12848

Site Management Plan

Implementation of Best Practical Treatment or Control Measures

In Fulfillment of Water Quality Order 2019-0001-DWQ

State Water Resources Control Board

Humboldt County APN 522-033-010

May 2020

Prepared for:
4 Ponds, LLC
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As a condition of approval for enrollment into the Water Quality Order 2019-0001-DWQ for the cultivation, processing, manufacture, or distribution of cannabis, the owner or permittee shall indemnify and hold harmless Mother Earth Engineering, Inc. 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, Mother Earth Engineering, Inc. 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 Mother Earth Engineering, Inc., 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: Drew Cowan, for 4 Ponds LLC

Signature: DocuSigned by: Drew Cowan, 4 Ponds LLC 901F03265C45432... Date: 7/29/2020

Discharger Printed Name: Drew Cowan, for 4 Ponds LLC

Signature: DocuSigned by: Drew Cowan, 4 Ponds LLC 901F03265C45432... Date: 7/29/2020

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Site Management Plan prepared on: 5/25/2020

Signature: DocuSigned by: Trillian Duran Schroeder D73F4F0244C944F... Date: 7/29/2020

GENERAL INFORMATION

Discharger: 4 Ponds LLC
2530 Fickle Hill
Arcata, CA 95521

Site Address: Three Creeks Rd
Willow Creek, CA 95573
Humboldt County

Parcel: APN: 522-033-010
Zoning: (U) – Improved, Rural Residential, 40+ac
Assessed Parel Size: 61 Acres
Cannabis Cultivation Area: 10,000 SQ FT
Disturbed Area: 26,900 SQ FT
HUC-12: 180102111205/180101020102

SWB WDID: 1_12CC419822

Facility Status: Tier 1- Low Risk

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1 Introduction & Purpose

This Site Management Plan (Plan) was developed to report how the discharger is complying with the Best Practicable Treatment or Controls (BPTC's) listed in Attachment A, Section 2 of the State Water Resources Control Board (SWB) Order 2019-0001-DWQ (Order). The purpose of this Order is to provide a regulatory structure to minimize adverse impacts to water quality due to cannabis cultivation. Cannabis cultivators that are enrolled under this Order and compliant with its regulations will receive a conditional waiver for the discharges associated with cannabis cultivation. Using data from on-site assessments and office analysis; this Plan provides an inventory of all cannabis cultivation activities, land and resource management, and land stewardship practices to ensure the discharger is in compliance with the Order.

1.1 Site Location

The site is located between both the Supply Creek and Minor Creek-Redwood Creek watersheds in north eastern Humboldt County approximately 17 miles west of Willow Creek. To reach the site from Arcata, CA take CA-299 east 27.7 miles to Old 3 Creeks Rd on left. Proceed 5.5 miles and turn right on an unnamed access road, property is one mile ahead. The site is located in Section 28, Township 7 North, Range 4 East. The property is located on the Willow Creek USGS 7.5-minute quadrangle map (USGS 1979). The parcel centroid is located at latitude 40.9685 and longitude -123.7345.

1.2 Site Description

The property is located on ridgeline and generally sloping terrain and ranges from approximately 3,440 feet to 3,920 feet above mean sea level. The property contains Douglas Fir, Montane Chaparral and Hardwood-Conifer habitat types (EcoAtlas n.d.). The land is generally characterized as having moderate instability grades with slopes ranging from less than 15% to over 50% in some areas. The site drains towards the north-east to Supply Creek and towards the west to Three Creeks. The climate can be generalized by a pattern of high-intensity rainfall with snow in the late fall until the early spring and hot, dry summers. Mean annual precipitation is approximately 55.5 inches (US Climate Data 2020). Soils within the property are primarily composed of Hospiter-Hewent complex at 30% to 50% slopes (NRCS 1990).

1.3 Field And Assessment Methods

Office analysis and field inventory were used to determine the status of the property for enrollment in the Order. Pre-field inspection using aerial footage of the property was used to identify existing infrastructure, cultivation areas, watercourses, and the general layout of the property. The field inventory was conducted by Mother Earth Engineering staff on May 14, 2020. The inventory included the study and GPS mapping of structures, water tanks, ponds, roads, cultivation sites, and other infrastructure.

2 SEDIMENT DISCHARGE BPTC MEASURES

2.1 SITE CHARACTERISTICS

Included with this report is an up to date map showing access roads, vehicle parking areas, streams, stream crossings, cultivation site(s), disturbed areas, buildings, and other relevant site features. See Appendix A.

2.2 ROAD CONDITIONS

The private access roads total approximately 1.2 miles and are accessed from a private access road off Old 3 Creeks Rd. An inventory of the private access road and the public roads to the property are given below in Table 1.

Table 1: Inventory of access roads on site.

Road Segment #/Map ID	Approx. Distance (mi.)	Type	Description and Condition	Improvements
RS1	0.8	Active-Seasonal	Hard packed soil with some natural gravel and rock. Mostly good condition.	Road shaping recommended. Specific points listed below.
RS2	0.1	Active-Seasonal	Hard packed soil with some natural gravel and rock. Mostly good condition.	None recommended
RS3	0.1	Active-Seasonal	Hard packed soil with some natural gravel and rock. Mostly good condition.	None recommended
RS4	0.2	Inactive-Unused ATV Track	Hard packed soil with some natural gravel and rock. Mostly good condition.	Decommission road and install permanent drainage features. See Section 2.5 for specific project points.

The main access road is used by the site owner, family and by neighbors through easement only. On average, the main access road is used two times a day during the growing season and closed during the winter season. Stormwater is drained from the access roads by installed water bars and slight out-sloping. The Handbook for Forest, Ranch & Rural Roads recommended maximum rolling dip spacing is listed below in Table 2 and should be used as guidance for installing drainage structures to the property's road segments.

Table 2: Recommended maximum rolling dip and ditch relief culvert spacing, in feet, based on road gradient and soil erodibility (Weaver, W.E., Weppner, E.M. and Hagans, D.K. 2015).

Soil erodibility	Road gradient (%) and drainage structure spacing (feet)				
	0-3	4-6	7-9	10-12	>12
High to moderate	250	160	130	115	100
Low	400	300	250	200	160

Frequent benches formed from recent road grading was observed during field investigation. It is recommended that these bench points be monitored for sediment transport, destabilizing organic material, or signs of erosion such as surface tension cracking. If during monitoring, any of these signs appear, increased road shaping such as installing water bars and/or rolling dips or outsloping the road is recommended. Existing road benches were observed at the following Map Points (MP)/locations:

Table 3: Existing road benches.

Map ID/Location	Notes
RB1/40.9691, -123.7364	Existing road bench
RB2/40.9687, -123.7373	Existing road bench
RB3/40.8685, -123.7376	Existing road bench
RB4/40.9686, -123.7328	Existing road bench
RB5/40.9671, -123.7318	Existing road bench
RB6/40.9668, -123.7312	Existing road bench

The following road segment map points (MPs) have been identified as currently needing remediation:

Table 4: Map points identified for remediation.

Map ID/Location	Notes
MP1/40.9696, -123.7362	Install water bar
MP2/40.9688, -123.7355	Reestablish inside ditch, water moves from side of road to middle of road causing erosion

MP3/40.9690, -123.7351	Install rolling dip
MP4/40.9704, -123.7348	Install water bar
MP5/40.9707, -123.7344	Install water bar
MP6/40.9705, -123.7341	Streambank alteration listed in CDFW LSAA. The map point needs rolling dip installed above, sediment removed from location and vegetation reestablished. Will be done per upcoming CDFW LSA agreement.
MP7/40.9701, -123.7332	Install water bar
MP8/40.9680, -123.7326	Install rolling dip
MP9/RS4/40.9694, -123.7355	Permanent decommissioning of Road Segment 4 is recommended. Install water bars to drain the road at frequent intervals with 100 ft spacing. Road Segment 4 is also noted as a Legacy Waste Discharge Issue below, in Section 2.5 of this report.

2.3 CULTIVATION AREA

There are four (4) distinct cultivation areas located on site. The cultivation areas (CA) are inventoried in Table 5.

Table 5: Inventory of cultivation areas and associated characteristics.

Map ID	Cultivation Area (ft^2)	Area Description	Cultivation Area Slope (%)	Distance to Water Body (ft)	Water Body Classification
CA1	4836	Outdoor, inground	<5%	>150 ft	Class III
CA2	1800	Outdoor, pots	<5%	>150 ft	Class III
CA3	1364	Outdoor, pots	<5%	>150 ft	Class III
CA4	2000	Greenhouse, inground	<5%	>150 ft	Class III

2.4 WATERCOURSES AND STREAM CROSSINGS

There are three (3) known watercourses running through the site. An inventory of watercourses (WC) can be found in Table 6.

Table 6: Inventory of watercourses that run through the site.

Map ID	Type	Notes
WC1	Intermittent Class II	Flows east near northern property boundary
WC2	Ephemeral Class III	Dry at time of field investigation
WC3	Intermittent Class III	Flow east near the center of the property

There is one known stream crossing on site, listed in Table 7.

Table 7: Inventory of all stream crossings on site.

Map ID	Type	Comments
MP10	Existing rocked ford	Crossing will be upgraded per CDFW LSAA, see recommended improvement listed below.

Recommended improvement to the stream crossing is as follows:

- MP10/40.9705, -123.7341: Upgrade stream crossing to a armored rockfill ford. The stream crossing upgrade will include a rocked rolling dip large enough to contain the 100-year peak stream flow.

2.5 Water Resources

Cannabis irrigation water is sourced from a groundwater well installed in 2018. The water is pumped a short distance to three HDPE storage tanks. The water is then gravity fed for irrigation uses.

2.6 Storage Areas

One shed is used for agricultural chemical storage and harvest storage. These sheds are listed below in Table 8.

Table 8: Inventory of all storage areas onsite.

Map ID	Lat	Long	Type/Size	Materials Stored or Use
Shed/Agricultural Chemical and Pesticide Storage	40.9695	-123.7324	Barn 25'x60'	Agricultural materials/harvest storage

2.7 Legacy Waste Discharge Issues

Due to in the site's location within Regional Water Quality Control Board Region 1, legacy waste discharge issues must be identified and discussed in the Site Management Plan. There are four(4) legacy waste discharge issues on site. Table 9 lists the known legacy waste issues located on site.

Table 9: Inventory of legacy waste issues located on site.

Map ID/Location	Type	Notes
MP9/RS4/40.9694, -123.7355	Unused road/ATV trail	Erosion occurring on road surface. Remediation discussed in Section 2.2 Road Conditions
MP11/40.9693, -123.7319	Unused cultivation area	Previously used cultivation area located too close to a Class II/III stream
MP12/40.9671, -123.7310	Unused cultivation area	Previously used cultivation area
MP13/40.9702,-123.7322	Onstream Reservoir	Unused, estimated capacity 18,000 gallons.

Road Segment 4 has been discussed as Map Point 9 for remediation above in Section 2.2 Road Conditions.

MP11 is a previously used cultivation area and disturbs approximately 2,648 square feet. The area shall be remediated by removing all cultivation materials and reseeding the area. All disturbed areas shall be revegetated with primary succession in the fall and winter months to take advantage of seasonal rainfall. Seed should be distributed in late October before first winter rains and in late winter/ spring after the last frost. Supplemental water is also recommended to assure survival of plantings until root systems have sufficiently developed. We recommend the King Range mix by Mattole Valley Restoration council or similar mix. This mix contains lightly competitive grasses for initial stabilization and perennial grasses and herbs for long term establishment while attracting native pollinators.

MP12 is a previously used cultivation area and disturbs approximately 750 square feet. The area shall be remediated by removing all cultivation materials and reseeding the area. All disturbed areas shall be revegetated with primary succession in the fall and winter months to take advantage of seasonal rainfall. Seed should be distributed in late October before winter rains and in late winter/spring after the last frost. Supplemental water is also recommended to assure survival of plantings until root systems have sufficiently developed. We recommend the King Range mix by Mattole Valley Restoration council or similar mix. This mix contains lightly competitive grasses for initial stabilization and perennial grasses and herbs for long term establishment while attracting native pollinators.

MP13 is an onstream reservoir located on a Class II seasonally intermittent stream. The reservoir is a legacy structure and is not used on site. The reservoir is estimated to be 20 feet x 30 feet and 4 feet deep with an approximate capacity of 18,000 gallons. The reservoir is unlined and shows signs of erosion on the downstream berm, around the outfall. The proposed remediation is to excavate the downstream berm to the native channel depth. The excavated material will be used to recontour the stream channel upstream of the lower berm. The native channel will be used as reference reaches to match the upstream and downstream morphology. The recontoured banks will be compacted and stabilized at a slope not greater than 2:1. The streambanks and riparian area will be revegetated with native seed and/or plant cuttings. Mulch and/or organic fiber erosion mats will be used until vegetation is established. All work will be carried out between June 15 and October 15 and when the stream channel is dry with no rain events forecasted. Monitoring will be carried out after the project completion to ensure project success. The reservoir is being included in the upcoming CDFW LSA notification. The reservoir will be removed and a stream restoration project will be carried out under CDFW LSAA as well as the project and applicant will be necessarily enrolled in the California SWRCB 401 Water Quality Certification and Wetlands property.

