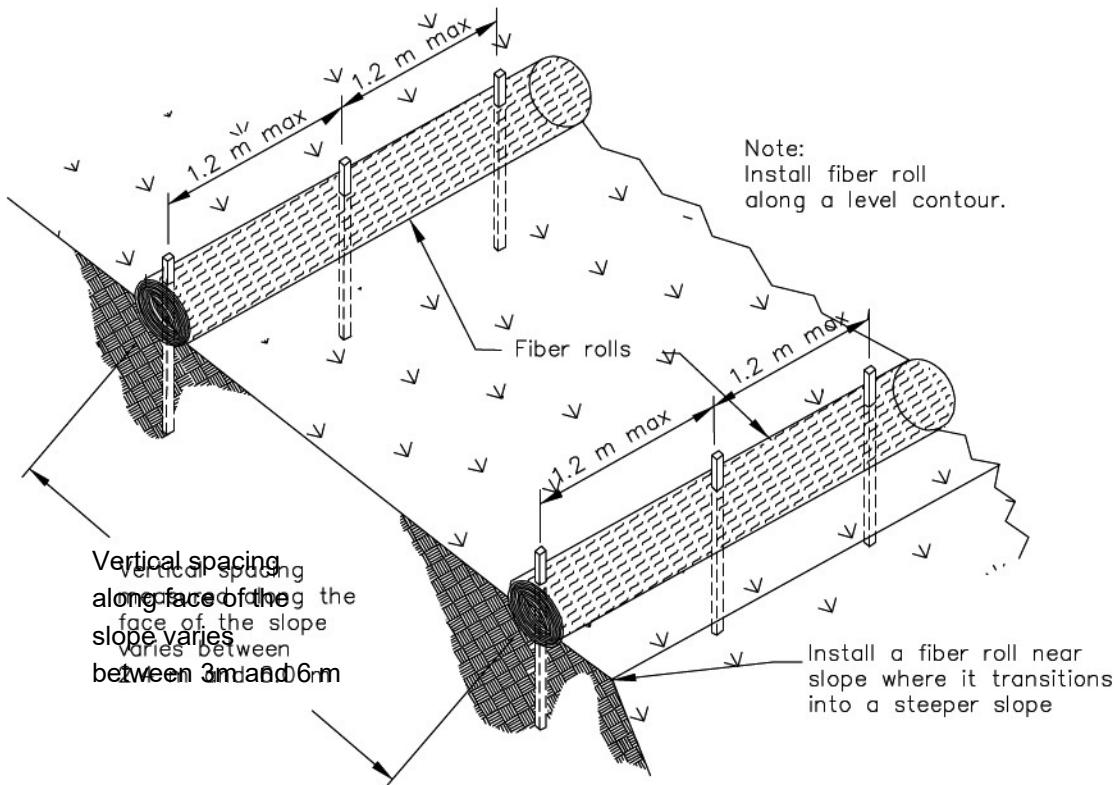
PERSPECTIVE  
**TEMPORARY FIBER ROLL (TYPE 1)**



PERSPECTIVE  
**TEMPORARY FIBER ROLL (TYPE 2)**

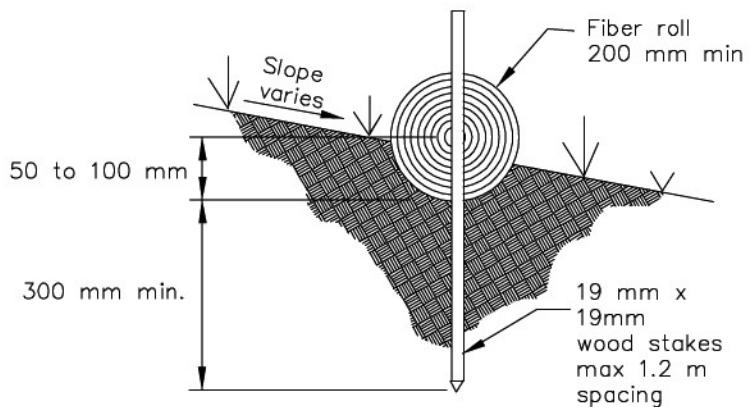
**TEMPORARY WATER POLLUTION  
CONTROL DETAILS**





TYPICAL FIBER ROLL INSTALLATION

N.T.S.



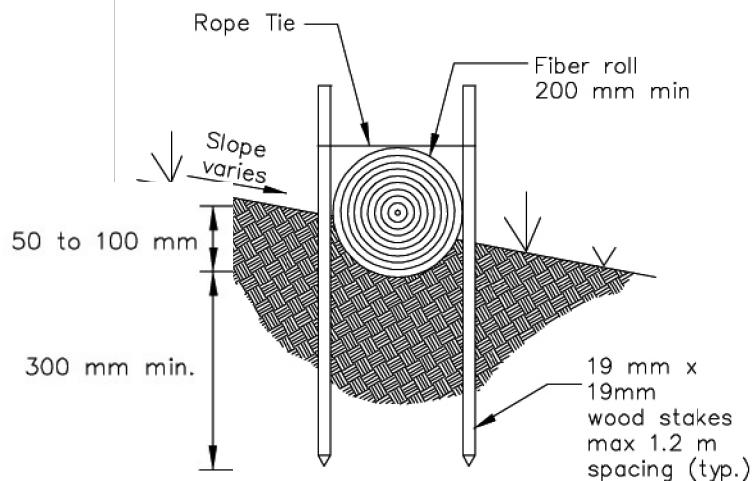
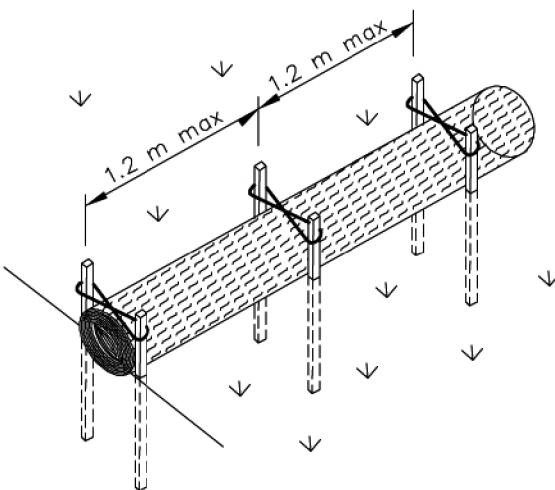
ENTRENCHMENT DETAIL

N.T.S.

