



**Site Management Plan Technical Report
Order WQ 2019-0001-DWQ**

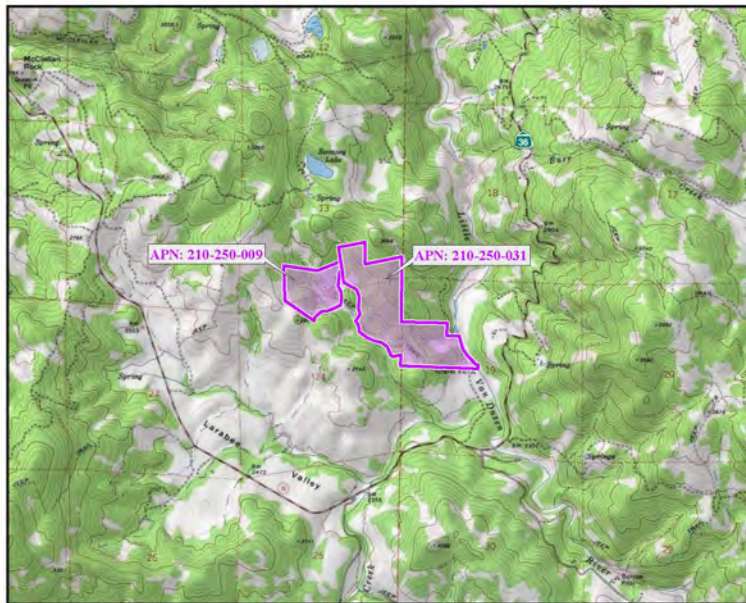
For

APNs 210-250-009 & 210-250-031

Located at

**Hidden Valley Road
Bridgeville, CA 95526**

October 2021



Prepared for:
Larabee Valley Family Farms, LLC
WDID # 1_12CC406609
Humboldt County APNs: 210-250-009 & 210-250-031
P.O. Box 464
Arcata, CA 95518

Prepared by:
Ivonne Romero, Staff Biologist
Michelle Robinson, Staff Geologist
ivonner@pacificwatershed.com
mrobinson@pacificwatershed.com
Pacific Watershed Associates Inc.
P.O. Box 4433, Arcata, CA 95518
(707) 839-5130

TABLE OF CONTENTS

I. INTRODUCTION AND PROJECT SUMMARY	1
II. CERTIFICATIONS, LIMITATIONS AND CONDITIONS.....	1
III. SITE MANAGEMENT PLAN – ORDER WQ 2019-0001-DWQ REQUIREMENTS.....	5
1.0 SEDIMENT DISCHARGE BPTC MEASURES	5
1.1 SITE CHARACTERISTICS	5
1.1.1 Site Map	5
1.1.2 Access, Maintenance, and Storm Water	5
1.1.3 Stream Crossings.....	9
1.1.4 Legacy Waste Discharge Issues for Region 1	13
1.2 SEDIMENT EROSION PREVENTION AND SEDIMENT CAPTURE	14
1.2.1 Erosion Prevention and Sediment Control Measures: BPTCs, Schedule, and Map	15
1.2.2 Maintenance Activities – Erosion Prevention and Sediment Control.....	15
1.2.2.1 <i>Monitoring and Maintenance</i>	15
1.2.2.2 <i>Captured Sediment</i>	16
1.2.3 Erosion Control BPTC Measures – Interim and Long-term	17
2.0 FERTILIZER, PESTICIDE, HERBICIDE, & RODENTICIDE BPTC MEASURES.....	17
2.1 SUMMARY TABLE	17
2.2 SITE MAP.....	17
2.3 BULK FERTILIZERS AND CHEMICAL CONCENTRATES.....	17
2.4 SPILL PREVENTION AND CLEANUP.....	18
3.0 PETROLEUM PRODUCT BPTC MEASURES	18
3.1 SUMMARY TABLE	18
3.2 SITE MAP.....	19
3.3 HANDLING.....	19
3.4 SPILL PREVENTION AND CLEANUP.....	19
4.0 TRASH/REFUSE, AND DOMESTIC WASTEWATER BPTC MEASURES	20
4.1 TYPES, CONTAINMENT, AND DISPOSAL OF TRASH/REFUSE	20
4.1.1 Site Map	20
4.2 DOMESTIC WASTEWATER GENERATION AND DISPOSAL	20
4.2.1 Domestic Wastewater Generation.....	20
4.2.2 Domestic Wastewater Disposal.....	20
4.2.2.1 <i>Permitted onsite wastewater treatment system (e.g., septic tank and leach lines)</i>	20
4.2.2.2 <i>Chemical toilets or holding tank. If so, provide the name of the servicing company and the frequency of service</i>	21
4.2.2.3 <i>Outhouse, pit privy, or similar. Use of this alternative requires approval from the Regional Water Board Executive Officer; include the approval from the Executive Officer and any conditions imposed for use of this alternative</i>	21
4.2.3 Site Map	21
5.0 WINTERIZATION BPTC MEASURES.....	21
5.1 WINTERIZATION ACTIVITIES.....	21
5.2 MAINTENANCE OF DRAINAGE OR SEDIMENT CAPTURE FEATURES	21

5.3 REVEGETATION..... 22
5.4 BPTC MEASURES THAT CANNOT BE COMPLETED BEFORE ONSET OF WINTER 22
5.5 LEGACY WASTE DISCHARGE ISSUES FOR SPECIFIC REGIONS..... 22

IV. LANDOWNER/LESSEE CERTIFICATION/SIGNATURES 25

LIST OF FIGURES

Figure 1. Location map for WDID 1_12CC406609 CGO Site Management Plan, APNs 210-250-009 and 210-250-031, located off Hidden Valley Road, Humboldt County, California.....4
Figure 2A. Site map for WDID 1_12CC406609 CGO Site Management Plan, APN 210-250-009, located off Hidden Valley Road, Humboldt County, California.23
Figure 2B. Site map for WDID 1_12CC406609 CGO Site Management Plan, APN 210-250-031, located off Hidden Valley Road, Humboldt County, California.24

LIST OF TABLES

Table 1. Prioritized implementation schedule for Best Practicable Treatment or Controls (BPTC).....6
Table 2. Fertilizer and Agricultural Chemical Product List.....18
Table 3. Petroleum Product List19

LIST OF APPENDICES

Appendix A. Applicable Permits, Licenses and Registrations*in back of report*
Appendix B. PWA Typical Drawings and CASQA Typical Erosion and Sediment Control Measures/BMPs*in back of report*

I. INTRODUCTION AND PROJECT SUMMARY

Tier 1 and Tier 2 Dischargers enrolled in the State Water Resources Control Board (SWRCB) Cannabis Cultivation Policy Order WQ 2019-0001-DWQ, General Waste Discharge Requirements and Waiver of Waste Discharge Requirements for Discharges of Waste Associated with Cannabis Cultivation Activities (General Order) shall submit and implement a Site Management Plan (Plan) that describes how the Discharger is implementing the Best Practicable Treatment or Control (BPTC) measures listed in Attachment A of the State Water Resource Control Board's Cannabis Cultivation Policy (approved April 16, 2019). The Plan may include a schedule to achieve compliance, but all work must be completed by the onset of winter period each year. (The due date does not relieve a Discharger from implementing the interim soil stabilization BPTC measures described in Attachment A.)

This report documents Pacific Watershed Associate's (PWA) Site Management Plan (Plan) for Humboldt County APNs 210-250-009 and 210-250-031 located near the town of in Humboldt County, California, as shown on Figure 1. This property is located approximately 6.5 miles east of Bridgeville, Humboldt County, CA, and hereinafter is referred to as the "Project Site."

The Project Site cultivator ("Discharger") is enrolled in the State Water Resources Control Board (SWRCB) Cannabis Cultivation Policy Order WQ 2019-0001-DWQ, General Waste Discharge Requirements and Waiver of Waste Discharge Requirements for Discharges of Waste Associated with Cannabis Cultivation Activities (General Order).

Based on the total disturbance area, slopes of disturbed areas, and riparian setbacks, this Project Site falls within **Tier 2 Low Risk** of the State Water Resources Control Board (SWRCB) Cannabis Cultivation Policy Order WQ 2019-0001-DWQ, General Waste Discharge Requirements and Waiver of Waste Discharge Requirements for Discharges of Waste Associated with Cannabis Cultivation Activities (General Order). Properties that fall into Tier 1 or 2 of the General Order are required to develop a Site Management Plan (Plan). This Plan has been developed for the Discharger based on site inspections made by PWA on the Project Site. PWA's recommendations for any remediation or corrective actions are a result of water quality requirements under the General Order, including Best Practicable Treatment or Control (BPTCs) designed to meet those requirements. This Plan documents the findings of a site visits and inspections conducted in October 2019 and 2021 by PWA Staff Geologist Michelle Robinson, PWA Staff Ecologist Georgia Hamer, and PWA Staff Biologist Ivonne Romero when reconnaissance level investigations of the Project Site were conducted, and the conditions noted.

II. CERTIFICATIONS, LIMITATIONS AND CONDITIONS

This Plan has been reviewed by a California licensed professional geologist at PWA and all information herein, including treatment recommendations, are based on observations, data, and information collected by PWA staff.

This Plan has been prepared to: 1) provide specific BPTC measures to be utilized on the Project Site to minimize potential threats to water quality, 2) provide itemized remedial actions to be taken on the Project Site to correct existing or potential water quality threats or impacts and meet the general waste discharge requirements of the General Order, 3) provide a revised schedule for the implementation of the itemized remedial actions, and 4) provide implementation schedules for all Winterization and BPTC measures. The analysis and recommendations submitted in this Plan are based on PWA's evaluation of the Project Site and activities which fall under the General Order.

In this Plan, we have described the recent and current conditions of the Project Site and any water resource and water quality risk factors we observed during our site inspections. PWA is not responsible for

problems or issues we did not observe on our site inspections, or for changes that have naturally occurred or been made to the Project Site after our site review. The interpretations and conclusions presented in this Plan are based on reconnaissance level site investigations of inherently limited scope. Observations are qualitative, or semi-quantitative, and confined to surface expressions of limited extent and artificial exposures of subsurface materials. Interpretations of problematic geologic, geomorphic, or hydrologic features such as unstable hillslopes, erosional processes, and water quality threats are based on the information available at the time of our inspection and on the nature and distribution of existing features we observed on the Project Site.

A schedule of itemized remedial actions that are based on these observations is included with this Plan. The remedial actions provided in this Plan have been developed from professional opinions derived in accordance with current standards of professional practice and are valid as of the date of the most recent or most applicable field inspection. No other warranty, expressed or implied, is made. Furthermore, to ensure proper applicability to existing conditions, the information and remedial actions contained in this report shall be regularly reevaluated and it is the responsibility of the landowner and/or lessee operating under the General Order to ensure that no remedial actions or recommendations are inappropriately applied to conditions on the Project Site that have changed since the recommendations were developed.

If site conditions have changed for any reason, the Project Site should be reevaluated, and the Plan and associated recommendations revised and updated as required. These conditions include any changes in land management activities or Project Site conditions that have occurred since our site visit (regardless of what they are, how they occurred, or who performed them). Similarly, if the landowner/lessee uses portions of this Project Site not identified or covered under the current Plan, this Plan will need to be updated with the new information, including possible additions or changes to the recommended remedial or corrective actions and BPTCs.

The person, persons, business, or other entity listed as the enrollee under the General Order is responsible for complying with all the requirements thereunder, regardless of who is operating or cultivating on that Project Site. If the enrollee is not the sole landowner and fails to comply with the Order and its requirements, the landowner or remaining landowners will automatically assume responsibility for the requirements therein, including all related penalties or actions brought by the SWRCB and/or NCRWQCB.

If at any time in the future the Project Site is to transfer ownership, it is the responsibility of the current owner(s), or their representative(s), to ensure that the information and recommendations contained herein are called to the attention of any future owner or agent for the Project Site. Unless this Plan is modified by the SWRCB or NCRWQCB, the findings and recommendations contained in this Plan shall be utilized as a tool while implementing the remedial actions. Necessary steps shall be taken to see that contractor(s) and subcontractor(s) carry out such recommendations in the field in accordance with the most current Plan and BPTC standards.

PWA will be responsible for the data, interpretations, and recommendations developed by PWA, but will not be responsible for the interpretation by others of that information, for implementation of corrective actions by others, or for additional or modified work arising out of those plans, interpretations, and recommendations. PWA assumes no liability for the performance of other workers or suppliers while following PWA's recommendations in the Plan, unless PWA is under contract to perform or oversee those activities. Additionally, PWA is not responsible for changes in applicable or appropriate standards beyond our control, such as those arising from changes in legislation or regulations, or the broadening of knowledge which may invalidate or alter any of our findings or recommended actions.

Any Plan review or construction management services that may be needed or identified in the recommendations sections of this Plan are separate tasks from the preparation of this Plan and are not a part of the contract under which this Plan was prepared. If requested, additional PWA field inspections, surveys, Plan revisions/updates, project layout, design, permitting, construction oversight/management, or other related services arising from tasks described and recommended in the Plan may be performed under separate agreements requiring advance notice and contracting.

PWA's services consist of professional opinions and recommendations made in accordance with generally accepted principles and practices. No warranty, expressed or implied, or merchantability or fitness, is made or intended in connection with our work, by the proposal for consulting or other services, or by the furnishing of oral or written reports or findings. This Plan, as written or as modified in writing, takes precedence over all other communication. If the client desires assurances against project failures, they shall obtain appropriate insurance through their own insurance broker or guarantor.

Prepared by:



Michelle Robinson

Michelle Robinson, Staff Geologist
Pacific Watershed Associates, Inc.
P.O. Box 4433, Arcata, California 95518
Plan finalized on: _____

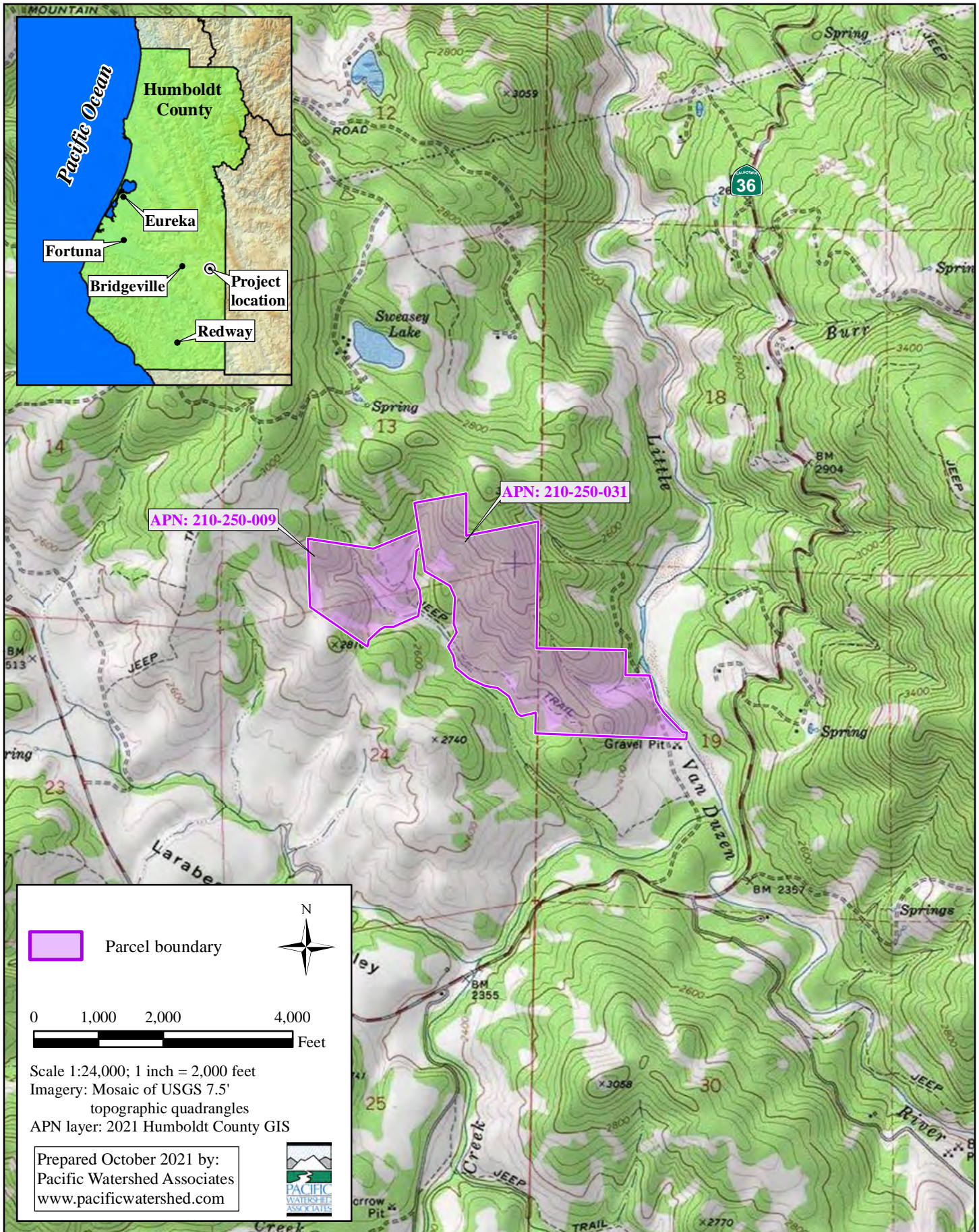


Figure 1. Location map for WDID 1_12CC406609 CGO Site Management Plan, APNs 210-250-009 and 210-250-031, located off Hidden Valley Road, Humboldt County, California.

III. SITE MANAGEMENT PLAN – ORDER WQ 2019-0001-DWQ REQUIREMENTS

1.0 SEDIMENT DISCHARGE BPTC MEASURES

1.1 Site Characteristics

1.1.1 Site Map

See the attached site maps, Figures 2A and 2B, showing access roads, vehicle parking areas, streams, stream crossings, cultivation site(s), disturbed areas, buildings, and other relevant site features, as applicable, that are listed below:

- for Region 1 dischargers: legacy waste discharge issues that exist on the Project Site
- erosion prevention BPTC measures
- sediment control BPTC measures
- winterization BPTC measures
- fertilizers and amendments storage locations
- petroleum product storage locations
- trash/refuse storage locations
- Onsite Wastewater Treatment System(s) (OWTS), including any domestic wastewater treatment, storage, or disposal area(s)

1.1.2 Access, Maintenance, and Storm Water

Describe the access road conditions including estimating vehicle traffic, road surface (e.g., paved, rocked, or bare ground), and maintenance activities. Describe how storm water is drained from the access road (e.g., crowned, out slope, armored ditch, culverts, rolling dips, etc.).

There are a total of nine (9) gravel-rocked and native-surfaced roads and driveways within the Project Site totaling approximately 4.5 miles, and three (3) native-surfaced 4x4 (quad) roads totaling approximately 0.25 miles. Road #1 is part of a road easement, Hidden Valley Road, which connects to California Highway 36 at its southern origin and continues north beyond the Project Site. Roads #1, #2, #4, #6, #7, #9 and #11 all provide access to cultivation areas and water storage sites. Vehicle traffic on the main access road to the Project Site is limited to one (1) commercial vehicle per year, approximately five (5) commuter vehicles per week, with about three (3) vehicles utilizing the neighboring easement road, and heavy equipment traffic limited to job specific activities.

Currently, all access roads lack sufficient permanent road drainage features to prevent surface erosion and sediment delivery to watercourses. Several segments of road are deeply rutted, with concentrated surface runoff creating numerous gullies and ruts in the roads and surrounding hillslopes. There are four (4) existing ditch relief culverts (DRCs) onsite which appeared to be adequately functioning, but DRC #2 - #4 are undersized 12-inch culverts. DRC #3 and DRC #4 were identified by CDFW as SCX2 and SCX3, respectively. However, onsite observations and aerial imagery show that overflow from Pond #1 prior to 2016 used to flow to the southwest, resulting in gullying of the hillslope and the installation DRC #3 on Road #2, and DRC #4 on Road #1 downslope. The spillway to Pond #1 now flows

to the southeast, leaving the previous spillway flowpath abandoned, with less than 1 acre of drainage area. Any concentrated runoff that is conveyed by the lower DRC #4 is dispersed onto the grassy hillslope more than 100 ft from the nearest watercourse. Additionally, the lower (southernmost) portion of Road #4 is located on the left bank of a Class II watercourse where there is potential for the outboard edge of the road to be undermined by the left cutbank.

Seasonal water bars (WBs), permanent road drainage features and other road related BPTC measures to disperse road runoff, reduce erosion and hydrologically disconnect road segments draining to the stream network are included in Table 1, below, and shown on the site maps (Figures 2A and 2B). All road segments and road drainage features should be monitored on a regular basis and after significant storm events to ensure functionality and that erosion and sediment delivery to nearby watercourses is not occurring. Upgrade undersized DRCs to a minimum 18-inch diameter culvert. Maintain DRCs as needed by regularly inspecting and clearing the culvert of sediment to ensure proper drainage. Additional maintenance should be performed and BPTC measures implemented as needed to ensure functioning road drainage. If necessary, an amendment to CDFW LSA Notification No. 1600-2019-0873-R1 should be requested to add rock armor to the left bank of the watercourse to prevent undermining of the outboard edge of Road #4. See LSAA No 1600-2019-0873-R1 in Appendix A for descriptions of existing projects and measures to protect fish and wildlife resources, and PWA and CASQA Typical Drawings in Appendix B for general road drainage treatments, culvert upgrade, armor placement, and other erosion control specifications.

Table 1. Prioritized implementation schedule for Best Practicable Treatment or Controls (BPTC).

Schedule	Map Point or Location	Summary of Corrective Actions/Recommendations
<p>CA – Cultivation Area; CW – Cultivation Waste; DA – Disturbed Area; DRC – Ditch Relief Culvert; FR – Fiber Rolls; GP – Graded Pad; IBD – Inboard Ditch; OWTS – Onsite Wastewater Treatment System; RD – Rolling Dip; RA- Rock Armor; SC – Stream Crossing; SM – Straw Mulch; W – Winterization; WB – Water Bar; WM – Waste Management; WR – Waste Removal; <E> – Existing; <P> – Proposed</p>		
<p><u>Cultivation Areas</u></p>		
<p>By 11/15 annually and as needed</p>	<p><E>/<P> BPTC/W; CA #1 – CA #4</p>	<ol style="list-style-type: none"> 1) Plant cover crops, tarp, or otherwise cover any growing medium in beds, pots, or piles to prevent nutrient leaching and transport. 2) Store cultivation-related materials in a stable location and protected from the elements to prevent nutrient leaching or delivery to surface waters. 3) Seed and mulch all other bare soil areas with 1) native erosion control seed that does not contain Annual or Perennial Ryegrass and 2) weed-free straw. 4) Monitor all erosion control measures during and after each storm event that produces at least 0.5 in/day or 1.0 in/week of precipitation. 5) Reapply, repair, or implement new erosion or sediment control measures as needed to protect water quality. 6) Contain and regularly dispose of all cultivation-related debris and waste at an appropriate facility.

Schedule	Map Point or Location	Summary of Corrective Actions/Recommendations
<p>CA – Cultivation Area; CW – Cultivation Waste; DA – Disturbed Area; DRC – Ditch Relief Culvert; FR – Fiber Rolls; GP – Graded Pad; IBD – Inboard Ditch; OWTS – Onsite Wastewater Treatment System; RD – Rolling Dip; RA- Rock Armor; SC – Stream Crossing; SM – Straw Mulch; W – Winterization; WB – Water Bar; WM – Waste Management; WR – Waste Removal; <E> – Existing; <P> – Proposed</p>		
<p><u>Stream Crossings</u></p>		
By 11/15 annually and as needed	<P> BPTC/W; SC #1 – #SC #13 and CDFW SCX	1) Monitor and maintain all stream crossings on a regular basis and following significant storm events to ensure functionality and that erosion, sediment transport, and sediment delivery to watercourses is not occurring.
10/15/2022; or as stated in LSAA No. 1600-2019-0873-R1	<P> BPTC/W; SC #1 – SC #13	1) Implement stream crossing treatments as described in CDFW Lake and Streambed Alteration Agreement (LSAA) No. 1600-2019-0873-R1. See section 1.1.3 and Appendix A for treatment details. 2) Implement appropriate stabilization and erosion control BPTCs (seed, straw mulch, etc.) to all disturbed and bare soil areas to minimize surface erosion and sediment transport after construction. 3) Store any excess spoil material generated during construction activities locally in a stable location with appropriate BPTCs. 4) Reapply, repair, or implement new erosion or sediment control measures as needed to protect water quality.
<p><u>Roads</u></p>		
By 11/15 annually and as needed	<E> BPTC; DRC #1 - #2, DRC #3/CDFW SCX2, DRC #4/CDFW SCX3, IBD	1) Monitor and maintain existing road drainage and sediment control features on a regular basis and following significant storm events to ensure functionality and that erosion, sediment transport, and sediment delivery to watercourses is not occurring.
11/15/2021 and annually as necessary	<P> BPTC/W; WB #1-#34	1) Install water bars at locations detailed in figures 2A and 2B as interim erosion control and winterization measures for this season to reduce hydrologic connectivity, surface erosion, and sediment delivery to the stream network. Proposed WBs not associated with the proposed RDs listed below should be installed annually by 11/15 at the mapped locations, and elsewhere, as feasible, to ensure proper road drainage and reduce surface erosion. 2) Monitor and maintain the erosion control measures on a regular basis and following significant storm events to ensure functionality and that erosion, sediment transport, and sediment delivery to watercourses is not occurring.
11/15/2022	<P>BPTC; Install RD #1 - #13 2022	3) Install rolling dips as permanent road drainage and sediment control features as detailed in figures 2A and 2B to reduce hydrologic connectivity, surface erosion, and sediment delivery to the stream network. These BPTCs can be found in conjunction with the interim erosion-control measures - water bars #1 - #6, #8, #15, #16, #18, #19, #22, and #32 - listed above. 4) Monitor and maintain the permanent road drainage and sediment control features on a regular basis and following significant storm events to ensure functionality and that erosion, sediment transport, and sediment delivery to watercourses is not occurring.

Schedule	Map Point or Location	Summary of Corrective Actions/Recommendations
<p>CA – Cultivation Area; CW – Cultivation Waste; DA – Disturbed Area; DRC – Ditch Relief Culvert; FR – Fiber Rolls; GP – Graded Pad; IBD – Inboard Ditch; OWTS – Onsite Wastewater Treatment System; RD – Rolling Dip; RA- Rock Armor; SC – Stream Crossing; SM – Straw Mulch; W – Winterization; WB – Water Bar; WM – Waste Management; WR – Waste Removal; <E> – Existing; <P> – Proposed</p>		
11/15/2022	<P> BPTC/DRC #2, DRC #3/CDFW SCX2, DRC #4/CDFW SCX3	<ol style="list-style-type: none"> 1) Upgrade DRCs to minimum 18-inch diameter culverts. 2) Monitor and maintain the DRC on a regular basis and following significant storm events to ensure functionality and that erosion, sediment transport, and sediment delivery to stream network is not occurring. 3) If surface erosion is observed above or below the DRC, appropriate BPTCs, such as the installation of rock armor, application of straw mulch, and/or additional road drainage features upslope should be implemented to mitigate impacts to water quality.
11/15/2022	<P> BPTC – Install RA at IBD	<ol style="list-style-type: none"> 1) Install rock armor within in-board ditch draining western edge of Road #1 to dissipate energy of road runoff and mitigate sediment delivery to the stream network. 2) Monitor and maintain the permanent road drainage and sediment control features on a regular basis and following significant storm events to ensure functionality and that erosion, sediment transport, and sediment delivery to watercourses is not occurring.
<u>Disturbed Areas/Graded pads</u>		
By 11/15 annually and as needed	<E>/<P> BPTC/W; DA/GP #1 - #4	<ol style="list-style-type: none"> 1) Seed and mulch (SM) any bare soil areas with 1) native erosion control seed that does not contain annual or perennial Ryegrass and 2) weed-free straw. 2) Monitor and maintain existing pad drainage and sediment control features on a regular basis and after each storm event that produces at least 0.5 in/day or 1.0 in/week of precipitation. 3) Reapply, repair, or implement new erosion or sediment control measures as needed to protect water quality.
<u>Fertilizers, Pesticides, and Petroleum/Chemical Storage</u>		
11/15 annually	<E>BPTC; Petroleum/Generator storage	<ol style="list-style-type: none"> 1) Store all hazardous materials of differing type (e.g., petroleum products vs. agricultural chemicals) in separate locations. 2) Store all hazardous materials (petroleum products) under cover, off the ground, and with adequate secondary containment. 3) Keep spill prevention kits accessible to areas where hazardous materials are used
11/15 annually	<E> BPTC; Agricultural chemical storage	<ol style="list-style-type: none"> 1) Store all hazardous materials of differing type (e.g., petroleum products vs. agricultural chemicals) in separate locations. 2) Store liquid fertilizers, amendments, and other chemicals under cover, off the ground, and with adequate secondary containment. 3) Keep spill prevention kits accessible to areas where hazardous materials are used.
<u>Trash/Refuse and Domestic Wastewater</u>		
11/15/2021 and ongoing	<E>BPTC Trash storage	<ol style="list-style-type: none"> 1) Collect and properly store household and cultivation-related wastes in a way that is protected from the elements and animals. 2) Regularly remove all waste and dispose of at an appropriate facility.