3 Sediment Erosion Prevention & Sediment Capture

3.1 Erosion Prevention BPTC Measures

Erosion prevention controls such as straw mulch, plastic covers, slope stabilization, soil binders, culvert outlet armoring, and revegetation efforts shall be inventoried and monitored to ensure their effectiveness. A complete inventory of existing and pending erosion prevention controls is listed in Table 10.

Table 10: Inventory of all existing and pending erosion prevention controls on site.

Map ID	Control Measure	Existing or Date to be Installed	Comments
All cultivation areas	Straw mulch applied to areas of exposed soil	Existing	
All cultivation areas	Established vegetation buffers around cultivation areas	Existing	
E&SC1/40.9687,-123.7352 653	Slash Mat	Existing	Slash on outfall of drainage & straw wattles being used
E&SC2/40.9701,-123.7331 663	Slash mat	Existing	Slash on outfall of drainage

3.2 Sediment Control BPTC Measures

Sediment controls such as silt fences, fiber rolls, settling basins, vegetated outfalls, and hydroseeding shall be inventoried and monitored to ensure their effectiveness. A complete inventory of existing and pending erosion prevention controls is listed in Table 11.

Table 11: Inventory of all existing and pending sediment controls on site.

Map ID/Location	Control Measure	Existing or Date to be Installed	Comments
MP1/E&SC3/40.9696, -123.7362	Straw waddles	Existing	Recommended permanent replacement of straw waddle with waterbar to direct surface runoff off roadway
MP9/E&SC4/40.9694, -123.7355	Straw wattles	Existing	Recommended permanent treatment to road segment by installing waterbars every 100 ft

4 Maintenance Activities

The discharger will maintain logs of daily water diversion, daily water usage, land disturbance weather and road & drainage feature maintenance, as applicable. The discharger will implement winterization measures, erosion control measures and soil disposal & management measures, as applicable. Example pages of the data logs and measure

checklists have been added to this document as Appendix C: Selected Best Practicable Treatment or Control Measures, Data Logs and Measure Checklists.

Storms that produce 0.5 inches of precipitation within 24 hours or over 1 inch over the course of 7 days shall trigger an inspection of all roads, ditches, culverts and their outfalls, and any other drainage features. This same inspection shall occur prior to the onset of the wet season (e.g. September before regular rain events begin). Dischargers shall inspect the condition of the roads and drainage features. Any woody debris that is found at drainage inlets shall be removed to prevent any blockages. Any sediment buildup that impacts access road or drainage feature performance shall be removed and stabilized outside of the riparian setbacks. Stabilization of sediment will be achieved by one of the following methods:

- Reused in contained vegetable or ornamental gardening beds that are located outside of the riparian setbacks.
- In contained stockpiles that are covered when not in use. These stockpiles can then be used when amending/reusing cultivation medium.
- Transported contained and covered to the closest transfer station as green waste.

5 Agricultural Chemical BPTC Measures

5.1 Inventory of Agricultural Chemicals

Table 12 lists all off the agricultural chemicals in use on site. All agricultural chemicals are used and stored in a manner that prevents those chemicals from entering the riparian setbacks or waters of the State. Delivery of all products happen in May, before the growing season. All chemical usage is in accordance with the label instructions. Agricultural chemicals are applied at agronomic rates. No restricted pesticides are allowed on the site.

Table 12: Inventory of all agricultural chemicals in use on site.

Agricultural Chemical Name	Agricultural Chemical Type	Method of Storage	Storage Location	Description of Use
Dry Mix Amendments	Amendment	Applied immediately	None stored	Applied and/or mixed into soil immediately.
Chester Boones & Plant therapy	Integrated pest management	Stored in manufacturer's container with totes for secondary containment	Agricultural chemical storage shed	Applied weekly from back pack sprayer.
Calcium-Magnesium	Fertilizer	Stored in manufacturer's container with totes for secondary containment	Agricultural chemical storage shed	Applied as needed throughout growing season. Applied from gravity fed hose.
Liquid fish emulsion	Fertilizer	Stored in manufacturer's	Agricultural chemical	Applied as needed throughout growing season. Applied from gravity fed hose.

		container with totes for secondary containment	storage shed	
Molasses	Amendment	Stored in manufacturer's container with totes for secondary containment	Agricultural chemical storage shed	Applied as needed throughout growing season. Applied from gravity fed hose.
Microbial tea	Fertilizer	Stored in manufacturer's container with totes for secondary containment	Agricultural chemical storage shed	Applied as needed throughout growing season. Applied from gravity fed hose.

5.2 Agricultural Chemical Storage, Application & Disposal

Empty agricultural chemical containers are disposed of per their label instruction. If the discharger is unsure of proper disposal method, they will contact their local Waste Management or Transfer Center Facility for instruction. Until proper disposal, empty containers will be kept in heavy-duty plastic totes or heavy-duty contractor bags stored in weatherproof shelter. All containers are recycled if possible.

6 Petroleum Product BPTC Measures

6.1 Inventory of Petroleum Products

Table 13 lists all off the petroleum products in use on site. All petroleum products are used and stored in a manner that prevents those chemicals from entering the riparian setbacks or waters of the State. All petroleum product usage is in accordance with the label instructions.

Table 13: Inventory of all petroleum products used on site.

Petroleum Product	Associated Equipment	Method of Storage	Storage Location	Description of Use
Diesel	Honda 2200 generator, MQ Power 25 Wisperwatt generator	500 gal steel tank with secondary containment	Near Shed/Agricultural Chemical and Pesticide Storage	As needed for farm equipment
Propane	Domestic use	5 gal tanks	Near Bath House	

6.2 Petroleum Product Storage, Use & Disposal

Empty petroleum product containers are stored, used and disposed of per label instruction. If the discharger is unsure of proper disposal method, they will contact their local Waste Management or Transfer Center Facility for

instruction. Until proper disposal, empty containers will be kept in heavy duty plastic totes or contractor bags stored in weatherproof shelter.

7 Spill Prevention and Cleanup

Spill kits shall be located in the Agricultural Chemical and Fertilizer storage shed for immediate use to clean up any agricultural chemical or petroleum product spills. Discharger will maintain spill kits by restocking whenever any materials are used, deteriorated or expired.

The following procedure is to be used is the event of a hazardous material spill:

I. **Risk Assessment:** The moment a spill occurs and throughout the response, risks will be determined that may affect human health, the environment, and property. The spilled material and quantity released will be and determined.

II. **Selection of Personal Protective Equipment:** The appropriate Personal Protective Equipment (PPE) is selected to safely respond to the spill will be determined. MSDS and literature from Chemical and PPE manufacturers will be used to make this determination. If there is uncertainty of the danger and the spilled material is unknown, the worst will be assumed and the highest level of protection will be implemented.

III. **Spill Confinement:** As quickly as possible the spill area will be confined. Use of contained absorbents such as socks and booms will be implemented. Priority will be given to stop the flow of the liquid before it has a chance to contaminate a water source. Spill kits will be used to facilitate a quick, effective response.

IV. **Stopping the Source:** After the spill has been confined, the source of the spill will be stopped. This may simply involve turning a container upright or plugging a leak from a damaged drum or container. Putty, barrel patches, and cone plugs will be used to stop leaks. Material will be transferred from the damaged container to a new one.

V. **Incident evaluation and cleanup implementation:** Once the spill has been confined and the leak has been stopped, the incident will be assessed and a plan of action for implementing the spill clean-up will be developed. Pillows and mat pads will be used to absorb the remainder of the spill. Once the absorbents are saturated they will be considered hazardous waste and disposed of accordingly.

VI. **Decontamination:** Site, personnel and equipment will be decontaminated by removing or neutralizing the hazardous materials that have accumulated during the spill. This may involve removing and disposing of contaminated media such as soil that was exposed during the spill incident.

8 Trash/Refuse and Domestic Wastewater BPTC Measures

Trash and refuse is generated from cannabis cultivation and domestic-related activities. There are no residences located on site. There are no employees who work on the site with only discharger and family growing and drying.

8.1 Inventory of Refuse Sources On Site

Table 14 Inventory of Refuse Sources on site.

Refuse Source	Type	Storage Location	Disposal Process

Domestic Waste	Food waste/packaging	Shed/Agricultural Chemical and Pesticide Storage	Bagged and delivered by discharger to transfer station weekly
Agricultural Waste	Organic Matter	Near Cultivation Areas	Contained and composted

8.2 Inventory of Wastewater Sources On Site

Table 15 Inventory of Wastewater Sources on site

Wastewater Source	Treatment Type	Treatment System Location	Additional Notes
Domestic	Toilet	Bath House	Unknown permit status
Domestic	Portable Toilet	Near Bath House	Will be serviced regularly

9 Winterization BPTC Measures

The winter period has been defined by the General Order as the calendar dates from November 15th to April 1st. The goal of implementing winterization best management practices is to limit an erosion or sediment transport during the rainy season. All applicable erosion control and sediment prevention measures shall be implemented prior to the beginning of the winter period, November 15. All soil stockpiles and spoils must either be properly disposed of or fully contained and weatherproofed before the winter period. Any seasonal roads shall be blocked off and no heavy equipment will be used during the winter period. All road drainage features shall be maintained and inspected prior to the winter season. All disturbed areas must be stabilized and erosion repair and control measures must be applied to bare ground to prevent discharge of sediment to waters of the state. All refuse should be removed from site. Hydroseed any exposed earth areas with native plant seed to revegetate and stabilize those areas.

10 State Water Resources Control Board (SWRCB) Reporting

Full SWRCB monitoring and reporting guidelines can be found in Attachment B: Monitoring and Reporting Program of the General Order. Important specific guidelines from Attachment B of the General Order have been highlighted here.

The Discharger shall retain records of all monitoring information, including copies of all reports required by the General Order and records of all data used to complete the application for the General Order. Records shall be maintained for a minimum of three years from the date of the report or application. Records may be maintained electronically. This period may be extended during the course of any unresolved litigation regarding this discharge or when requested by the Regional Water Board Executive Officer.

Table 16 lists the technical reports required for Tier 1 and Tier 2 dischargers.

Table 16: Technical Report Requirements by Tier (SWRCB 2019).

Tier	Risk Level	Technical Reports
Conditionally Exempt	N/A	Site Closure Report
Tier 1	All	Site Management Plan
Tier 1	Moderate	Site Erosion Sediment Control Plan
Tier 1	High	Disturbed Area Stabilization Plan
Tier 1	All	Site Closure Report
Tier 2	All	Site Management Plan
Tier 2	Moderate	Site Erosion Sediment Control Plan
Tier 2	High	Disturbed Area Stabilization Plan
Tier 2	All	Nitrogen Management Plan
Tier 2	All	Site Closure Report

The monitoring requirements for Tier 1 or Tier 2 facilities are shown in Table 17.

Table 17: Monitoring Requirements (SWRCB 2019).

Monitoring Requirement	Description
Winterization Measures Implemented	Report winterization procedures implemented, any outstanding measures, and the schedule for completion.
Tier Status Confirmation	Report any change in the tier status. (Stabilization of disturbed areas may change the tier status of a facility. Contact the Regional Water Board if a change in status is appropriate.)
Third Party Identification	Report any change in third party status as appropriate.
Nitrogen Application (if cultivation area or aggregate of cultivation areas exceeds one acre)	Report monthly and annual total nitrogen use for bulk, solid, and liquid forms of nitrogen. Provide the data as pounds per canopy acre per time (month or year) as described in Attachment D, Nitrogen Management Plan. If plant tissue was collected to determine limited nitrogen availability, the results shall be submitted.

Annual Reports shall be submitted to the Regional Water Board by March 1 following the year being monitored. For example, the monitoring report for activities conducted in the year 2018 is due on March 1, 2019. The Annual Report shall include the following: 1.) Facility Status, Site Maintenance Status, and Storm Water Runoff Monitoring. 2.) The name and contact information for the person responsible for operation, maintenance, and monitoring.

A letter transmitting the annual report shall accompany each report. The letter shall summarize the numbers and severity of violations found during the reporting period, and actions taken or planned to correct the violations and prevent future violations. The transmittal letter shall contain the following penalty of perjury statement and shall be signed by the Discharger or the Discharger's authorized agent:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

The Discharger shall submit notices, technical reports, and annual reports to appropriate Regional Water Board where the permitted activity is taking place. The appropriate Regional Water Board office and e-mail information is

provided on the application receipt (e.g., notice of exemption, Notice of Receipt, Notice of Applicability, etc.). The North Coast Regional Water Board Cannabis Office Contact Information is:

North Coast Regional Water Board
55550 Skylane Blvd., Suite A
Santa Rosa, CA 95403
Northcoast.cannabis@waterboards.ca.gov

11 SUMMARY OF CORRECTIVE ACTIONS

Table 18 is a summary of Corrective Actions and BPTC measures that are either underway or yet to be implemented. These measures must be completed prior to the start of the winter period, November 15.