# Fiber Rolls

**SC-5**

N.T.S.



OPTIONAL ENTRENCHMENT DETAIL



# Straw Bale Barrier

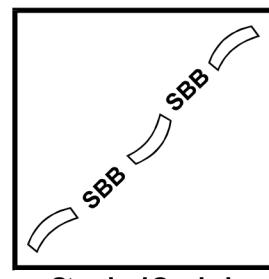
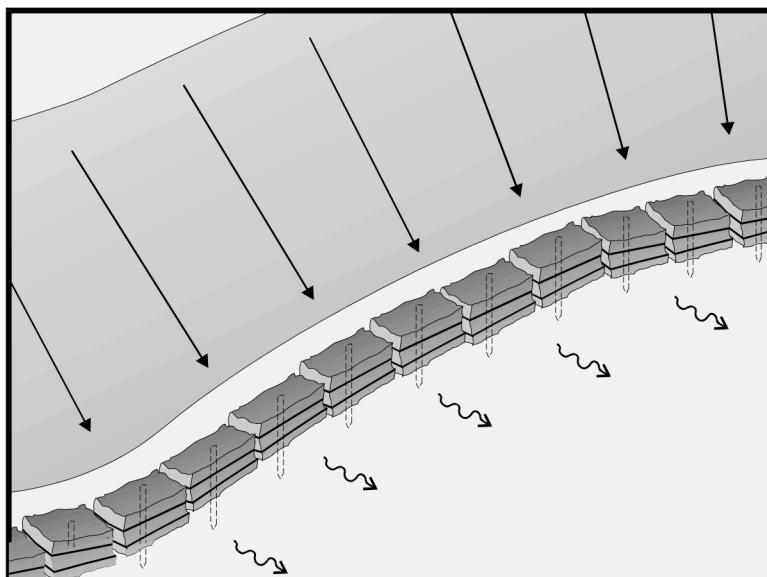
SC-9

## 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.

**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.



Standard Symbol

### BMP Objectives

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



# Straw Bale Barrier

SC-9

- 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.



# Straw Bale Barrier

SC-9

- 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.



# Straw Bale Barrier

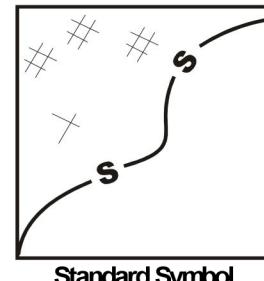
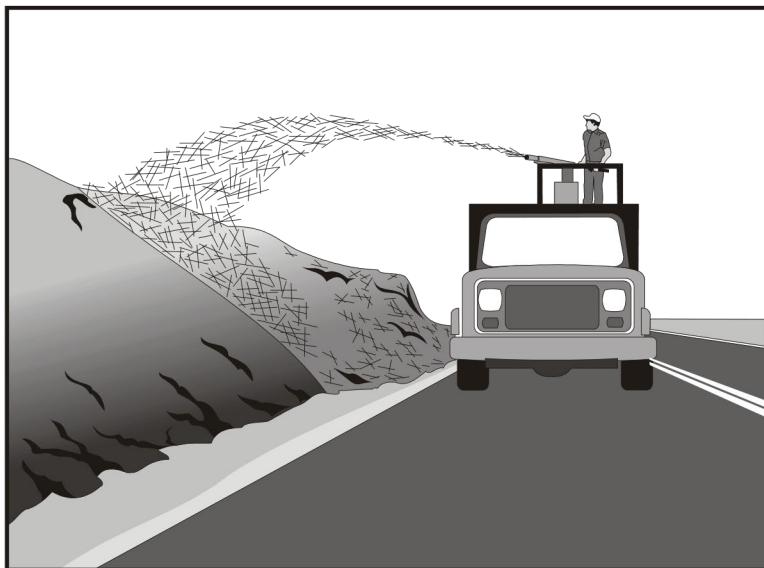
**SC-9****Maintenance and Inspection**

- 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.
- 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.



# Straw Mulch

**SS-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

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.

### Limitations

- Also typically used in combination with temporary and/or permanent seeding strategies to enhance plant establishment.
- 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.



# Straw Mulch

SS-6

## 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.



# Straw Mulch

**SS-6**

- 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.”

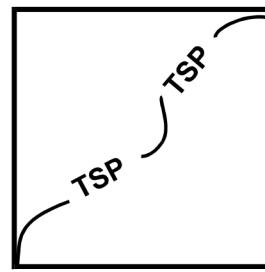
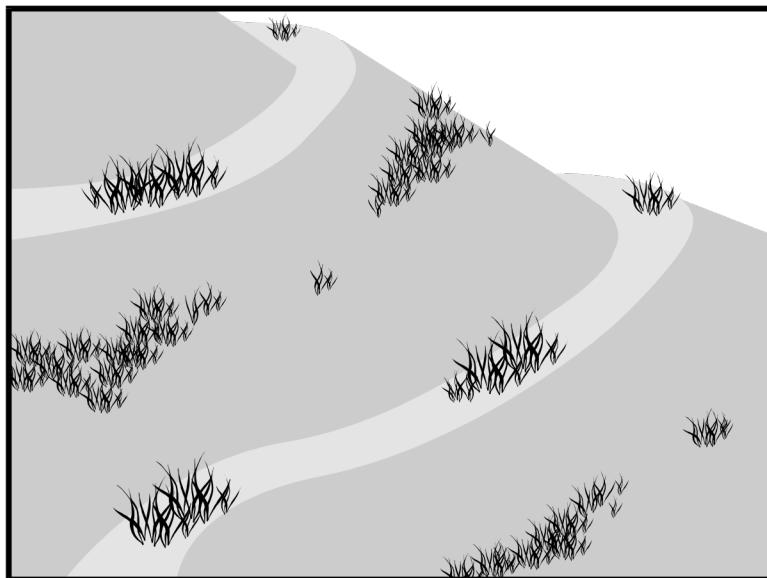
## Maintenance and Inspections

- 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.