Schedule	Map Point or Location	Summary of Corrective Actions/Recommendations
<p>CA – Cultivation Area; CW – Cultivation Waste; DA – Disturbed Area; DRC – Ditch Relief Culvert; FR – Fiber Rolls; GP – Graded Pad; IBD – Inboard Ditch; OWTS – Onsite Wastewater Treatment System; RD – Rolling Dip; RA- Rock Armor; SC – Stream Crossing; SM – Straw Mulch; W – Winterization; WB – Water Bar; WM – Waste Management; WR – Waste Removal; <E> – Existing; <P> – Proposed</p>		
10/15/2022	<E>/<P>BPTC/WM; OWTS, Portable toilet, Domestic sink and shower	<ol style="list-style-type: none"> 1) The Order requires one or more county-approved (permitted) OWTS on the Project Site. The OWTS should be designed for the number of workers, residents, and visitors onsite when cultivation activities are at their peak. Proof of permitting through the Humboldt County Division of Environmental Health (HCDEH) is required onsite at all times for all OWTS. 2) Continue use of portable toilets until the existing and proposed OWTS have been permitted or installed, respectively. Portable toilets should be serviced on a regular basis as needed for the amount of use. Maintain service records for the portable toilet onsite and additional portable toilets should be delivered to the Project Site based on the number of workers, residents, and visitors onsite when cultivation activities are at their peak. 3) Wastewater from kitchen sinks and dishwashers is not considered graywater and must be disposed of through a permitted OWTS. For true graywater (laundry, shower, bathroom sink, etc.), follow guidelines for California graywater regulations.
<u>Other</u>		
10/15/2022; or as stated in LSAA No. 1600-2019-0873-R1	<P> BPTC - Lined off-stream, cutbank seep-fed Pond #1	<ol style="list-style-type: none"> 1) Implement the necessary treatments to meet the requirements for reservoirs described in CDFW Lake and Streambed Alteration Agreement (LSAA) No. 1600-2019-0873-R1.
By 11/15 annually and as needed	<E> BPTC/W; SM, FR (Legacy Area #1 & #2)	<ol style="list-style-type: none"> 1) Monitor all erosion control measures during and after each storm event that produces at least 0.5 in/day or 1.0 in/week of precipitation. 2) Reapply, repair, or implement new erosion or sediment control measures as needed to protect water quality.
11/15/2021 and as needed	<P> BPTC/W; WR, SM, (Legacy Area #3)	<ol style="list-style-type: none"> 1) Remove all abandoned cultivation materials and either store/repurpose appropriately onsite outside of all riparian setbacks or properly dispose of at an approved waste disposal facility. 2) Implement appropriate stabilization and erosion control BPTCs (seed, straw mulch, etc.) to all disturbed/bare soil areas resulting from removal of cultivation materials to minimize surface erosion and sediment transport after work period. 3) Monitor all erosion control measures during and after each storm event that produces at least 0.5 in/day or 1.0 in/week of precipitation. 4) Reapply, repair, or implement new erosion or sediment control measures as needed to protect water quality.
<p>All BPTC measures will conform to the State Water Resources Control Board Order WQ 2019-0001-DWQ guidelines. All BPTC measures are outlined in Section 2 of Attachment A of the General Order.</p>		

1.1.3 Stream Crossings

Describe any vehicle stream crossing including the type of crossing (e.g., bridge, culvert, low water, etc.).

There are thirteen (13) stream crossings (SC) on the Project Site (SC #1 - #13). Twelve (12) of the thirteen stream crossings are to be upgraded or decommissioned as part of the California Department of Fish and Wildlife (CDFW) Lake and Streambed Alteration Agreement (LSAA) Notification No. 1600-2019-0873-R1. See Appendix A for descriptions of existing LSAA projects and measures to protect fish and wildlife resources, and PWA and CASQA Typical Drawings in Appendix B for general road drainage treatments, culvert upgrade, armor placement, and other erosion control specifications. CDFW identified an additional stream crossing (SCX), which is used to access APN -009, but was observed to be located off property, on the neighbor's side of the gate. According to the landowner CDFW SCX is maintained by the owner of that parcel, however woody debris was observed at the inlet. There are two (2) other CDFW stream crossing locations (CDFW SCX2 and SCX3), which are described as DRC #3 and DRC #4 in the text, above. Project Site stream crossings include:

Stream Crossing #1: (40.457455°, -123.674067°) A near origin, Class III stream comes down to the road prism and is diverted down the left inboard ditch, which conveys flow for approximately 275 feet to a Class II watercourse (Figure 2A). There is no defined channel below the road prism and no apparent path to direct water downslope.

Streamflow will be maintained in the inboard ditch, which will be armored for approximately 80 feet with 15 cubic yards of 0.25-0.75-foot diameter riprap to accommodate 100-year flows. Hydrologically connected road surfaces will be disconnected from all crossings by the implementation of the road drainage treatments outlined above in Table 1.

Stream Crossing #2: (40.453273°, -123.661030°) A 24-inch diameter plastic culvert on a Class II stream with a single post trash rack above the inlet (Figure 2B). The culvert at this site was set high and short in the outboard fillslope with a 3-foot plunge pool beyond the outlet.

A 54-inch diameter by 40-foot long culvert sized for the 100-year stream flow and associated debris using the 0.67 HW/D ratio will be installed with the culvert outlet in-line with the existing stream channel alignment below the road. The culvert will be installed at the natural channel grade with the outlet placed at the base of the outboard fillslope. The height of the road surface will need to be increased and approximately 30 cubic yards of additional fill material imported to accommodate the recommended 54-inch diameter culvert. The lower 3/4 of the outboard fillslope will be armored with 15 cubic yards of 0.5-2.0-foot diameter riprap. If diversion potential is created after increasing the road height through installation of the culvert a critical dip will be installed on the right hinge line of the stream crossing to prevent diversion.

Stream Crossing #3: (40.453007°, -123.663619°) An 18-inch diameter plastic culvert on a Class II stream (Figure 2B). The culvert at this site was set high in the outboard fillslope with a 1-foot plunge at the outlet.

The crossing will be decommissioned by excavating the fill prism down to a natural grade. A 6-foot wide channel will be established through the crossing with 2:1 side

slopes. Excavated material will be stockpiled locally to the left and right of the site. All bare soil areas will be seeded and mulched.

Stream Crossing #4: (40.456015°, -123.666714°) A fill crossing on a Class III stream (Figure 2B). There is evidence of past erosion in the outboard fillslope where a developing rill complex continues downslope to the base of fill for 25 feet. This crossing is located on a seasonal road.

The crossing will be decommissioned by excavating the fill prism down to a natural grade. A 4-foot wide channel will be established through the crossing with 2:1 side slopes. Excavated material will be stockpiled locally to the left and right of the site. All bare soil areas will be seeded and mulched.

Stream Crossing #5: (40.453556°, -123.664736°) A 36-inch diameter metal culvert on a Class II stream (Figure 2B). The culvert at this site was set at the base of fill, but there is fallen woody debris at the culvert outlet that is causing the pipe to plug with sediment. The culvert outlet is also ripped open, potentially from efforts to remove sediment or debris.

The crossing will be decommissioned by excavating the fill prism down to a natural grade. A 6-foot wide channel will be established through the crossing with 2:1 side slopes. Excavated material will be stockpiled locally to the left and right of the site. All bare soil areas will be seeded and mulched.

Stream Crossing #6: (40.457698°, -123.676312°) A fill crossing on a Class III stream (Figure 2A) which flows to the Class II stream immediately downstream. This crossing is located on a quad road that is no longer in use.

The crossing will be decommissioned by excavating the remaining material down to a natural grade at the confluence with the Class II stream. A 4-foot wide channel will be established through the flat with 2:1 side slopes. Excavated material will be stockpiled locally to the left and right of the site. All bare soil areas will be seeded and mulched.

Stream Crossing #7: (40.457046°, -123.675780°) A ford crossing on a Class II stream (Figure 2A). This crossing is located on a quad road that is no longer in use.

No work within the bed and banks of the stream is proposed at this location, but this crossing will be utilized to access SC #6 for decommissioning.

Stream Crossing #8: (40.456540°, -123.675153°) A 48-inch diameter metal culvert on a Class II stream (Figure 2A). Bank erosion was observed on the upstream left bank and downstream of the crossing, along with a scour pool at the outlet. This crossing is located on a seasonal road.

The crossing be upgraded to a ford by removing the existing culvert, establishing a 7-foot wide channel, and laying back the road approaches to 3:1 slopes.

Stream Crossing #9: (40.458507°, -123.670897°) A fill crossing on a Class III stream (Figure 2B). A small, incised channel has developed through the roadway and a small rill exists down the outboard fillslope for 20 feet. This crossing is located on a seasonal road.

The crossing will be upgraded to an armored fill at this location. A broad dip will be created through road prism and a keyway excavated from the base of the outboard fill and approximately a third into the roadway, measuring approximately 7 feet wide by 2 feet deep by 25 feet long. The excavated keyway will then be armored with 15 cubic yards of 0.5-1.5-foot diameter riprap to accommodate the 100-year streamflow.

Stream Crossing #10: (40.458403°, -123.670815°) A low power, near origin Class III stream is seasonally diverted down the right road and exits down the outboard fillslope, where flow then meets the Class III watercourse downstream from SC #9. (Figure 2B) This crossing is located on a seasonal road.

Original treatments proposed at this location include insloping the road between SC #9 and SC #10 with an inboard ditch excavated to divert the Class III stream for approximately 40 feet down to SC #9. Upon inspection of the crossing and discussions with CDFW, it was determined that an armored fill should be installed at this location to convey streamflow directly across the road. The description of work proposed at this crossing should be amended in CDFW LSAA No. 1600-2019-0873-R1. A broad dip will be created through road prism and a keyway excavated from the base of the outboard fill and approximately a third into the roadway, measuring approximately 7 feet wide by 2 feet deep by 20 feet long. The excavated keyway will then be armored with 15 cubic yards of 0.5-1.5-foot diameter riprap to accommodate the 100-year streamflow.

Stream Crossing #11: (40.457289°, -123.670635°) A Class III stream is conveyed across the road through a fill crossing (Figure 2B). A small, incised channel has developed through the roadway and a small rill exists down the outboard fillslope for 21 feet. The right road approach to the crossing is steep at a 35% grade. This crossing is located on a seasonal road.

The crossing will be upgraded to an armored fill at this location. A broad dip will be created through road prism and a keyway excavated from the base of the outboard fill and approximately a third into the roadway, measuring approximately 7 feet wide by 2 feet deep by 25 feet long. The excavated keyway will then be armored with 15 cubic-yards of 0.5-1.5-foot diameter riprap to accommodate the 100-year streamflow.

Stream Crossing #12: (40.456618°, -123.670762°) A fill crossing on a Class III stream (Figure 2B). A small, incised channel has developed through the roadway and a small rill exists down the outboard fillslope for approximately 20 feet. The right road approach to the crossing is steep at a 30% grade and diversion potential exists down the left road approach. This crossing is located on a seasonal road.

The crossing will be upgraded to an armored fill at this location instead of a culvert. A broad dip will be created through road prism that will prevent potential stream diversion . A keyway will be excavated from the base of the outboard fill and approximately a third into the roadway, measuring approximately 7 feet wide by 2 feet deep by 25 feet long. The excavated keyway will then be armored with 15 cubic yards of 0.5-1.5-foot diameter riprap to accommodate the 100-year streamflow.

Stream Crossing #13: (40.455508°, -123.670358°) A fill crossing on a Class III stream (Figure 2B). A small, incised channel has developed through the roadway and a small rill exists down the outboard fillslope for 21 feet. Approximately 40 feet upstream of the road prism, the channel is heavily vegetated, low gradient, and has potential to flow/divert onto the right road approach before returning to its natural path. This crossing is located on a seasonal road.

The crossing will be upgraded to an armored fill at this location. A broad dip will be created through road prism and a keyway will be excavated from the base of the outboard fill and approximately a third into the roadway, measuring approximately 7 feet wide by 2 feet deep by 25 feet long. The excavated keyway will then be armored with 15 -cubic yards of 0.5-1.5-foot diameter riprap to accommodate the 100-year streamflow. Upstream of the crossing, a 4-foot channel with 2:1 side-slopes will be defined for approximately 40 feet to prevent the stream from diverting down the right road approach.

It is recommended that all stream crossings be monitored and maintained, as needed, on a regular basis and after significant storm events before, during, and after upgrading or decommissioning activities. Any pff-property stream crossings located on appurtenant roads accessing the Project Site should be included in annual maintenance and winterization measures, such as clearing debris from culvert inlets and outlets. Additional permanent road drainage features and road related BPTC measures to disperse runoff, reduce erosion and hydrologically disconnect road segments draining to streams are included in Table 1, described in Section 1.1.2, and shown on the site maps (Figures 2A and 2B). See LSAA No 1600-2019-0873-R1 in Appendix A for descriptions of existing projects and measures to protect fish and wildlife resources, and PWA and CASQA Typical Drawings in Appendix B for general road drainage treatments, culvert upgrade, armor placement, and other erosion control specifications.

1.1.4 Legacy Waste Discharge Issues for Region 1

For Region 1 Dischargers, identify, discuss, and locate on the site map any legacy waste discharge issues that exist on the property.

There three (3) legacy waste discharge issues on the Project Site. Legacy Areas #1 and #2 have existing erosion control measures to monitor and maintain, and Legacy Area #3 is to be remediated as part of this Site Management Plan. Existing and proposed BPTC measures associated with legacy areas are included in Table 1, below, and shown on the site maps (Figures 2A and 2B). See CASQA Typical Drawings in Appendix B for general erosion control specifications.

- 1) Legacy Area #1 is an abandoned cultivation area that is approximately 2,500-square feet in size. All cultivation and associated infrastructure have been removed and properly disposed of at an approved waste disposal facility. All disturbed and bare soil areas have been mulched with weed-free straw, seeded with native erosion control seed, and a fiber roll has been installed on the outboard/downslope perimeter of the area.

Monitor and maintain all existing erosion and sediment control measures. Additional erosion and sediment control measures, such as surface mulch,

native erosion control seed, and fiber rolls should be installed as necessary to prevent fine-grained sediment generation, mobilization, and delivery to surface waters. Appropriate maintenance should be performed and BPTC measures implemented as needed.

- 2) Legacy Area #2 is an area previously occupied by a 20,000-gallon water bladder. All cultivation and associated infrastructure have been removed and properly disposed of at an approved waste disposal facility. All disturbed and bare soil areas have been mulched with weed-free straw, seeded with native erosion control seed, and a fiber roll has been installed on the outboard/downslope perimeter of the area

Monitor and maintain all existing erosion and sediment control measures. Additional erosion and sediment control measures, such as the installation of straw wattles, will be implemented as needed to ensure protection of water quality. Appropriate maintenance should be performed and BPTC measures implemented as needed.

- 3) Legacy Area #3 is an abandoned cultivation area that is approximately 3,200-square feet in size. All cultivation and associated infrastructure will be removed and the appropriate stabilization and erosion control BPTCs (seed, straw mulch, etc.) applied to all disturbed/bare soil areas to minimize surface erosion and sediment transport after the work period.

Additional erosion and sediment control measures, such as the installation of straw wattles, will be implemented as needed to ensure protection of water quality. Appropriate maintenance should be performed and BPTC measures implemented as needed.

1.2 Sediment Erosion Prevention and Sediment Capture

Moderate risk Tier 1 or Tier 2 Dischargers are required to submit a Site Erosion and Sediment Control Plan. Those Dischargers may refer to that plan rather than repeat it here.

There are four (4) graded pads (GP) and four (4) cultivation areas (CA) on the Project Site, which have existing BPTC measures to mitigate surface runoff offsite and/or discharge to nearby watercourses. Implemented sediment and erosion control measures at these locations include the application of straw mulch or otherwise covering bare soils and cultivation mediums immediately after harvest and shaping the areas to. Existing and proposed erosion prevention and sediment control BPTC measures are included in Table 1, below and shown on the site maps (Figures 2A and 2B). There is one off-stream Pond on the project site that is primarily filled with rainwater but also receives water via a cutbank seep just upslope to the north of the pond. The spillway for the pond is a constructed ditch along the east side of the pond and CA #3 (GP #3) which is lined with rock and geo fabric that has since become vegetated with grasses. The pond spillway outlets onto a well vegetated grassy slope south of CA #2 where the water disperses over the area and does not appear to connect to nearby surface waters located to the east.

During discussions with CDFW onsite it was determined that to maintain compliance with the requirements for reservoirs described in CDFW Lake and Streambed Alteration Agreement (LSAA) No. 1600-2019-0873-R1, the water from the cutbank seep upslope from the pond

should be disconnected from the pond at minimum during the forbearance season (April 1 – October 31). Ideally, the landowner would like to disconnect the cutbank seep from the pond entirely, by directing the flow away from the pond via a ditch, or by creating a french drain to allow the cutbank seep water to infiltrate back into the groundwater system. Additionally, the pond spillway could be improved by redefining the orientation of the outlet to direct overflow from the pond more to the southwest in order to eliminate any chance that water could enter nearby surface water to the east. All erosion and sediment control features should be monitored on a regular basis and after significant storm events to ensure functionality and that erosion and sediment delivery to nearby watercourses is not occurring. Appropriate maintenance should be performed and BPTC measures implemented as needed. An amendment to CDFW LSA Notification No. 1600-2019-0873-R1 should be requested to update the work description associated with the cutbank seep (CDFW ID Spring-diversion) to allow for disconnection from the pond. See LSAA No 1600-2019-0873-R1 in Appendix A for descriptions of existing projects and measures to protect fish and wildlife resources, and PWA and CASQA Typical Drawings in Appendix B for general road drainage treatments, culvert upgrade, armor placement, and other erosion control specifications.

1.2.1 Erosion Prevention and Sediment Control Measures: BPTCs, Schedule, and Map

The description shall address physical BPTC measures, (e.g., placement of straw mulch, plastic covers, slope stabilization, soil binders, culvert outfall armoring, placement of /silt fences, fiber rolls, or settling ponds/areas, etc.) and biological BPTC measures (vegetation preservation/replacement, vegetated outfalls, hydro seeding, etc.).

Refer to Table 1, above, for a description of erosion prevention and sediment capture BPTC measures that will be implemented to prevent or limit erosion and capture sediment that has been eroded. The table also includes a schedule for BPTC measures that will be implemented.

Specific erosion prevention and sediment control measures intended to prevent or limit erosion and capture sediment that has been eroded shall be implemented prior to the onset of each wet weather season, including the placement of straw mulch on bare soil areas as needed, planting of cover crops at cultivation areas, preservation/replacement of existing vegetative cover, indoor storage of bulk potting soil, slope stabilization, and stream crossing upgrade treatments. These measures will be implemented as needed prior to the wet weather season at cultivation areas, stream crossings, road segments, and any additional areas on the Project Site with the potential to threaten water quality.

Refer to the site maps, Figures 2A and 2B, for the location of erosion prevention and sediment control BPTC measures.

1.2.2 Maintenance Activities – Erosion Prevention and Sediment Control

1.2.2.1 *Monitoring and Maintenance*

Describe how the erosion prevention and sediment control BPTC measures will be monitored and maintained to protect water quality.

In general, the Project Site needs to be monitored throughout the year to identify any problems that might arise and to monitor the effectiveness of

corrective actions when completed. Refer to Table 1, above, for recommendations relating to existing and proposed BPTC measures that will require monitoring and/or maintenance.

The goal of the monitoring is to ensure the original problem/feature has been effectively treated and that the causal mechanisms (ineffective road drainage, improperly designed stream crossings, etc.) are not continuing to threaten or cause water quality degradation. If additional deficiencies develop or individual problems arise, then corrective actions must be implemented immediately.

Periodic inspections should include visual inspection of the site, including any management measures/practices, to ensure they are being implemented correctly and are functioning as expected. Inspections include photographic documentation of any controllable sediment discharge sites, as identified on the site map, and a visual inspection of those locations on the site where pollutants or wastes, if uncontained, could be transported into receiving waters, and those locations where runoff from roads or developed areas drains into or towards surface water.

At a minimum, sites shall be inspected at the following times to ensure timely identification of changed site conditions and to determine whether implementation of additional management measures is necessary to prevent or minimize discharges of waste or pollutants to surface water:

- 1) Before and after any significant alteration or upgrade to a given stream crossing, road segment, or other controllable sediment discharge site. Inspection should include photographic documentation, if possible.
- 2) Prior to October 15th to evaluate site preparedness for storm events and stormwater runoff.
- 3) Following the accumulation of 3 inches cumulative precipitation (starting September 1st) or by December 15th, whichever is sooner.
- 4) Following storm events that produce 0.5 inches in 24 hours or 1 inch within seven consecutive days of precipitation (Cannabis Cultivation Policy: Attachment A). Precipitation data can be obtained from the National Weather Service by entering the site zip code at <http://www.srh.noaa.gov/forecast>; Pick the nearest or most relevant zip code and then select the 3-day history that will also show precipitation totals.

1.2.2.2 Captured Sediment

Describe how any captured sediment will be either stabilized in place, excavated, and stabilized on-site, or removed from the site.

If any excess sediment is generated, all captured sediment will be stabilized and stored in a stable location onsite with no threat of delivery to surface waters. All applicable BPTC measures will be implemented to prevent sediment mobilization and encourage revegetation.

1.2.3 Erosion Control BPTC Measures – Interim and Long-term

Describe the interim soil stabilization, if applicable and long-term BPTC measures implemented to prevent sediment transport at each identified disturbed area(s) and improperly constructed features.

Please refer to Table 1, above, for more information regarding interim and long-term erosion control BPTC measures and implementation schedules.

2.0 FERTILIZER, PESTICIDE, HERBICIDE, & RODENTICIDE BPTC MEASURES

2.1 Summary Table

Provide a summary table that identifies the products used at the site, when they are delivered to the site, how they are stored, and used at the site. If products are not consumed during the growing season, describe how they are removed from the site or stored to prevent discharge over the winter season.

See the summary in Table 2, below, that identifies the agricultural chemical products utilized onsite for cultivation purposes, when they are delivered to the site, and how they are stored and used at the site. Table 2 also describes how products are removed from the site or stored to prevent discharge if they are not consumed before the winter season. No pesticides, herbicides, or rodenticides are used onsite.

2.2 Site Map

The site maps, Figures 2A and 2B, identify the locations of agricultural chemical use and storage.

2.3 Bulk Fertilizers and Chemical Concentrates

Describe how bulk fertilizers and chemical concentrates are stored, mixed, applied, and how empty containers are disposed.

Fertilizer, potting soil, soil amendments, and any plant related chemical not directly being used within the cultivation areas are stored in Building #1 (Figure 2A) and Building #3 (Figure 2B). According to the landowner, all amendments are applied at the manufacturer recommended rate. If fertilizers contain ammonium nitrate, they will be stored in separate locations away from petroleum products.

Nutrient containing amendments and all chemical materials will be stored indoors or completely tarped outdoors during the rainy season. If tarped outdoors, chemicals will not be stored directly on the ground surface and surface runoff from precipitation should be diverted away from the storage area. At the completion of the final harvesting activities, all potting soil will be planted with cover crops or covered with tarps or plastic sheeting to prevent mobilization and leaching of any residual nutrients during the wet season. If not done already any compost piles on the Project Site will be planted with a winter cover crop or consolidated as much as feasible and covered with plastic sheeting or tarps to prevent mobilization and leaching of any residual chemicals during the wet season. Any bulk potting soil on the Project Site will either be stored indoors or properly covered with tarps or plastic sheeting during the wet season.

Table 2. Fertilizer and Agricultural Chemical Product List

	Product	When Delivered	How Stored	How Used	How Products Are Removed from the Site or Stored to Prevent Discharge If They Are Not Consumed Before the Winter Season
FERTILIZERS/AGRICULTURAL CHEMICAL	Bone Meal	Purchased and brought to Project Site as needed using personal vehicles.	Fertilizers and other agricultural chemicals are stored onsite in Building #1 and #3	Applied as directed on product labels.	Any unused product(s) remaining after the cultivation season are generally stored in Building #1 and #3.
	Composted Chicken Manure	Purchased and brought to Project Site as needed using personal vehicles.	Fertilizers and other agricultural chemicals are stored onsite in Building #1 and #3	Applied as directed on product labels.	Any unused product(s) remaining after the cultivation season are generally stored in Building #1 and #3
	Gypsum	Purchased and brought to Project Site once per year using personal vehicle.	Amendments are applied to the soil once brought onsite.	Applied directly to soil at beginning of season.	Any unused product(s) remaining after the cultivation season are generally stored in Building #1 and #3.

2.4 Spill Prevention and Cleanup

The likelihood of chemical spills will be minimized by storing all fertilizers and other cultivation-related chemicals off the ground, in designated secondary containment and in enclosed structures. In the event of a spill cleanup will be initiated as quickly as possible after occurrence. In the event of spills on pavement or concrete, solid materials will be removed utilizing a broom/brush and pan or vacuum. Affected paved surfaces will be decontaminated using a mild detergent and water. Liquid chemical spills on pavement or concrete will be captured using absorbent materials. Spills of solid or liquid materials on soil will be cleaned by removal of the spilled materials and contaminated soil using a shovel and/or absorbent materials. Contaminated soil will be stored in a labeled sealed container and disposal of contaminated materials will be conducted in accordance with manufacturer’s instructions and local regulations. According to the landowner, spill prevention cleanup kits are stored in a covered garage on the Project Site. Multiple spill prevention cleanup kits should be readily available and located where chemicals are stored and used (Figures 2A and 2B). Also see Section 3.4, below, regarding chemical spill kits.

3.0 PETROLEUM PRODUCT BPTC MEASURES

3.1 Summary Table

Table 3, below, identifies the petroleum products utilized onsite for cultivation and other purposes, when they are delivered to the site, and how they are stored and used at the site.

Table 3. Petroleum Product List

Product Name	When Delivered	How Stored	How Used	How Products Are Removed from the Site or Stored to Prevent Discharge If They Are Not Consumed Before the Winter Season
Gasoline	Five 5-Gallon cans are purchased and brought to Project Site every two weeks in personal vehicles.	Petroleum products were observed being stored in the agricultural building as showed in Figures 2a and 2b.	Back-up generator	Any unused petroleum products are stored in the same manner as described previously and at the locations shown on Figure 2. Used/spent products and empty containers are recycled at an appropriate facility as needed.
Propane	Delivered by Sequoia Gas Co.	One propane tank was identified during site inspection.	Domestic purposes	Propane is stored in tanks and refilled as needed.

3.2 Site Map

The site maps, Figures 2A and 2B, identify petroleum product storage and use locations.

3.3 Handling

Describe how fuels, lubricants, and other petroleum products are stored, mixed, applied, and empty containers are disposed.

Petroleum products were observed to be stored indoors in the Generator Shed shown on Figure 2B. All petroleum products (e.g., fuel cans, motor oil containers, etc.) will be stored indoors, out of the elements and equipped with adequate secondary containment basins capable of containing the entire stored volume in the event of spills or leaks. All gas-powered equipment (e.g., generators, water pumps, etc.) will also be equipped with adequate secondary containment basins and should be stored indoors when not in use and during the wet season or equipped with a roof or cover to protect these items from the elements and avoid accumulation of precipitation in the secondary containment basins. It is recommended that metal secondary containment basins be used for any device capable of generating excessive heat (e.g., generators, water pumps, etc.) to mitigate the risk of fire.

For more information regarding storage, application, and disposal of full and empty containers of petroleum products, see Table 3, above.