Table 18: Summarized site-specific BPTC measures

MP ID/Location	Map Point Description	BPTC Measure	Recommendation to Meet Measure	Existing or Date to be Installed
MP1/40.9696, -123.7362	On Road Segment 4	26	Install water bar	Nov. 15 2020
MP2/40.9688, -123.7355	On Road Segment 1	15	Reestablish inside road ditch	Nov. 15 2020
MP3/40.9690, -123.7351	On Road Segment 1	26	Install water bar	Nov. 15 2020
MP4/40.9704, -123.7348	On Road Segment 1	26	Install water bar	Nov. 15 2020
MP5/40.9707, -123.7344	On Road Segment 1	26	Install water bar	Nov. 15 2020
MP6/40.9705, -123.7341	On Road Segment 1	64	Remediate streambank alteration per CDFW LSAA	Nov. 15 2021
MP7/40.9701, -123.7332	On Road Segment 1	26	Install water bar	Nov. 15 2020
MP8/40.9680, -123.7326	On Road Segment 1	26	Install rolling dip	Nov. 15 2020
MP9/40.9694, -123.7355	Road Segment 4	26	Install water bars to drain road every 100 ft	Nov. 15 2020

MP10/40.9705, -123.7341	On Road Segment 1/Stream Crossing	31	Upgrade stream crossing to armored rockfill ford	Nov. 15 2021
MP11/40.9693, -123.7319	Unused cultivation area	North Coast Regional Water Board Legacy Issue	Remove all cultivation materials and reestablish vegetation on the disturbed area	Nov. 15 2020
MP12/40.9671, -123.7310	Unused cultivation area	North Coast Regional Water Board Legacy Issue	Remove all cultivation materials and reestablish vegetation on the disturbed area	Nov. 15 2020
MP13/40.9702,-123.7322	Water Course 1/Onstream Reservoir	63,64	Remove watercourse berm and restore area per CDFW LSAA	Nov. 15 2021

12 REFERENCES

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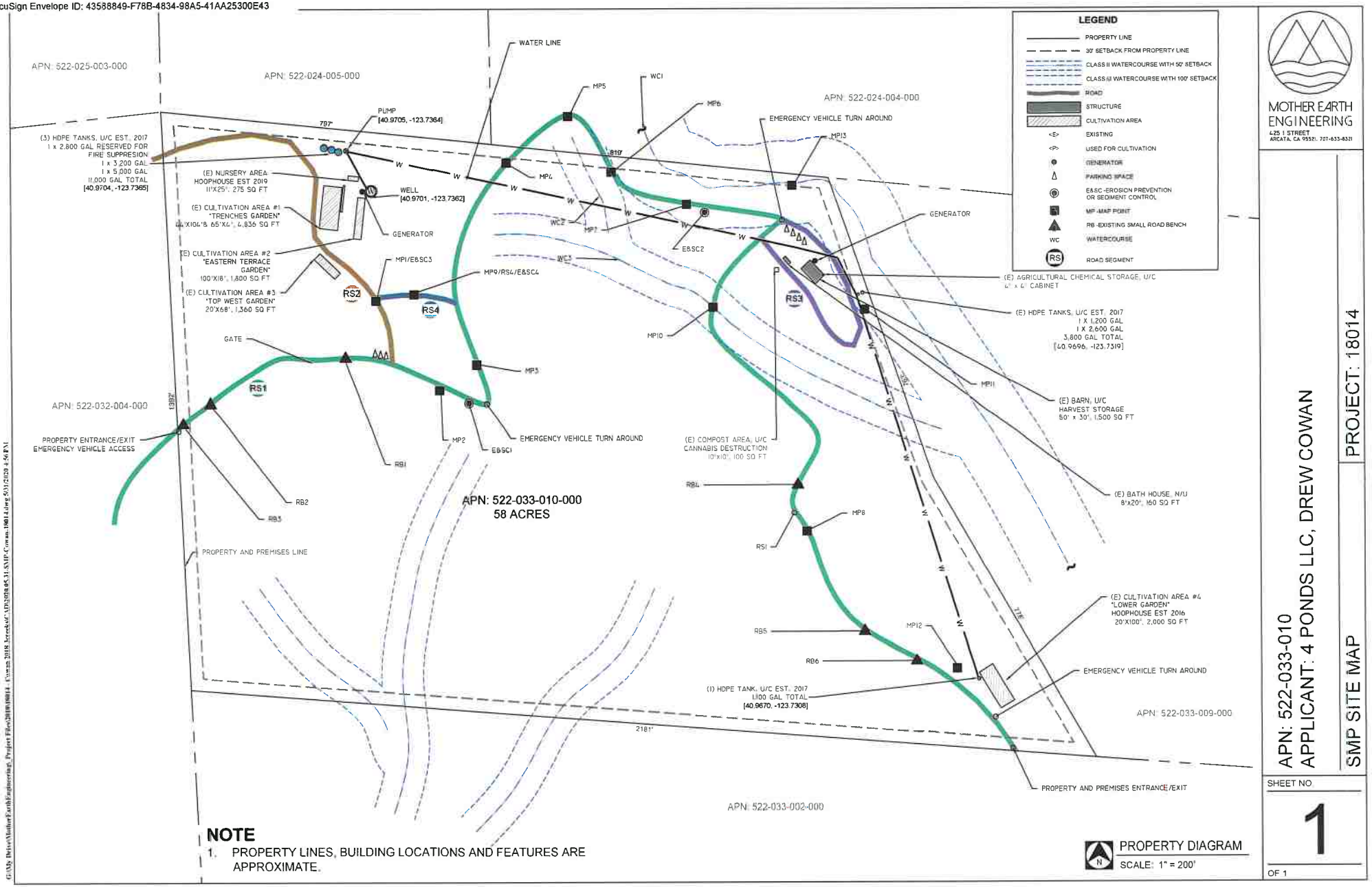
Appendix A

Site Map



NOTE

1. PROPERTY LINES, BUILDING LOCATIONS AND FEATURES ARE APPROXIMATE.

PROPERTY DIAGRAM
SCALE: 1" = 200'

MOTHER EARTH ENGINEERING
425 I STREET
ARCATA, CA 95521, 707-633-8321

APN: 522-033-010
APPLICANT: 4 PONDS LLC, DREW COWAN

PROJECT: 18014

SMP SITE MAP

SHEET NO
1
OF 1

G:\My Drive\MotherEarthEngineering_Project Files\2018\18014 - Cowan 2018 Spreads\C3D\2020.05.31 SMP Cowan 18014.dwg 5/31/2020 4:56 PM

Appendix B

Site Pictures

Project Photos

Implementation of Best Practical Treatment or Control Measures

In Fulfillment of Water Quality Order 2019-0001-DWQ

State Water Resources Control Board

Humboldt County APN 522-033-010

May 2020

Prepared for:
4 Ponds, LLC
Drew Cowan
1_1CC419822
(707) 272-5815

Prepared by:
Belle Ciotti
Staff Engineer
18014
Belle@motherearthengineering.com

MOTHER EARTH ENGINEERING

425 I Street Arcata, California 95521
707-633-8321 | motherearthengineering.com

MP1

Photo #: 1
Description: MP1 straw waddle applied as a sediment control feature. Replace with a waterbar for a permanent treatment.

MP2

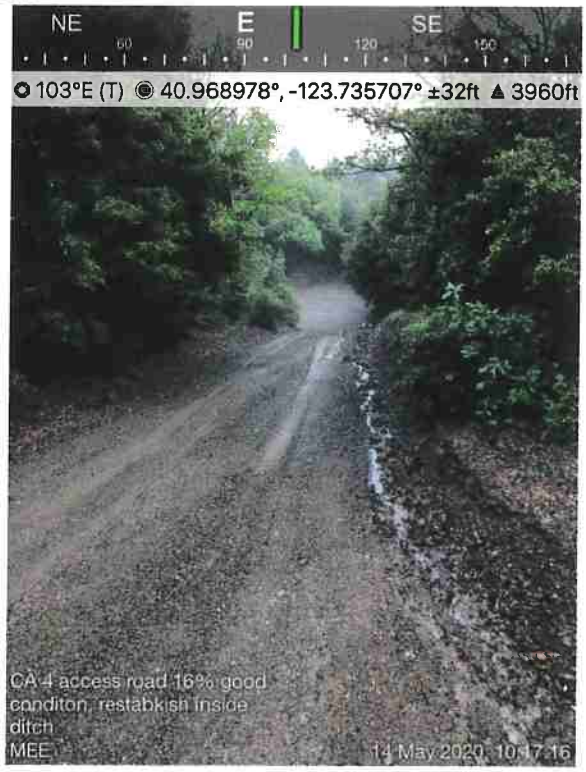


Photo #: 2
Description: Reestablish inside road ditch

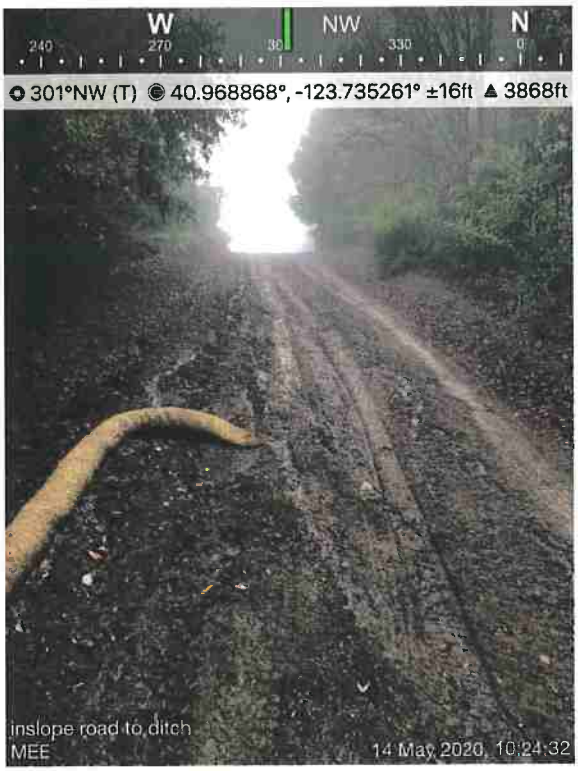


Photo #: 3
Description: Straw waddle applied as a sediment control feature. Reestablish inside road ditch.

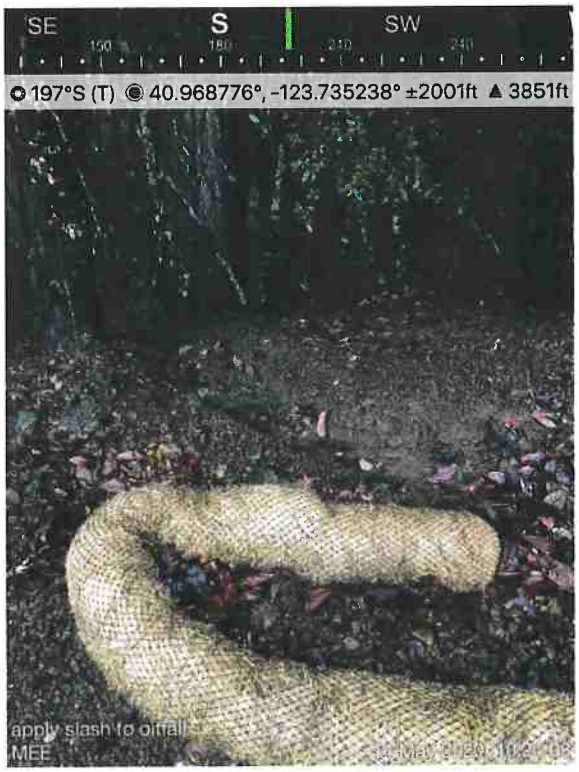


Photo #: 4
Description: Existing straw waddle, apply more slash to outfall.

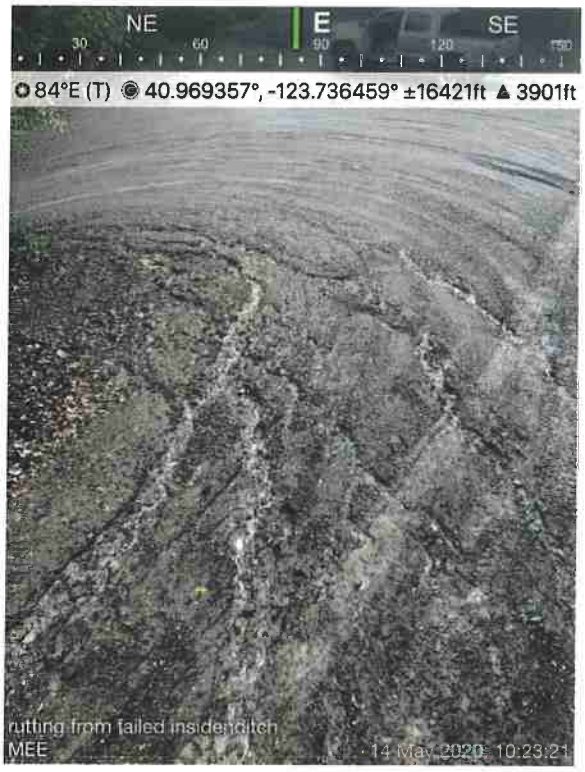


Photo #: 5
Description: Rutting on road from failed inside ditch.