# Hydroseeding

**SS-4**



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

**Limitations** must be re-disturbed following an extended period of inactivity.

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.
- Hydroseeding may be used alone only when there is sufficient time in the



# Hydroseeding

**SS-4**

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

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



# Hydroseeding

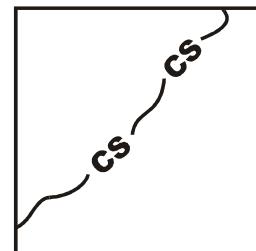
**SS-4**

- Commercial fertilizer shall conform to the requirements of the California Food and Agricultural Code. Fertilizer shall be pelleted or granular form.
  
- 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.
  
- Maintenance and Inspection**
  - 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.



# Stockpile Management

**WM-3**



**Standard Symbol**

## BMP Objectives

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

<b>Definition and Purpose</b>	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.
<b>Appropriate Applications</b>	Implemented in all projects that stockpile soil and other materials.
<b>Limitations</b>	<ul style="list-style-type: none"> <li>■ None identified</li> </ul>
<b>Standards and Specifications</b>	<ul style="list-style-type: none"> <li>■ Protection of stockpiles is a year-round requirement.</li> <li>■ Locate stockpiles a minimum of 15 m (50 ft) away from concentrated flows of storm water, drainage courses, and inlets.</li> <li>■ Implement wind erosion control practices as appropriate on all stockpiled material. For specific information see BMP WE-1, "Wind Erosion Control."</li> <li>■ Stockpiles of contaminated soil shall be managed in accordance with BMP WM-7, "Contaminated Soil Management."</li> <li>■ Bagged materials should be placed on pallets and under cover.</li> </ul>

### ***Protection of Non-Active Stockpiles***

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



# Stockpile Management

WM-3

■ ***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.



# Stockpile Management

WM-3

- Stockpiles of “cold mix” shall be placed on and covered with plastic or comparable material prior to the onset of precipitation.

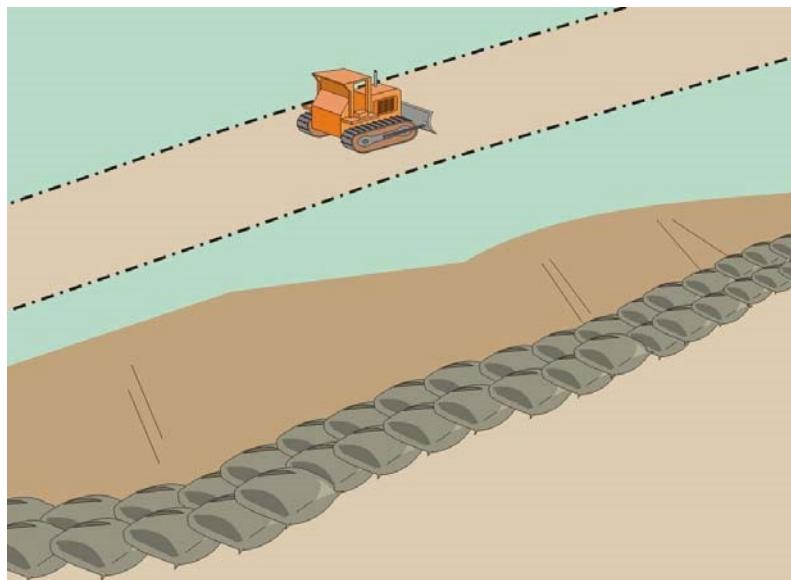
**Maintenance and ■** Repair and/or replace perimeter controls and covers as needed, or as directed

**Inspections** by the RE, to keep them functioning properly. Sediment shall be removed when sediment accumulation reaches one-third (1/3) of the barrier height.

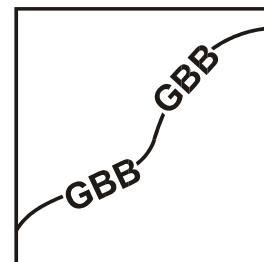


# Gravel Bag Berm

SC-6



Standard Symbol



## BMP Objectives

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

## Appropriate Applications

### 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.

- 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.



# Gravel Bag Berm

**SC-6**

- 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.



# Gravel Bag Berm

**SC-6**

## Standards and Specifications

### **Materials**

- **Bag Material:** Bags shall be woven polypropylene, polyethylene or polyamide fabric, minimum unit weight 135 g/m<sup>2</sup> (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.
- Inspect gravel bag berms before and after each rainfall event, and weekly throughout the rainy season.

## Maintenance and Inspection



# Gravel Bag Berm

**SC-6**

- 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.



# Fiber Rolls

**SC-5****Standard Symbol****BMP Objectives**

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

**Definition and Purpose**

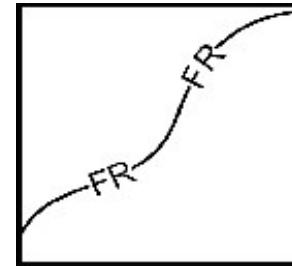
A fiber roll consists of wood excelsior, rice or wheat straw, or coconut fibers that is rolled or bound into a tight tubular roll and placed on the toe and face of slopes to intercept runoff, reduce its flow velocity, release the runoff as sheet flow and provide removal of sediment from the runoff. Fiber rolls may also be used for inlet protection and as check dams under certain situations.



# Fiber Rolls

SC-5

- Appropriate Applications This BMP may be implemented on a project-by-project basis with other



BMPs when determined necessary and feasible by the RE.

- slopes Along the toe, top, face, and at grade breaks of exposed and erodible to shorten slope length and spread runoff as sheet flow.

- Below the toe of exposed and erodible slopes.

- the (refer to Fiber rolls may be used as check dams in unlined ditches if approved by Resident Engineer (RE) or the District Construction Storm Water Coordinator SC-4 "Check Dams").

- or the Inlet Fiber rolls may be used for drain inlet protection if approved by the RE District Construction Storm Water Coordinator (refer to SC-10 "Storm Drain Protection").