3.4 Spill Prevention and Cleanup

The likelihood of chemical spills will be minimized by storing all petroleum products off the ground, in designated secondary containment, and in enclosed structures. In the event of a spill, cleanup will be initiated as quickly as possible after occurrence. Liquid petroleum spills on pavement or concrete will be captured using absorbent materials. Spills of liquid materials on soil will be cleaned by removal of the spilled materials and contaminated soil using a shovel

and/or absorbent materials. Contaminated soil will be stored in a labeled sealed container. Disposal of contaminated materials will be conducted in accordance with manufacturer's instructions and local regulations. According to the landowner, spill prevention cleanup kits are stored in a covered garage on the Project Site. Multiple spill prevention cleanup kits should be readily available and located where fuel is stored and where refueling occurs (Figures 2A and 2B).

4.0 TRASH/REFUSE, AND DOMESTIC WASTEWATER BPTC MEASURES

4.1 Types, Containment, and Disposal of Trash/Refuse

Describe the types of trash/refuse that will be generated at the site. Describe how the material is contained and properly disposed of.

Trash and refuse typically includes domestic waste such as general household trash and organic materials. Cultivation-related waste material includes organic wastes (cannabis stems, leaves, roots, etc.), plastic pots and planting materials, plastic containers, degraded plastic tarps etc. All waste materials will be properly stored where there is no threat to surface waters and disposed of at an approved waste disposal facility on a regular basis. There are two (2) designated trash/refuse storage location (Buildings #1 and #2) were observed on the Project Site (Figures 2A and 2B). It is recommended that multiple lidded trash and recycling cans be located at each cultivation area and at each structure and/or work area. Collect and properly store household and cultivation-related wastes before disposing of these materials at an approved waste facility. The trash/refuse and recycling material is taken to the Recology Eel River in Fortuna, CA on a regular basis.

4.1.1 Site Map

The site maps, Figure 2A and 2B, show the trash/refuse and recycling storage locations.

4.2 Domestic Wastewater Generation and Disposal

4.2.1 Domestic Wastewater Generation

Describe the number of employees, visitors, or residents at the site [per unit time]. Describe the types of domestic wastewater generated at the site (e.g., household generated wastewater or chemical toilet).

According to the landowner, there are two (2) employees, two (2) visitors per month, and two (2) permanent residents onsite year-round.

Household wastewater is generated onsite (cooking, cleaning, septic, etc.). One (1) portable toilet was observed on the Project Site (Figure 2B).

4.2.2 Domestic Wastewater Disposal

4.2.2.1 Permitted onsite wastewater treatment system (e.g., septic tank and leach lines).

There is currently one (1) OWTS on the Project Site. The OWTS is located at the residential Cabin (Figure 2A), and though not currently permitted, the landowner has agreed to obtain a permit for it as part of their Humboldt County Cannabis Cultivation License Ordinance permitting process. Proof

of permitting through the Humboldt County Division of Environmental Health (HCDEH) is required at all times onsite for all OWTS.

A domestic sink and shower shed is located on the Project Site near CA #3 (Figure 2B). Though used infrequently, the shed lacks proper wastewater treatment. Install an appropriate OWTS, or follow guidelines for California graywater regulations, if applicable.

4.2.2.2 Chemical toilets or holding tank. If so, provide the name of the servicing company and the frequency of service.

There is one portable chemical toilet on the Project Site located adjacent to the domestic sink and shower shed (Figure 2B). Continue use of portable toilets until the existing and proposed OWTS have been permitted or installed, respectively. Portable toilets should be serviced on a regular basis as needed for the amount of use. Maintain service records for the portable toilet onsite and additional portable toilets should be delivered to the Project Site based on the number of workers, residents, and visitors onsite when cultivation activities are at their peak.

4.2.2.3 Outhouse, pit privy, or similar. Use of this alternative requires approval from the Regional Water Board Executive Officer; include the approval from the Executive Officer and any conditions imposed for use of this alternative.

There are no outhouses or pit-privies on the Project Site.

4.2.3 Site Map

The site maps, Figure 2A and 2B, identify the location of the existing domestic wastewater treatment system (OWTS), and other areas where domestic wastewater is produced, stored, or disposed of.

5.0 WINTERIZATION BPTC MEASURES

5.1 Winterization Activities

Describe activities that will be performed to winterize the site and prevent discharges of waste. The description should address all the issues listed above.

Winterization measures applied to bare soil areas, garden areas, and cultivation areas include the following: 1) covering soil beds with tarps or planting of cover crops, 2) mulching bare soil areas and applying native erosion control seed, and 3) disconnecting water lines not in use. During the wet season, amendments will be stored indoors or under tarps such that they are protected from the elements.

Please refer to Table 1, above, for more information regarding winterization activities and implementation schedules.

5.2 Maintenance of Drainage or Sediment Capture Features

Describe maintenance of all drainage or sediment capture features (e.g., drainage culverts, drainage trenches, settling ponds, etc.) to remove debris, soil blockages, and ensure adequate capacity exists.

Please refer to Table 1, above, for more information regarding maintenance of drainage and sediment capture feature BPTCs and implementation schedules.

5.3 Revegetation

Describe any revegetation activities that will occur either at the beginning or end of the precipitation season.

No land disturbance activities requiring winter revegetation are planned or anticipated with the exception of any application of native erosion control seed or implementation of additional erosion or sediment control BPTCs as needed to protect water quality.

5.4 BPTC Measures That Cannot Be Completed Before Onset of Winter

If any BPTC measure cannot be completed before the onset of winter period, contact the Regional Water Board to establish a compliance schedule.

Every effort is being made to implement interim BPTCs before the onset of the winter weather period for this season. However, according to the landowner these have been difficult to implement as construction and contractor work schedules have been significantly impacted by the ongoing global COVID-19 health crisis, local wildfires and weather. The stream crossing treatments are anticipated to commence during the 2022 dry weather season (pending regulatory agency approval). The Regional Water Board will be contacted to establish a compliance schedule for these activities if they are not able to be completed prior to the onset of the next winter period. Refer to Table 1, above, for information regarding a BPTC implementation schedule.

5.5 Legacy Waste Discharge Issues for Specific Regions

For Region 1 Dischargers, describe any activities that will be performed to address legacy waste discharge issues. Region 6 Dischargers should consult with Regional Water Board staff to confirm if any other activities in addition to BPTCs are necessary to address legacy waste discharge issues.

Please refer to Section 1.1.3 and Table 1, above, for more information regarding legacy waste discharge issues on the Project site and the necessary BPTCs and implementation schedules.

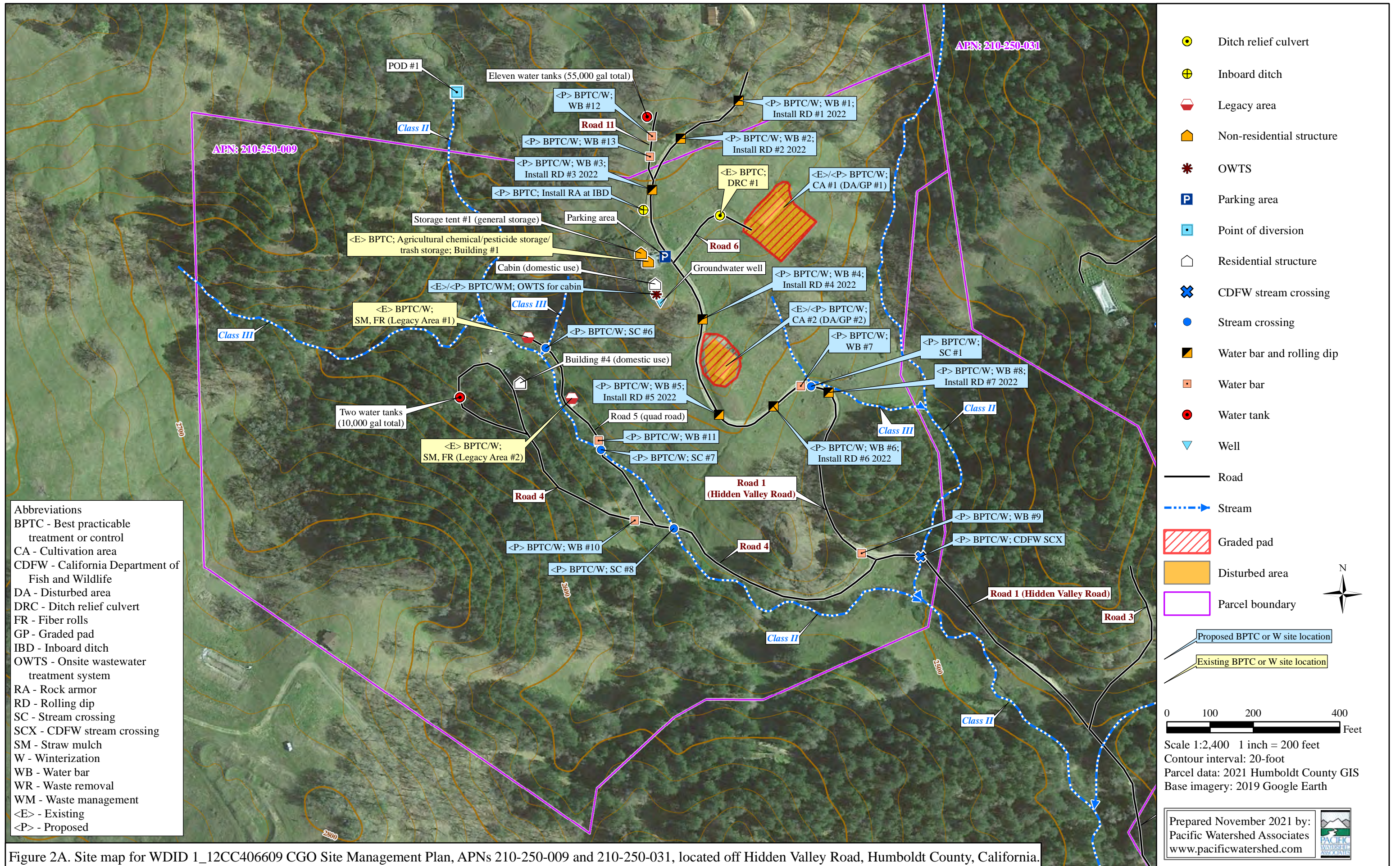


Figure 2A. Site map for WDID 1_12CC406609 CGO Site Management Plan, APNs 210-250-009 and 210-250-031, located off Hidden Valley Road, Humboldt County, California.

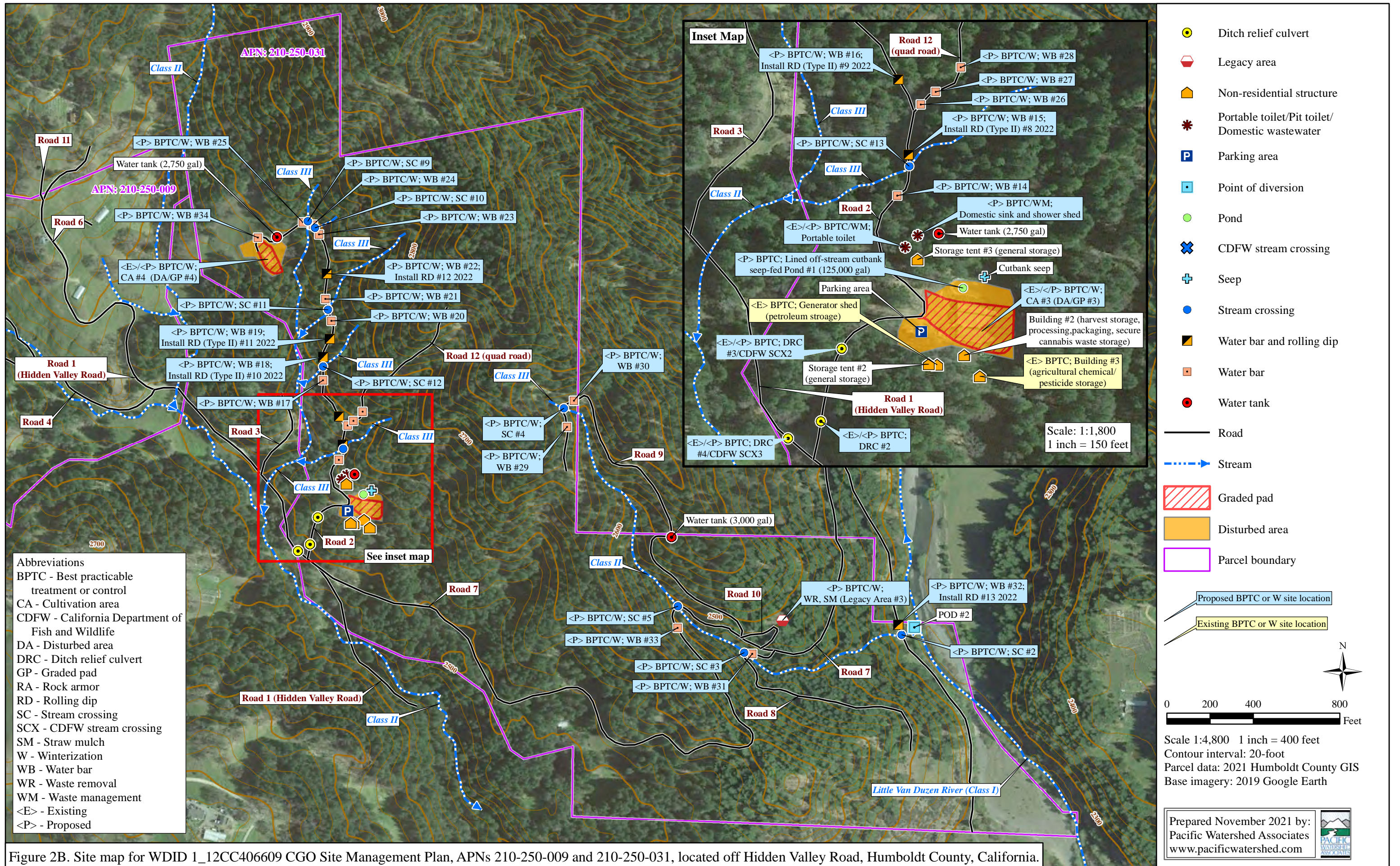


Figure 2B. Site map for WDID 1_12CC406609 CGO Site Management Plan, APNs 210-250-009 and 210-250-031, located off Hidden Valley Road, Humboldt County, California.

IV. LANDOWNER/LESSEE CERTIFICATION/SIGNATURES

This Site Management Plan has been prepared by Pacific Watershed Associates on behalf of the Discharger.

“I have read and understand this Site Management Plan, including Section II – Certifications, Conditions and Limitations, and the associated attachments. I agree to comply with the requirements of the State Water Resources Control Board (SWRCB) Cannabis Cultivation Policy Order WQ 2019-0001-DWQ, General Waste Discharge Requirements and Waiver of Waste Discharge Requirements for Discharges of Waste Associated with Cannabis Cultivation Activities (General Order), including the recommendations and actions listed in this Site Management Plan.”

Name of Legally Responsible Person (LRP): _____

Title (owner, lessee, operator, etc.): _____

Signature: _____ Date: _____

Site Management Plan prepared by (if different from LRP): **Pacific Watershed Associates, Inc.**

Site Management Plan prepared and finalized on (date): _____

Signature: _____ Date: _____

Appendix A

Applicable Permits, Licenses and Registrations

**Notice of Applicability – Waste Discharge Requirements
Water Quality Order 1_12CC406609**

**CDFW Lake or Streambed Alteration Agreement Notification
No. 1600-2019-0873-R1**

**Site Management Plan Order WQ 2019-0001-DWQ
Larabee Valley Family Farms, LLC
Humboldt County APNs 210-250-009 & 210-250-031**

October 2021



North Coast Regional Water Quality Control Board

May 14, 2019

WDID:1_12CC406609

LAUREN MARLAK
HIDDEN VALLEY ROAD OFF HIGHWAY 36 ROAD
BRIDGEVILLE, CA 95526

Subject: Notice of Applicability - Waste Discharge Requirements
Water Quality Order WQ 2019-0001-DWQ

The attached Notice of Applicability provides notice that the requirements of the State Water Board *Cannabis Cultivation Policy- Principles and Guidelines for Cannabis Cultivation* (Policy), and the *General Waste Discharge Requirements and Waiver of Waste Discharge Requirements for Discharges of Waste Associated with Cannabis Cultivation Activities*, Order WQ 2019-0001-DWQ (General Order – previously WQ 2017-0023-DWQ, with updates and revisions effective April 16, 2019) are applicable to the site as described below. Based on the information provided, the Discharger self-certifies the cannabis cultivation activities are consistent with the requirements of the State Water Board Policy and General Order.

Please direct all submittals, discharge notifications, and questions regarding compliance and enforcement to the North Coast Regional Water Quality Control Board Cannabis Program at (707) 576-2676 or northcoast.cannabis@waterboards.ca.gov.

Sincerely,

Matthias St. John
Executive Officer
North Coast Regional Water Quality Control Board

190514_1L_1_12CC406609_Hidden Creek_NOA_TW

NOTICE OF APPLICABILITY – WASTE DISCHARGE REQUIREMENTS, WATER QUALITY ORDER WQ 2019-0001-DWQ, LAUREN MARLAK, HUMBOLDT COUNTY APN(s) 201-250-009-000 & 201-250-031-000

Lauren Marlak (hereafter “Discharger”) submitted information through the State Water Resources Control Board’s (State Water Board’s) online portal on November 27, 2018, for discharges of waste associated with cannabis cultivation related activities. Based on the information provided, the Discharger self-certifies the cannabis cultivation activities are consistent with the requirements of the Policy and General Order. This letter provides notice that the Policy and General Order are applicable to the site as described below. You are hereby assigned waste discharge identification (WDID) number **1_12CC406609**.

The Discharger is responsible for all the applicable requirements in the Policy, General Order, and this Notice of Applicability (NOA). This includes making any necessary changes to the enrollment, and the Discharger is the sole person with legal authority to make those changes. The Discharger will be held liable for any noncompliance with the Policy, General Order, and the NOA.

1. FACILITY AND DISCHARGE DESCRIPTION

The information submitted by the Discharger states the disturbed area is equal to or greater than 2,000 square feet and less than 1 acre (43,560 square feet) no portion of the disturbed area is within the setback requirements, no portion of the disturbed area is located on a slope greater than 30 percent, and the cannabis cultivation area is less than or equal to 1 acre.

Based on the information submitted by the Discharger, the cannabis cultivation activities are classified as Tier 1 Low Risk.

2. SITE-SPECIFIC REQUIREMENTS

The Policy and General Order are available on the Internet at:

https://www.waterboards.ca.gov/water_issues/programs/cannabis/cannabis_water_quality.html

The Discharger shall ensure that all site operating personnel know, understand, and comply with the requirements contained in the Policy, General Order, this NOA, and the Monitoring and Reporting Program (MRP, Attachment B of the General Order). Note that the General Order contains standard provisions, general requirements, and prohibitions that apply to all cannabis cultivation activities.

The application requires the Discharger to self-certify that all applicable Best Practicable Treatment or Control (BPTC) measures are being implemented, or will be implemented by the onset of the winter period (November 15 - April 1), following the enrollment date. Landowners of the cultivation site in the North Coast Region are required to submit and implement Site Management Plans that describes how BPTC measures are implemented property-wide, including BPTC measures implemented to address discharges from legacy activities (e.g. former timber harvest, road building, mining, etc.) at the site per Provision C.1.a. of the General Order. Dischargers that cannot implement all applicable BPTC measures by the onset of the winter period, following their enrollment date, shall submit to the appropriate Regional Water Board a *Site Management Plan* that includes a time schedule and scope of work for use by the Regional Water Board in developing a compliance schedule as described in Attachment A of the General Order.

During reasonable hours, the Discharger shall allow the State Water Board or Regional Water Board (collectively Water Boards), California Department of Fish and Wildlife, CAL FIRE, and any other authorized representatives of the Water Boards upon presentation of a badge, employee identification card, or similar credentials, to:

- i. enter premises and facilities where cannabis is cultivated; where water is diverted, stored, or used; where wastes are treated, stored, or disposed; or in which any records are kept;
- i. access and copy, any records required to be kept under the terms and conditions of the Policy and General Order;
- ii. inspect, photograph, and record audio and video, any cannabis cultivation sites, and associated premises, facilities, monitoring equipment or device, practices, or operations regulated or required by the Policy and General Order; and
- iii. sample, monitor, photograph, and record audio and video of site conditions, any discharge, waste material substances, or water quality parameters at any location for the purpose of assuring compliance with the Policy and General Order.

3. TECHNICAL REPORT REQUIREMENTS

The following technical report(s) shall be submitted by the Discharger as described below:

A Site Management Plan, by February 24, 2019, consistent with the requirements of General Order Provision C.1.a., and Attachment A, Section 5. Attachment D of the General Order provides guidance on the contents of the Site Management Plan.

A *Site Closure Report* must be submitted 90 days prior to permanently ending cannabis cultivation activities and seeking to rescind coverage under the General Order. The *Site Closure Report* must be consistent with the requirements of General Order Provision C.1.e., and Attachment A, Section 5. Attachment D of the General Order provides guidance on the contents of the *Site Closure Report*.

4. MONITORING AND REPORTING PROGRAM

The Discharger shall comply with all provisions of the Monitoring and Reporting Program (MRP), which appears as Attachment B to the General Order. The Discharger shall also comply with all provisions of the *North Coast Regional Supplement to Annual Monitoring and Reporting Requirements for Statewide Cannabis General Order WQ 2017-0023-DWQ* (Regional Supplement), which independently appears as Investigative Order No. R1-2019-0023, issued by the Regional Water Board Executive Officer on March 22, 2019. Annual reports for both sets of requirements shall be submitted to the Regional Water Board in a combined report by March 1 following the year being monitored. The Discharger shall not implement any changes to the MRP or to the Regional Supplement unless and until a revised MRP or Regional Supplement is issued by the Regional Water Board Executive Officer or the State Water Board Division of Water Quality Deputy Director, or the State Water Board Chief Deputy Director.

A copy of Attachment B to the General Order can be obtained online at the following location, or by contacting staff at the phone number and email address listed below.

https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2019/wqo2019_0001_dwq.pdf#page=32

A copy of the Regional Supplement can be obtained online at the following location, or by contacting staff at the phone number and email address listed below.

https://www.waterboards.ca.gov/northcoast/board_decisions/adopted_orders/pdf/2019/19_0023_Regional%20Supplement%2013267%20Order.pdf.

5. ANNUAL FEE

According to the information submitted, the discharge is classified as Tier 1 Low Risk with the current annual fee assessed at \$600. The fee is due and payable on an annual basis until coverage under this General Order is formally rescinded. To rescind coverage, the Discharger must submit a Notice of Termination, including a Site Closure Report at least 90 days prior to termination of activities and include a final MRP report.

6. TERMINATION OF COVERAGE UNDER THE GENERAL ORDER & REGIONAL WATER BOARD CONTACT INFORMATION

Cannabis cultivators that propose to terminate coverage under the Conditional Waiver or General Order must submit a Notice of Termination (NOT). The NOT must include a *Site Closure Report* (see Technical Report Requirements above), and Dischargers enrolled under the General Order must also submit a final monitoring report. The Regional Water Board reserves the right to inspect the site before approving a NOT. Attachment C of the General Order includes the NOT form and Attachment D of the General Order provides guidance on the contents of the *Site Closure Report*.

If the Discharger cannot comply with the General Order, or will be unable to implement an applicable BPTC measure contained in Attachment A by the onset of the winter period each year, the Discharger shall notify the North Coast Regional Cannabis Unit staff at (707) 576-2676 or northcoast.cannabis@waterboards.ca.gov so that a site-specific compliance schedule can be developed.

Cc: Kevin Porzio, State Water Resources Control Board,
dwq.cannabis@waterboards.ca.gov
Cheri Sanville, California Department of Fish and Wildlife,
cheri.sanville@wildlife.ca.gov
Cliff Johnson, Humboldt County Planning and Building,
cjohnson@co.humboldt.ca.us
Lauren Marlak Hidden valley road off Highway 36 Road Bridgeville, CA 95526
Marc Gulizio 9 Zappa Court Felton, CA 95018
Cristinzio, Simon 760 Redwood Drive #75 0

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
REGION 1 – NORTHERN REGION
619 Second Street
Eureka, CA 95501

RECEIVED

MAY 01 2020

CDFW - EUREKA



STREAMBED ALTERATION AGREEMENT

NOTIFICATION No. 1600-2019-0873-R1

Unnamed Tributaries to the Little Van Duzen River, Tributary to the Van Duzen River, Tributary to the Eel River and the Pacific Ocean

Lauren Marlak
Marlak Water Diversions and Stream Crossings Project
15 Encroachments

This Lake or Streambed Alteration Agreement (Agreement) is entered into between the California Department of Fish and Wildlife (CDFW) and Lauren Marlak (Permittee).

RECITALS

WHEREAS, pursuant to Fish and Game Code (FGC) section 1602, the Permittee initially notified CDFW on November 7, 2019, and revised on February 11, 2020, that the Permittee intends to complete the project described herein.

WHEREAS, pursuant to FGC section 1603, CDFW has determined that the project could substantially adversely affect existing fish or wildlife resources and has included measures in the Agreement necessary to protect those resources.

WHEREAS, the Permittee has reviewed the Agreement and accepts its terms and conditions, including the measures to protect fish and wildlife resources.

NOW THEREFORE, the Permittee agrees to complete the project in accordance with the Agreement.

PROJECT LOCATION

The project is located within the Little Van Duzen River watershed, approximately four miles southwest of the town of Dinsmore, County of Humboldt, State of California. The project is located in Sections 13, 19, and 24, T1N, R4E, Humboldt Base and Meridian; in the Larabee Valley U.S. Geological Survey 7.5-minute quadrangle; Assessor's Parcel Numbers 210-250-009 and 210-250-031; latitude 40.4532 N and longitude 123.6607 W at the first point of diversion (POD-1); latitude 40.4584 N and longitude 123.6766 W at the second point of diversion (POD-2); latitude 40.4550 N and longitude 123.6699 W at the third point of diversion (POD-3).

PROJECT DESCRIPTION

This Agreement relies on the Notification materials and a desk review without a CDFW site inspection.

The project is limited to 15 encroachments (Table 1). Three encroachments are for water diversion for commercial irrigation purposes. Work for the water diversions will include use and maintenance of water diversion infrastructure. The 12 other proposed encroachments are to upgrade failing and undersized stream crossings. Work for these encroachments will include excavation, removal of fill material and/or failing culverts, replacement with new properly designed crossings, backfilling and compaction of fill, and rock armoring as necessary to minimize erosion.

Table 1. Project Encroachments with Description

ID	Latitude/Longitude	Description
POD-1	40.4532, -123.6607	Water diversion from the Little Van Duzen River for commercial irrigation. Season of diversion confined to January 1 to March 31.
POD-2	40.4584, -123.6766	Water diversion from an unnamed tributary to the Little Van Duzen River for commercial irrigation. Season of diversion confined to March 1 to March 31.
Spring-diversion	40.4550, -123.6699	Water is diverted to a reservoir described as a lined, rainwater and spring-fed pond with storage capacity of 125,000 gallons. This reservoir may be subject to further evaluation by CDFW in coordination with SWRCB Division of Water Rights. Water is used for irrigation of adjacent cultivation areas. Season of diversion confined to November 1 to March 31.
Crossing-1	40.4532, -123.6740	Stream diverted down inside ditch until next stream crossing. Rock armor as necessary to prevent erosion and sediment delivery.
Crossing-2	40.4532, -123.6610	Replace existing undersized and improperly placed 24-in culvert crossing with minimum 54-inch diameter culvert of sufficient length.
Crossing-3	40.4530, -123.6636	Decommission the undersized and improperly placed culvert crossing and rehabilitate the stream channel. Relocate spoils to prevent sediment delivery to the stream.
Crossing-4	40.4560, -123.6667	Decommission the dirt fill crossing and rehabilitate the stream channel. Relocate spoils to prevent sediment delivery to the stream.
Crossing-5	40.4535, -123.6647	Decommission the undersized and failing crossing and rehabilitate the stream channel. Relocate spoils to prevent sediment delivery to the stream.
Crossing-6	40.4576, -123.6763	Decommission the crossing and rehabilitate the stream channel. Relocate spoils to prevent sediment delivery to the stream. Revegetate the area disturbed by the abandoned cultivation flat with native oaks and riparian plants appropriate to the area.
Crossing-8	40.4565, -123.6751	<i>This crossing appears to provide the sole access to at least two water tanks (10,000 gallon total capacity) and a residence shown in Photo 20 of the Notification; the Permittee/landowner stated regular use of this road shall be discontinued.</i> Remove the failing and significantly undersized culvert and reestablish the stream channel. Relocate spoils to prevent sediment delivery to the stream. Create an appropriately designed ford crossing. Revegetate the stream corridor with riparian plants appropriate to the area. Crossing shall only be used when fording surface is dry.
Crossing-9	40.4585, -123.6708	Existing failing dirt fill crossing. Install armored fill. Crossing shall only be used when fording surface is dry.
Crossing-10	40.4584, -123.6708	Redirect diverted stream to Crossing-9 as described in the Notification.