MP6

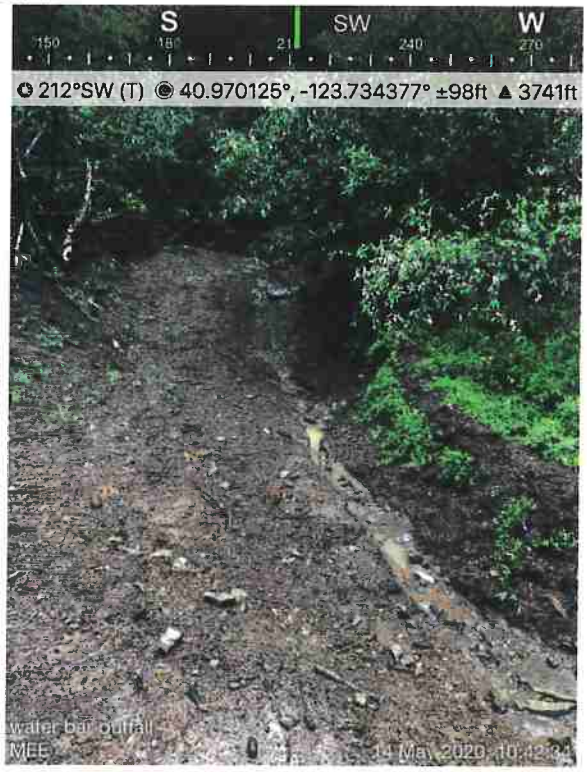


Photo #: 6
Description: Streambank alteration. Remediate per CDFW LSAA

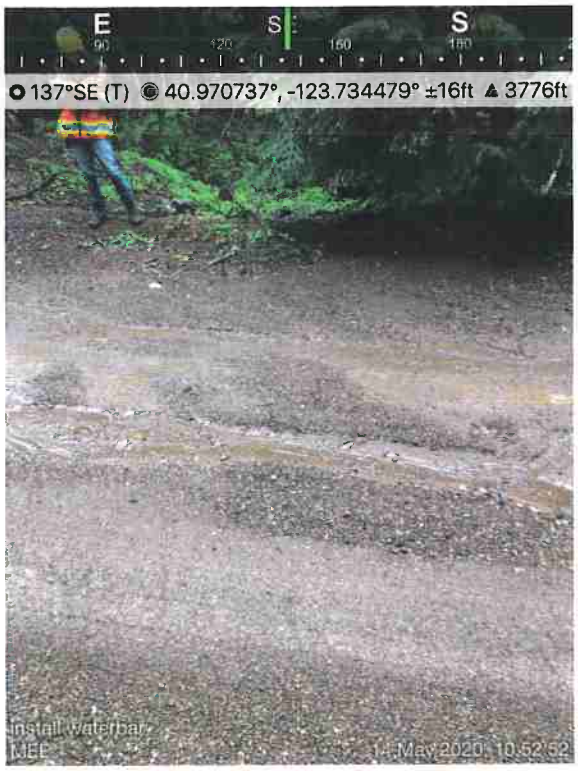


Photo #: 7
Description: Streambank alteration site.

MP9

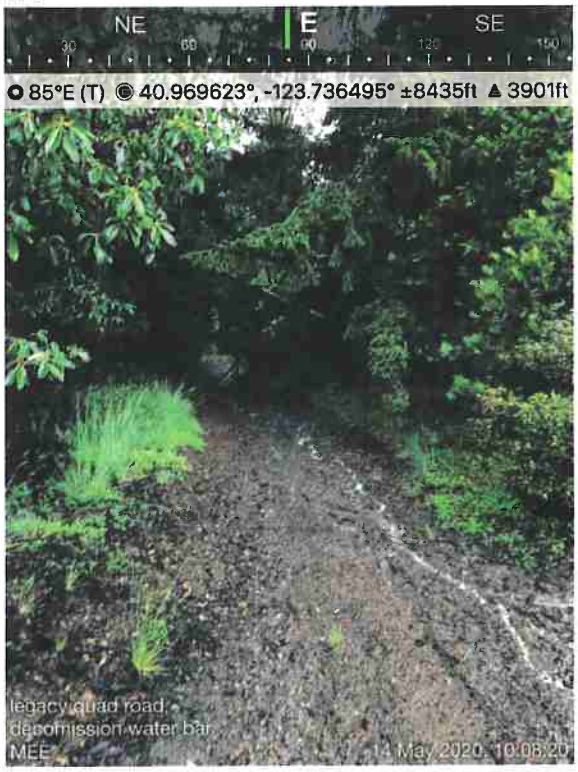


Photo #: 8
Description: Top of Road Segment 4. Permanently decommission by blocking roadway and installing waterbars at 100 foot intervals.

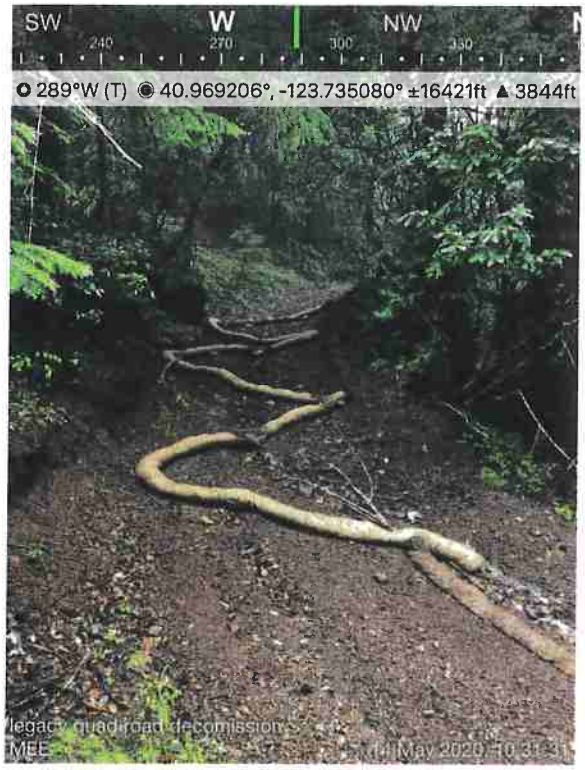


Photo #: 9
Description: Bottom of Road Segment 4. Straw waddles applied for sediment erosion control. Permanently decommission by blocking roadway and installing waterbars at 100 foot intervals.

MP10

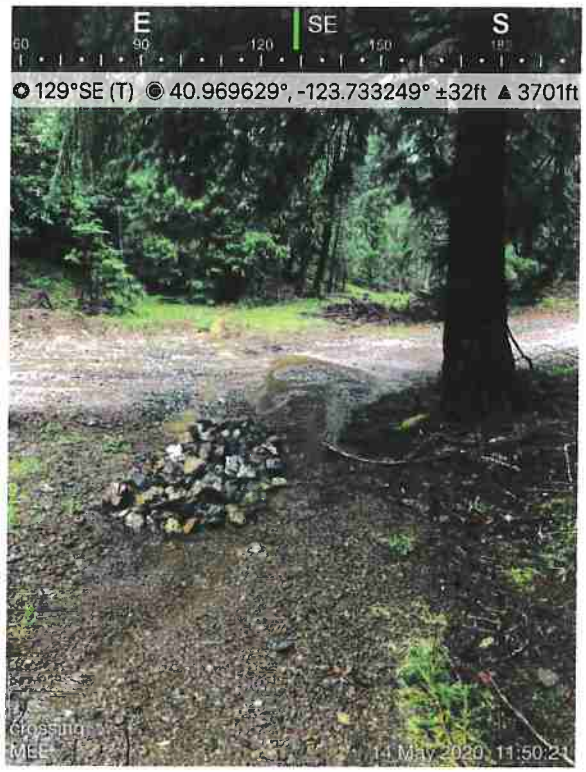


Photo #: 10
Description: Stream crossing, upgrade to 30" Culvert

MP11

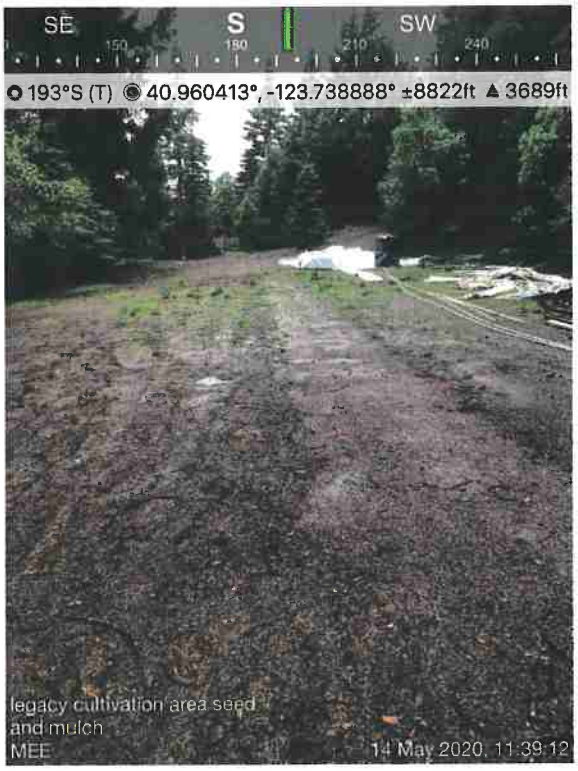


Photo #: 11
Description: Legacy cultivation area encroaching on streamside management area. Reestablish vegetation on the disturbed area.

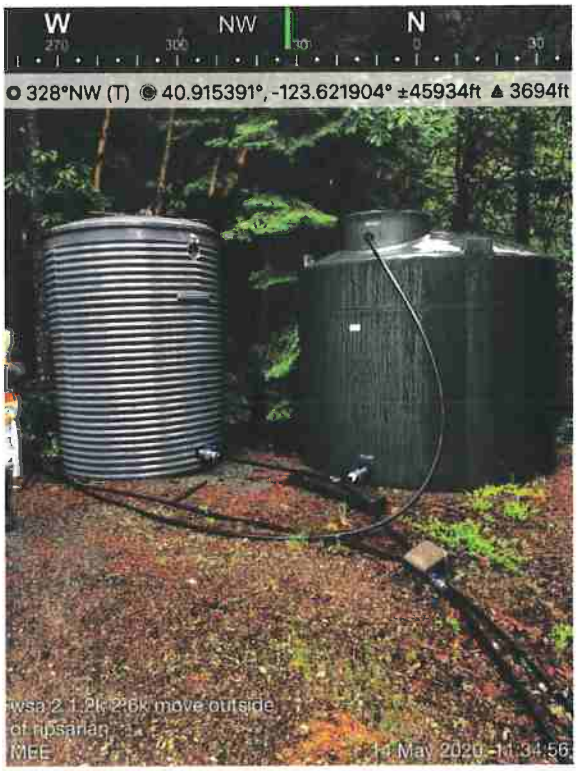


Photo #: 12
Description: Water storage area next to legacy cultivation area. Move outside of riparian area.

MP12

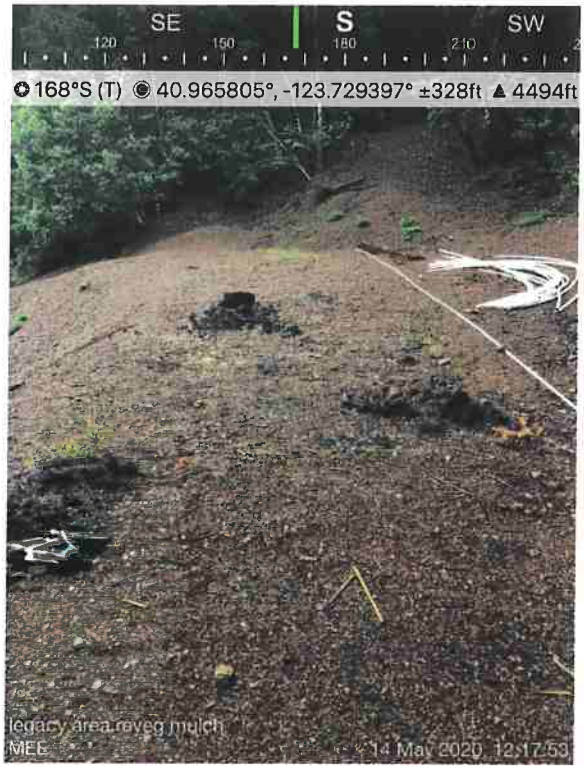


Photo #: 13
Description: Legacy cultivation area. Remove all cultivation materials and reestablish vegetation on the disturbed area.

MP13

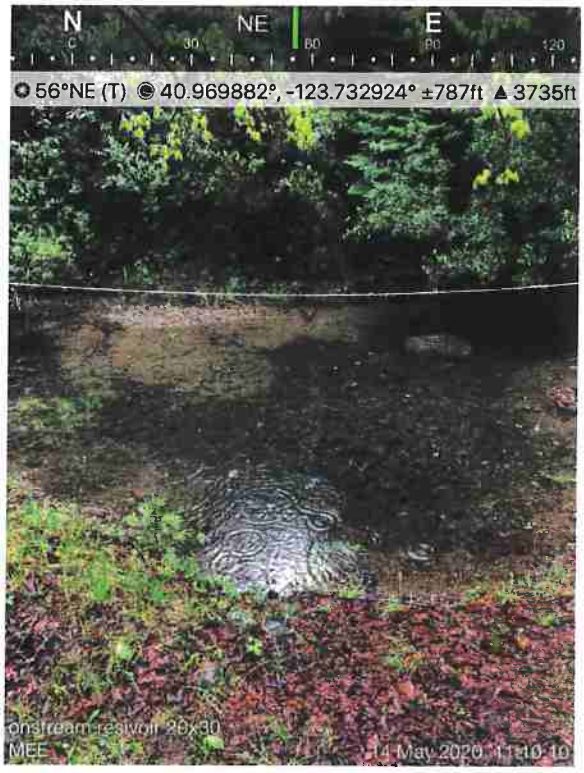


Photo #: 14
Description: Onstream pond. Remove berm and restore area per CDFW LSAA.