- Down-slope of exposed soil areas.
- Around temporary stockpiles.
- Along the perimeter of a project.



# Fiber Rolls

SC-5

**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.



# Fiber Rolls

**SC-5**

- 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.

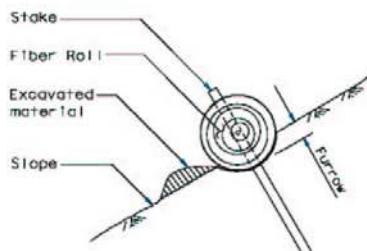
## ***Removal***

- 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.
- 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 at 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.

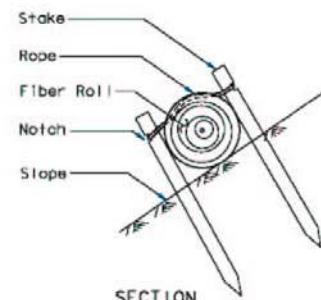
## Maintenance and Inspection



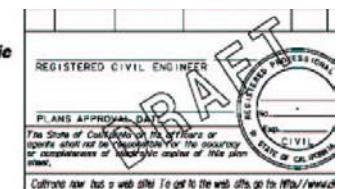
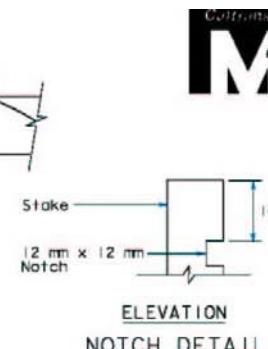
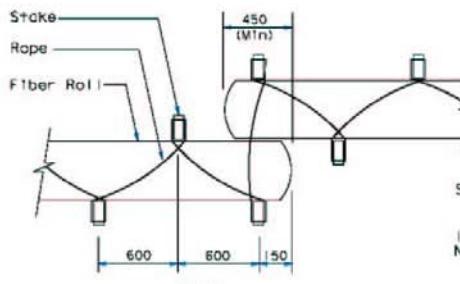
SC-5

**Fiber Rolls**

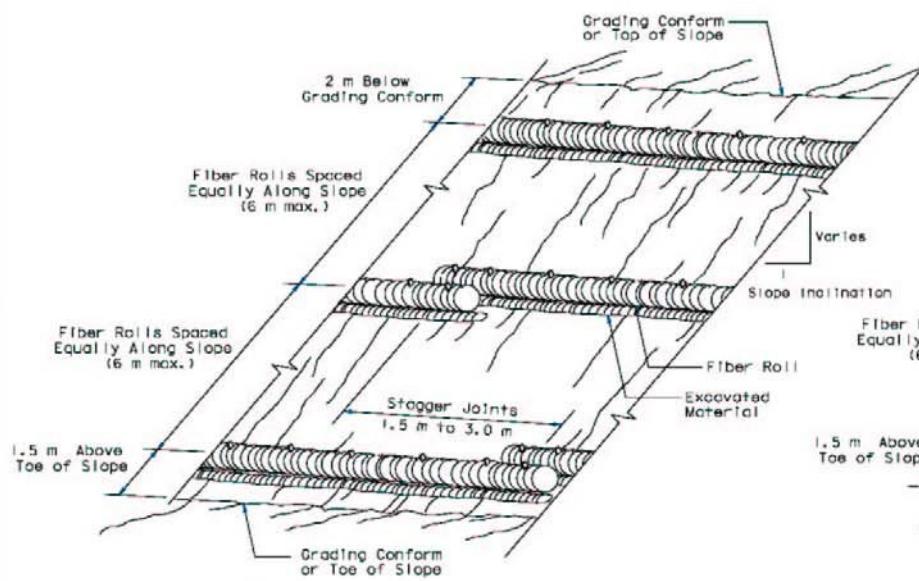
SECTION  
**TEMPORARY FIBER ROLL  
(TYPE 1)**



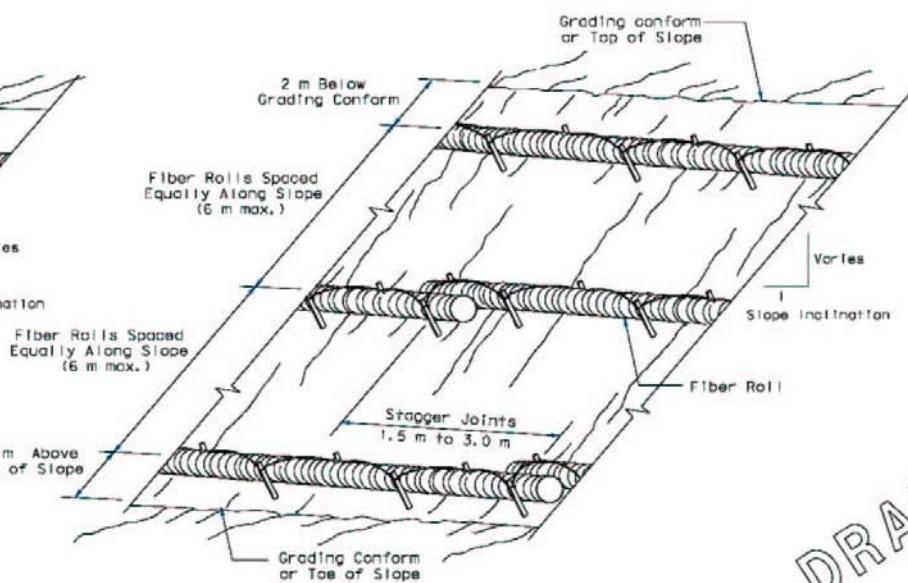
SECTION  
**TEMPORARY FIBER ROLL  
(TYPE 2)**