ID	Latitude/Longitude	Description
Crossing-11	40.4572, -123.6706	Existing failing dirt fill crossing. Install armored fill. Crossing shall only be used when fording surface is dry.
Crossing-12	40.4566, -123.6707	Existing failing dirt fill crossing. Install armored fill. Crossing shall only be used when fording surface is dry.
Crossing-13	40.4555, -123.6703	Existing failing dirt fill crossing. Install armored fill. Crossing shall only be used when fording surface is dry.

The Permittee disclosed an existing wet-ford crossing ("Stream Crossing #7" Lat/Long 40.4570, -123.6757). The Notification proposes no work at this crossing but states it will be used during the decommissioning of Crossing-6. Use of Stream Crossing #7 beyond that required for decommissioning Crossing-6 is not authorized by this Agreement and this Agreement does not provide any take authorization. Existing stream crossings disclosed in the Notification, but not included as 1602 projects with fees, are not covered under this Agreement. If maintenance (such as armoring) and/or replacement become necessary, that work must be covered by a major amendment or a separate Agreement.

No other projects that may be subject to FGC section 1602 were disclosed. This Agreement does not retroactively permit any constructed reservoirs (including "ponds"), stream crossings, water diversions, modifications to riparian buffers, or other encroachments not described in Table 1.

PROJECT IMPACTS

Existing fish or wildlife resources the project could substantially adversely affect include **Chinook Salmon** (*Oncorhynchus tshawytscha*), **Coho Salmon** (*O. kisutch*), **Steelhead Trout** (*O. mykiss*), **Western Brook Lamprey** (*Lampetra richardsoni*), **Pacific Lamprey** (*Entosphenus tridentatus*), **Southern Torrent Salamander** (*Rhyacotriton variegatus*), **Pacific Giant Salamander** (*Dicamptodon tenebrosus*), **Foothill Yellow-legged Frog** (*Rana boylei*), **Coastal Tailed Frog** (*Ascaphus truei*), **Western Pond Turtle** (*Actinemys marmorata marmorata*), **Northern Spotted Owl** (*Strix occidentalis caurina*), amphibians, reptiles, aquatic invertebrates, mammals, birds, and other aquatic and riparian species.

The adverse effects the project could have on the fish or wildlife resources identified above include:

Impacts to water quality:

increased water temperature;
reduced instream flow;
increased sedimentation (chronic or episodic);

Impacts to bed, channel, or bank and direct effects on fish, wildlife, and their habitat:

loss or decline of riparian habitat;

direct impacts on benthic organisms;
direct and/or incidental take;

Impacts to natural flow and effects on habitat structure and process:

cumulative effect when other diversions on the same stream are considered;
diversion of flow from activity site;
indirect impacts;
impediment of up- or down-stream migration;
water quality degradation; and
damage to aquatic habitat and function.

MEASURES TO PROTECT FISH AND WILDLIFE RESOURCES

1. Administrative Measures

The Permittee shall meet each administrative requirement described below.

- 1.1 Documentation at Project Site. The Permittee shall make the Agreement, any extensions and amendments to the Agreement, and all related notification materials and California Environmental Quality Act (CEQA) documents, readily available at the project site at all times and shall be presented to CDFW personnel, or personnel from another state, federal, or local agency upon request.
- 1.2 Providing Agreement to Persons at Project Site. The Permittee shall provide copies of the Agreement and any extensions and amendments to the Agreement to all persons who will be working on the project at the project site on behalf of the Permittee, including but not limited to contractors, subcontractors, inspectors, and monitors.
- 1.3 Notification of Conflicting Provisions. The Permittee shall notify CDFW if the Permittee determines or learns that a provision in the Agreement might conflict with a provision imposed on the project by another local, state, or federal agency. In that event, CDFW shall contact the Permittee to resolve any conflict.
- 1.4 Project Site Entry. The Permittee agrees to allow CDFW employees access to the Project site for the purpose of inspecting and/or monitoring the activities covered by this Agreement, provided CDFW: a) provides 24 hours advance notice; and b) allows the Permittee or representatives to participate in the inspection and/or monitoring. This condition does not apply to CDFW law enforcement personnel.
- 1.5 Applicable Permits. Land development or alterations may be subject to additional federal, state and local laws, regulations, and permitting requirements, including but not limited to the following:

- The Clean Water Act (CWA) as implemented through permits, enforcement orders, and self-implementing requirements. When needed per the requirements of the CWA, the Permittee shall obtain a CWA section 404 (33 U.S.C. § 1344) permit from the United States Army Corps of Engineers (Army Corps) and a CWA section 401 (33 U.S.C. § 1341) water quality certification from the State Water Board or the Regional Water Board with jurisdiction.
- The California Water Code as implemented through applicable water quality control plans (often referred to as Basin Plans), waste discharge requirements (WDRs) or waivers of WDRs, enforcement orders, and self-implementing requirements issued by the State Water Resources Control Board (State Water Board) or Regional Water Quality Control Boards (Regional Water Boards).
- All applicable state, city, county, or local regulations, ordinances, or license requirements including, but not limited to those for grading, construction, and building.
- All applicable requirements of the California Department of Forestry and Fire Protection (CAL FIRE), including the Board of Forestry.

1.6 Water Rights. This agreement does not constitute a valid water right. All water diversion facilities that the Permittee owns, operates, or controls shall be operated and maintained in accordance with current law and applicable water rights. Water rights are administered by the State Water Resources Control Board as described here:

https://www.waterboards.ca.gov/waterrights/water_issues/programs/registrations/.

1.7 Change of Conditions and Need to Cease Operations. If conditions arise, or change, in such a manner as to be considered deleterious by CDFW to the stream or wildlife, operations shall cease until corrective measures approved by CDFW are taken. This includes new information becoming available that indicates bypass flows, diversion rates or other measures provided in this Agreement are not providing adequate protection to keep aquatic life downstream in good condition or to avoid "take" or "incidental take" of federal or State listed species.

1.8 Notification Materials. Permittee's Notification of Lake or Streambed Alteration, together with all maps, plans, photographs, drawings, and all other supporting documents submitted with the Notification and received on November 7, 2019, and revised on February 11, 2020, is hereby incorporated by reference into this Agreement. Permittee shall conduct project activities within the work areas, and using the protective measures, described in the Notification and supporting documents, unless such project activities, work areas or protective measures are modified by the provisions of this Agreement, in which case the activities shall be conducted as described in this Agreement.

- 1.1 Cannabis Cultivation Policy. If Cannabis is or becomes cultivated on the project parcel, Permittee shall comply with all requirements of the State Water Resource Control Board (SWRCB) Cannabis Cultivation Policy - Principles and Guidelines for Cannabis Cultivation (Cannabis Cultivation Policy), dated April 16, 2019, or the latest version.
 - 1.1.1 Site Management Plan and Related Technical Reports. Permittee shall submit to CDFW the initial preparation and subsequent updates to the project's Site Management Plan and related technical reports that are prepared in conformance with the SWRCB Cannabis Cultivation Policy.
 - 1.1.2 Onstream Storage Reservoirs. Use of onstream storage reservoirs for cannabis cultivation requires a Small Irrigation Use Registration. Registrants must request a joint determination from the Deputy Director of the Division of Water Rights and CDFW. If additional work or reservoir decommissioning is deemed necessary, Permittee shall submit an amendment request or new Notification.

2. Avoidance and Minimization Measures

To avoid or minimize adverse impacts to fish and wildlife resources identified above, the Permittee shall implement each measure listed below.

Work Periods and Pre-project Notice

- 2.1 Work Period. All work, not including diversion of water, shall be confined to the period **July 15 through October 15** of each year. Work within the active channel of a stream shall be restricted to periods of **dry weather**. Precipitation forecasts and potential increases in stream flow shall be considered when planning construction activities. Construction activities shall cease and all necessary erosion control measures shall be implemented prior to the onset of precipitation. A notice of completed work, including photographs of each site, shall be submitted to CDFW within seven (7) days of project completion.
- 2.2 CDFW Notification of Work Initiation and Completion. The Permittee shall contact CDFW in writing within the 7-day period preceding the beginning of work permitted by this Agreement. Information to be disclosed shall include Agreement number, and the anticipated start date. Subsequently, the Permittee shall notify CDFW in writing no later than seven (7) days after the project is fully completed. **Notification of completion will include photographs of the completed work, erosion control measures, waste containment and disposal, and a summary of any CNDDB submissions as required below.**
- 2.3 Work Period Modification. If Permittee needs more time to complete the project activity, the work may be permitted outside of the work period and extended on a day-to-day basis by the CDFW representative who reviewed the project. Requests

shall be made in writing via email or letter. The work period variance request shall: 1) describe the extent of work already completed; 2) detail the activities that remain to be completed; 3) detail the time required to complete each of the remaining activities; and 4) provide photographs of both the current work completed and the proposed site for continued work. The work period variance request should consider the effects of increased stream flows, rain delays, increased erosion control measures, limited access due to saturated soil conditions, and limited growth of erosion control grasses due to cool weather. Work period variances are issued at the discretion of CDFW. CDFW will review the written request to work outside of the established work period. CDFW reserves the right to require additional measures to protect fish and wildlife resources as a condition for granting the variance. CDFW shall have ten (10) calendar days to review the proposed work period variance.

General Species Protection Measures

- 2.4 **No Equipment in Stream.** No heavy equipment shall be operated within the wetted channel when water is present and flowing. The Permittee shall notify CDFW if it determines that the use of equipment in the stream channel is required to complete a project and will submit a diversion plan.
- 2.5 **Fish and Aquatic Species.** If surface water is or becomes present during construction, the Permittee shall: a) have the Designated Biologist survey the site and adjacent area for fish, amphibians, and turtles three (3) days or less before commencing project activities and b) if fish, amphibians, or turtles are detected, CDFW will be contacted and work shall not commence until authorized by a CDFW representative.
- 2.6 **Maintain Passing of Fish Up and Down Stream.** It is unlawful to construct or maintain in any stream any device or contrivance that prevents, impedes, or tends to prevent or impede, the passing of fish (as defined in FGC Section 45 "fish" means a wild fish, mollusk, crustacean, invertebrate, amphibian, or part, spawn, or ovum of any of those animals) up and down stream pursuant to FGC section 5901
- 2.7 **Decontamination.** The Permittee is responsible for ensuring all project personnel adhere to the latest version of the Northern Region California Department of Fish and Wildlife Aquatic Invasive Species Decontamination Protocol for all field gear and equipment that will be in contact with water. Heavy equipment and other motorized or mechanized equipment that comes in contact with water should generally follow watercraft decontamination protocols found in the AIS Decontamination Protocol. <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=92821&inline>
- 2.8 **Staging and Storage.** Staging and storage areas for equipment, materials, fuels, lubricants and solvents shall be located outside of the stream channel and banks. Stationary equipment such as motors, pumps, generators, compressors and welders, located adjacent to the stream, shall be positioned over drip-pans. Any equipment or vehicles driven and/or operated in proximity to the stream must be

checked and maintained daily. Vehicles must be moved away from the stream prior to refueling and lubrication.

- 2.9 Allow Wildlife to Leave Unharmed. Permittee shall allow any wildlife encountered during the course of construction to leave the construction area unharmed. This Agreement does not allow for the trapping, capture, or relocation of any state or federally listed species.
- 2.10 Escape Ramp in Trench. At the end of each work day, Permittee shall place an escape ramp at each end of any open trench greater than 6-inches in depth and walls greater than 30 degrees to allow any animals that may have become entrapped in the trench to climb out overnight. The ramp may be constructed of either dirt fill or wood planking or other suitable material that is placed at an angle no greater than 30 degrees.
- 2.11 Prohibition Against Use of Plastic Netting in Erosion Control Measures. Permittee shall not use temporary or permanent erosion control devices containing plastic netting, including photo- or bio-degradable plastic netting. Erosion control and landscaping specifications shall allow only natural fiber for use in erosion control mats, blankets, and straw or fiber wattles.
- 2.12 Remove Temporary Flagging, Fencing, and Barriers. Permittee shall remove all temporary flagging, fencing, and/or barriers from the project site and vicinity of the stream upon completion of project activities.

Designated Biologist

- 2.13 Designated Biologist. At least thirty (30) days before initiating project activities requiring biological surveys, the Permittee shall submit to CDFW in writing the name, qualifications, business address, and contact information for a Designated Biologist. Permittee shall obtain CDFW's written approval of the Designated Biologist prior to the commencement of project activities. The Designated Biologist shall be knowledgeable and experienced in the biology and natural history of local fish and wildlife resources present at the project site. In addition to these requirements, only Designated Biologists with a valid Scientific Collection Permit issued pursuant to FGC sections 1002 and 1002.5 will be approved and authorized to capture, handle, and relocate any species of fish and wildlife. The Designated Biologist shall be responsible for monitoring all project activities, avoidance measures, including any ground-disturbing activities in areas subject to this Agreement.
- 2.14 Designated Biologist Authority. To ensure compliance with the measures within this Agreement, the Designated Biologist shall have authority to immediately stop any activity that is not in compliance with this Agreement, and/or to order any reasonable measure to avoid the unauthorized take of Special Status Species. Neither the Designated Biologist nor CDFW shall be liable for any costs incurred in complying

with the Measures within this Agreement, including cease-work orders issued by the CDFW.

Special Status Species Avoidance and Minimization

- 2.15 Prohibition on Take of Listed Species. This agreement does not authorize the take or incidental take of any State or Federal listed threatened or endangered listed species. State Listed or Fully Protected Species include any native plant species listed as rare under the Native Plant Protection Act (Fish & G. Code, § 1900 et seq.; Cal. Code Regs., tit. 14, § 670.2); any species that is listed or is a candidate for listing under the California Endangered Species Act (Fish & G. Code, § 2080 et seq.; Cal. Code Regs., tit. 14, §§ 670.2, 670.5); or any fully protected species (Fish & G. Code, §§ 3511, 4700, 5050, 5515). The Permittee is required, as prescribed in these laws, to consult with the appropriate agency prior to commencement of the project.
- 2.16 Northern Spotted Owl (NSO) Avoidance. To avoid take of NSO from noise disturbance (U.S. Fish and Wildlife Service, July 26, 2006, guidance document "Estimating the Effects of Auditory and Visual Disturbance to Northern Spotted Owls and Marbled Murrelets in Northwestern California), all road maintenance and improvement activities are prohibited during the breeding season until **July 10** of each year.
The Northern Spotted Owl Take Avoidance Analysis and Guidance for California Coast Forest District ("Attachment A") can be found at:
https://www.fire.ca.gov/media/4894/revised_usfws_attachement_a_nso_take_avoidance_analysis-coast-redwood_3-15-11.pdf
- The Northern Spotted Owl Take Avoidance Analysis and Guidance for Interior ("Attachment B") can be found at: <https://www.fire.ca.gov/media/4935/revised-usfws-attachement-b-nso-take-avoidance-analysis-interior-2-27-08.pdf>
- 2.17 Avoidance of Nesting Birds. Permittee shall avoid nests occurring within and near the project site pursuant to the Migratory Bird Treaty Act of 1918 and Fish and Game Code section 3503. Vegetation maintenance/removal as necessary within the scope of the project shall be confined to the period commencing **August 16 and ending February 28**, of any year in which this Agreement is valid, provided the work area is outside of the actively flowing stream. Vegetation maintenance/removal may continue during precipitation events provided stream flows have not risen into work areas and sediment delivery will not result.
- 2.18 Nesting Bird Survey Before Commencement. If vegetation removal or other project-related improvements that could impact nesting birds are scheduled during the nesting season (typically **March 1 to August 15**), a focused survey for active bird nests shall be conducted by a Designated Biologist within seven (7) days prior to the beginning to project-related activities. Surveys shall begin prior to sunrise and continue until vegetation and nests have been sufficiently observed. The results of the survey shall be submitted to CDFW by email within three (3) business days of

survey completion. Survey results shall include a description of the area surveyed, time and date of surveys, ambient conditions, species observed, active nests observed, evidence of breeding behaviors (e.g., courtship, carrying nesting material or food, etc), and a description of any outstanding conditions that may have impacted survey results (e.g. weather conditions, excess noise, predators present, etc.) If an active nest is found, the Permittee shall avoid disturbance and destruction of the nest by implementing avoidance measures. If the nest cannot be avoided, consult with CDFW regarding appropriate action to comply with the Fish & Game Code section 3503. If a lapse in project-related work of seven (7) days or longer occurs, another focused survey and if required, consultation with CDFW, will be required before project work can be reinitiated.

2.19 Special-Status Plants. If Special-Status plants (State listed and taxa that meet the definition of Rare or Endangered under CEQA Guidelines 15380, including California Rare Plant Rank 1A, 1B, 2A and 2B) may occur on the project site, the Designated Biologist shall conduct annual, focused surveys on the Project site during the bloom periods and before the implementation of Project-related activities. If populations of any of these species are found:

2.19.1 Fencing shall be installed a minimum of 100 feet from the location of special-status plants, and no Project activity will be permitted in the area occupied by special-status plants or the 100-foot buffer area around these plants.

2.19.2 If special-status plant populations are found on the Project site and it is not feasible to avoid them during Project-related activities, the Project applicant shall consult with CDFW to determine if the project may be covered under this Agreement. Separate notification pursuant to FGC 1602 may be required in some instances.

Dewatering and Sediment Control

2.20 Dewatering and Sediment Control Plan. If flowing water is present or reasonably anticipated, the Permittee shall submit for approval a detailed dewatering or sediment control plan to CDFW for review and approval. Dewatering and sediment control structures may include the use of a sandbag coffer dam or a water bladder dam. Within 15 days of receiving the dewatering plan, CDFW will review the proposed dewatering method, to approve the Plan or provide the requirements for that approval. Dewatering shall be conducted under the guidance of the Designated Biologist who shall have stop work authority over dewatering activities. The Permittee may not commence the dewatering of the stream without the explicit approval from CDFW. At minimum, diversion/dewatering plans shall include the following species protections:

2.20.1 Screen According to Existing Standards. In order to prevent impingement, the inlets of the dewatering pump structure shall be fitted with fish screens meeting the "fry-size" criteria of CDFW and the National Marine Fisheries

Service (NMFS) before water is pumped from within the coffer dams.

- 2.20.2 Maintain Aquatic Life. When any dam or other artificial obstruction is being constructed, maintained, or placed in operation, Permittee shall allow sufficient water at all times to pass downstream to maintain aquatic life below the dam pursuant to Fish and Game Code §5937.
- 2.20.3 Maintain Water Quality. Permittee shall divert flow in a manner that prevents turbidity, siltation, or pollution and provides flows to downstream reaches. Flows to downstream reaches shall be provided during all times that the natural flow would have supported aquatic life. Said flows shall be sufficient quality and quantity, and of appropriate temperature to support fish and other aquatic life both above and below the diversion.
- 2.20.4 Fish Capture and Relocation. Prior to dewatering a construction site, fish and amphibian species shall be captured and relocated by the Designated Biologist. The following measures shall be taken to minimize harm and mortality to fish and amphibians resulting from fish relocation and dewatering activities:
- 2.20.4.1 Fish relocation and dewatering activities shall only occur between July 15 and October 15 of each year.
- 2.20.4.2 Fish relocation shall be performed by a Designated Biologist, with all necessary State and Federal permits. Rescued fish shall be moved to the nearest appropriate site outside of the work area. A record shall be maintained of all fish rescued and moved. The record shall include the date, time and duration of capture and relocation; identification of capture personnel; the method of capture, the location of the relocation site in relation to the project site; stream, transport and receiving water temperatures; the number and species of fish captured and relocated; an enumeration of any tagged fish collected, encountered, and released; and an estimate of any short-term/immediate mortality that resulted from the relocation. Anesthetization or measuring fish shall be avoided. The record shall be provided to CDFW within two weeks of the completion of the work season or project, whichever comes first.
- 2.20.4.3 Capture methods may include dip nets. All nets shall be made of a soft braded nylon material that is nonabrasive. Mesh sizing shall be matched to species and the life stages likely encountered. Electrofishing shall be used as a last resort and only when appropriate according to the National Marine Fisheries Service Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act.
- 2.20.4.4 Prior to capturing fish, the most appropriate release location(s)

and the most direct route to that location(s) shall be determined. The following shall be determined:

- Temperature: Water temperature shall be similar as the capture location.
- Habitat: There shall be ample habitat for the captured fish.

2.20.4.5 Capture and handling of animals shall be minimized. Prior to any capture of animals, an effort shall be made to herd species downstream and out of the work area

2.20.4.6 Exclusions from work site: There shall be a low likelihood for the fish to reenter the work site or become impinged on exclusion net or screen.

2.20.4.7 The most efficient method for capturing fish shall be determined by the Designated Biologist. Complex stream habitat generally requires the use of electrofishing equipment, whereas in outlet pools, fish may be concentrated by pumping-down the pool and then seining or dip netting fish.

2.20.4.8 Handling of native fish shall be minimized. However, when handling is necessary, all hands and equipment shall be wetted down with stream water and shall be free of any materials including hand sanitizers, sunscreen or insect repellent. No animals shall be handled with dry hands or dry equipment.

2.20.4.9 Temporarily hold fish in cool, shaded, aerated water in a container with a lid. Protect fish from jostling and noise and do not remove fish from this container until time of release. An aeration system shall be used in any live well or other holding facility. The aerator shall be operating prior to placing animals in it to ensure that sufficient oxygen is present during the adjustment period and to minimize the build-up of toxic carbon dioxide in holding waters. The aeration rate and the number of animals in each holding facility shall be managed such that the dissolved oxygen concentration shall be maintained above 6 ppm.

2.20.4.10 Water from the local collection site shall be used in live wells or other holding facilities during loading and transport. At no time will chlorinated tap water be used.

2.20.4.11 Air and water temperatures shall be measured periodically. A thermometer shall be placed in holding containers and, if necessary, periodically conduct partial water changes to maintain a stable water temperature. If water temperature reaches or exceeds

18 °C, fish shall be released, and rescue operations ceased.

2.20.4.12 Overcrowding in containers shall be avoided by having at least two containers and segregating young-of-year (YOY) fish from larger age-classes to avoid predation. Larger amphibians, such as salamanders, shall be placed in the container with larger fish or in a separate container. If fish are abundant, the capturing of fish and amphibians shall cease periodically and shall be released at the predetermined locations.

2.20.4.13 If feasible, initial fish relocation efforts shall be performed several days prior to the start of construction. This provides the Designated Biologist an opportunity to return to the work area and perform additional electrofishing passes immediately prior to construction. In many instances, additional fish will be captured that eluded the previous day's efforts.

2.20.4.14 If mortality during relocation occurs, capturing efforts shall be stopped and the CDFW shall be contacted immediately.

2.20.4.15 If native cold water species are expected to be present, activities shall not be initiated when and if water temperatures exceed or are expected to exceed 68°F.

2.20.4.16 If maximum daytime air temperatures are expected to exceed 23 °C (~75 °F), relocation activities shall be performed in the morning when the temperatures are cooler.

2.20.4.17 The Permittee shall minimize the amount of wetted stream channel that is dewatered at each individual project site to the fullest extent possible.

2.20.4.18 If these mitigation measures cannot be implemented, or the project actions proposed at a specific work site cannot be modified to prevent or avoid potential impacts to native fish or their habitat, then activity at that work site shall be discontinued and CDFW shall be contacted immediately.

2.20.5 Restore Normal Flows. Permittee shall restore normal flows to the effected stream immediately upon completion of work at that location.

Vegetation Management

2.21 Riparian Buffers. Riparian buffers shall not be modified, unless authorized by CDFW in writing.

- 2.22 Minimum Vegetation Removal. No native riparian vegetation shall be removed from the bank of the stream, except where authorized by CDFW. Permittee shall limit the disturbance or removal of native vegetation to the minimum necessary to achieve design guidelines and standards for the Authorized Activity. Permittee shall take precautions to avoid damage to vegetation outside the work area.
- 2.23 Vegetation Maintenance. Permittee shall limit vegetation management (e.g., trimming, pruning, or limbing) and removal for the purpose of Authorized Activity to the use of hand tools. Vegetation management shall not include treatment with herbicides.
- 2.24 Invasive Plant Species. Permittee shall not plant, seed or otherwise introduce invasive plant species within the Project area. Invasive plant species include those identified in the California Invasive Plant Council's inventory database, which is accessible at: <https://www.cal-ipc.org/plants/inventory/>.

Water Diversion

- 2.25 Maximum Diversion Rate. The maximum instantaneous diversion rate from the water intake shall not exceed **three (3) gallons per minute (gpm)** at any time.
- 2.26 Bypass Flow. The Permittee shall pass **90% of the flow** at all times at each of the PODs to keep all aquatic species including fish and other aquatic life in good condition below the POD.
- 2.27 Seasonal Diversion Minimization. No water shall be diverted during the low flow season from **April 1 to October 31** of each year. Water shall be diverted only if the Permittee can adhere to the maximum diversion rate and bypass flow conditions of this Agreement.
- 2.28 Measurement of Diverted Flow. Permittee shall install and maintain an adequate measuring device for measuring the instantaneous and cumulative rate of diversion. This measurement shall begin as soon as this Agreement is signed by the Permittee. The device shall be installed within the flow of diverted water. The Permittee shall maintain records of diversion, and provide information including, but not limited to the following:
- 2.28.1 A log including the date, time and quantity of water diverted from the POD.
- 2.28.2 The amount of water used per day for cannabis cultivation separated out from the amount of water used for other irrigation purposes and other uses of water (e.g., domestic use or fire protection).
- 2.28.3 Permittee shall make available for review at the request of CDFW the diversion records required by the SWRCB Cannabis Cultivation Policy.

Water Diversion Infrastructure

- 2.29 Intake Structure. No polluting materials (e.g., particle board, plastic sheeting, bentonite) shall be used to construct or screen, or cover the diversion intake structure.
- 2.30 Intake Structure Placement. Infrastructure installed in the streambed (e.g. spring box) shall not exceed 10% of the active channel width.
- 2.31 Intake Screening. The Permittee shall regularly inspect, clean, and maintain screens in good condition.
- 2.31.1 The water intake screens shall be securely attached (e.g., threaded or clamped) to the intake line and have a minimum wetted area of 0.25 square feet.
- 2.31.2 The intakes screen shall be designed so that approach velocity is no more than 0.1 foot per second. Approach velocity is the velocity of the water perpendicular to the screen face measured three (3) inches in front of the screen surface.
- 2.31.3 A water intake screen with round openings shall not exceed 3/32-inch diameter; a screen with square openings shall not exceed 3/32-inch measured diagonally; and a screen with slotted openings shall not exceed 0.069 inches in width. Slots must be evenly distributed on the screen area.
- 2.31.4 The water intake screen may be constructed of any rigid material, perforated, woven, or slotted and should have a minimum of 27% open area. Stainless steel or other corrosion-resistant material is recommended to reduce clogging due to corrosion. Care should be taken not to use materials deemed deleterious to aquatic species.
- 2.31.5 The screen shall be designed to distribute the flow uniformly over the entire screen area.
- 2.32 Intake Shall Not Impede Aquatic Species Passage. The water diversion structures shall be designed, constructed, and maintained such that they do not constitute a barrier to upstream or downstream movement of aquatic life.
- 2.33 Intake Maintenance. Intakes shall be kept in good repair. Intakes shall be inspected periodically and kept clean and free of accumulated algae, leaves or other debris, which could block portions of the screen surface and increase approach velocities at any point on the screen. No part of screen surfaces shall be obstructed.

- 2.34 Exclusionary Devices. Permittee shall keep the diversion-related structures covered at all times to prevent the entrance and entrapment of amphibians and other wildlife.
- 2.35 Diversion Intake Removal. Permittee shall plug, cap, block (e.g., with a shut-off valve located near the source), or remove all intakes when no water diversion is planned for a period of one week or longer.
- 2.36 Heavy Equipment Use. No heavy equipment shall be used in the excavation or replacement of the existing water diversion structure. The Permittee shall use hand tools or other low impact methods of removal/replacement. All project materials and debris shall be removed from the project site and properly disposed of off-site upon project completion.