General Site Photos

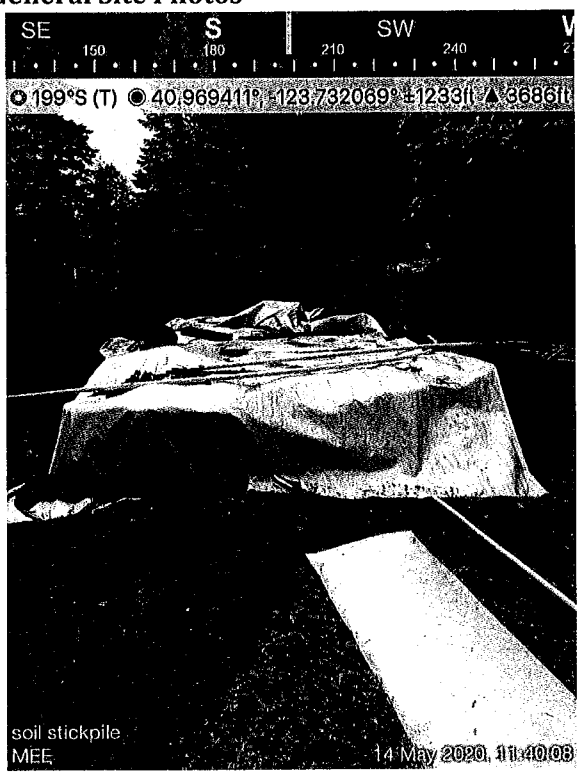


Photo #: 15
Description: Soil stockpile, covered and contained.

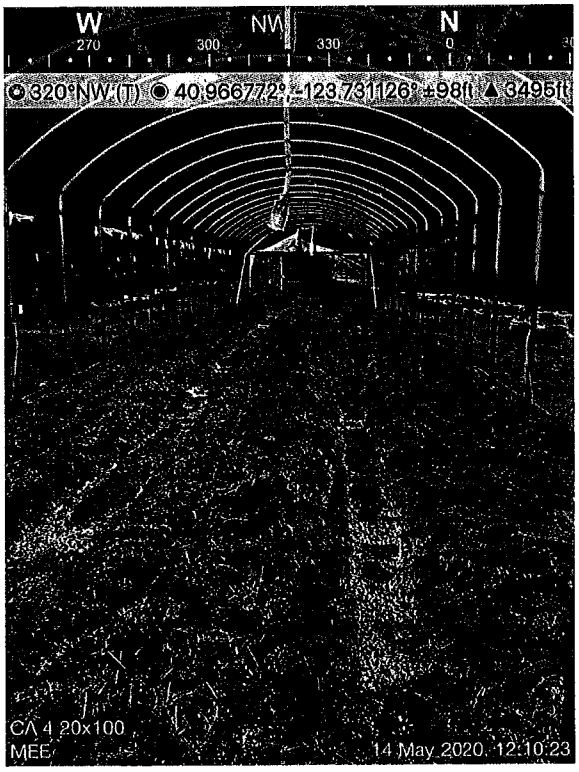


Photo #: 16
Description: Cultivation area 4. Mulched for winter and vegetation buffer established.

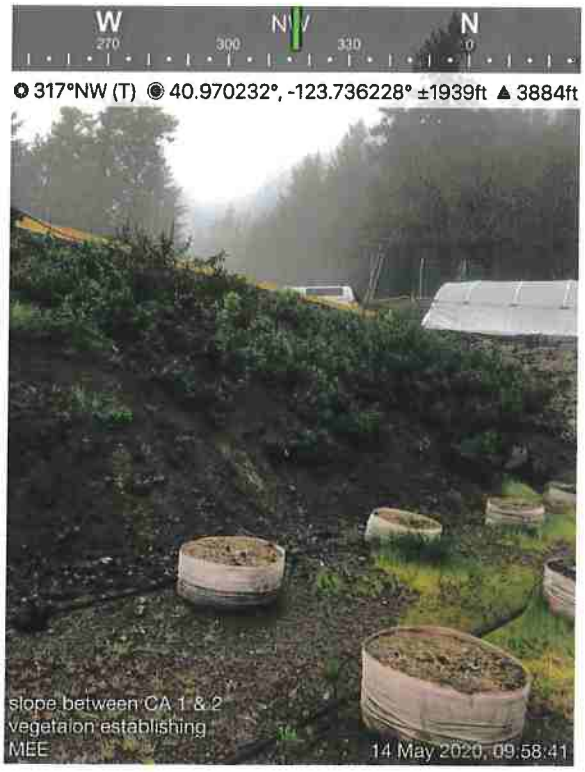


Photo #: 17
Description: Cultivation area 1&2 with vegetation establishing on exposed soils.

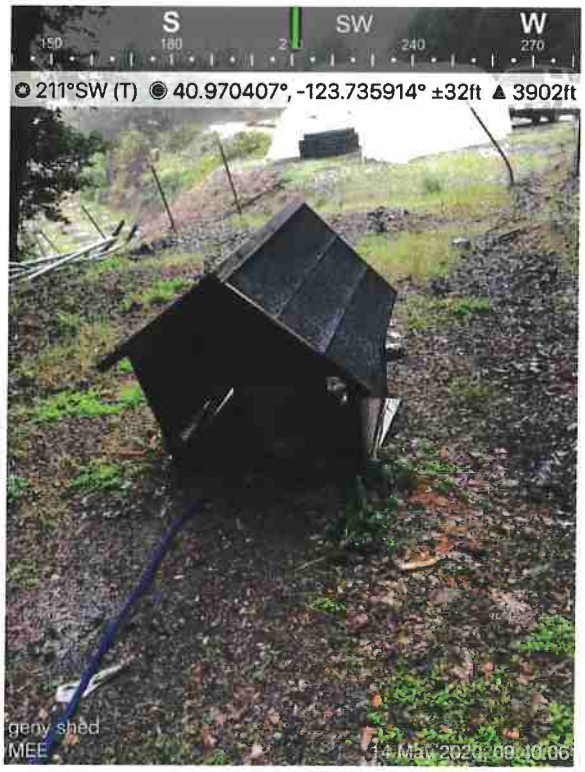


Photo #: 18
Description: Small generator housing near groundwater well.

Appendix C

Selected BPTC, Data Logs & Measure Checklists

Selected Best Practicable Treatment or Control (BPTCs) Measures, Data Logs and Measure Checklists

A) Year Round BPTCs
B) BPTC Schedule
C) Conditional BPTCs
D) Daily Water Usage Log
C) Land Disturbance Weather Log
D) Road and Drainage Feature Maintenance Log
E) Winterization Checklist
F) Erosion Control Checklist
G) Soil Disposal and Management Checklist
H) Erosion and Sediment Control BMPs

Year-Round BPTCs

In order to maintain compliance with the State Water Board General Order the following conditions shall be met all throughout the year.

Cannabis cultivators shall comply with the minimum riparian setback below for all land disturbance, cannabis cultivation, facilities (material/vehicle/equipment storage, pump locations, portable toilet, water storage), and equipment maintenance/usage:

Class I watercourses - Stream that flows 9 months or more of the year, fish present or includes a habitat to sustain fish migration and spawning, lakes, ponds and springs. **Maintain a 150 feet setback.**

Class II watercourses - Intermittent watercourse that runs 3 to 9 months a year, provides habitat to non-fish aquatic species. **Maintain a 100-foot setback.**

Class III watercourses - Ephemeral watercourse that runs 3 months or less a year, does not provide habitat for riparian vegetation or aquatic species. **Maintain a 50-foot setback.**

Maintain a complete spill kit on site. Use spill kit and properly dispose of any spilled agricultural chemicals, petroleum products, or any other hazardous chemicals. Properly dispose all wastes off-site. **All Agricultural products and fuel products require separate storage areas with secondary containment.** Hazardous materials shall only be used by their label usage. No unpermitted pesticides or chemicals are allowed on site. No agricultural products shall be used in the 48 hours before a forecast of 0.25 inches or more with a 50% or greater chance.

Temporary sediment controls (seeding and strawing, straw wattles, hay bales, silt fences, etc.) shall be **installed within 7 days of any land disturbance activities.** Only native seed and plants shall be used for revegetating disturbed areas.

Road approaches to water crossings should be rocked if not paved. The steeper the road the higher quality of surfacing. Winter roads shall be surfaced. Asphalt grindings not allowed for surfacing.

All applicable permits shall be obtained before working around surface water or wetlands. Habitat in and immediately around streams cannot be disturbed without the correct permits. These may include CWA 401/404 permits, Regional Water Board WDRs, and CDFW 1600.

Soil, construction, and waste materials should be stored in an area that is stable, contained, and outside of the riparian setbacks.

Cultivator shall inspect their water distribution system regularly and immediately repair any leaks.

No domestic wastewater shall be disposed without meeting applicable local and regional regulations. Septic systems must be permitted. Porta-Potties should be sited on stable flat ground and maintained regularly.

Surface water diversions for cannabis cultivation shall be recorded daily. Additionally, the water usage for cannabis cultivation shall be recorded daily. Surface water shall not be diverted from April 1st to October 31st. Surface water diversions must allow 50% of the streamflow to bypass the point of diversion. Surface water diversions are not permitted unless the flow of the watercourse diverted from meets the designated Numeric Flow Requirement. Groundwater may be subject to forbearance, if State Water Board decides so.

For each water delivery make sure to obtain a receipt and information needed to fill out the Water Delivery Log.

Before any land disturbance activity is initiated the conditions on the Land Disturbance Weather Log must be met and it must be filled out through the duration of activities.

Prior to the rainy season and whenever there are large storm events the Road and Drainage Maintenance log shall be filled in. Prior to November 15th the Winterization Checklist shall be completed.

BPTCs Schedule

Monitoring Element	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Water Usage Log	X	X	X	X	X	X	X	X	X	X	X	X
Road and Drainage Maintenance Log	X	X	X	X					X	X	X	X
Winterization Checklist										X	X	
Surface Water Diversion Forbearance				X	X	X	X	X	X	X		

Conditional BPTCs

If	Then
You plan to do any land disturbance work (grading, clearing, terracing, roadbuilding, culvert installation, etc.)	Make sure you are in possession of all necessary permits (CDFW LSAA, County Grading Permit, etc.). Maintain the Land Disturbance Weather Log, Erosion Control Checklist, and Soil Disposal and Management Checklist. Install erosion and sediment controls within 7 days of the completion of the project. If the project is an emergency project in the winter period (Nov 15th to April 1st) the Regional Water Board and CDFW must be notified .
A storm produces 0.5 inches of rain within 24 hours or a storm produces 1 inch of rain over 7 days	Fill out the Road Drainage Feature Maintenance Log.
A 48 hours prior rainfall forecast predicts 0.25 inches of rain with 50% chance or greater	No agricultural chemicals/products can be applied.
Your diversion is a surface water diversion	Maintain Water Diversion Log as well as Water Usage Log.
There is exposed ground on your property	Erosion controls must be applied under the guidance of the Erosion Control Checklist .

Daily Water Usage Log

- Fill out daily, write down the date and the metered amount
- Only record usage for cannabis irrigation - not domestic or other irrigation usage
- Use a meter as installed as close to point of irrigation or use estimate based on amount of time watering and known irrigation rate
- Records must be kept on site, available for up to 5 years

Date	Irrigation Amount	Date	Irrigation Amount
ex. 05/24/2018	*ex. 10,424 gals*		

Land Disturbance Weather Log

A land disturbance is any activity that increases the amount of soil that will runoff the property when it rains. Examples of this are construction/maintenance of roads, building construction, grading, and site clearing. Please acknowledge the following requirements when engaging in land disturbance activities:

- Prior to any land disturbance the cultivator shall have a Biologist investigate the proposed site and inform CDFW and CALFIRE if any sensitive plant or wildlife species are identified
- Work that is valued over $500 in labor and material costs are to be performed by a licensed contractor
- No land disturbance activities are allowed during the Winter period (Nov 15 to April 1) unless authorized by a Regional Water Board Executive Officer

Fill out this log when you are doing permitted to do land disturbance work with the above condition met. For each day of land disturbance activity, the 24-hour forecast must be checked and recorded. If the 24-hour forecast reports a chance of precipitation at 50 percent or greater of 0.5 inches or more within that period than all land disturbance work was stop and erosion controls put into place.

Date	Forecast chance of rain	Forecast depth of rain	Notes
ex. 05/24/2019	*ex. 20%*	*ex. 0.2 in*	*ex. Started regrading access road to cultivation area*

Land Disturbance Weather Log

Date	Forecast chance of rain	Forecast depth of rain	Notes

Road and Drainage Feature Maintenance Log

Road surfaces and drainage features (culverts, drop inlets, trash racks) shall be closely inspected before the rainy season and after large storm events. Record the dates of inspection and mark down any maintenance work that was completed. Perform inspection and maintenance when any of the following occur:

- Prior to the start of the rainy season
- A storm produces 0.5 inches of rain within 24 hours
- A storm produces 1 inch of rain over 7 days

Examples of road and drainage feature maintenance:

- Wood or debris blocking entrance of ditch relief culvert or stream crossing culvert
- Sediment blocking rolling dip outlet removed and disposed of
- Rocking road where it is necessary

Any sediment or debris removed should be stabilized on a flat area away from surface water or stormwater flow.