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



PERSPECTIVE  
**TEMPORARY FIBER ROLL (TYPE 1)**



PERSPECTIVE  
**TEMPORARY FIBER ROLL (TYPE 2)**

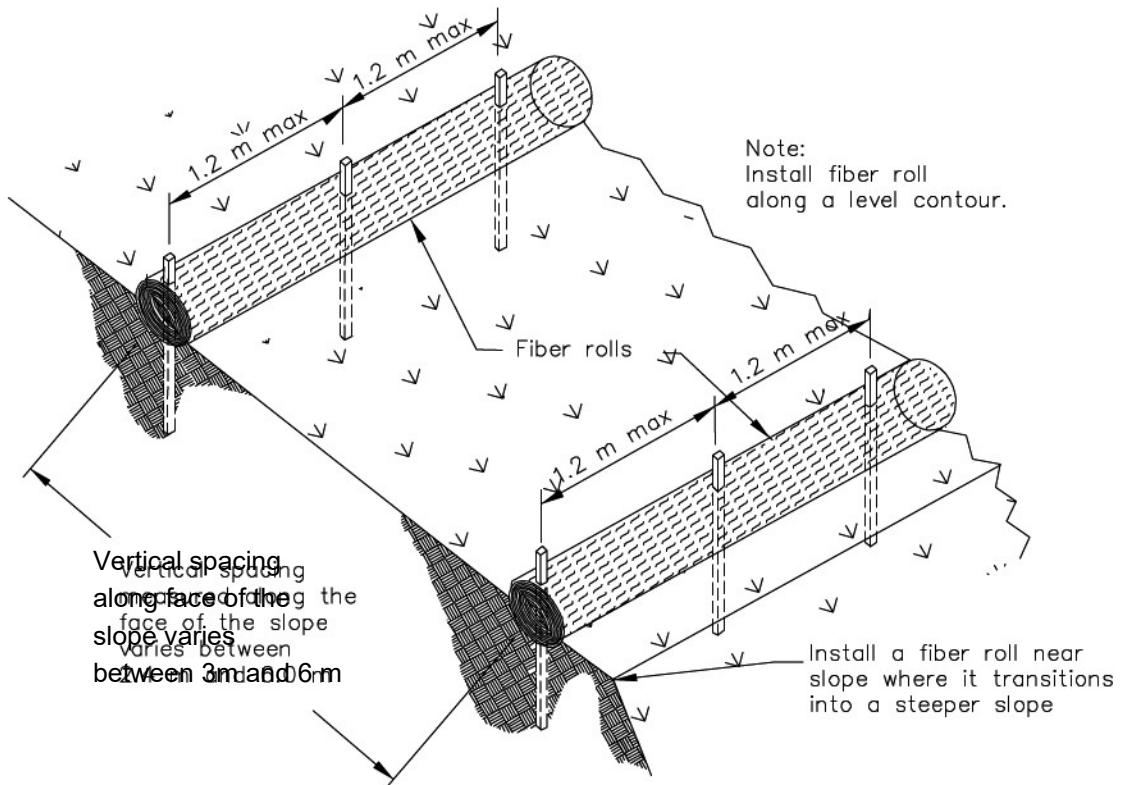
**TEMPORARY WATER POLLUTION  
CONTROL DETAILS**

DRAFT



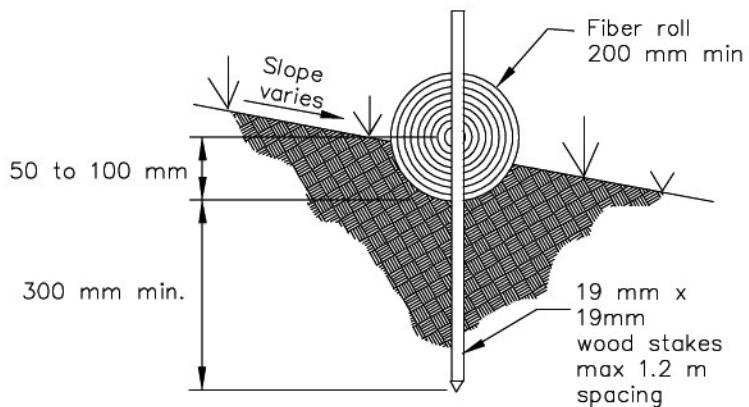
Caltrans Storm Water Quality Handbooks  
Construction Site Best Management Practices Manual  
March 1, 2003

Section 4  
Fiber Rolls SC-5  
4 of 6



TYPICAL FIBER ROLL INSTALLATION

N.T.S.



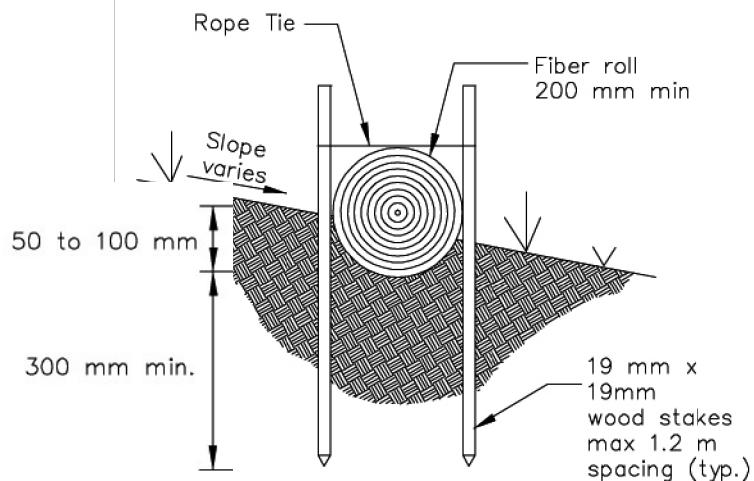
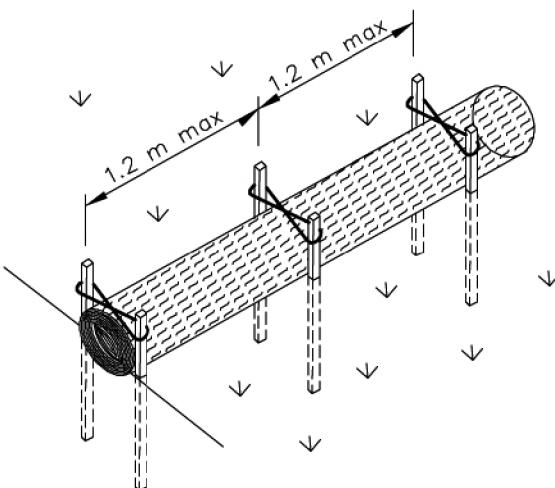
ENTRENCHMENT DETAIL

N.T.S.