Diversion to Storage

- 2.37 Water Storage. All water storage facilities (WSFs) (e.g., reservoirs, storage tanks, mix tanks, and bladders tanks) shall be located outside the active 100-year floodplain and outside the top of bank of a stream. Covers/lids shall be securely affixed to water tanks at all times to prevent potential entry by wildlife. Permittee shall cease all water diversion at the POD when WSFs are filled to capacity.
- 2.38 Water Storage Maintenance. WSFs shall have a float valve to shut off the diversion when tanks are full to prevent overflow. Water shall not leak, overflow, or overtop WSFs at any time. Permittee shall regularly inspect all WSFs and infrastructure used to divert water to storage and use and repair any leaks.
- 2.39 Water Conservation. The Permittee shall make best efforts to minimize water use, and to follow best practices for water conservation and management.
- 2.40 Limitations on Impoundment and Use of Diverted Water. The Permittee shall impound and use water in accordance with a valid water right, including any limitations on when water may be impounded and used, the purpose for which it may be impounded and used, and the location(s) where water may be impounded and used.

Reservoirs

- 2.41 Reservoirs. Shall be appropriately designed, sized, and managed to contain any diverted water in addition to precipitation and storm water runoff, without overtopping. The Permittee shall install an overflow spillway that will withstand a 100-year flood event, designed with a dispersal mechanism, or low-impact design, that discourages channelization and promotes dispersal and infiltration of flows to prevent surface overflow from reaching Waters of the State. The spillway shall be designed and placed to allow for a minimum of two-feet of freeboard.

- 2.42 Diversion. Water shall be diverted to reservoirs only if the Permittee can adhere to the diversion rate, bypass flow, season of diversion and all other relevant conditions of this Agreement.
- 2.43 No Stocking. Stocking of fish, wildlife, or plant of any kind, in any Waters of the State, including reservoirs, shall be prohibited without written permission from CDFW pursuant to FGC section 6400.
- 2.44 Invasive Species Management for Reservoirs. Permittee shall implement an invasive species management plan for any existing or proposed reservoir. The plan shall include, at a minimum, an annual survey for invasive aquatic species, including the American bullfrog (*Lithobates catesbeianus* = *Rana catesbeiana*). The Designated Biologist, if appropriate, shall implement eradication measures if invasive aquatic species are identified as part of the survey.
- 2.44.1 Bullfrog Management Plan. If bullfrogs are observed, they shall be appropriately managed. Management of bullfrogs, including annual draining and drying of reservoirs, shall follow the guidelines in Exhibit A. A copy of the annual monitoring report, shall be submitted to CDFW in accordance with the reporting measures described in Exhibit A and in the Reporting Measures section of this Agreement.
- 2.44.2 All Other Invasive Aquatic Species. If at any time additional invasive aquatic species are detected, Permittee shall submit an updated Invasive Species Management Plan for Reservoirs for CDFW review and approval.
- 2.45 Wildlife Entrapment Prevention. If open reservoirs have plastic lining, slopes greater than 2:1, or if there is any potential for wildlife entrapment, Permittee shall install several exit ramps to prevent wildlife entrapment. Exit ramps shall meet the following requirements: installed at no greater than 2:1 slope, and shall provide a feasible mechanism of escape. A notice of completed work, with supplemental pictures, shall be submitted to CDFW **within seven (7) days** of project completion as part of the work completion report.

Stream Crossings

- 2.46 Road Approaches. The Permittee shall treat road approaches to new or re-constructed permanent crossings to minimize erosion and sediment delivery to the watercourse. Permittee shall ensure road approaches are hydrologically disconnected to the maximum extent feasible to prevent sediment from entering the crossing site, including when a Stream Crossing is being constructed or reconstructed. Road approaches shall be armored from the crossing for a minimum of *50 feet in both directions*, or to the nearest effective water bar or point where road drainage does not drain to the crossing, with durable, clean, screened, angular rock.

- 2.47 Excavated Fill. Excavated fill material shall be placed in upland locations where it cannot deliver to a watercourse. To minimize the potential for material to enter the watercourse during the winter period, all excavated and relocated fill material shall be tractor contoured (to drain water) and tractor compacted to effectively incorporate and stabilize loose material into existing road and/or landing features.
- 2.48 Runoff from Steep Areas. The Permittee shall make preparations so that runoff from steep, erodible surfaces will be diverted into stable areas with little erosion potential or contained behind erosion control structures. Erosion control structures such as straw bales and/or siltation control fencing shall be placed and maintained until the threat of erosion ceases. Frequent water checks shall be placed on dirt roads, cat tracks, or other work trails to control erosion.
- 2.49 No Equipment in Wetted Areas. No heavy equipment shall enter the wetted stream channel.
- 2.50 Fill Materials. No fill material, other than clean rock, shall be placed in the stream channel.
- 2.51 Material Sizing. Rock shall be sized to withstand washout from high stream flows and extend above the ordinary high-water level.
- 2.52 Crossing Maintenance. The Permittee shall provide site maintenance for the life of the structures, including, but not limited to, re-applying erosion control to minimize surface erosion and ensuring drainage structures, streambeds and banks remain sufficiently armored and/or stable. Permanent culverts shall be maintained and kept open year-round. The Permittee is responsible for such maintenance as long as the culvert remains in the stream.
- 2.53 Armoring. The placement of armoring shall be confined to the work period when the stream is dry or at its lowest flow.
- 2.54 Armor Placement. Rock armoring shall not constrict the natural stream channel width and shall be keyed into a footing trench with a depth sufficient to prevent instability.

Culvert Installation

- 2.55 Permanent Culvert Sizing. Permanent culverts shall be sized to accommodate the estimated 100-year flood flow [i.e. ≥ 1.0 times the width of the bankfull channel width or the 100-year flood size, whichever is greater], including debris, culvert embedding, and sediment loads.
- 2.56 Critical Dips. Where diversion potential exists, a critical dip shall be installed to direct flood flow over the crossing fill and back into the channel. Critical dips shall be constructed to accommodate the entire estimated 100-year flood flow and may

be installed by lowering the existing fill over the crossing or by constructing a deep, broad rolling dip over the crossing surface to prevent flood flow from diverting down the road.

- 2.57 Culvert Materials in High Fire Zones. If the project is located in a high to very high Fire Hazard Severity Zone as designated by CAL FIRE, CDFW recommends culvert materials consist of corrugated metal pipe. Use of High-Density Polyethylene pipe is discouraged. <https://osfm.fire.ca.gov/divisions/wildfire-prevention-planning-engineering/wildland-hazards-building-codes/fire-hazard-severity-zones-maps/>
- 2.58 Fill Material. Existing fill material in the crossing shall be excavated down vertically to the approximate original channel and outwards horizontally to the approximate crossing hinge points (transition between naturally occurring soil and remnant temporary crossing fill material) to remove any potential unstable debris and voids in the older fill prism.
- 2.59 Culvert Grade. Culvert shall be installed to grade (not perched or suspended), aligned with the natural stream channel, and extend lengthwise completely beyond the toe of fill. If culvert cannot be set to grade, it shall be oriented in the lower third of the fill face, and a downspout or energy dissipator (such as boulders, rip-rap, or rocks) shall be installed above or below the outfall as needed to effectively control stream bed, channel, or bank erosion (scouring, headcutting, or downcutting). The Permittee shall ensure basins are not constructed and channels are not be widened at culvert inlets.
- 2.60 Culvert Bed. Culvert bed shall be composed of either compacted rock-free soil or crushed gravel. Bedding beneath the culvert shall provide for even distribution of the load over the length of the pipe, and allow for natural settling and compaction to help the pipe settle into a straight profile. The crossing backfill materials shall be free of rocks, limbs, or other debris that could allow water to seep around the pipe, and shall be compacted. No geotextile fabric shall be placed in the culvert bed, streambed, bank or channel.
- 2.61 Culvert Armoring. Culvert inlet, outlet (including the outfall area), and fill faces shall be armored where stream flow, road runoff, or rainfall energy is likely to erode fill material and the outfall area.
- 2.62 Project Inspection. The Project shall be inspected by a qualified licensed professional to ensure that the stream crossings were installed and functioning as designed. A copy of the inspection report, including photographs of each site, shall be submitted to CDFW within 90 days of completion of this project.

Fords, Armored and Vented Crossings

- 2.63 Design Capacity. Fords, armored and vented crossings are considered permanent watercourse encroachments and shall be designed and sized to accommodate the 100-year flood flow plus associated sediment and debris.
- 2.64 Crossing Maintenance. Fords, armored and vented crossings and hydrologically-connected road approaches shall be maintained as necessary to avoid delivery of fine sediment to the watercourse below.
- 2.65 Outslope Crossings. Fords, armored and vented crossings shall be sufficiently outsloped to minimize aggradation of suspended sediments at the crossing.
- 2.66 Crossing Alignment. The lowest point of fords, armored and vented crossings shall be constructed within or directly over the original stream channel, to the extent feasible, in order to contain high flows up to twice bank-full and to avoid diversion potential.
- 2.67 Crossing Materials. Armor material shall be comprised of durable angular screened quarry rock of sufficient size and placement to minimize mobilization during a 100-year storm event. Wood may be used for armoring if sound, tight-grained, redwood is applied and sufficiently keyed into the fillslope to resist movement during a 100-year storm event.
- 2.67.1 If maximum fill heights exceed 15 feet or fills exceed 500 cubic yards of fill, rock sizing, armoring thickness, chute width and chute depth shall be calculated and sized using the nomograph provided in Figure 23 of Cafferata et al. (2017).
- 2.68 Scour Prevention. Stream crossing spillway fill slopes shall be armored from roadbed to the natural channel in a manner sufficient to prevent significant scour or removal of armor during high flows. Scour is expected through road surface rock cap.
- 2.69 No Geotextiles In Stream. No geotextile fabric shall be placed in the streambed, bank or channel.
- 2.70 Ford Use. Fords shall only be used when the fording surface is dry.
- 2.71 Project Inspection. The Project shall be inspected by qualified licensed professional to ensure that the stream crossings were installed and functioning as designed. A copy of the inspection report, including photographs of each site, shall be submitted to CDFW within 90 days of completion of this project.

Erosion and Sediment Control

- 2.72 Erosion Control. Erosion control measures shall be utilized throughout all phases of operation where sediment runoff from exposed slopes threatens to enter waters of the State. Erosion control measures, such as, silt fences, straw hay bales, gravel or rock lined ditches, water check bars, and broadcasted straw shall be used where ever sediment has the potential to leave the work site and enter the stream.
- 2.73 Silt Laden Runoff. At no time shall silt laden runoff be allowed to enter the stream or directed to where it may enter the stream. Silt control structures shall be monitored for effectiveness and shall be repaired or replaced as needed.
- 2.74 Disposal and Removal of Material. All removed spoils and construction debris shall be moved outside the work area prior to inundation by water. Spoil sites shall not be located within the stream channel or areas that may be subjected to stream flows, where spoil may be washed back into a stream, or where it may impact streambed habitat, aquatic or riparian vegetation. All removed material shall be disposed of according to State and local laws and ordinances.

Equipment and Vehicles

- 2.75 Operating Equipment and Vehicle Leaks. Any equipment or vehicles driven and/or operated within or adjacent to the stream shall be checked and maintained daily to prevent leaks of materials that could be deleterious to aquatic and terrestrial life or riparian habitat.
- 2.76 Stationary Equipment Leaks. Stationary equipment such as motors, pumps, generators, and welders, located within or adjacent to the stream shall be positioned over drip pans. Stationary heavy equipment shall have suitable containment to handle a catastrophic spill/leak.
- 2.77 Equipment Storage. Staging and storage areas for equipment, materials, fuels, lubricants and solvents, shall be located outside of the stream channel and banks.
- 2.78 Stockpiled Materials. Building materials and/or construction equipment shall not be stockpiled or stored where they may be washed into the water or cover aquatic or riparian vegetation. Stockpiles shall be covered when half inch (0.5") or more precipitation within a 48-hour or greater period and/or when a rain event with 30 percent or greater probability of precipitation is forecasted. Permittee shall monitor the National Weather Service (NWS) 72-hour forecast for the project area.

Debris Materials and Waste

- 2.79 Waste Containment and Disposal. Permittee shall contain all refuse in enclosed, wildlife proof, storage containers, at all times, and relocate refuse to an authorized waste management facility, in compliance with State and local laws, on a regular and ongoing basis. All refuse shall be removed from the site and properly

disposed of, at the close of the cultivation season and/or when the parcel is no longer in use.

- 2.80 No Dumping. Permittee and all contractors, subcontractors, and employees shall not dump any litter or construction debris within the stream, or where it may pass into the stream.
- 2.81 Pick Up Debris. Permittee shall pick up all debris and waste daily.
- 2.82 Wash Water. Water containing mud, silt, or other pollutants from equipment washing or other activities, shall not be allowed to enter a lake or flowing stream or placed in locations that may be subjected to high storm flows.

Toxic and Hazardous Materials

- 2.83 Toxic Materials. Any hazardous or toxic materials that could be deleterious to aquatic life that could be washed into the stream or its tributaries shall be contained in water tight containers or removed from the project site.
- 2.84 Hazardous Substances. Permittee shall ensure that debris, soil, silt, bark, slash, sawdust, rubbish, creosote-treated wood, raw cement and concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances which could be hazardous to any life stage of fish and wildlife or their habitat (includes food sources) does not enter the riparian setback or waters of the state, pursuant to FGC Section 5650. Permittee shall immediately remove any of these materials placed within, or where they may enter, a stream or lake or other waters of the state.
- 2.85 Hazardous Materials. Debris, soil, silt, bark, slash, sawdust, rubbish, creosote-treated wood, raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances which could be hazardous to aquatic life, wildlife, or riparian habitat resulting from the project related activities shall be prevented from contaminating the soil and/or entering the waters of the State.

Spills and Emergencies

- 2.86 Spill Clean Up Equipment. Clean up equipment such as extra boom, absorbent pads, skimmers, shall be on site prior to the start of work within the stream zone.
- 2.87 Spill Cleanup. Permittee shall begin the cleanup of all spills immediately. CDFW shall be notified immediately by the Permittee of any spills and shall be consulted regarding cleanup procedures. The Permittee shall have all spill clean-up equipment on site during construction.
- 2.88 Spill Containment. All activities performed in or near a stream shall have absorbent materials designated for spill containment and clean-up activities on-

site for use in an accidental spill. The Permittee shall immediately notify the California Emergency Management Agency at 1-800-852-7550 and immediately initiate the clean-up activities. CDFW shall be notified by the Permittee and consulted regarding clean-up procedures.

3. Reporting Measures

Permittee shall meet each reporting requirement described below.

- 3.1 CDFW Notification of Work Initiation. The Permittee shall contact CDFW within the seven-day period **preceding the beginning of work** permitted by this Agreement. Information to be disclosed shall include Agreement number, and the anticipated start date.
- 3.2 Work Completion. The proposed work shall be completed by no later than **October 15, 2021**. **Notification of completion will include photographs of the completed work, erosion control measures, waste containment and disposal, and a summary of any CNDDDB submissions** and shall be submitted to CDFW, LSA program at 619 Second Street, Eureka, CA 95501 **within seven (7) days** of project completion.
 - 3.2.1 Wildlife Entrapment Prevention for Reservoirs. A notice of completed work, with supplemental photos, shall be submitted to CDFW.
- 3.3 Project Inspection. The Project shall be inspected by a licensed professional to ensure that the stream crossings were installed and functioning as designed and/or the stream rehabilitation was implemented and is functioning as designed and/or the diversion infrastructure complies with the terms of this Agreement. A copy of the inspection report, including photographs of each site, shall be submitted to CDFW within 90 days of completion of each separate project. The Permittee shall submit the **Project Inspection Report** to CDFW, LSA Program at 619 Second Street, Eureka, CA 95501.
- 3.4 Measurement of Diverted Flow. Copies of the **Water Diversion Records** shall be submitted to CDFW, LSA Program at 619 Second Street, Eureka, CA 95501 no later than **March 31** of each year beginning in **2021**, to report the preceding year's diversion.
- 3.5 Site Management Plan and Related Technical Reports. The Permittee shall submit to CDFW the project's current draft of the Site Management Plan and related technical reports if it was not included in the Notification. If the Site Management Plan and/or related technical reports are still in preparation, Permittee shall submit it and all subsequent revisions and updates within 30 days of submittal to the SWRCB.

- 3.6 Invasive Species Management Plan for Reservoirs. The Permittee shall submit an Invasive Species Management Plan for Reservoirs by **May 31, 2020** for CDFW approval; or adopt the Bullfrog Management Plan (Exhibit A) if no other invasive species are present. Permittee shall submit Monitoring and Implementation Report no later than **December 31** of each year. The Invasive Species documents shall be submitted to CDFW at 619 Second Street, Eureka, CA 95501.
- 3.7 Notification to the California Natural Diversity Database. If any special status species are observed at any time during the project, the Designated Biologist shall submit California Natural Diversity Data Base (CNDDDB) forms to the CNDDDB within five (5) working days of the sightings. A summary of CNDDDB submissions shall be included with the completion notification. Forms and instructions for submissions to the CNDDDB may be found at:
<https://www.wildlife.ca.gov/Data/CNDDDB/Submitting-Data>.

CONTACT INFORMATION

Any communication that Permittee or CDFW submits to the other shall be in writing and any communication or documentation shall be delivered to the address below by U.S. mail, fax, or email, or to such other address as Permittee or CDFW specifies by written notice to the other.

To Permittee:

Lauren Marlak
P.O. Box 188
Bridgeville, California 95526
707-672-5516
larabeevalleyfamilyfarms@gmail.com

To Contact:

Courtney Sundberg
P.O. Box 4433
Arcata, California 95518
707-839-5130
courtneys@pacificwatershed.com

To CDFW:

Department of Fish and Wildlife
Northern Region
619 Second Street
Eureka, California 95501
Attn: Lake and Streambed Alteration Program – Jonathan Hollis
Notification #1600-2019-0873-R1

LIABILITY

Permittee shall be solely liable for any violation of the Agreement, whether committed by the Permittee or any person acting on behalf of the Permittee, including its officers, employees, representatives, agents or contractors and subcontractors, to complete the project or any activity related to it that the Agreement authorizes.

This Agreement does not constitute CDFW's endorsement of, or require the Permittee to proceed with the project. The decision to proceed with the project is the Permittee's alone.

SUSPENSION AND REVOCATION

CDFW may suspend or revoke in its entirety this Agreement if it determines that the Permittee or any person acting on behalf of the Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, is not in compliance with the Agreement.

Before CDFW suspends or revokes the Agreement, it shall provide the Permittee written notice by certified or registered mail that it intends to suspend or revoke. The notice shall state the reason(s) for the proposed suspension or revocation, provide the Permittee an opportunity to correct any deficiency before CDFW suspends or revokes the Agreement, and include instructions to the Permittee, if necessary, including but not limited to a directive to immediately cease the specific activity or activities that caused CDFW to issue the notice.

ENFORCEMENT

Nothing in the Agreement precludes CDFW from pursuing an enforcement action against the Permittee instead of, or in addition to, suspending or revoking the Agreement.

Nothing in the Agreement limits or otherwise affects CDFW's enforcement authority or that of its enforcement personnel.

OTHER LEGAL OBLIGATIONS

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from complying with, or obtaining any other permits or authorizations that might be required under, other federal, state, or local laws or regulations before beginning the project or an activity related to it. For example, if the project causes take of a species listed as threatened or endangered under the Endangered Species Act (ESA), such take will be unlawful under the ESA absent a permit or other form of

authorization from the U.S. Fish and Wildlife Service or National Marine Fisheries Service.

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from complying with other applicable statutes in FGC including, but not limited to, FGC sections 2050 *et seq.* (threatened and endangered species), section 3503 (bird nests and eggs), section 3503.5 (birds of prey), section 5650 (water pollution), section 5652 (refuse disposal into water), section 5901 (fish passage), section 5937 (sufficient water for fish), and section 5948 (obstruction of stream).

Nothing in the Agreement authorizes the Permittee or any person acting on behalf of the Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, to trespass.

AMENDMENT

CDFW may amend the Agreement at any time during its term if CDFW determines the amendment is necessary to protect an existing fish or wildlife resource.

The Permittee may amend the Agreement at any time during its term, provided the amendment is mutually agreed to in writing by CDFW and the Permittee. To request an amendment, the Permittee shall submit to CDFW a completed CDFW "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the corresponding amendment fee identified in CDFW's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

TRANSFER AND ASSIGNMENT

This Agreement may not be transferred or assigned to another entity, and any purported transfer or assignment of the Agreement to another entity shall not be valid or effective, unless the transfer or assignment is requested by the Permittee in writing, as specified below, and thereafter CDFW approves the transfer or assignment in writing.

The transfer or assignment of the Agreement to another entity shall constitute a minor amendment, and therefore to request a transfer or assignment, the Permittee shall submit to CDFW a completed CDFW "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the minor amendment fee identified in CDFW's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

EXTENSIONS

In accordance with FGC section 1605, subdivision (b), Permittee may request one extension of the Agreement, provided the request is made prior to the expiration of the Agreement's term. To request an extension, Permittee shall submit to CDFW a

completed CDFW "Request to Extend Lake or Streambed Alteration" form and include with the completed form payment of the extension fee identified in CDFW's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5). CDFW shall process the extension request in accordance with FGC section 1605, subdivisions (b) through (e).

If Permittee fails to submit a request to extend the Agreement prior to its expiration, Permittee must submit a new notification and notification fee before beginning or continuing the project the Agreement covers (Fish & G. Code § 1605, subd. (f)).

EFFECTIVE DATE

The Agreement becomes effective on the date of CDFW's signature, which shall be: 1) after the Permittee signature; 2) after CDFW complies with all applicable requirements under CEQA; and 3) after payment of the applicable FGC section 711.4 filing fee listed at <https://www.wildlife.ca.gov/Conservation/CEQA/Fees>.

TERM

This Agreement shall **expire five (5) years** from date of execution, unless it is terminated or extended before then. All provisions in the Agreement shall remain in force throughout its term. The Permittee shall remain responsible for implementing any provisions specified herein to protect fish and wildlife resources after the Agreement expires or is terminated, as FGC section 1605, subdivision (a)(2) requires.

EXHIBITS

The documents listed below are included as exhibits to the Agreement and incorporated herein by reference.

A. Exhibit A. Bullfrog Management Plan

AUTHORITY

If the person signing the Agreement (signatory) is doing so as a representative of Permittee, the signatory hereby acknowledges that he or she is doing so on Permittee's behalf and represents and warrants that he or she has the authority to legally bind Permittee to the provisions herein.

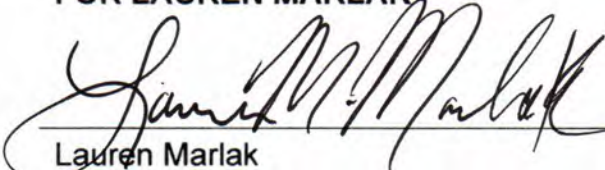
AUTHORIZATION

This Agreement authorizes only the project described herein. If Permittee begins or completes a project different from the project the Agreement authorizes, Permittee may be subject to civil or criminal prosecution for failing to notify CDFW in accordance with FGC section 1602.

CONCURRENCE

The undersigned accepts and agrees to comply with all provisions contained herein.

FOR LAUREN MARLAK



Lauren Marlak

March 15th 2020

Date

FOR DEPARTMENT OF FISH AND WILDLIFE

Cheri Sanville
Senior Environmental Scientist Supervisor

Date

EXHIBIT A.

BULLFROG MONITORING AND MANAGEMENT PLAN FOR 1600-2019-0873-R1

GENERAL BULLFROG INFORMATION

The American bullfrog (*Lithobates catesbeianus* = *Rana catesbeiana*); hereafter bullfrog, is an invasive non-native species in California and poses a significant threat to California's native fish and wildlife resources. Bullfrogs were introduced in California over 100 years ago from eastern parts of the United States as a food supply but have since caused substantial ecological consequences. Bullfrogs are considered highly invasive and are well documented to prey upon a variety of fish and wildlife species, including some that are rare, threatened, and endangered. Human modifications to the environment provide favorable conditions to bullfrogs such as artificially created agricultural ponds, canals, and ditches where warm, still water occurs. As a result, bullfrogs have spread throughout California.

Efforts to control bullfrogs have been met with varying degrees of success because: 1) bullfrogs can be difficult to detect, and go dormant from fall through winter, 2) bullfrogs often take cover in difficult areas to manage (e.g. dense vegetation), 3) they can travel long distances to colonize and re-colonize areas, 4) they have high reproductive output, 5) they are weary and readily flee perceived threats, and 6) they can survive physical trauma remarkably well. CDFW scientific staff recognizes there is an urgent and immediate need to develop improved bullfrog management strategies to protect California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public. Public support and implementation of bullfrog control in California is an important conservation strategy that will help protect natural resources for future generations.

MONITORING

The Project reservoir(s) shall be monitored for bullfrog presence on an annual basis with a minimum of five total surveys, no less than two weeks apart, throughout the months of May-July

- All pond survey effort must be made by a person knowledgeable in bullfrog identification (see Appendix A for reference photos);
- Survey efforts shall include listening for bullfrog calls and slowly walking the complete perimeter of the pond at night* (dusk or later) while shining a flashlight to detect movement and eye-shine

If bullfrogs are not detected upon completion of five total surveys, or at any other time of the year incidentally, removal efforts are not required that year.

*Day time monitoring can also be conducted to aid detection but is not required under this plan.

SUCCESS CRITERIA

The level of effort needed to successfully manage bullfrog populations varies with infestation levels. This plan shall be considered successfully implemented if sufficient effort is provided to prevent adult bullfrogs from reproducing in the reservoir(s) each year, and no bullfrog life-stages can be detected. Bullfrogs are capable of traveling long distances over-land, and on-going

efforts will be required to ensure dispersing bullfrogs do not colonize the reservoir(s) at a future time.

OPTIONS FOR MANAGEMENT

Two management methods may be employed for controlling bullfrogs under this plan and include:

- Manual direct removal
- Reservoir de-watering (Hydro-modification)

Implementing both reservoir de-watering and manual direct removal is currently believed to be the most effective method of managing bullfrog infestations. For reservoirs that are heavily infested with juvenile bullfrogs and/or tadpoles, reservoir dewatering may be necessary to break the bullfrog's life cycle and prevent on-going reproduction. Prior to conducting reservoir dewatering activities, please coordinate with CDFW Scientist Jonathan Hollis at Jonathan.Hollis@wildlife.ca.gov.

Direct Removal

All direct removal efforts must be made by a person knowledgeable in bullfrog identification.

- Removal efforts must occur during, but are not limited to the active/breeding season, occurring May – July;
- A minimum of **five** efforts throughout the season are considered necessary;
- Direct removal efforts are typically most effective when conducted at night with use of lights but can also be conducted during the day;
- Direct removal must include working the entire perimeter of the reservoir;
- A rubber raft or small boat may be necessary to successfully remove some individuals;
- A team of two individuals or more is often helpful, one person for shining lights and/or operating a boat and the other person to perform removal efforts;
- Bullfrog tadpoles must be removed and dispatched and must not be relocated or kept as pets.

Management Authorization

Take of bullfrogs is specifically allowed in the California Code of Regulations (CCR), Title 14 (T-14) section 5.05(a)(28), under the authority of a sport fishing license. There is no daily bag limit, possession limit or hour restriction, but bullfrogs can only be taken by hand, hand-held dip net, hook and line, lights, spears, gigs, grabs, paddles, bow and arrow or fish tackle.

Alternatively, FGC Section 5501 allows CDFW, as limited by the commission, to issue a permit to destroy fish that are harmful to other wildlife. The regulations have addressed this under Section CCR T-14 226.5 Issuance of Permits to Destroy Harmful Species of Fish in Private Waters for Management Purposes. This allows CDFW to issue free permits to destroy harmful aquatic species by seining and draining.

Pond Dewatering

Pond dewatering may be appropriate if the reservoir can be successfully dewatered without adversely affecting stream resources. Careful planning and coordination with CDFW, is necessary to ensure potential impacts to stream resources can be addressed, prior to commencing pond draining. Discharge of polluted water to waters of the state may require permitting from other agencies with permitting authority, such as the Regional Water Quality Control Board.