Date	Pre-rainy season check or storm event	Maintenance Notes

Road and Drainage Feature Maintenance Log

Date	Pre-rainy season check or storm event	Maintenance Notes

Winterization Checklist

The winter season as defined by the State Water Board begins November 15th and ends April 1. Before the winter season begins the cultivator must go through this and the associated checklist and make sure the property that enrolled is winterized. The two associated checklists are the Erosion Control Checklist and the Soil Disposal and Management Checklist. Each time the winterization is completed sign and date below.

By November 15th complete the following:

- Complete the Erosion Control Checklist
- Complete the Soil Disposal and Management Checklist
- Block off seasonal roadways
- Refrain from using any heavy equipment during the winter season unless authorized
- Install linear sediment controls (silt fences, wattles) on the face of exposed slopes at the following spacing:
  - Slopes 0%-25% at 20 feet maximum apart
  - Slopes 25%-50% at 15 feet maximum apart
  - Slopes 50% and greater at 10 feet maximum apart
- Install linear sediment controls at the toe and break of any exposed slopes
- Complete the Drainage Feature Maintenance Log prior to the start of the rainy season
- Stabilize all disturbed areas and construction entrances and exits
- Stabilize all stockpiles using Stockpile Management BMPs (included with this document)
- All exposed or bare ground (cultivation area, access pathways) shall have erosion repair and control measures in place
- Any applicable checklist items that were not completed by November 15th should be reported on this form as well as a schedule for completion.

Date	*Notes*	*Signature*
Ex. 11/05/18	*ex: Waddles installed a upper cultivation area, perimeter of cultivation area seeded and mulched, all other checklists complete*	*DB*

Winterization Checklist

Date	*Notes*	*Signature*

Erosion Control Checklist

The Erosion Control Checklist should be completed when any of the following occur:

- Within seven days of completing any land disturbance activities (grading, terracing, etc)
- When any earthwork using heavy equipment occurs
- Prior to the start of the winter period (Nov 15th)

Each time the Erosion Control Checklist is completed sign and date this checklist.

Complete the following measures if applicable:

- Disturbed areas and/or stockpiles should be controlled by one or a combination of the following methods
  - Seeded and mulched
  - Hydroseed
  - Replanted
  - Stockpile Management BMPs
  - Rock slope protection
- The lower gradient perimeter of disturbed areas should be controlled by one or a combination of the following methods
  - Gravel bag berms
  - Fiber rolls
  - Straw bale barriers
  - Silt fences
  - Sediment settling basins
- Complete the Soil Disposal and Management Checklist
- Block off seasonal roadway
- Refrain from using any heavy equipment during the winter season unless authorized
- Install linear sediment controls (silt fences, wattles) on the face of exposed slopes at the following spacing:
  - Slopes 0%-25% at 20 feet maximum apart
  - Slopes 25%-50% at 15 feet maximum apart
  - Slopes 50% and greater at 10 feet maximum apart
- Install linear sediment controls at the toe and break of any exposed slopes
- Complete the Drainage Feature Maintenance Log prior to the start of the rainy season
- Stabilize all disturbed areas and construction entrances and exits
- Stabilize all stockpiles using Stockpile Management BMPs (included with this document)
- All exposed or bare ground (cultivation area, access pathways) shall have erosion repair and control measures in place

Date	*Notes*	*Signature*
Ex. 11/05/18	*ex: Waddles installed a upper cultivation area, perimeter of cultivation area seeded and mulched, all other checklists complete*	*DB*

Erosion Control Checklist

Date	*Notes*	*Signature*

Soil Disposal and Management Checklist

The Soil Disposal and Management Checklist should be completed when any of the following occur:

- Whenever soil, growth medium, or construction materials are to be stored on site.
- Prior to the start of the winter period (Nov 15th)

Each time the Soil Disposal and Management Checklist is completed sign and date this checklist.

Complete the following measures if applicable:

- Ensure that all soil, growth medium, and construction materials are stored in a stable, contained manner outside of the riparian setbacks.
- Large organic materials (woody debris, root balls) should be stored separate from soil stockpiles. These materials should be properly disposed of (landfill, burning, composted).
- Sediment control devices (silt fences, straw waddles, strawbales) and tarps should be used to protect soil stockpiles from erosion.
- Alternatively, the stockpiles can be vegetated to prevent erosion
    - Revegetate using a mix of native plant species and seed.
    - Cover with straw at a rate of two tons per acre
    - Apply non-synthetic netting or similar erosion control fabric (jute) on slopes greater than 2:1
- Any soil that is not stored for reuse or vegetated shall be disposed of at an appropriate green waste facility.

Date	*Notes*	*Signature*
Ex. 11/05/18	*ex: Leftover growth medium has been tarped and surrounded by straw bales on the flat by the cultivation area.*	*DB*

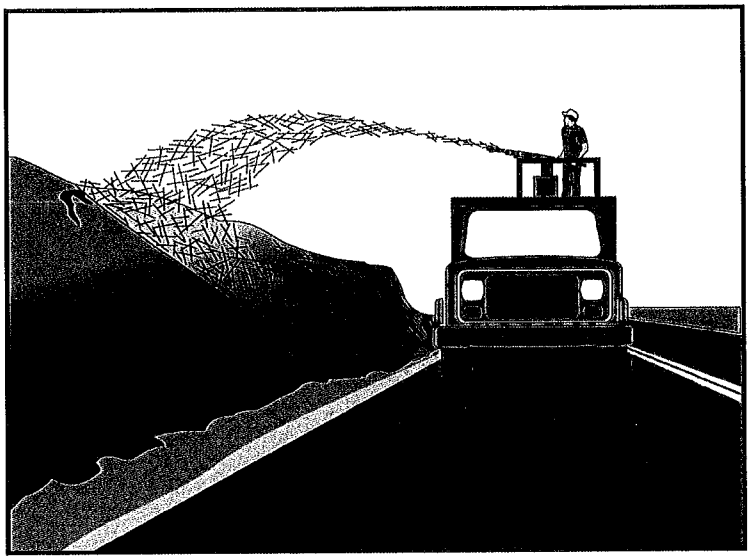
Soil Disposal and Management Checklist

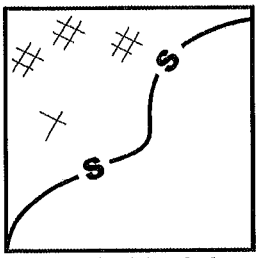
Date	*Notes*	*Signature*

Erosion and Sediment Control BMPs

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

Limitations

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

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.

- 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."

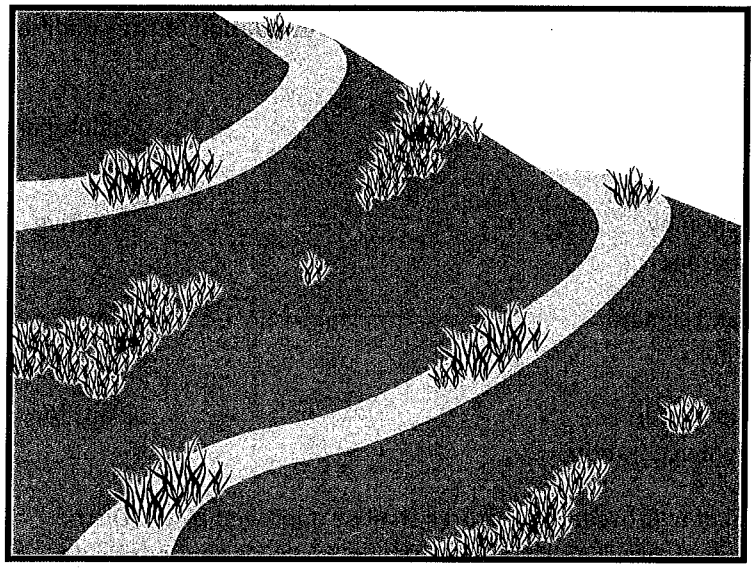
- On small areas and/or steep slopes, straw can also be held in place using plastic netting or jute. The netting shall be held in place using 11 gauge wire staples, geotextile pins or wooden stakes. Refer to BMP SS-7, "Geotextiles, Plastic Covers and Erosion Control Blankets/Mats."

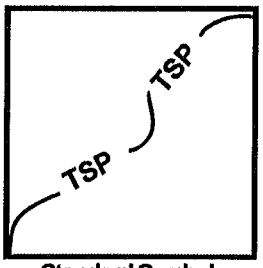
Maintenance and Inspections

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

Limitations

- 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.

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

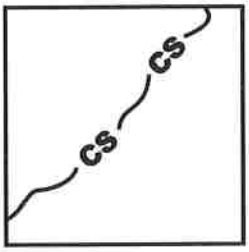
- Follow-up applications shall be made as needed to cover weak spots, and to maintain adequate soil protection.
- Avoid over-spray onto the traveled way, sidewalks, lined drainage channels, and existing vegetation.

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



BMP Objectives

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

Standard Symbol

Definition and Purpose

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

Appropriate Applications

Implemented in all projects that stockpile soil and other materials.

Limitations

- None identified

Standards and Specifications

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

Protection of Non-Active Stockpiles

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

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

Protection of Active Stockpiles

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

- All stockpiles shall be covered, stabilized, or protected with a temporary linear sediment barrier prior to the onset of precipitation.

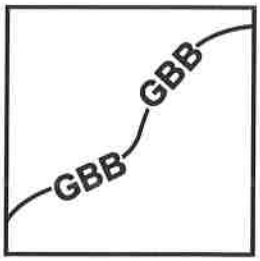
- Stockpiles of "cold mix" shall be placed on and covered with plastic or comparable material prior to the onset of precipitation.

Maintenance and Inspections

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

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/m2 (four ounces per square yard), mullen burst strength exceeding 2,070 kPa (300 psi) in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70% in conformance with the requirements in ASTM designation D4355.
- Bag Size: Each gravel-filled bag shall have a length of 450 mm (18 in), width of 300 mm (12 in), thickness of 75 mm (3 in), and mass of approximately 15 kg (33 lb). Bag dimensions are nominal, and may vary based on locally available materials. Alternative bag sizes shall be submitted to the RE for approval prior to deployment.
- Fill Material: Gravel shall be between 10 mm and 20 mm (0.4 and 0.8 inch) in diameter, and shall be clean and free from clay balls, organic matter, and other deleterious materials. The opening of gravel-filled bags shall be between 13 kg and 22 kg (28 and 48 lb) in mass. Fill material is subject to approval by the RE.

Installation

- When used as a linear control for sediment removal:
  - Install along a level contour.
  - Turn ends of gravel bag row up slope to prevent flow around the ends.
  - Generally, gravel bag barriers shall be used in conjunction with temporary soil stabilization controls up slope to provide effective erosion and sediment control.
- When used for concentrated flows:
  - Stack gravel bags to required height using a pyramid approach.
  - Upper rows of gravel bags shall overlap joints in lower rows.
- Construct gravel bag barriers with a set-back of at least 1m from the toe of a slope. Where it is determined to be not practicable due to specific site conditions, the gravel bag barrier may be constructed at the toe of the slope, but shall be constructed as far from the toe of the slope as practicable.
- Requires Certificate of Compliance per Standard Specifications 6-1.07.

Maintenance and Inspection

- Inspect gravel bag berms before and after each rainfall event, and weekly throughout the rainy season.

- Reshape or replace gravel bags as needed, or as directed by the RE.
- Repair washouts or other damages as needed, or as directed by the RE.
- Inspect gravel bag berms for sediment accumulations and remove sediments when accumulation reaches one-third of the berm height. Removed sediment shall be incorporated in the project at locations designated by the RE or disposed of outside the highway right-of-way in conformance with the Standard Specifications.
- Remove gravel bag berms when no longer needed. Remove sediment accumulations and clean, re-grade, and stabilize the area.

Fiber Rolls

SC-5

BMP Objectives

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

Standard Symbol

Definition and Purpose

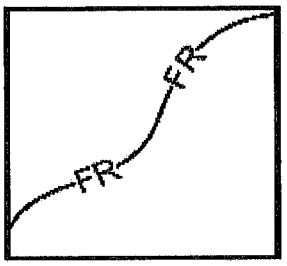
A fiber roll consists of wood excelsior, rice or wheat straw, or coconut fibers that is rolled or bound into a tight tubular roll and placed on the toe and face of slopes to intercept runoff, reduce its flow velocity, release the runoff as sheet flow and provide removal of sediment from the runoff. Fiber 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.



- Along the toe, top, face, and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.
- Below the toe of exposed and erodible slopes.
- Fiber rolls may be used as check dams in unlined ditches if approved by the Resident Engineer (RE) or the District Construction Storm Water Coordinator (refer to SC-4 "Check Dams").
- Fiber rolls may be used for drain inlet protection if approved by the RE or the District Construction Storm Water Coordinator (refer to SC-10 "Storm Drain Inlet Protection").
- Down-slope of exposed soil areas.
- Around temporary stockpiles.
- Along the perimeter of a project.

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.

- Drive stakes at the end of each fiber roll and spaced 600 mm (2 ft) apart if Type 2 installation is used (refer to Page 4). Otherwise, space stakes 1.2 m (4 ft) maximum on center if installed as shown on Pages 5 and 6.
- Use wood stakes with a nominal classification of 19 by 19 mm (3/4 by 3/4 in), and minimum length of 600 mm (24 in).
- If more than one fiber roll is placed in a row, the rolls shall be overlapped; not abutted.