# Fiber Rolls

**SC-5**

N.T.S.



OPTIONAL ENTRENCHMENT DETAIL



# Straw Bale Barrier

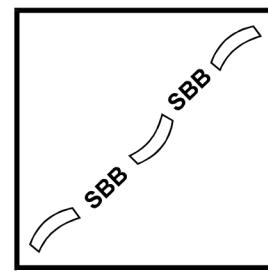
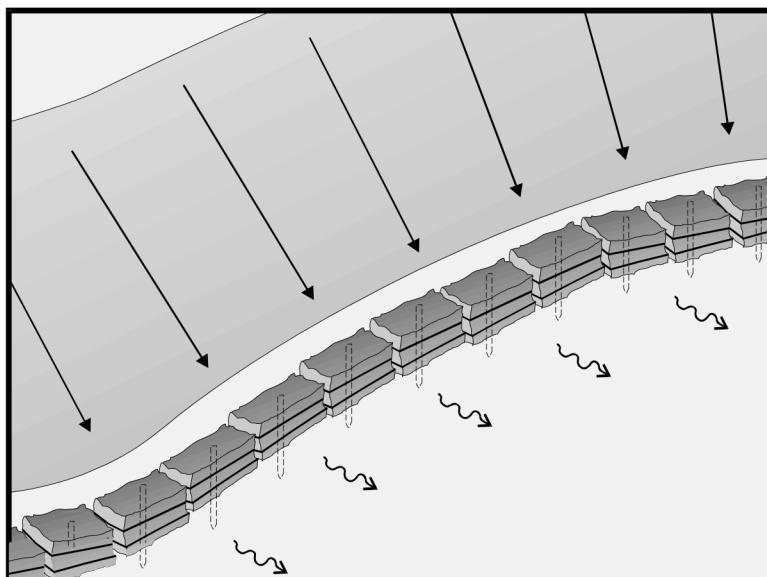
SC-9

## 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.

**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.



Standard Symbol

### BMP Objectives

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



# Straw Bale Barrier

SC-9

- 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.



# Straw Bale Barrier

SC-9

- 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.



# Straw Bale Barrier

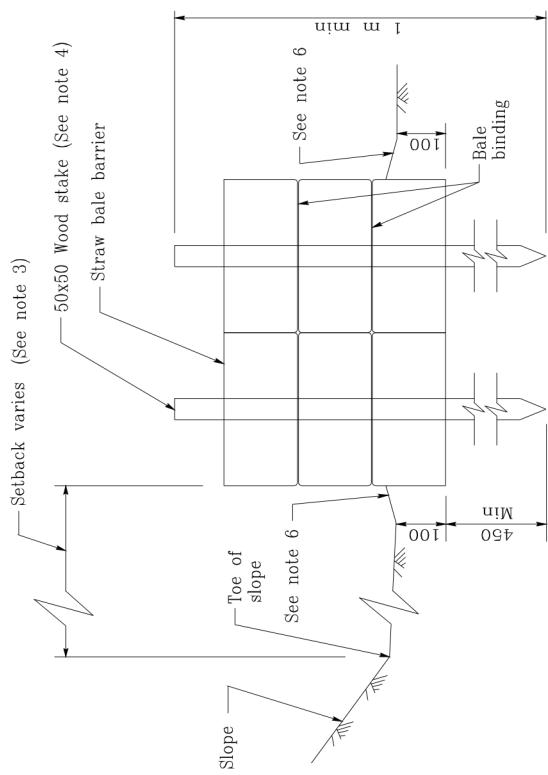
**SC-9****Maintenance and Inspection**

- 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.
- 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.