In general, bullfrog tadpoles require two years to develop into frogs, whereas native amphibians only require one year. Therefore, draining a reservoir every year is intended to interrupt bullfrog tadpole development, dramatically decrease bullfrog populations and allow for reduced efforts as a measure of adaptive management. Typically, in Northern California, reservoir draining should occur in September through October to avoid impacts to sensitive native amphibian and fishery resources. While draining occurs, direct removal efforts should be employed as described above if possible.

REPORTING

A written log shall be kept of monitoring and management efforts and shall be provided to CDFW **each year** by December 31. The written log shall include: 1) date and time of each monitoring and management effort, 2) approximate number of each bullfrog life stage detected and/or removed per effort, and 3) amount of time spent for each monitoring and management effort.

APPENDIX A. BULLFROG REFERENCE PHOTOS



This is a photo of a Bullfrog tadpole. (Photo taken by Mike van Hattem).



The photos shown in this Appendix demonstrate a medium sized adult bullfrog that was removed from Ten Mile Creek, Mendocino County. Note the bullfrog has a large tympanum, (circular ear drum shown with an arrow) and **does not** have distinct ridges along its back (dorsolateral folds). Photo taken by Wes Stokes.



The bullfrog has somewhat distinct mottling and **the underside of the bullfrog's hind legs are not shaded pink or red.**

Appendix B

PWA and CASQA Typical Drawings

PWA Typical drawings (schematic diagrams) showing components of erosion control and erosion prevention treatments, and techniques for construction

CASQA Erosion and Sediment Control Best Management Practices

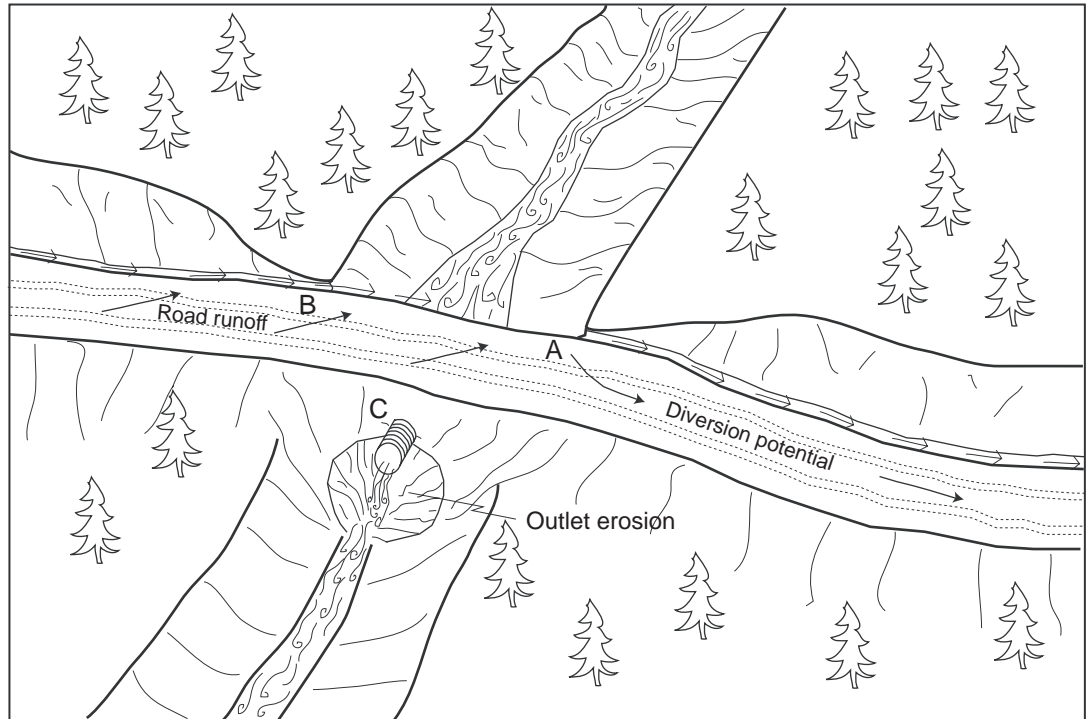
**Site Management Plan Order WQ 2019-0001-DWQ
Larabee Valley Family Farms, LLC
Humboldt County APNs 210-250-009 & 210-250-031**

October 2021

Typical Problems and Applied Treatments for a Non-fish Bearing Upgraded Stream Crossing

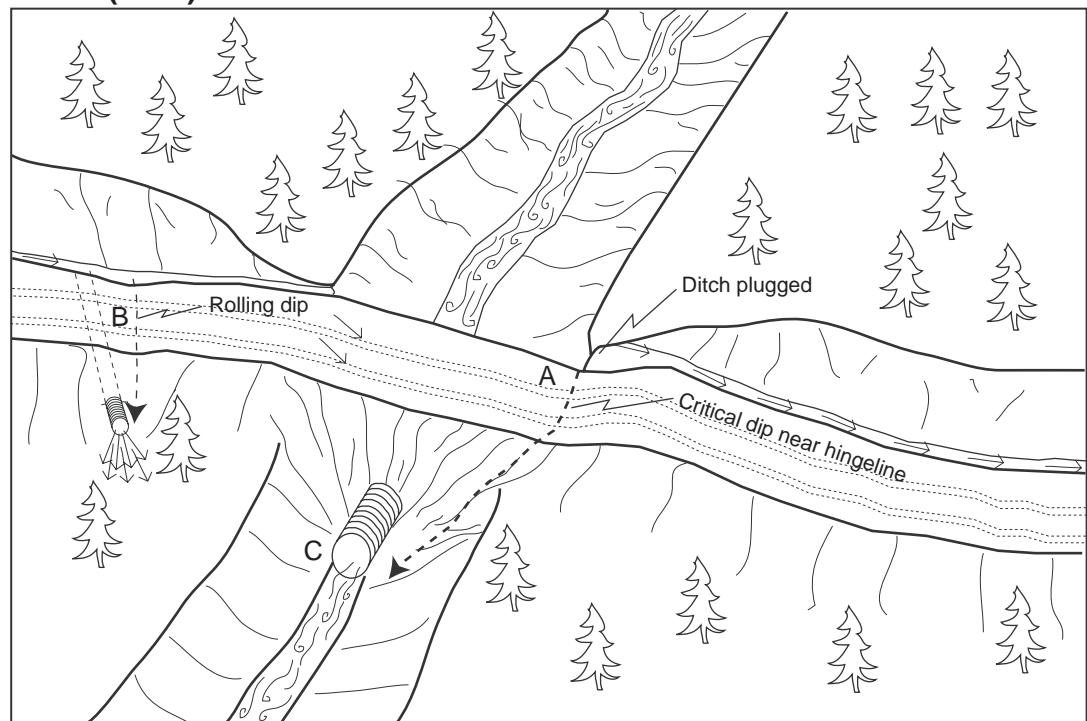
Problem condition (before)

- A - Diversion potential
- B - Road surface and ditch drain to stream
- C - Undersized culvert high in fill with outlet erosion



Treatment standards (after)

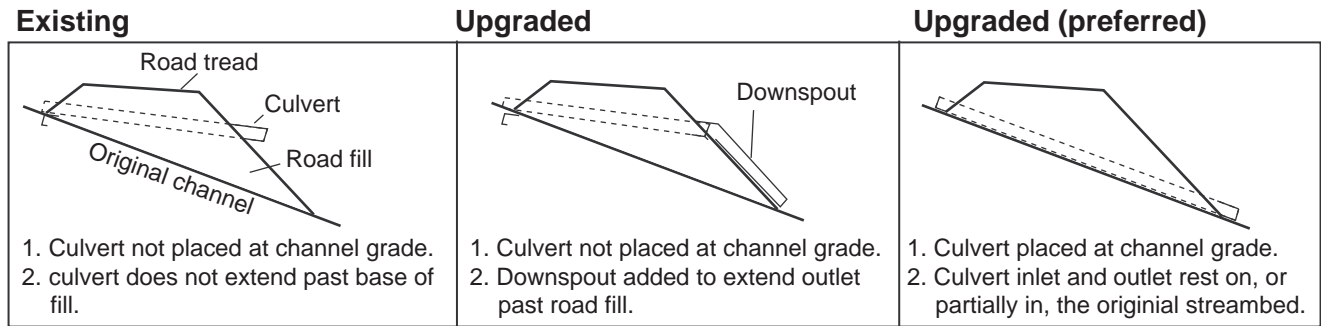
- A - No diversion potential with critical dip installed near hingeline
- B - Road surface and ditch disconnected from stream by rolling dip and ditch relief culvert
- C - 100-year culvert set at base of fill



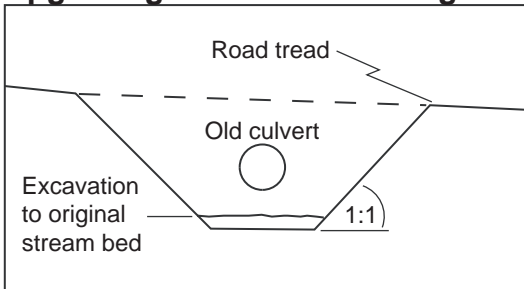
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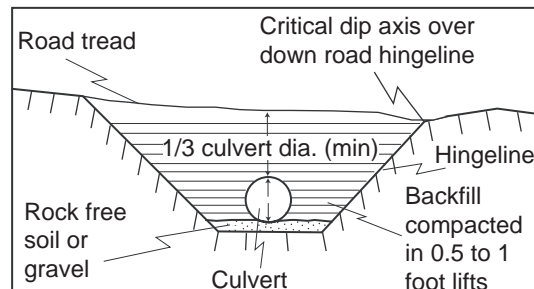
Typical Design of a Non-fish Bearing Culverted Stream Crossing



Excavation in preparation for upgrading culverted crossing



Upgraded stream crossing culvert installation



Note:

Road upgrading tasks typically include upgrading stream crossings by installing larger culverts and inlet protection (trash barriers) to prevent plugging. Culvert sizing for the 100-year peak storm flow should be determined by both field observation and calculations using a procedure such as the Rational Formula.

Stream crossing culvert Installation

1. Culverts shall be aligned with natural stream channels to ensure proper function, and prevent bank erosion and plugging by debris.
2. Culverts shall be placed at the base of the fill and the grade of the original streambed, or downspouted past the base of the fill.
3. Culverts shall be set slightly below the original stream grade so that the water drops several inches as it enters the pipe.
5. To allow for sagging after burial, a camber shall be between 1.5 to 3 inches per 10 feet culvert pipe length.
6. Backfill material shall be free of rocks, limbs or other debris that could dent or puncture the pipe or allow water to seep around pipe.
7. First one end then the other end of the culvert shall be covered and secured. The center is covered last.
8. Backfill material shall be tamped and compacted throughout the entire process:
 - Base and side wall material will be compacted before the pipe is placed in its bed.
 - Backfill compacting will be done in 0.5 - 1 foot lifts until 1/3 of the diameter of the culvert has been covered. A gas powered tamper can be used for this work.
9. Inlets and outlets shall be armored with rock or mulched and seeded with grass as needed.
10. Trash protectors shall be installed just upstream from the culvert where there is a hazard of floating debris plugging the culvert.
11. Layers of fill will be pushed over the crossing until the final designed road grade is achieved, at a minimum of 1/3 to 1/2 the culvert diameter.

Erosion control measures for culvert replacement

Both mechanical and vegetative measures will be employed to minimize accelerated erosion from stream crossing and ditch relief culvert upgrading. Erosion control measures implemented will be evaluated on a site by site basis. Erosion control measures include but are not limited to:

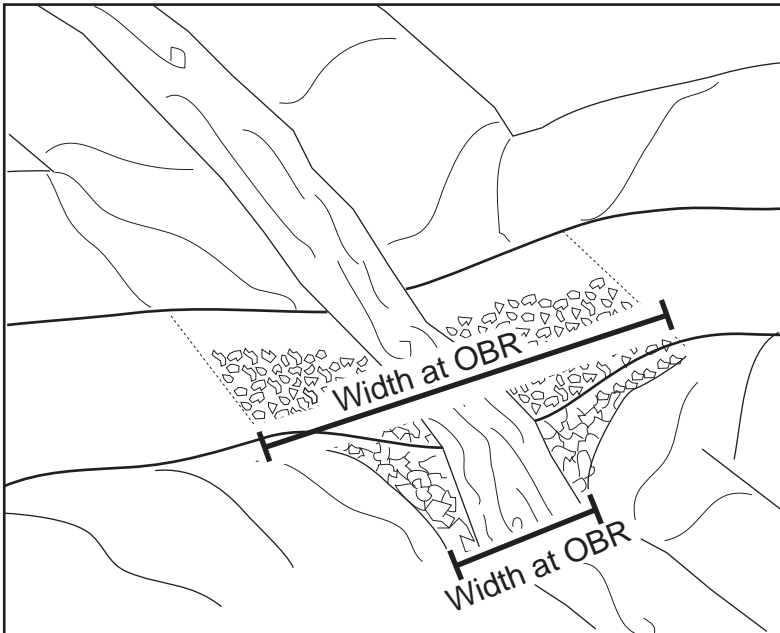
1. Minimizing soil exposure by limiting excavation areas and heavy equipment disturbance.
2. Installing filter windrows of slash at the base of the road fill to minimize the movement of eroded soil to downslope areas and stream channels.
3. Retaining rooted trees and shrubs at the base of the fill as "anchor" for the fill and filter windrows.
4. Bare slopes created by construction operations will be protected until vegetation can stabilize the surface. Surface erosion on exposed cuts and fills will be minimized by mulching, seeding, planting, compacting, armoring, and/or benching prior to the first rains.
5. Excess or unusable soil will be stored in long term spoil disposal locations that are not limited by factors such as excessive moisture, steep slopes greater than 10%, archeology potential, or proximity to a watercourse.
6. On running streams, water will be pumped or diverted past the crossing and into the downstream channel during the construction process.
7. Straw bales and/or silt fencing will be employed where necessary to control runoff within the construction zone.

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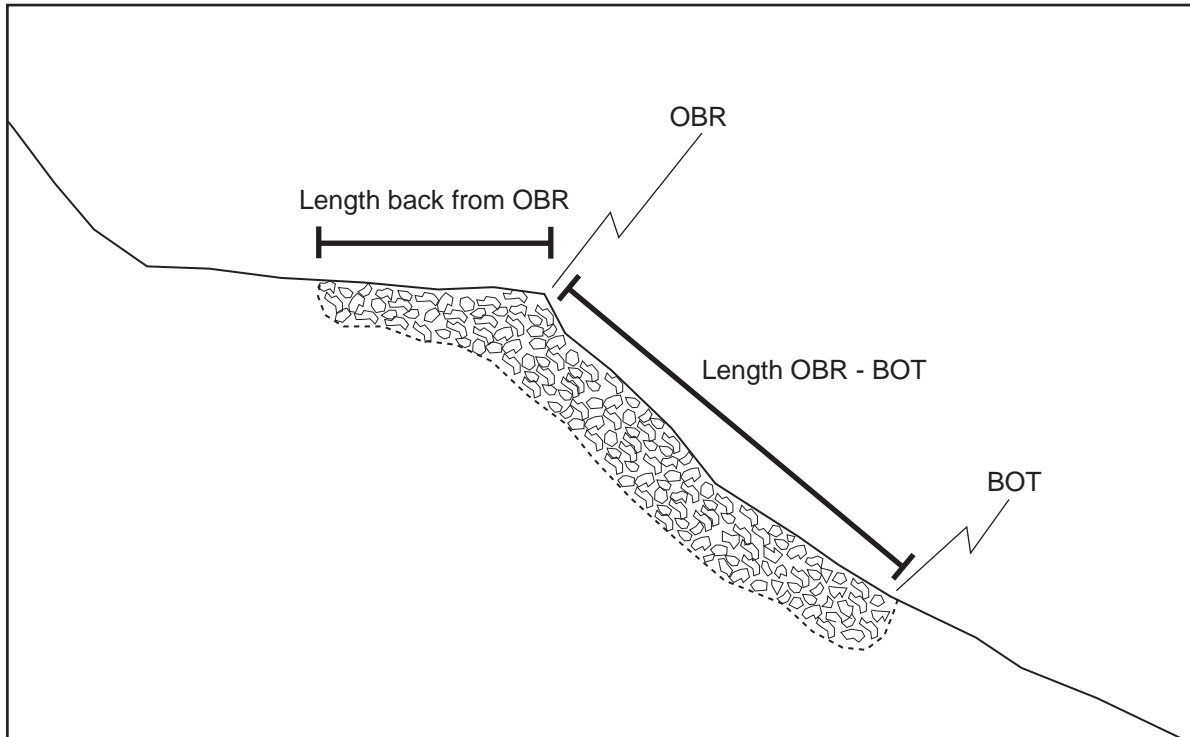
Typical Dimensions Referred to for Armored Fill Crossings

Widths in oblique view



OBR - Outboard edge of road

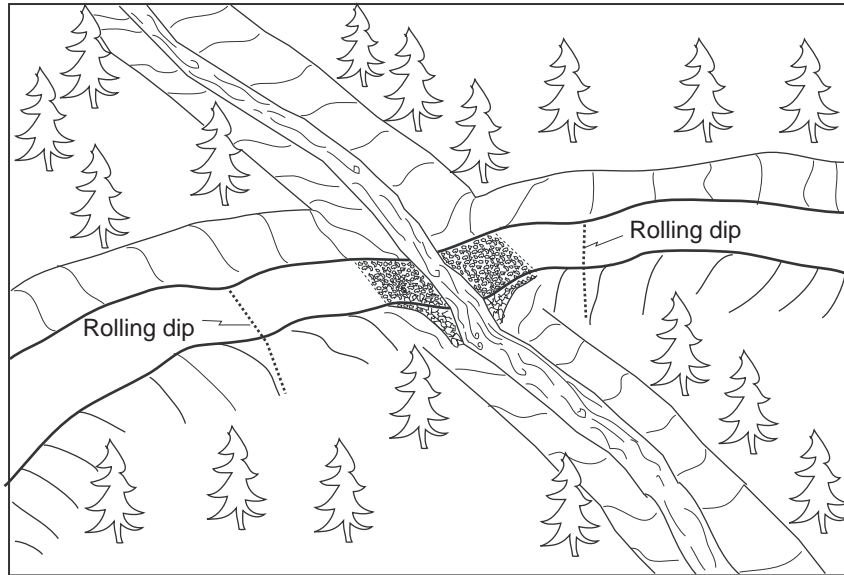
Lengths in profile view



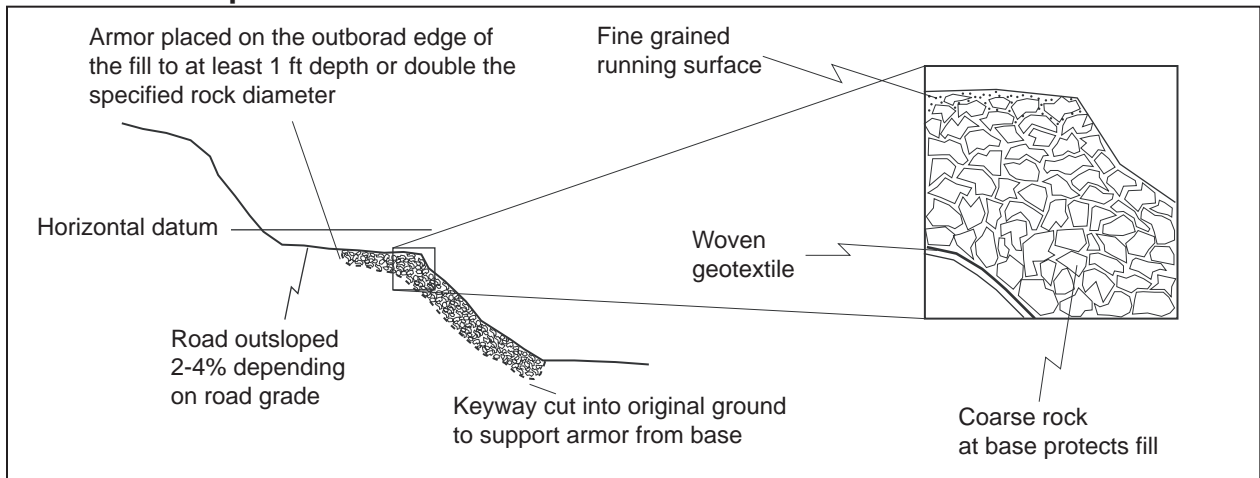
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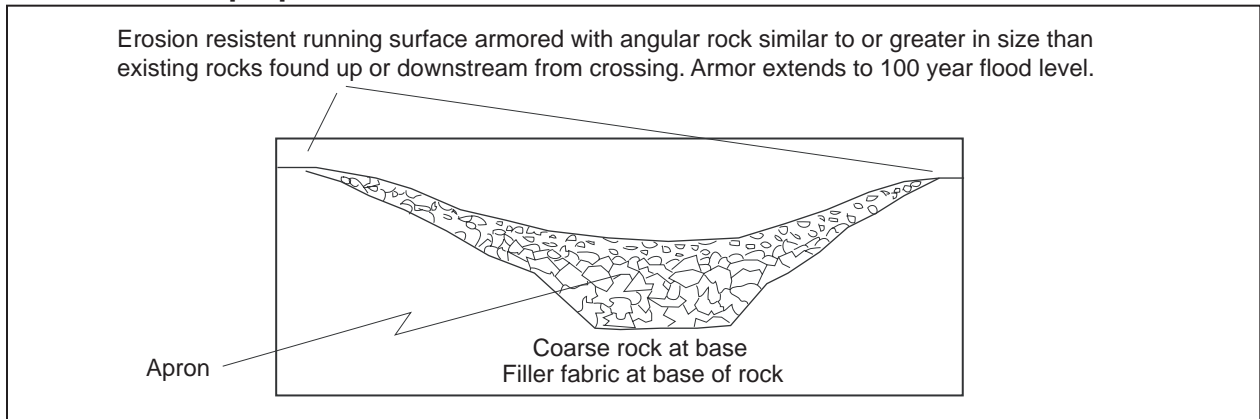
Typical Armored Fill Crossing Installation



Cross section parallel to watercourse



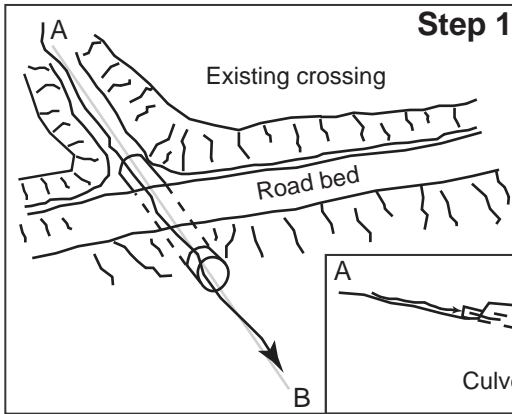
Cross section perpendicular to watercourse



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Ten Steps for Constructing a Typical Armored Fill Stream Crossing

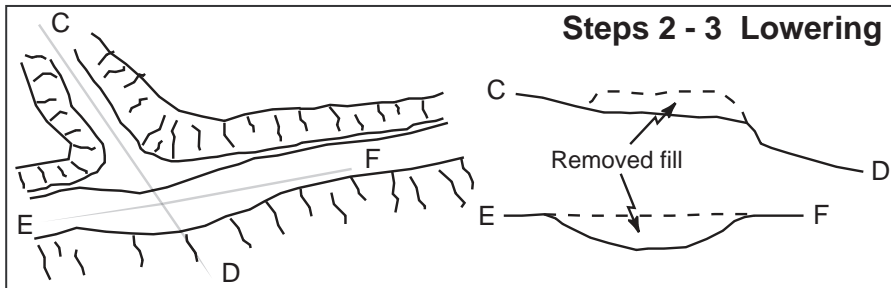


Step 1

1. The two most important points are:

A) **The rock must be placed in a "U" shape across the channel to confine flow within the armored area.** (Flow around the rock armor will gully the remaining fill. Proper shape of surrounding road fill and good rock placement will reduce the likelihood of crossing failure).

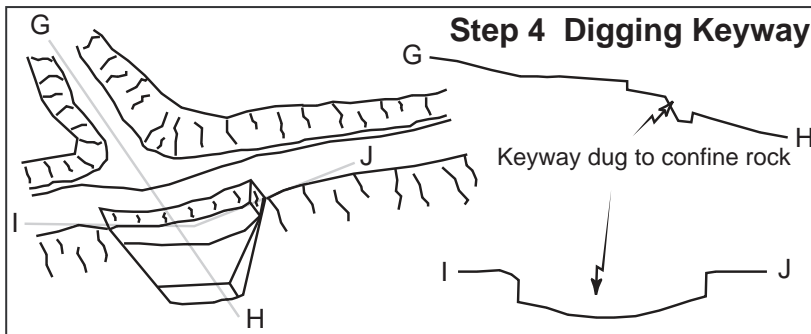
B) **The largest rocks must be used to buttress the rest of the armor in two locations:** i) The base of the armored fill where the fill meets natural channel. (This will buttress the armor placed on the outboard fill face and reduce the likelihood of it washing downslope). ii) The break in slope from the road tread to the outer fill face. (This will buttress the fill placed on the outer road tread and will determine the "base level" of the creek as it crosses the road surface).



Steps 2 - 3 Lowering

2. **Remove any existing drainage structures** including culverts and Humboldt logs.

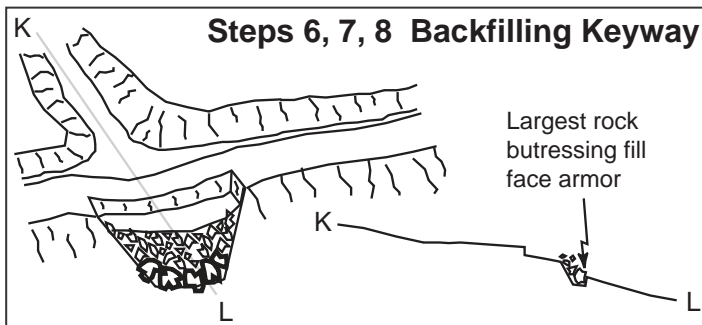
3. **Construct a dip** centered at the crossing that is large enough to accommodate the 100-year flow event and prevent diversion (C-D, E-F).



Step 4 Digging Keyway

4. **Dig a keyway** (to place rock in) that extends from the outer 1/3 of the road tread down the outboard road fill to the point where outboard fill meets natural channel (up to 3 feet into the channel bed depending on site specifics) (G-H, I-J).

5. **Install geofabric (optional)** within keyway to support rock in wet areas and to prevent winnowing of the crossing at low flows.

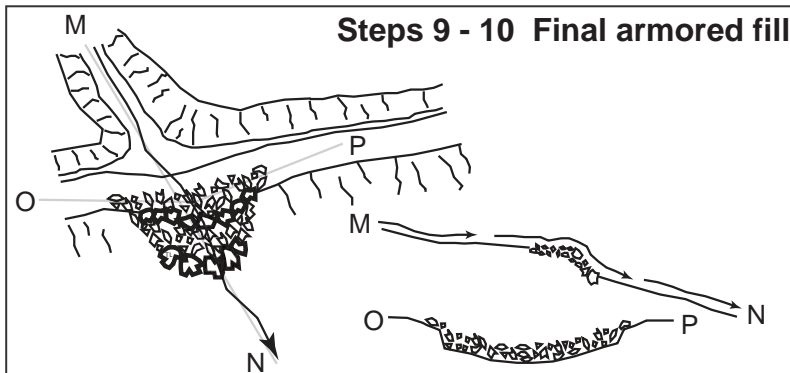


Steps 6, 7, 8 Backfilling Keyway

6. **Put aside the largest rock** armoring to create 2 buttresses in the next step.

7. **Create a buttress using the largest rock** (as described in the site treatments specifications) at the base of fill. (This should have a "U" shape to it and will define the outlet of the armored fill.)

8. **Backfill the fill face** with remaining rock armor making sure the final armored area has "U" shape that will accommodate the largest expected flow (K-L).