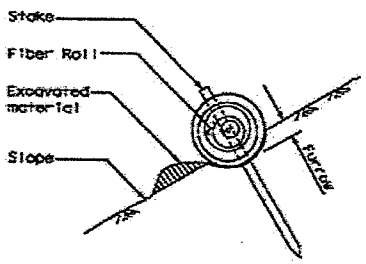
Removal

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

Maintenance and Inspection

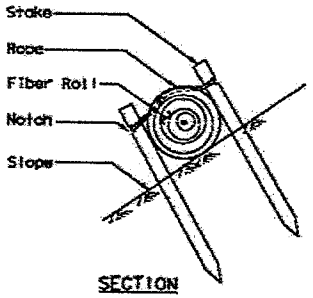
- Repair or replace split, torn, unraveling, or slumping fiber rolls.
- Inspect fiber rolls when rain is forecast. Perform maintenance as needed or as required by the RE.
- Inspect fiber rolls following rainfall events and a least daily during prolonged rainfall. Perform maintenance as needed or as required by the RE.
- Maintain fiber rolls to provide an adequate sediment holding capacity. Sediment shall be removed when the sediment accumulation reaches three quarters (3/4) of the barrier height. Removed sediment shall be incorporated in the project at locations designated by the RE or disposed of outside the highway right-of-way in conformance with the Standard Specifications.

Fiber Rolls

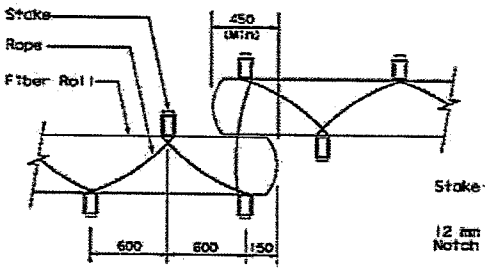


SECTION

TEMPORARY FIBER ROLL (TYPE 1)

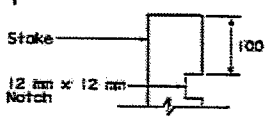


SECTION



PLAN

TEMPORARY FIBER ROLL (TYPE 2)

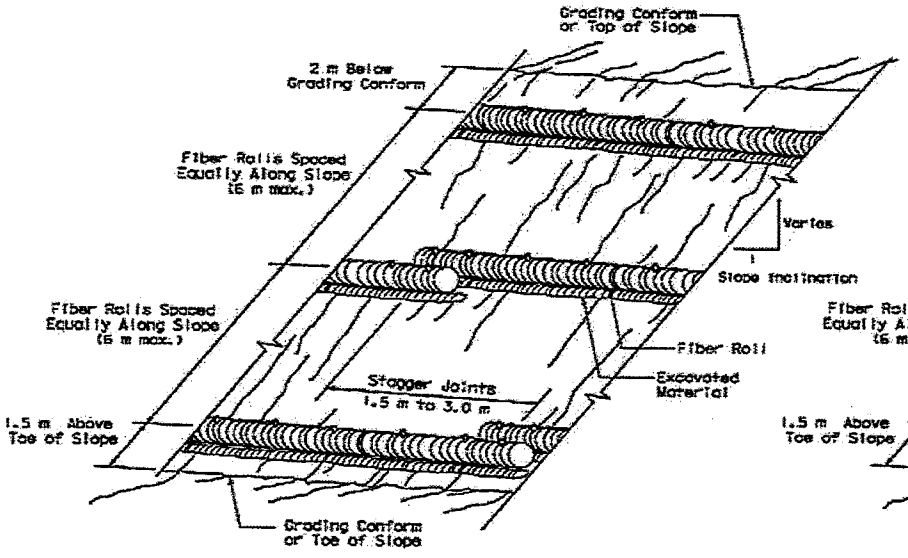


ELEVATION

NOTCH DETAIL

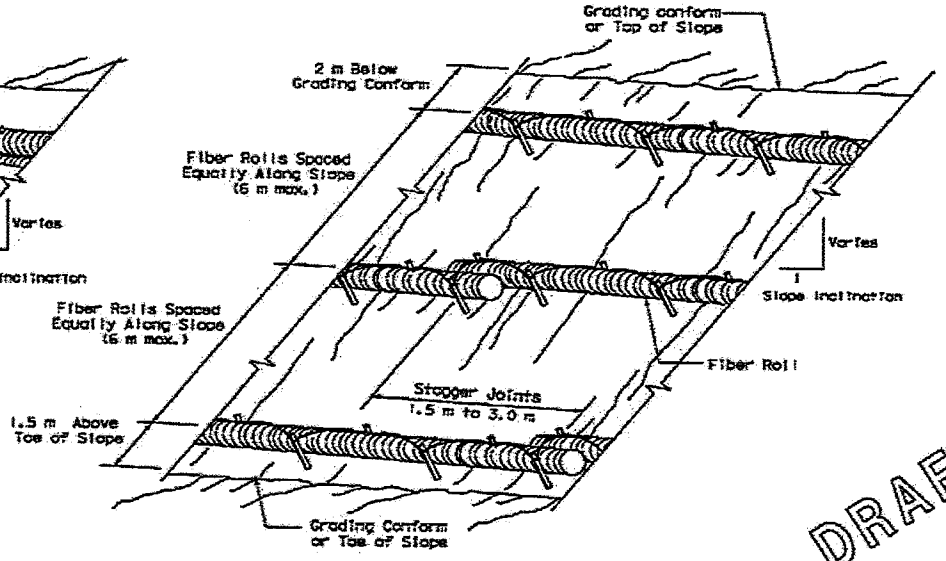
NOTE

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



PERSPECTIVE

TEMPORARY FIBER ROLL (TYPE 1)

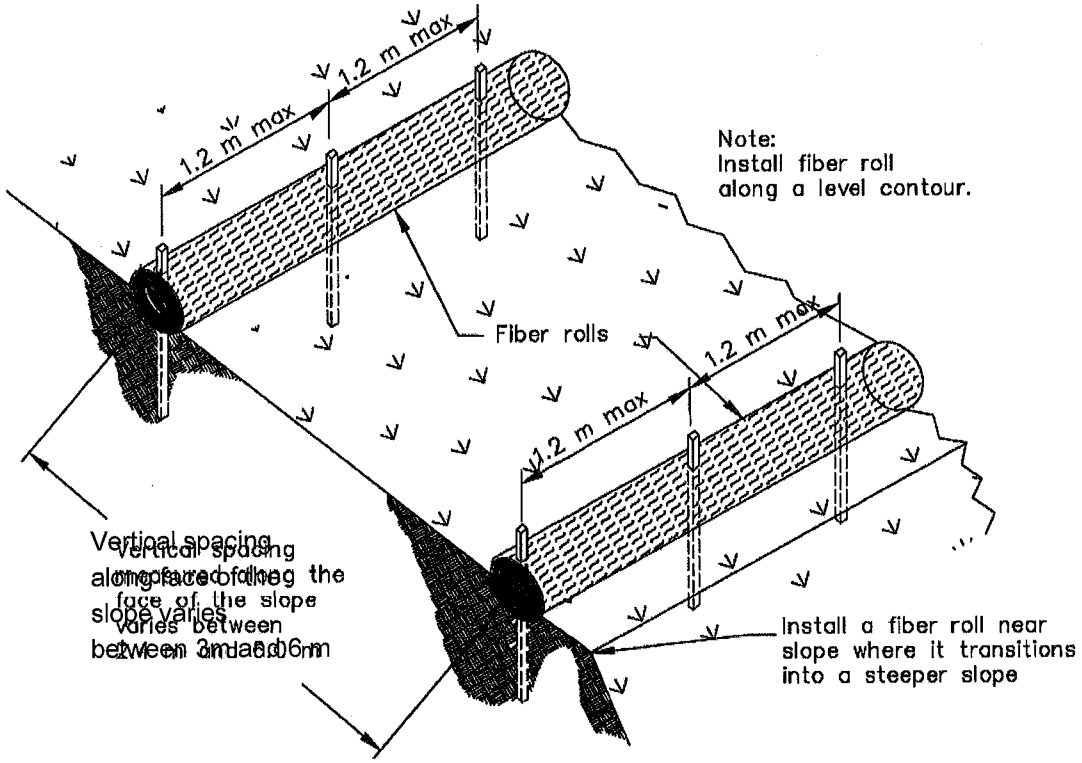


PERSPECTIVE

TEMPORARY FIBER ROLL (TYPE 2)

DRAFT

TEMPORARY WATER POLLUTION CONTROL DETAILS



TYPICAL FIBER ROLL INSTALLATION

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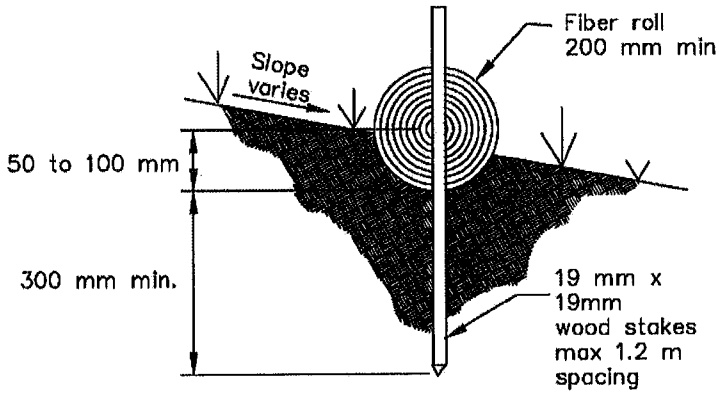
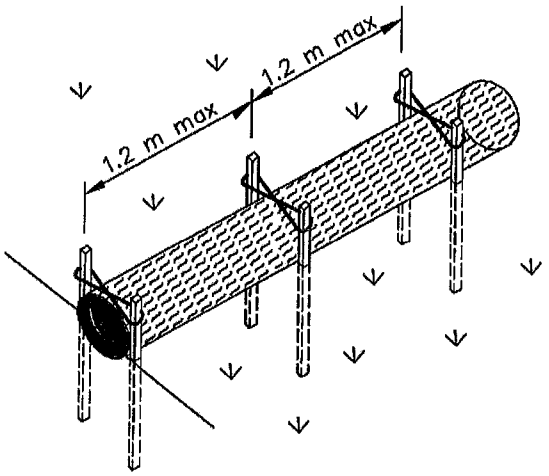
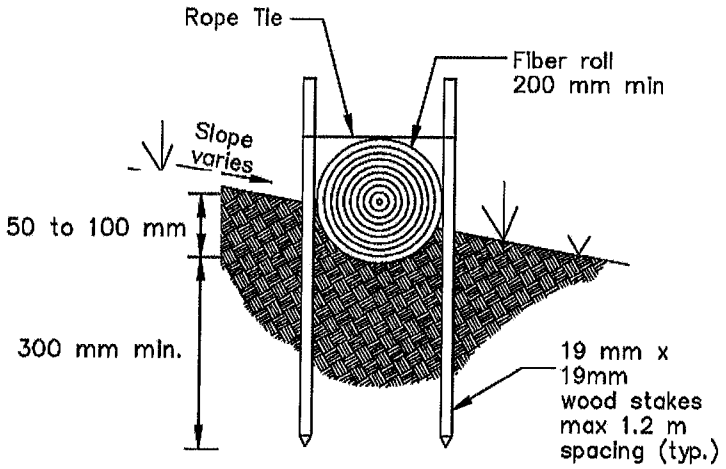


ENTRENCHMENT DETAIL

N.T.S.

N.T.S.





OPTIONAL ENTRENCHMENT DETAIL

Straw Bale Barrier

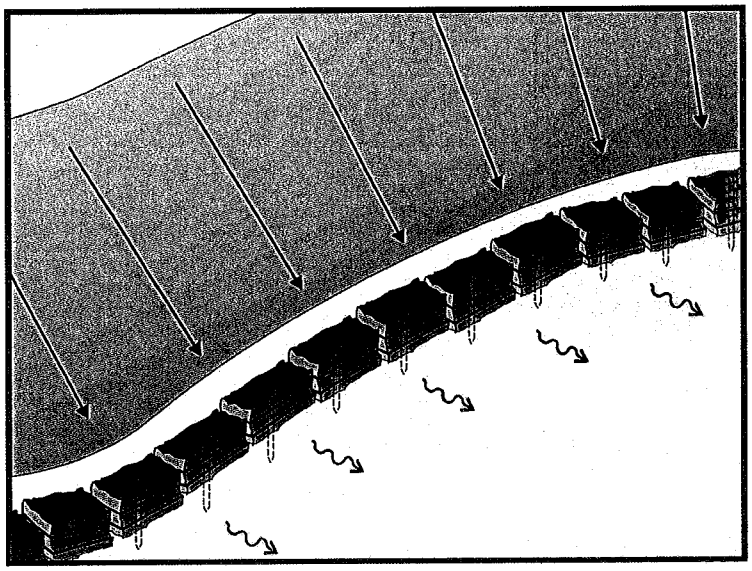
SC-9

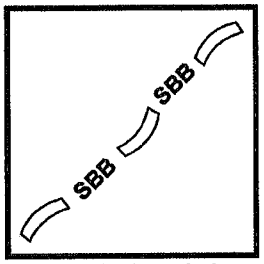
Appropriate Applications

- 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

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

Limitations

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

Standards and Specifications

Materials

- ***Straw Bale Material:*** Straw bale materials shall conform to the provisions in Standard Specifications Section 20-2.06, "Straw."
- Straw Bale Size: Each straw bale shall be a minimum of 360 mm (14 in) wide, 450 mm (18 in) in height, 900 mm (36 in) in length and shall have a minimum mass of 23 kg (51 lb.) The straw bale shall be composed entirely of vegetative matter, except for the binding material.