# Straw Bale Barrier

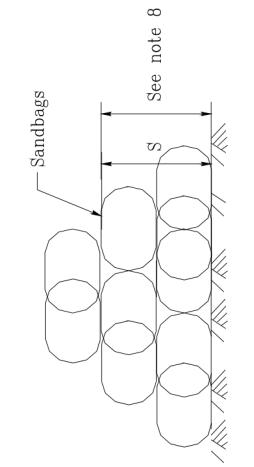
SC-9



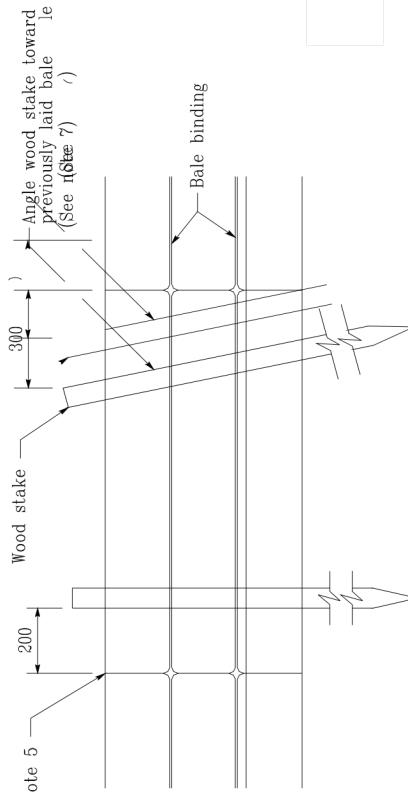
SECTION B-B

LEGEND

~~~  
DIRECTION OF FLOW



SANDBAG CROSS BARRIER



PROFILE

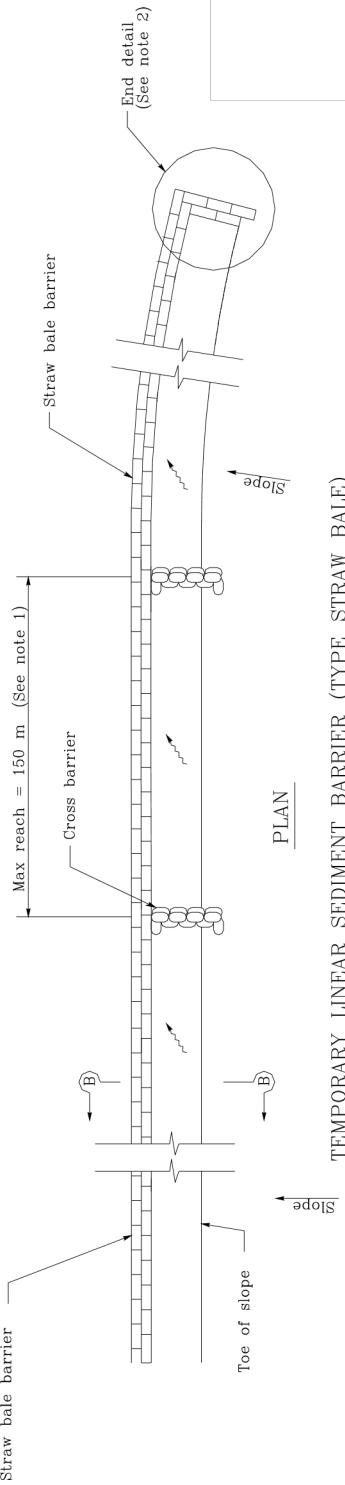
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
TEMPORARY LINEAR SEDIMENT BARRIER  
(TYPE STRAW BALE)

NO SCALE  
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

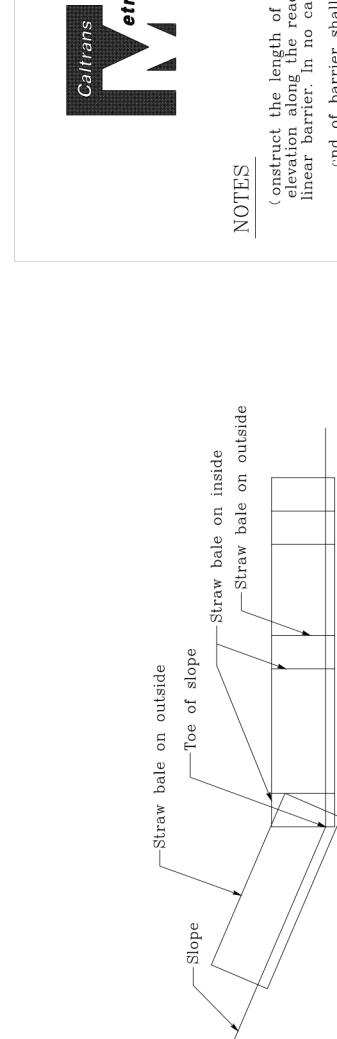


# Straw Bale Barrier

SC-9



TEMPORARY LINEAR SEDIMENT BARRIER (TYPE STRAW BALE)



END DETAIL

## NOTES

(construct the length of each reach so that the change in base elevation along the reach does not exceed  $1/2$  the height of linear barrier. In no case shall the reach length exceed 150 m. end of barrier shall be turned up slope dimension may vary to fit field condi

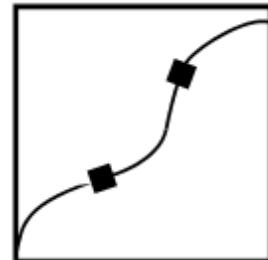
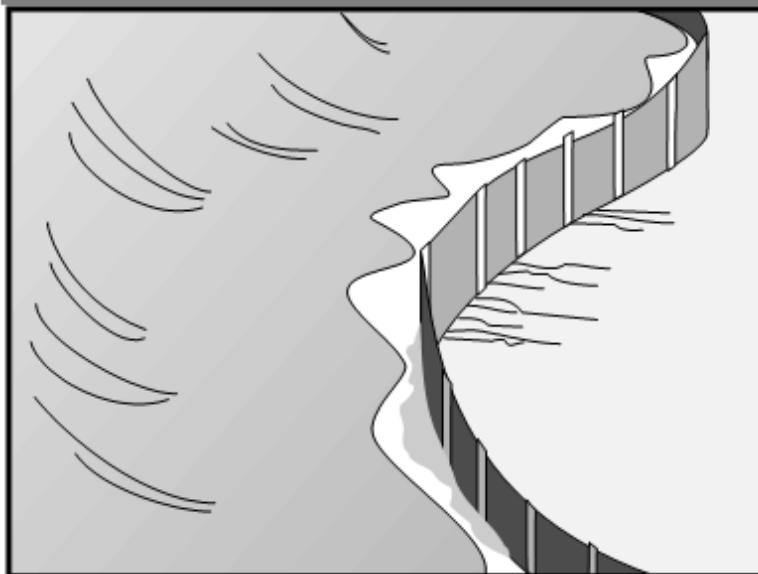
- Place
- 6. Tamp

- o. Cross
- o. noba

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

**Appropriate Applications** Silt fences are placed:

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

**Limitations**

- Not effective unless trenched and keyed in.
- Not intended for use as mid-slope protection on slopes greater than 1:4 (V:H).
- Must be maintained.

- Must be removed and disposed of.
- Don't use below slopes subject to creep, slumping, or landslides.
- Don't use in streams, channels, drain inlets, or anywhere flow is concentrated.
- Don't use silt fences to divert flow.

**Standards and  
Specifications**

***Design and Layout***

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

***Materials***

- Silt fence fabric shall be woven polypropylene with a minimum width of 900 mm (36 inches) and a minimum tensile strength of 0.45-kN. The fabric shall conform to the requirements in ASTM designation D4632 and shall have an integral reinforcement layer. The reinforcement layer shall be a polypropylene, or equivalent, net provided by the manufacturer. The permittivity of the fabric shall be between  $0.1 \text{ sec}^{-1}$  and  $0.15 \text{ sec}^{-1}$  in conformance with the requirements in ASTM designation D4491. Contractor

must submit certificate of compliance in accordance with Standard Specifications Section 6-1.07.

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

### ***Installation***

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

**Maintenance and  
Inspection**

- Install in accordance with Pages 5 and 6 of this BMP.
- Repair undercut silt fences.
- Repair or replace split, torn, slumping, or weathered fabric.
- Inspect silt fence when rain is forecast. Perform necessary maintenance, or maintenance required by the Resident Engineer (RE).
- Inspect silt fence following rainfall events. Perform maintenance as necessary, or as required by the RE.
- Maintain silt fences to provide an adequate sediment holding capacity. Sediment shall be removed when the sediment accumulation reaches one-third (1/3) of the barrier height. Removed sediment shall be incorporated in the project at locations designated by the RE or disposed of outside the right-of-way in conformance with the Standard Specifications.
- Silt fences that are damaged and become unsuitable for the intended purpose, as determined by the RE, shall be removed from the site of work, disposed of outside the highway right-of-way in conformance with the Standard Specifications, and replaced with new silt fence barriers.
- Holes, depressions or other ground disturbance caused by the removal of the temporary silt fences shall be backfilled and repaired in conformance with the Standard Specifications.
- Remove silt fence when no longer needed or as required by the RE. Fill and compact post holes and anchorage trench, remove sediment accumulation, and grade fence alignment to blend with adjacent ground.

## APPENDIX E: PHOTO PAGES



Photo 1: Typical cultivation area containing hoop houses, Smart Pots, and storage shed. Plant or tarp soil in pots prior to winter season.



Photo 2: Cultivation Area #3. Plant erosion control seed and straw mulch disturbed area prior to winter season. Plant or tarp soil in Smart Pots.



Photo 3: Covered compost pile.



Photo 4: Soil pile with tarp.



Photo 5: Generator with rain protection. Place in secondary containment.

## APPENDIX F: WATER USE RECORDS

|                                                                            |                                                    |                                                                        |          |       |       |     |      |      |        |                  |            |          |          |
|----------------------------------------------------------------------------|----------------------------------------------------|------------------------------------------------------------------------|----------|-------|-------|-----|------|------|--------|------------------|------------|----------|----------|
| <b>Water Use by Source<br/>- Log Sheet -</b>                               |                                                    |                                                                        | WDID:    |       |       |     |      |      |        |                  | Watershed: |          |          |
|                                                                            |                                                    | Location:                                                              |          |       |       |     |      |      |        | Sheet ___ of ___ |            | Year:    |          |
| <b>Water Source</b><br>(tank, bladder,<br>pond, well,<br>delivered, other) | <b>Water<br/>unit</b><br>(gallons or<br>acre feet) | Amount utilized from storage per month (gallons or acre feet), by type |          |       |       |     |      |      |        |                  |            |          |          |
|                                                                            |                                                    | January                                                                | February | March | April | May | June | July | August | Sept             | October    | November | December |
|                                                                            |                                                    |                                                                        |          |       |       |     |      |      |        |                  |            |          |          |
|                                                                            |                                                    |                                                                        |          |       |       |     |      |      |        |                  |            |          |          |
|                                                                            |                                                    |                                                                        |          |       |       |     |      |      |        |                  |            |          |          |
|                                                                            |                                                    |                                                                        |          |       |       |     |      |      |        |                  |            |          |          |
|                                                                            |                                                    |                                                                        |          |       |       |     |      |      |        |                  |            |          |          |