Steps 9 - 10 Final armored fill

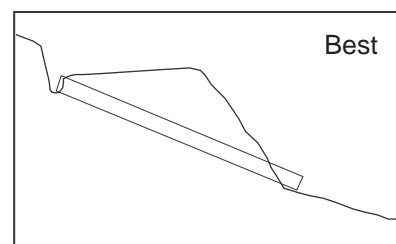
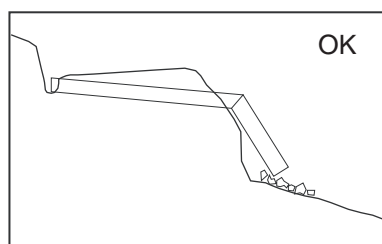
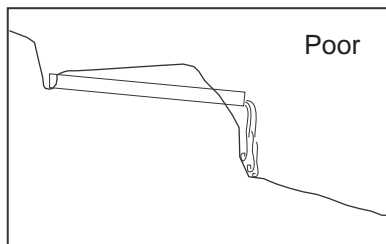
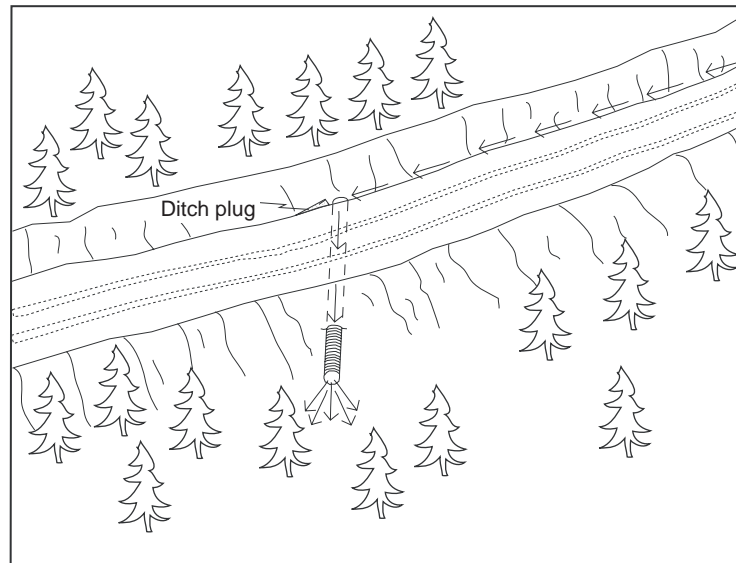
9. **Install a second buttress** at the break in slope between the outboard road and the outboard fill face. (This should define the base level of the stream and determine how deep the stream will backfill after construction) (M-N).

10. **Back fill the rest of the keyway** with the unsorted rock armor making sure the final armored area has a "U" shape that will accommodate the largest expected flow (O-P).

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Typical Ditch Relief Culvert Installation



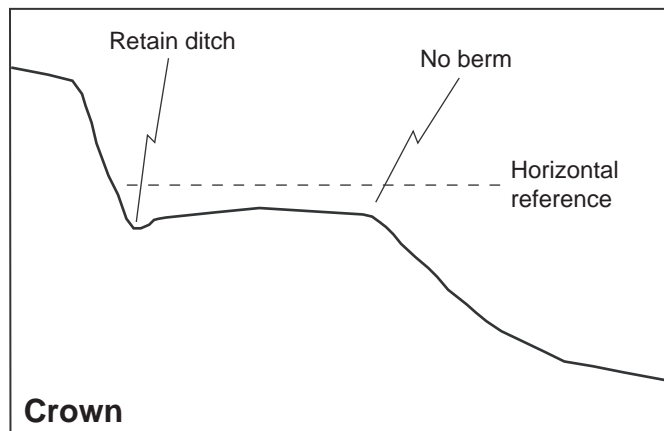
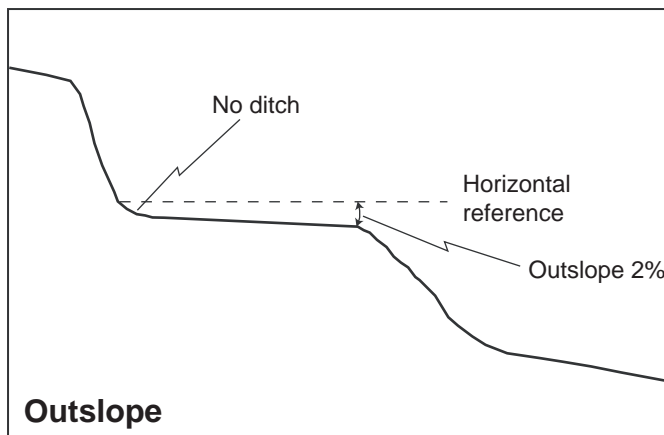
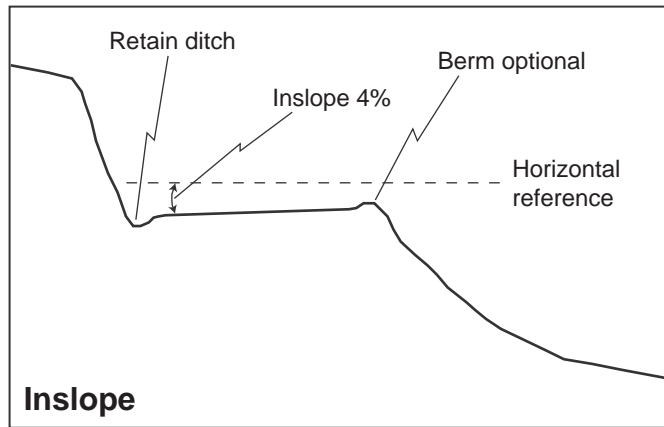
Ditch relief culvert installation

- 1) The same basic steps followed for stream crossing installation shall be employed.
- 2) Culverts shall be installed at a 30 degree angle to the ditch to lessen the chance of inlet erosion and plugging.
- 3) Culverts shall be seated on the natural slope or at a minimum depth of 5 feet at the outside edge of the road, whichever is less.
- 4) At a minimum, culverts shall be installed at a slope of 2 to 4 percent steeper than the approaching ditch grade, or at least 5 inches every 10 feet.
- 5) Backfill shall be compacted from the bed to a depth of 1 foot or 1/3 of the culvert diameter, which ever is greater, over the top of the culvert.
- 6) Culvert outlets shall extend beyond the base of the road fill (or a flume downspout will be used).
Culverts will be seated on the natural slope or at a depth of 5 feet at the outside edge of the road, whichever is less.

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Typical Designs for Using Road Shape to Control Road Runoff

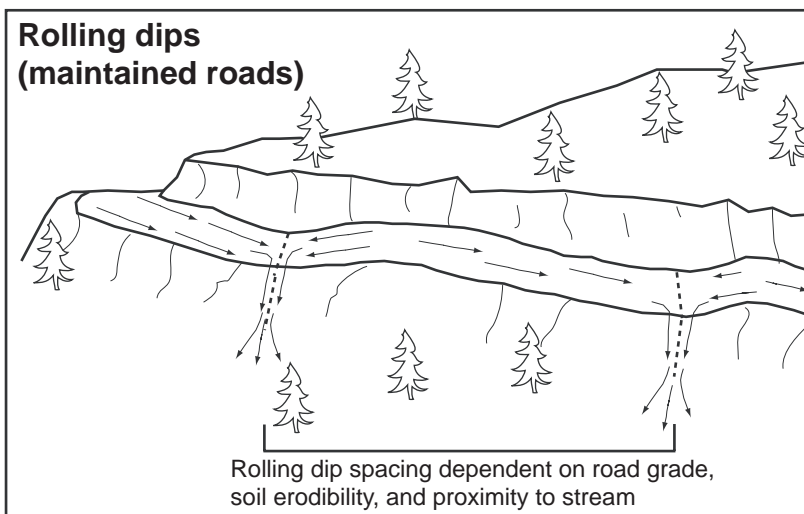
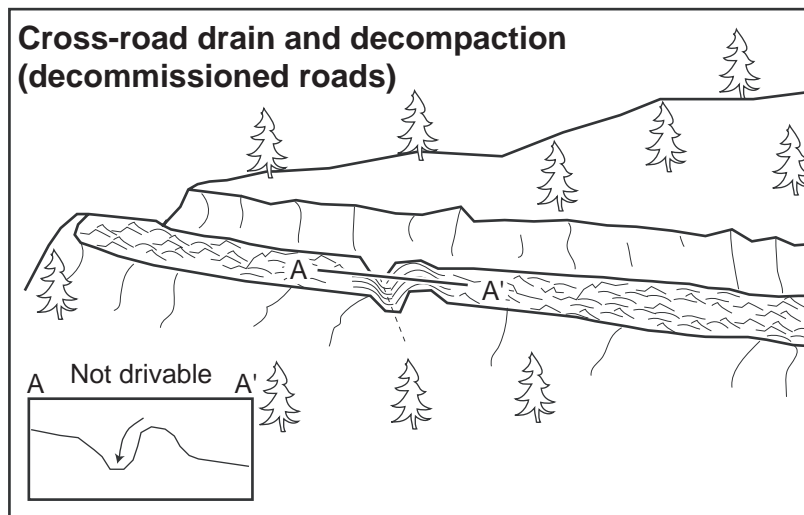
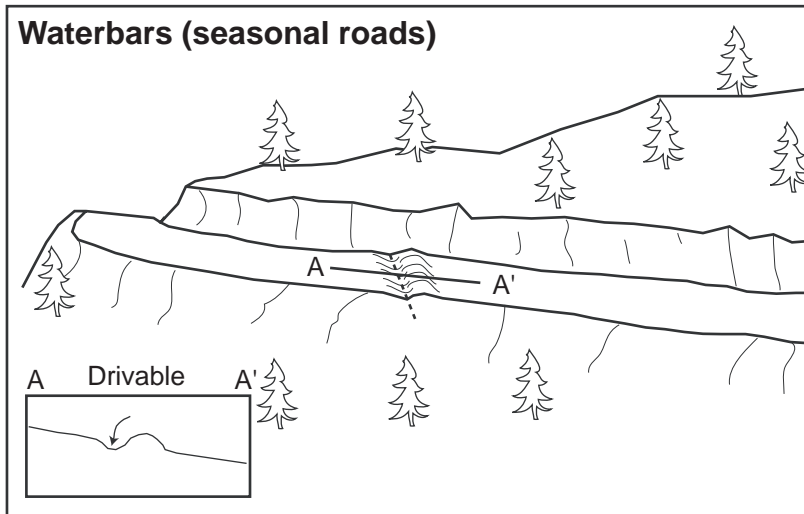


Outsloping Pitch for Roads Up to 8% Grade		
Road grade	Unsurfaced roads	Surfaced roads
4% or less	3/8" per foot	1/2" per foot
5%	1/2" per foot	5/8" per foot
6%	5/8" per foot	3/4" per foot
7%	3/4" per foot	7/8" per foot
8% or more	1" per foot	1 1/4" per foot

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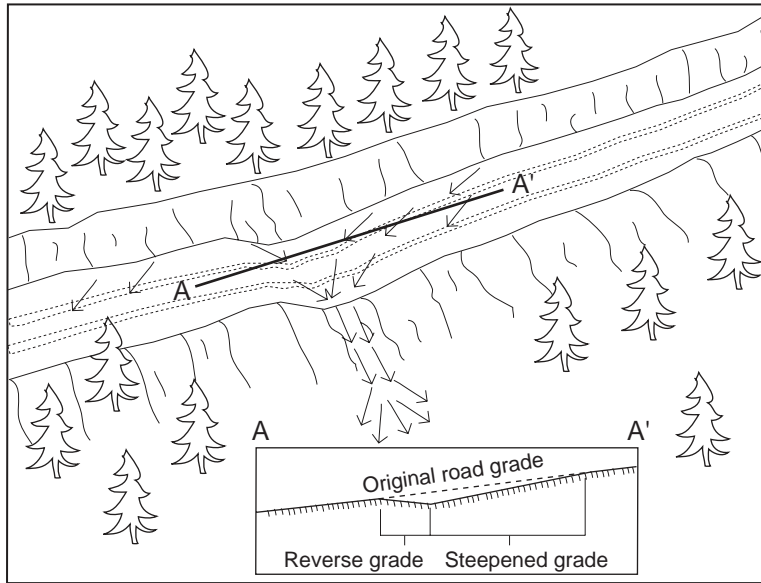
Typical Methods for Dispersing Road Surface Runoff with Waterbars, Cross-road Drains, and Rolling Dips



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Typical Road Surface Drainage by Rolling Dips



Rolling dip installation:

1. Rolling dips will be installed in the roadbed as needed to drain the road surface.
2. Rolling dips will be sloped either into the ditch or to the outside of the road edge as required to properly drain the road.
3. Rolling dips are usually built at 30 to 45 degree angles to the road alignment with cross road grade of at least 1% greater than the grade of the road.
4. Excavation for the dips will be done with a medium-size bulldozer or similar equipment.
5. Excavation of the dips will begin 50 to 100 feet up road from where the axis of the dip is planned as per guidelines established in the rolling dip dimensions table.
6. Material will be progressively excavated from the roadbed, steepening the grade until the axis is reached.
7. The depth of the dip will be determined by the grade of the road (see table below).
8. On the down road side of the rolling dip axis, a grade change will be installed to prevent the runoff from continuing down the road (see figure above).
9. The rise in the reverse grade will be carried for about 10 to 20 feet and then return to the original slope.
10. The transition from axis to bottom, through rising grade to falling grade, will be in a road distance of at least 15 to 30 feet.

Table of rolling dip dimensions by road grade

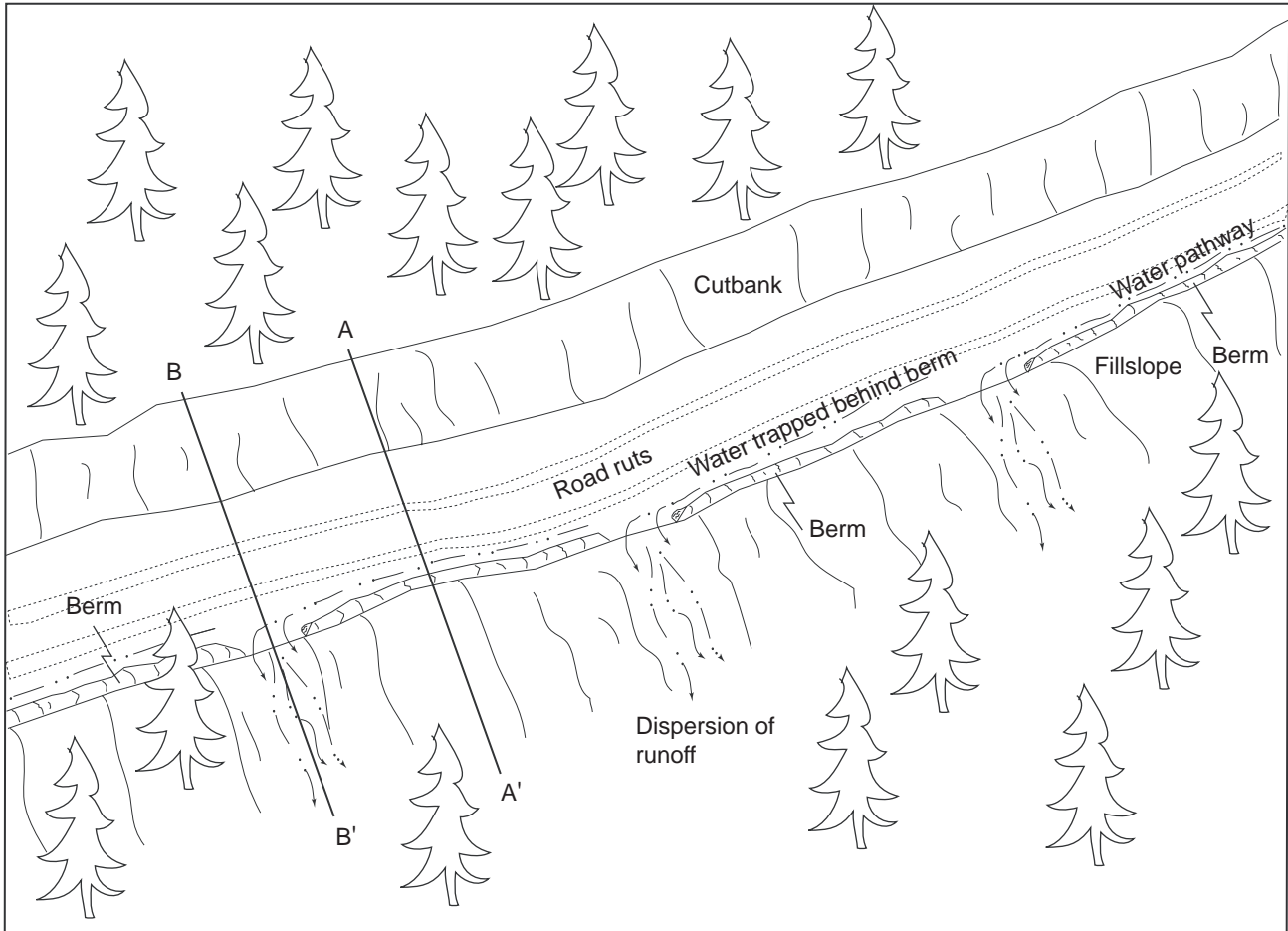
Road grade %	Upslope approach distance (from up road start to trough) ft	Reverse grade distance (from trough to crest) ft	Depth at trough outlet (below average road grade) ft	Depth at trough inlet (below average road grade) ft
<6	55	15 - 20	0.9	0.3
8	65	15 - 20	1.0	0.2
10	75	15 - 20	1.1	0.01
12	85	20 - 25	1.2	0.01
>12	100	20 - 25	1.3	0.01

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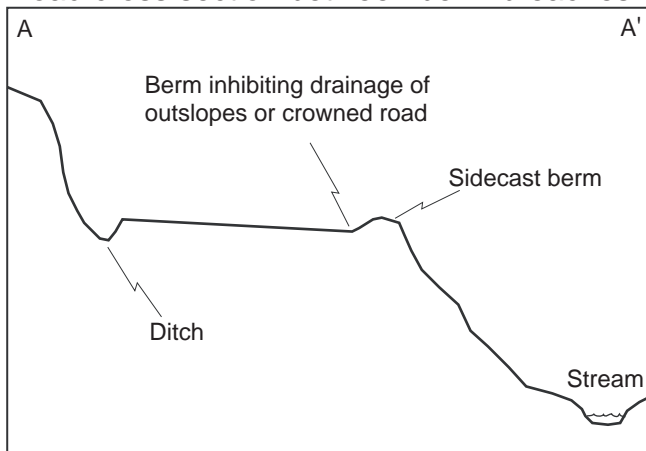
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Typical Sidecast or Excavation Methods for Removing Outboard Berms on a Maintained Road

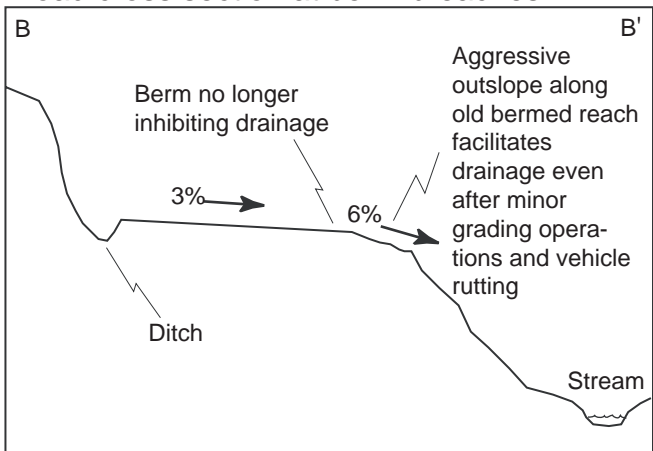
1. On gentle road segments berms can be removed continuously (see B-B').
2. On steep road segments, where safety is a concern, the berm can be frequently breached (see A-A' & B-B').
Berm breaches should be spaced every 30 to 100 feet to provide adequate drainage of the road system while maintaining a semi-continuous berm for vehicle safety.



Road cross section between berm breaches



Road cross section at berm breaches



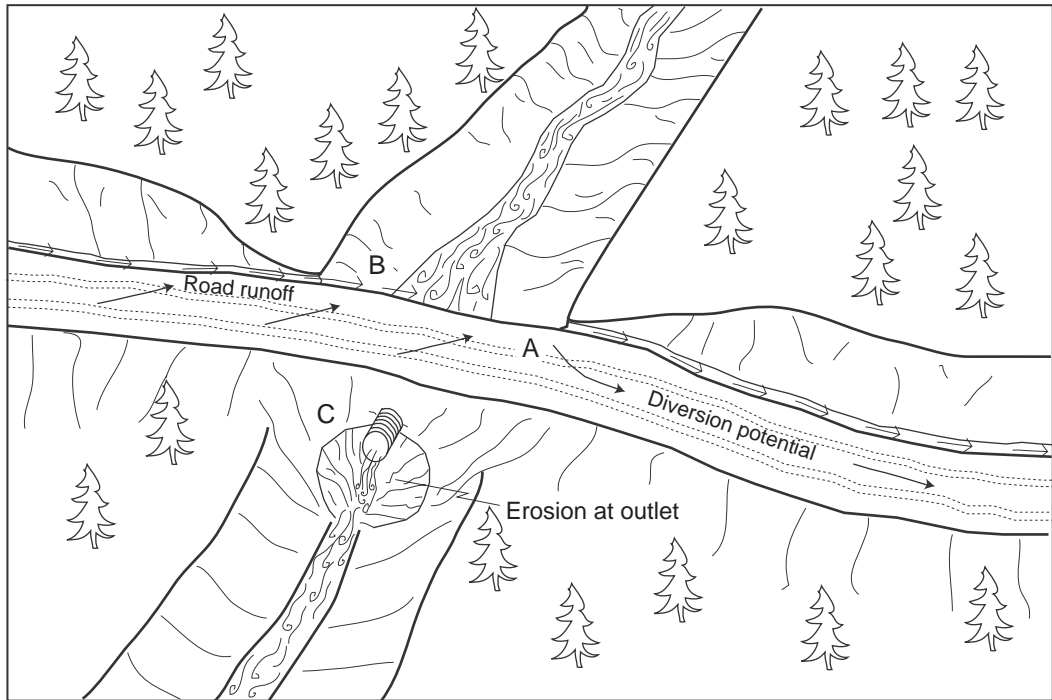
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Typical Problems and Applied Treatments for a Decommissioned Stream Crossing

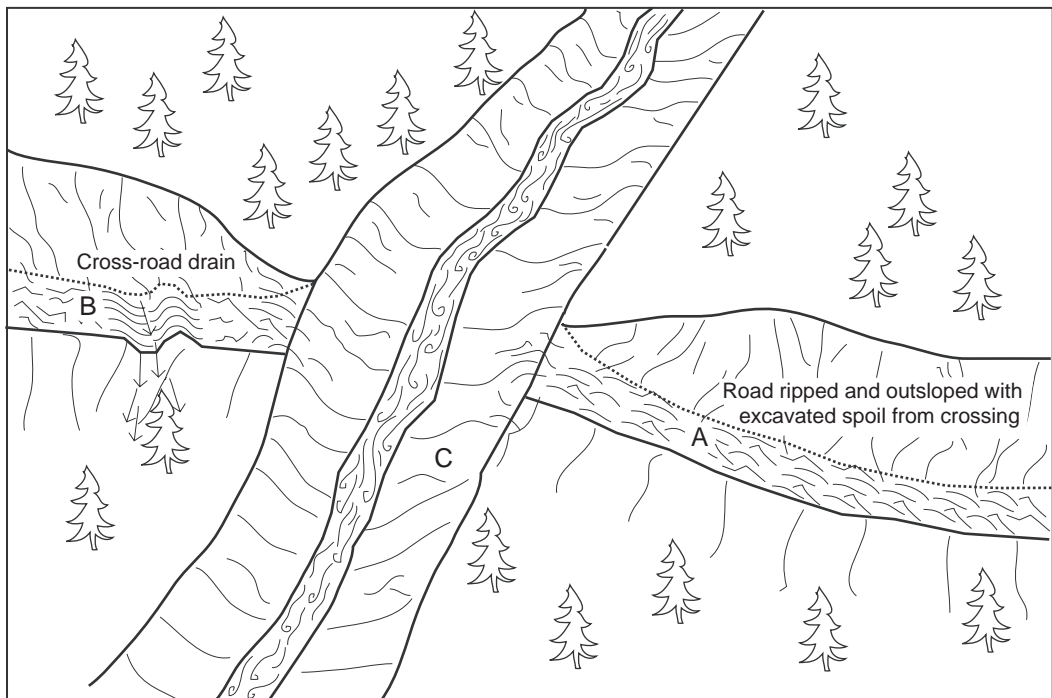
Problem condition (before)

- A - Diversion potential
- B - Road surface and ditch drain to stream
- C - Undersized culvert high in fill with outlet erosion



Treatment standards (after)

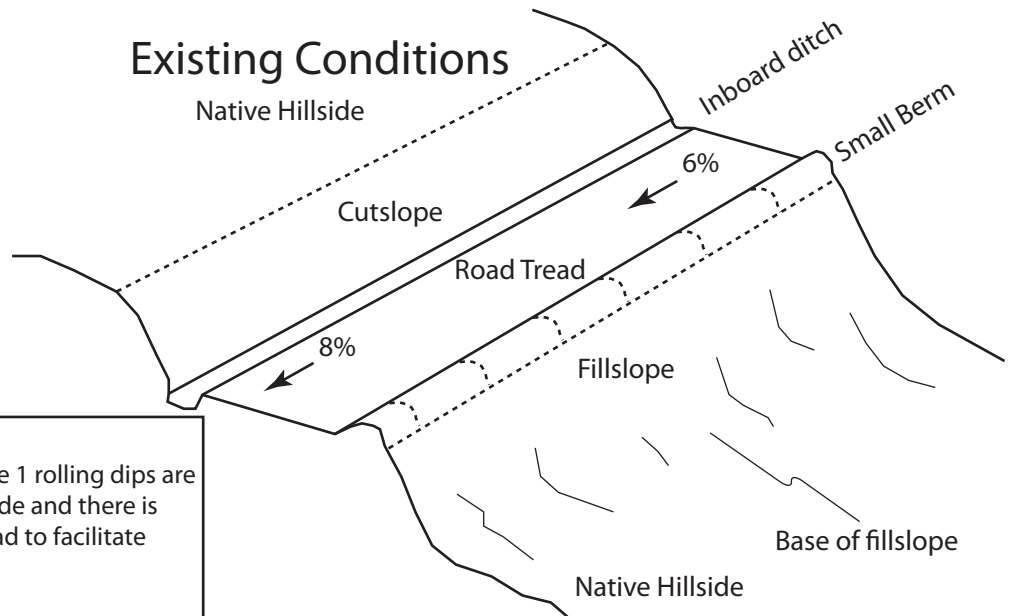
- A - Diversion prevented by road surface ripping and outsloping using excavated spoils
- B - Road surface and ditch disconnected from stream by road surface decompaction and cross-road drains
- C - Stream crossing fill completely excavated



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Standard (Type 1) Rolling Dip Construction



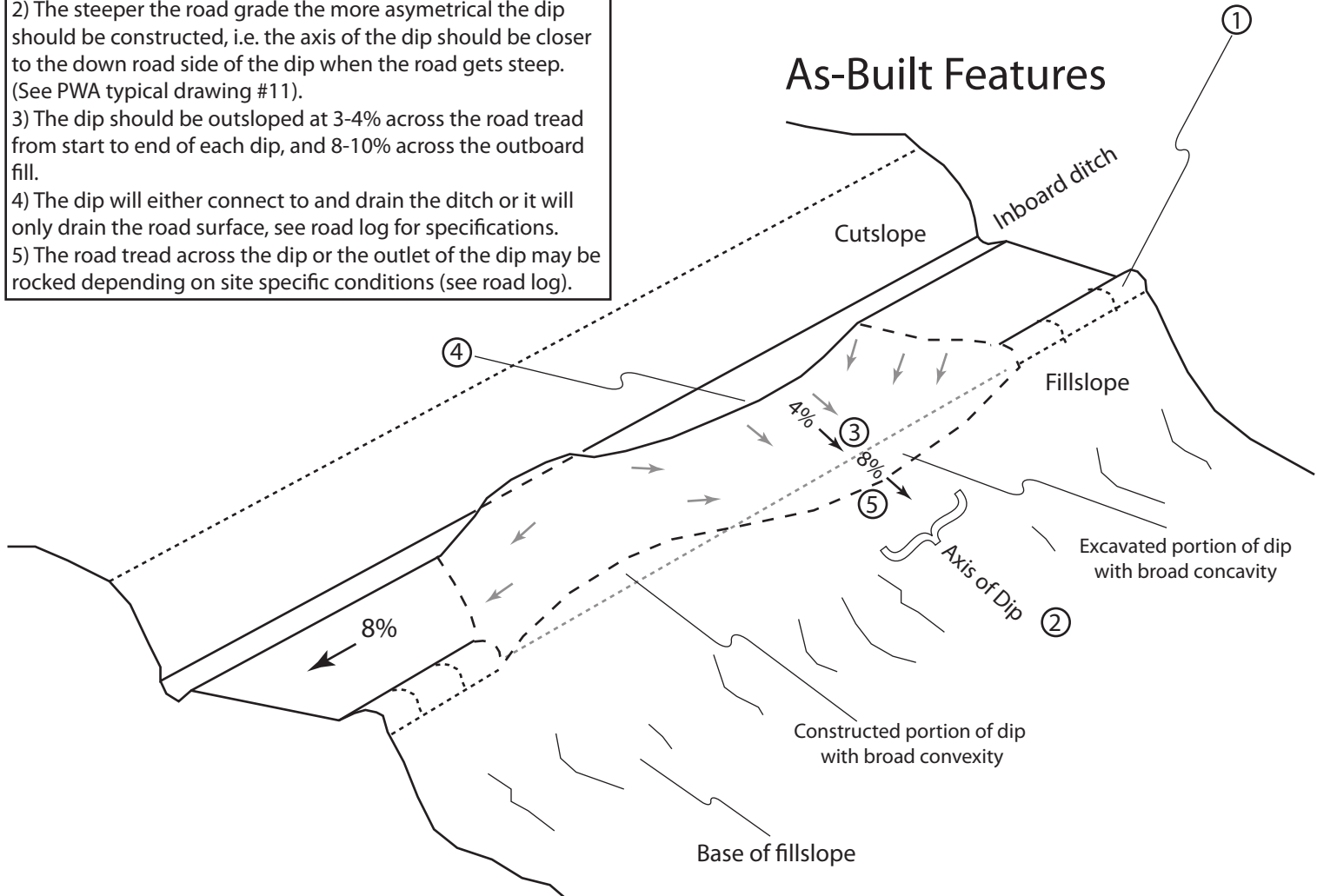
Notes

Rolling dip type 1 existing conditions: Type 1 rolling dips are utilized when roads are less than 12-14% grade and there is proximal outfall adjacent to the outboard road to facilitate road drainage.