- Bale Bindings: Bales shall be bound by either steel wire, nylon or polypropylene string placed horizontally. Jute and cotton binding shall not be used. Baling wire shall be a minimum diameter of 1.57 mm (0.06 inch). Nylon or polypropylene string shall be approximately 2 mm (0.08 inch) in diameter with a breaking strength of 360 N.
- Stakes: Wood stakes shall be commercial quality lumber of the size and shape shown on the plans. Each stake shall be free from decay, splits or cracks longer than the thickness of the stake, or other defects that would weaken the stakes and cause the stakes to be structurally unsuitable. Steel bar reinforcement shall be equal to a number four designation or greater. End protection shall be provided for any exposed bar reinforcement.

Installation

- Limit the drainage area upstream of the barrier to 0.3 ha/100 m (0.25 ac/100ft) or barrier.
- Limit the slope length draining to the straw bale barrier to 30 m (100 ft.)
- Slopes of 2:100 (V:H) (2%) or flatter are preferred. If the slope exceeds 1:10 (V:H) (10%), the length of slope upstream of the barrier must be less than 15 m (50 ft).
- Install straw bale barriers along a level contour, with the last straw bale turned up slope.
- Straw bales must be installed in a trench and tightly abut adjacent bales.

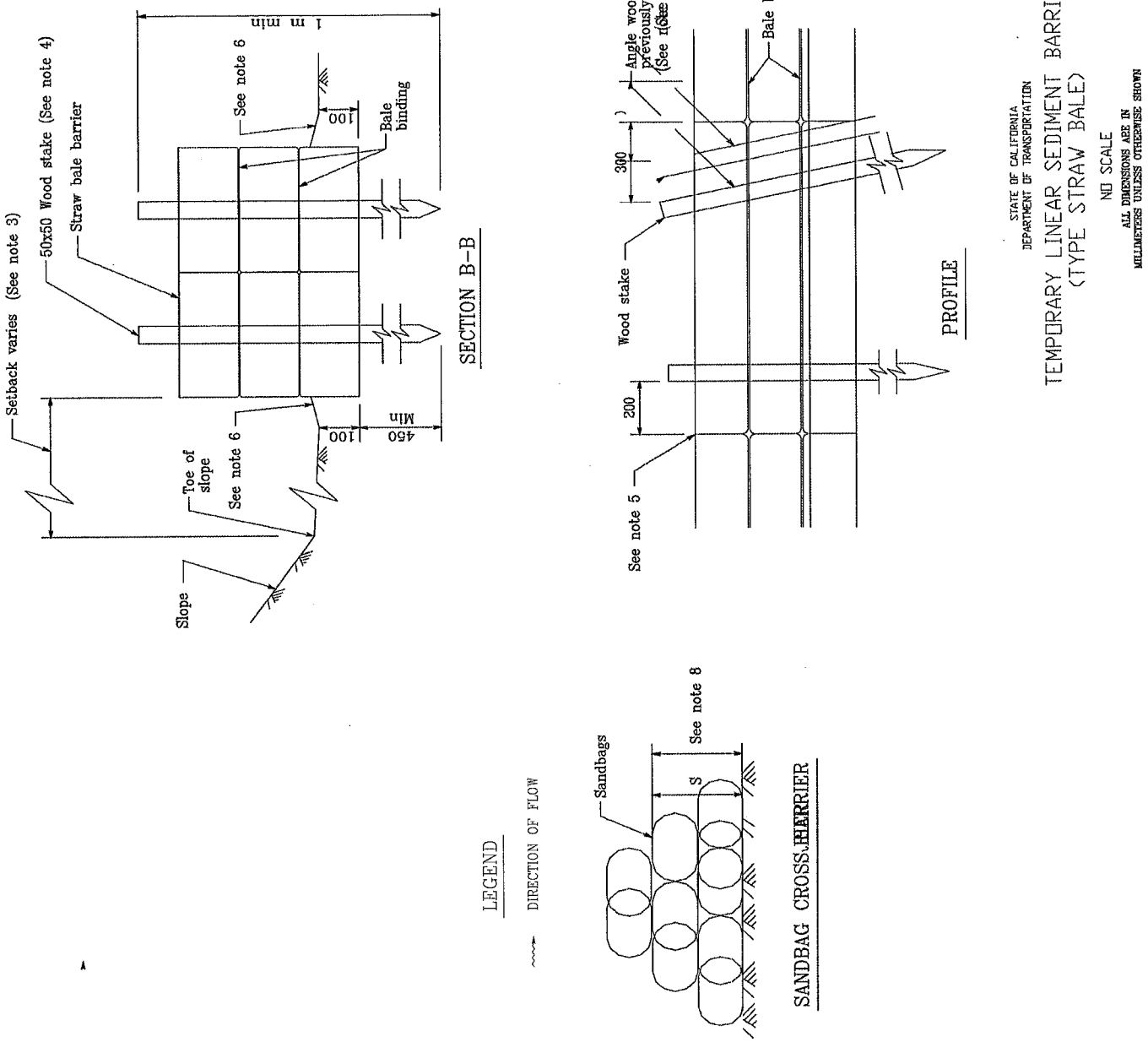
- Construct straw bale barriers with a set-back of at least 1 m (3 ft) from the toe of a slope. Where it is determined to be not practical due to specific site conditions, the straw bale barrier may be constructed at the toe of the slope, but shall be constructed as far from the toe of the slope as practical.
- See pages 4 and 5 of this BMP for installation detail.

Maintenance and Inspection

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

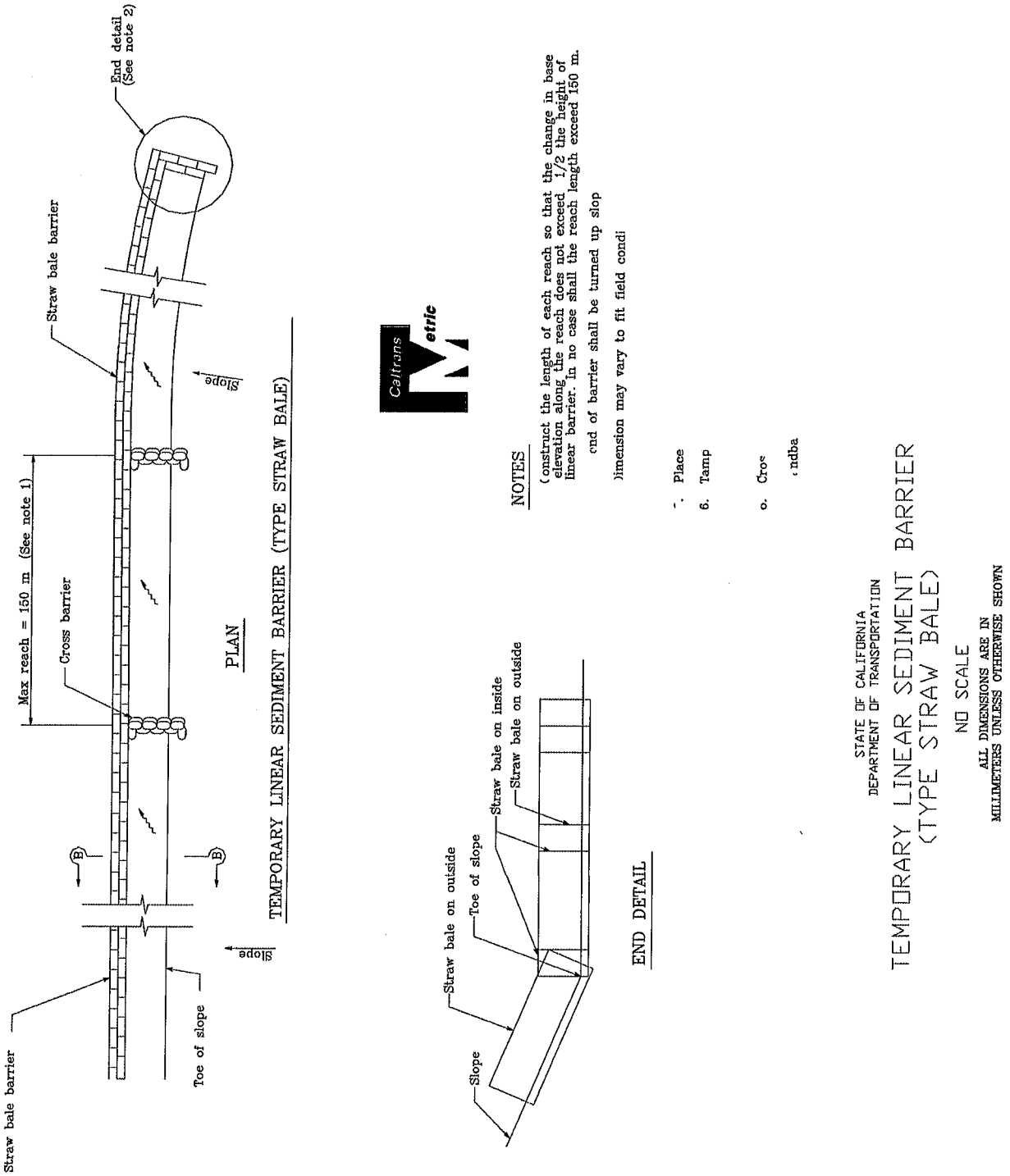
Straw Bale Barrier

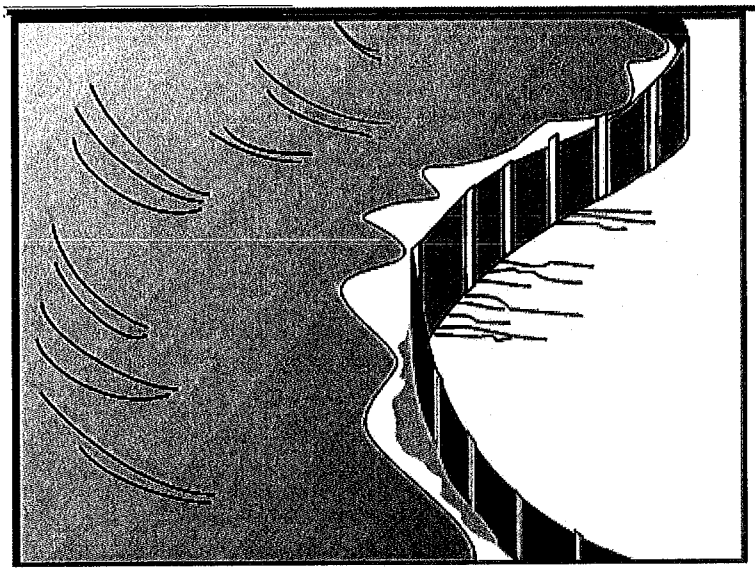
SC-9

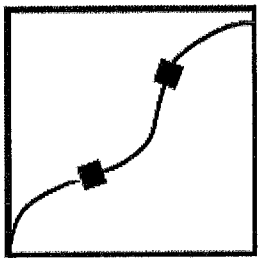


Straw Bale Barrier

SC-9







Standard Symbol

BMP Objectives

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

Definition and Purpose

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

Appropriate Applications

Silt fences are placed:

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

Limitations

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

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

Standards and Specifications

Design and Layout

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

Materials

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

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

- Wood stakes shall be commercial quality lumber of the size and shape shown on the plans. Each stake shall be free from decay, splits or cracks longer than the thickness of the stake or other defects that would weaken the stakes and cause the stakes to be structurally unsuitable.

- Bar reinforcement may be used, and its size shall be equal to a number four (4) or greater. End protection shall be provided for any exposed bar reinforcement.

- Staples used to fasten the fence fabric to the stakes shall be not less than 45 mm (1.75 inches) long and shall be fabricated from 1.57 mm (0.06 inch) or heavier wire. The wire used to fasten the tops of the stakes together when joining two sections of fence shall be 3.05 mm (0.12 inch) or heavier wire. Galvanizing of the fastening wire is not required.

Installation

- Generally, silt fences shall be used in conjunction with soil stabilization source controls up slope to provide effective erosion and sediment control.

- Bottom of the silt fence shall be keyed-in a minimum of 150 mm (12 inches).

- Trenches shall not be excavated wider and deeper than necessary for proper installation of the temporary linear sediment barriers.

- Excavation of the trenches shall be performed immediately before installation of the temporary linear sediment barriers.

- Construct silt fences with a set-back of at least 1m (3 ft) from the toe of a slope. Where a silt fence is determined to be not practical due to specific site conditions, the silt fence may be constructed at the toe of the slope, but shall be constructed as far from the toe of the slope as practical.

- Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the barrier; in no case shall the reach exceed 150 meters (490 ft).

- Cross barriers shall be a minimum of 1/3 and a maximum of 1/2 the height of the linear barrier.

- Install in accordance with Pages 5 and 6 of this BMP.

Maintenance and Inspection

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