|                                                                            |                                                    |                                                                        |          |       |       |     |      |      |        |                  |            |          |          |
|                                                                            |                                                    |                                                                        |          |       |       |     |      |      |        |                  |            |          |          |
|                                                                            |                                                    |                                                                        |          |       |       |     |      |      |        |                  |            |          |          |
| <b>Monthly Totals</b>                                                      |                                                    |                                                                        |          |       |       |     |      |      |        |                  |            |          |          |

**Comments:** "Report water volume used, listing each source separately. This may include use of stored water, immediate use of pumped groundwater, diverted surface water, or delivered water. If water is delivered, list delivery date, delivery volume, and name and address of water purveyor"

## APPENDIX G: FERTILIZER, PESTICIDE PRODUCT LIST AND USAGE REPORTING



| Pesticide and Herbicide Application Log Sheet |                                     |                            | WDID:                                                                                |                                                          |                                                        |                                                    |                       |          | Watershed:           |  |
|-----------------------------------------------|-------------------------------------|----------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------|----------------------------------------------------|-----------------------|----------|----------------------|--|
|                                               | Location:                           |                            |                                                                                      |                                                          |                                                        |                                                    |                       | Year:    | Sheet _____ of _____ |  |
| Product name                                  | Pesticide or Herbicide (circle one) | Product type (circle type) | Recommended application amount from product label (e.g. # of ounces per application) | Application units (grams, ounces, liters, gallons, etc.) | Recommended application schedule (daily, weekly, etc.) | Actual amount (in same units) used per application | Date applied (mo/day) | Initials | Comments             |  |
|                                               | Pest./Herb.                         | liquid/solid               |                                                                                      |                                                          |                                                        |                                                    |                       |          |                      |  |
|                                               | Pest./Herb.                         | liquid/solid               |                                                                                      |                                                          |                                                        |                                                    |                       |          |                      |  |
|                                               | Pest./Herb.                         | liquid/solid               |                                                                                      |                                                          |                                                        |                                                    |                       |          |                      |  |
|                                               | Pest./Herb.                         | liquid/solid               |                                                                                      |                                                          |                                                        |                                                    |                       |          |                      |  |
|                                               | Pest./Herb.                         | liquid/solid               |                                                                                      |                                                          |                                                        |                                                    |                       |          |                      |  |
|                                               | Pest./Herb.                         | liquid/solid               |                                                                                      |                                                          |                                                        |                                                    |                       |          |                      |  |
|                                               | Pest./Herb.                         | liquid/solid               |                                                                                      |                                                          |                                                        |                                                    |                       |          |                      |  |
|                                               | Pest./Herb.                         | liquid/solid               |                                                                                      |                                                          |                                                        |                                                    |                       |          |                      |  |
|                                               | Pest./Herb.                         | liquid/solid               |                                                                                      |                                                          |                                                        |                                                    |                       |          |                      |  |
|                                               | Pest./Herb.                         | liquid/solid               |                                                                                      |                                                          |                                                        |                                                    |                       |          |                      |  |

APPENDIX H: MONTHLY BPTC MONITORING AND MAINTENANCE  
RECORDS

## APPENDIX I: REFERENCES