Design Notes:

- 1) The berm should be removed for the entire length of the dip.
- 2) The steeper the road grade the more asymmetrical the dip should be constructed, i.e. the axis of the dip should be closer to the down road side of the dip when the road gets steep. (See PWA typical drawing #11).
- 3) The dip should be outsloped at 3-4% across the road tread from start to end of each dip, and 8-10% across the outboard fill.
- 4) The dip will either connect to and drain the ditch or it will only drain the road surface, see road log for specifications.
- 5) The road tread across the dip or the outlet of the dip may be rocked depending on site specific conditions (see road log).

As-Built Features

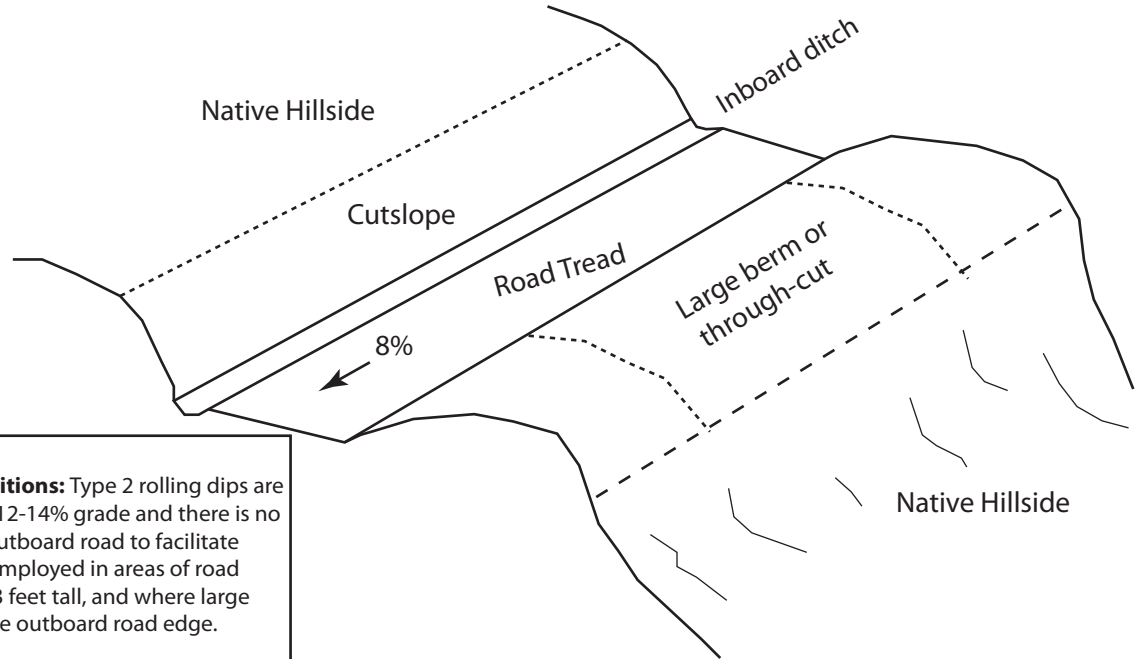


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Type 2 Rolling Dip Construction

(Through-cut or thick berm road reaches)



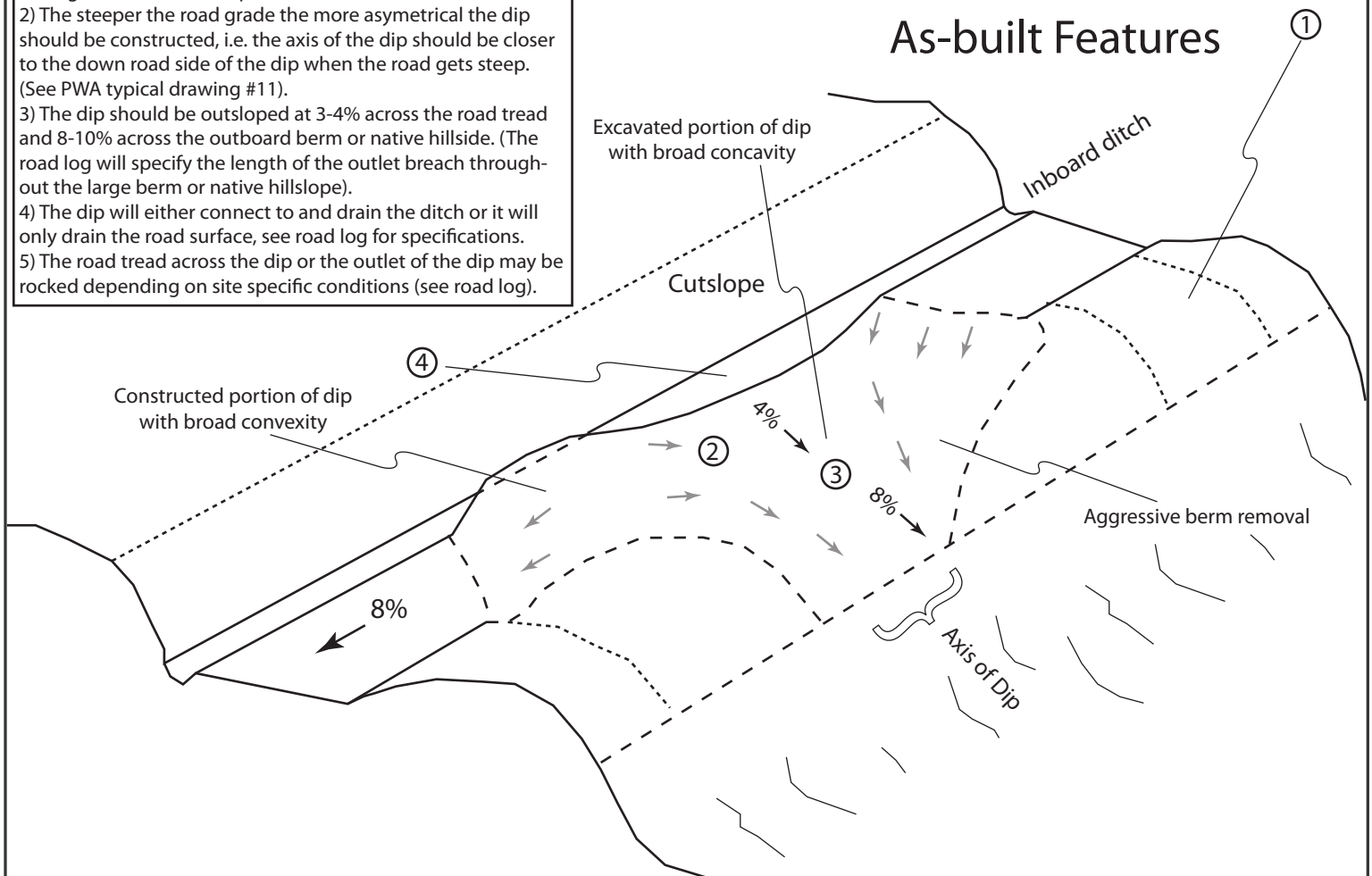
Notes

Rolling dip type 2 existing conditions: Type 2 rolling dips are utilized when roads are less than 12-14% grade and there is no proximal outfall adjacent to the outboard road to facilitate road drainage. These should be employed in areas of road through-cuts generally less than 3 feet tall, and where large wide and/or tall berms exist on the outboard road edge.

Design Notes:

- 1) The berm or native hillside should be removed for the entire length of the excavated portion of the dip, or, at a minimum through the axis of the dip.
- 2) The steeper the road grade the more asymmetrical the dip should be constructed, i.e. the axis of the dip should be closer to the down road side of the dip when the road gets steep.
- 3) The dip should be outsloped at 3-4% across the road tread and 8-10% across the outboard berm or native hillside. (The road log will specify the length of the outlet breach throughout the large berm or native hillside).
- 4) The dip will either connect to and drain the ditch or it will only drain the road surface, see road log for specifications.
- 5) The road tread across the dip or the outlet of the dip may be rocked depending on site specific conditions (see road log).

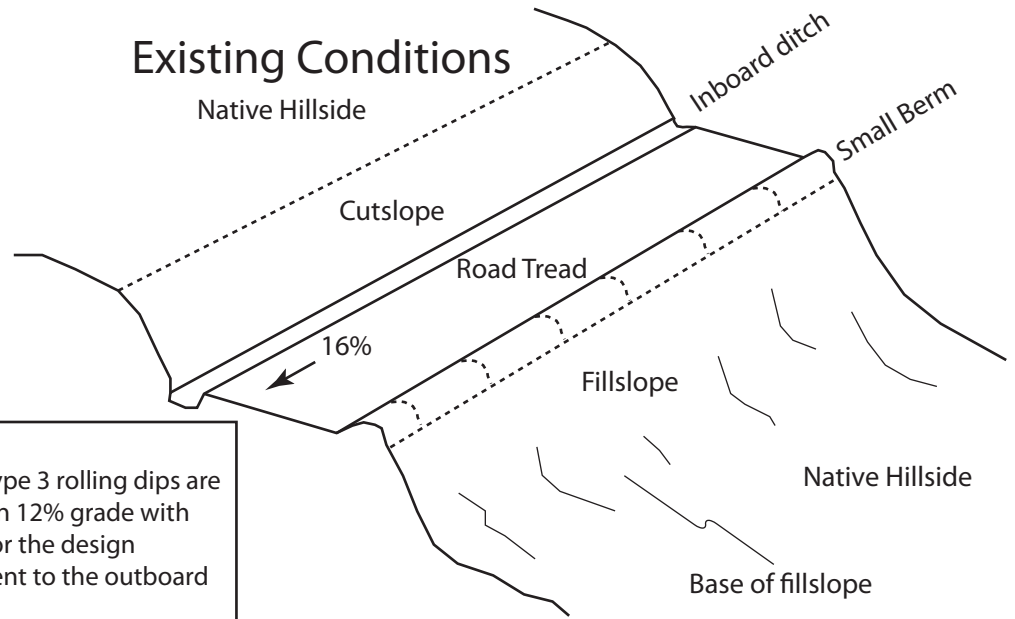
As-built Features



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Type 3 Rolling Dip Construction (steep slope outslope)

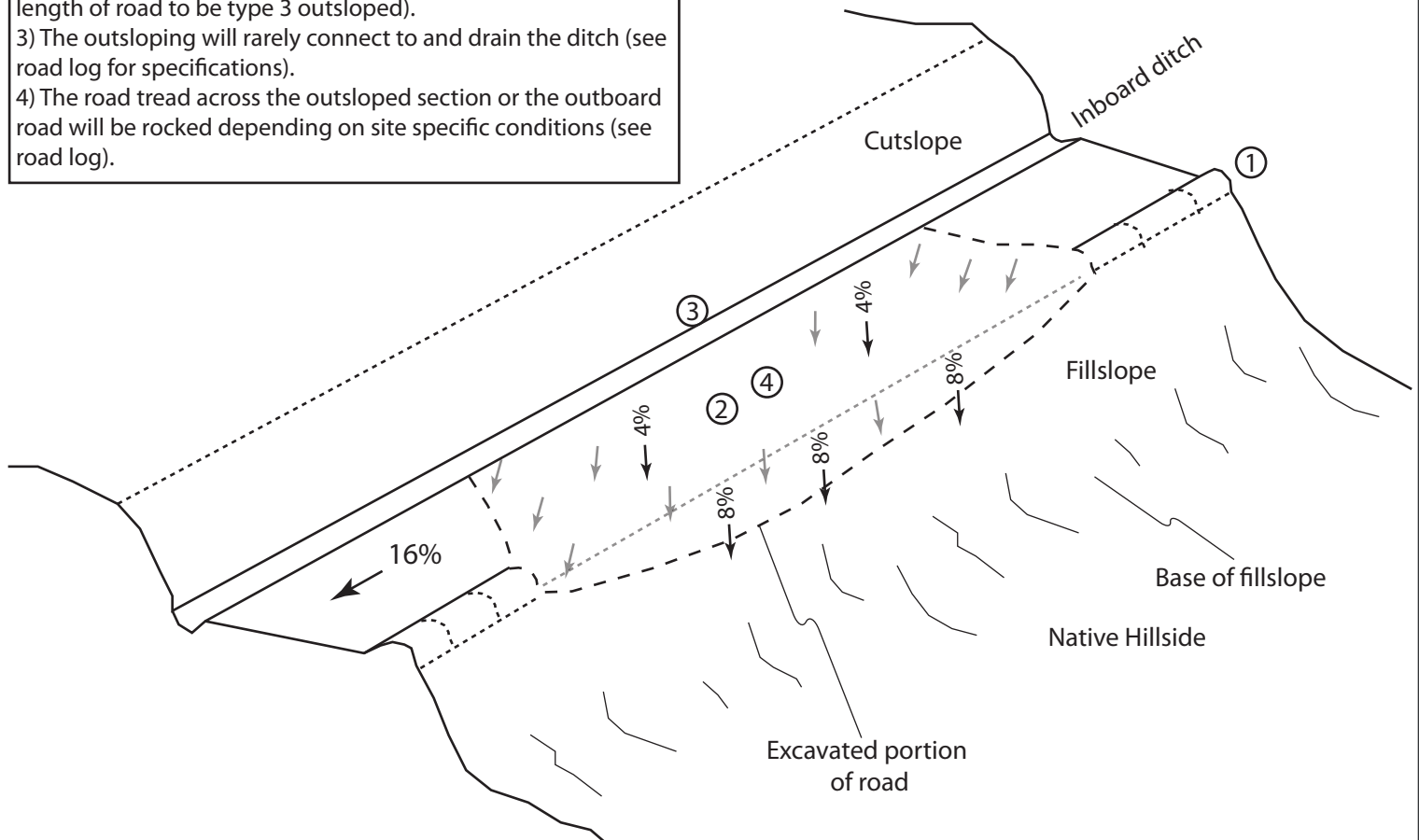


Notes

Rolling dip type 3 existing conditions: Type 3 rolling dips are utilized when roads grades are steeper than 12% grade with little opportunity to create reverse grade for the design vehicle, and there is proximal outfall adjacent to the outboard road to facilitate road drainage.

Design Notes:

- 1) The berm should be removed for the entire length of the outsloped section.
- 2) The dip should be outsloped at 2-4% across the road tread and 4-8% across the outboard fill. (The road log will specify the length of road to be type 3 outsloped).
- 3) The outsloping will rarely connect to and drain the ditch (see road log for specifications).
- 4) The road tread across the outsloped section or the outboard road will be rocked depending on site specific conditions (see road log).



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Section 3 Erosion and Sediment Control BMPs

3.1 Erosion Control

Erosion control is any source control practice that protects the soil surface and prevents soil particles from being detached by rainfall, flowing water, or wind. Erosion control consists of using project scheduling and planning to reduce soil or vegetation disturbance (particularly during the rainy season), preventing or reducing erosion potential by diverting or controlling drainage, as well as preparing and stabilizing disturbed soil areas. Erosion control BMPs that can be used to fulfill these objectives are shown in Table 3-1. It should be noted that several additional BMPs, such as Check Dams (SE-4) and Fiber Rolls (SE-5) can be used for erosion control, by reducing slope length or steepness, as well as for sediment control (i.e., perimeter control or retention of sediment). These BMPs have been included in this handbook as sediment control BMPs and are shown in Table 3-2.

All inactive soil disturbed areas on the project site, and most active areas prior to the onset of rain, must be protected from erosion. Soil disturbed areas may include relatively flat areas as well as slopes. Typically, steep slopes and large exposed areas require the most robust erosion controls; flatter slopes and smaller areas still require protection, but less costly materials may be appropriate for these areas, allowing savings to be directed to the more robust BMPs for steep slopes and large exposed areas. Additional guidance on the selection of temporary slope stabilization methods is provided in Appendix F. To be effective, erosion control BMPs for slopes at disturbed areas must be protected from concentrated flows.

Some erosion control BMPs can be used effectively to temporarily prevent erosion by concentrated flows. These BMPs, used alone or in combination, prevent erosion by intercepting, diverting, conveying, and discharging concentrated flows in a manner that prevents soil detachment and transport. Temporary concentrated flow conveyance controls may be required to direct run-on around or through the project in a non-erodible fashion. Temporary concentrated flow conveyance controls include the following BMPs:

Table 3-1 Erosion Control BMPs

BMP#	BMP Name
EC-1	Scheduling
EC-2	Preservation of Existing Vegetation
EC-3	Hydraulic Mulch ¹
EC-4	Hydroseeding ¹
EC-5	Soil Binders ¹
EC-6	Straw Mulch ¹
EC-7	Geotextiles & Mats ¹
EC-8	Wood Mulching ⁴
EC-9	Earth Dikes and Drainage Swales ⁴
EC-10	Velocity Dissipation Devices ⁴
EC-11	Slope Drains ⁴
EC-12	Streambank Stabilization ⁴
EC-13	Reserved ²
EC-14	<u>Compost</u> Blankets ³
EC-15	Soil Preparation / Roughening ³
EC-16	Non-Vegetative Stabilization ³

1) BMP fact sheet updated in 2009
 2) BMP fact sheet removed in 2009 (formerly PAM)
 3) New BMP fact sheet added in 2009
 4) BMP fact sheet updated in 2011

- EC-9, Earth Dikes and Drainage Swales
- EC-10, Velocity Dissipation Devices
- EC-11, Slope Drains

3.2 Sediment Control

Sediment control is any practice that traps soil particles after they have been detached and moved by rain, flowing water, or wind. Sediment control measures are usually passive systems that rely on filtering or settling the particles out of the water or wind that is transporting them.

Sediment control practices include the BMPs listed in Table 3-2.

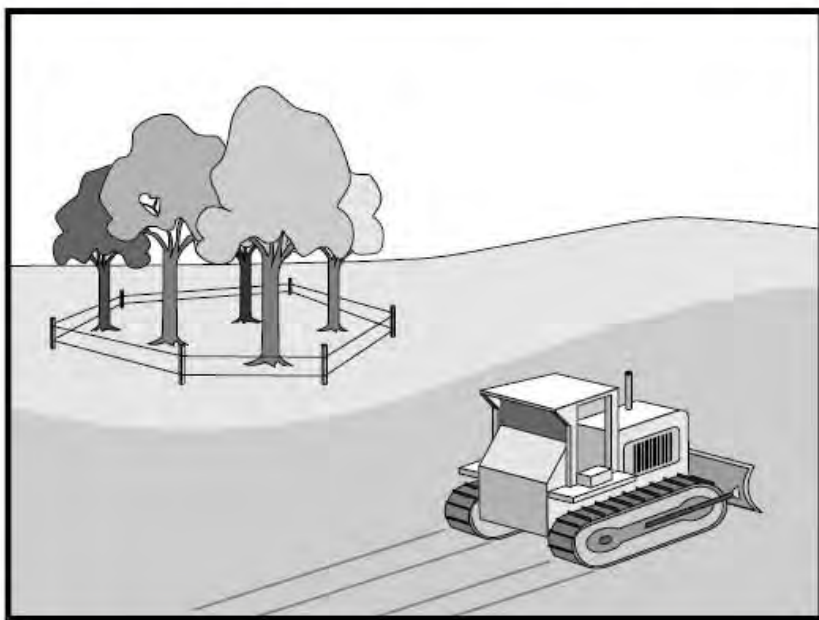
Sediment control BMPs include those practices that intercept and slow or detain the flow of stormwater to allow sediment to settle and be trapped. Sediment control practices can consist of installing linear sediment barriers (such as silt fences, gravel bag berms, or fiber rolls); and constructing check dams, a sediment trap or sediment basin to retain sediment on site. Linear sediment barriers are typically placed below the toe of exposed and erodible slopes, down-slope of exposed soil areas, around soil stockpiles, and at other appropriate locations along the site perimeter. As mentioned in Section 3.1, some BMPs are dual-purpose, such as Fiber Rolls and Check Dams. By reducing effective slope length or steepness, these BMPs reduce erosion as well as promote sedimentation.

Sediment control BMPs are most effective when used in conjunction with erosion control BMPs. The combination of erosion control and sediment control is the most effective means to prevent sediment from leaving the project site and potentially entering storm drains or receiving waters. The General Permit requires that sediment controls be established and maintained at all sites and requires the combined use with erosion controls to protect disturbed areas at most sites.

Table 3-2 Temporary Sediment Control BMPs

BMP#	BMP Name
SE-1	Silt Fence ¹
SE-2	Sediment Basin ^{1, 3}
SE-3	Sediment Trap ³
SE-4	Check Dam ¹
SE-5	Fiber Rolls ¹
SE-6	Gravel Bag Berm ¹
SE-7	Street Sweeping and Vacuuming ³
SE-8	Sandbag Barrier ¹
SE-9	Straw Bale Barrier ³
SE-10	Storm Drain Inlet Protection ¹
SE-11	Active Treatment Systems ¹
SE-12	Temporary Silt Dike ²
SE-13	Compost Socks and Berms ²
SE-14	Biofilter Bags ²
1) BMP fact sheet updated in 2009 2) New BMP fact sheet added in 2009 3) BMP fact sheet updated in 2011	

Preservation Of Existing Vegetation EC-2



Description and Purpose

Carefully planned preservation of existing vegetation minimizes the potential of removing or injuring existing trees, vines, shrubs, and grasses that protect soil from erosion.

Suitable Applications

Preservation of existing vegetation is suitable for use on most projects. Large project sites often provide the greatest opportunity for use of this BMP. Suitable applications include the following:

- Areas within the site where no construction activity occurs, or occurs at a later date. This BMP is especially suitable to multi year projects where grading can be phased.
- Areas where natural vegetation exists and is designated for preservation. Such areas often include steep slopes, watercourse, and building sites in wooded areas.
- Areas where local, state, and federal government require preservation, such as vernal pools, wetlands, marshes, certain oak trees, etc. These areas are usually designated on the plans, or in the specifications, permits, or environmental documents.
- Where vegetation designated for ultimate removal can be temporarily preserved and be utilized for erosion control and sediment control.

Limitations

- Requires forward planning by the owner/developer,

Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input type="checkbox"/>
TC	Tracking Control	<input type="checkbox"/>
WE	Wind Erosion Control	<input type="checkbox"/>
NS	Non-Stormwater Management Control	<input type="checkbox"/>
WM	Waste Management and Materials Pollution Control	<input type="checkbox"/>

Legend:

- Primary Objective
- Secondary Objective

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input type="checkbox"/>
Trash	<input type="checkbox"/>
Metals	<input type="checkbox"/>
Bacteria	<input type="checkbox"/>
Oil and Grease	<input type="checkbox"/>
Organics	<input type="checkbox"/>

Potential Alternatives

None



Preservation Of Existing Vegetation EC-2

contractor, and design staff.

- Limited opportunities for use when project plans do not incorporate existing vegetation into the site design.
- For sites with diverse topography, it is often difficult and expensive to save existing trees while grading the site satisfactory for the planned development.

Implementation

The best way to prevent erosion is to not disturb the land. In order to reduce the impacts of new development and redevelopment, projects may be designed to avoid disturbing land in sensitive areas of the site (e.g., natural watercourses, steep slopes), and to incorporate unique or desirable existing vegetation into the site's landscaping plan. Clearly marking and leaving a buffer area around these unique areas during construction will help to preserve these areas as well as take advantage of natural erosion prevention and sediment trapping.

Existing vegetation to be preserved on the site must be protected from mechanical and other injury while the land is being developed. The purpose of protecting existing vegetation is to ensure the survival of desirable vegetation for shade, beautification, and erosion control. Mature vegetation has extensive root systems that help to hold soil in place, thus reducing erosion. In addition, vegetation helps keep soil from drying rapidly and becoming susceptible to erosion. To effectively save existing vegetation, no disturbances of any kind should be allowed within a defined area around the vegetation. For trees, no construction activity should occur within the drip line of the tree.

Timing

- Provide for preservation of existing vegetation prior to the commencement of clearing and grubbing operations or other soil disturbing activities in areas where no construction activity is planned or will occur at a later date.

Design and Layout

- Mark areas to be preserved with temporary fencing. Include sufficient setback to protect roots.
 - Orange colored plastic mesh fencing works well.
 - Use appropriate fence posts and adequate post spacing and depth to completely support the fence in an upright position.
- Locate temporary roadways, stockpiles, and layout areas to avoid stands of trees, shrubs, and grass.
- Consider the impact of grade changes to existing vegetation and the root zone.
- Maintain existing irrigation systems where feasible. Temporary irrigation may be required.
- Instruct employees and subcontractors to honor protective devices. Prohibit heavy equipment, vehicular traffic, or storage of construction materials within the protected area.

Preservation Of Existing Vegetation EC-2

Costs

There is little cost associated with preserving existing vegetation if properly planned during the project design, and these costs may be offset by aesthetic benefits that enhance property values. During construction, the cost for preserving existing vegetation will likely be less than the cost of applying erosion and sediment controls to the disturbed area. Replacing vegetation inadvertently destroyed during construction can be extremely expensive, sometimes in excess of \$10,000 per tree.

Inspection and Maintenance

During construction, the limits of disturbance should remain clearly marked at all times. Irrigation or maintenance of existing vegetation should be described in the landscaping plan. If damage to protected trees still occurs, maintenance guidelines described below should be followed:

- Verify that protective measures remain in place. Restore damaged protection measures immediately.
- Serious tree injuries shall be attended to by an arborist.
- Damage to the crown, trunk, or root system of a retained tree shall be repaired immediately.
- Trench as far from tree trunks as possible, usually outside of the tree drip line or canopy. Curve trenches around trees to avoid large roots or root concentrations. If roots are encountered, consider tunneling under them. When trenching or tunneling near or under trees to be retained, place tunnels at least 18 in. below the ground surface, and not below the tree center to minimize impact on the roots.
- Do not leave tree roots exposed to air. Cover exposed roots with soil as soon as possible. If soil covering is not practical, protect exposed roots with wet burlap or peat moss until the tunnel or trench is ready for backfill.
- Cleanly remove the ends of damaged roots with a smooth cut.
- Fill trenches and tunnels as soon as possible. Careful filling and tamping will eliminate air spaces in the soil, which can damage roots.
- If bark damage occurs, cut back all loosened bark into the undamaged area, with the cut tapered at the top and bottom and drainage provided at the base of the wood. Limit cutting the undamaged area as much as possible.
- Aerate soil that has been compacted over a trees root zone by punching holes 12 in. deep with an iron bar, and moving the bar back and forth until the soil is loosened. Place holes 18 in. apart throughout the area of compacted soil under the tree crown.
- Fertilization
 - Fertilize stressed or damaged broadleaf trees to aid recovery.
 - Fertilize trees in the late fall or early spring.

Preservation Of Existing Vegetation EC-2

- Apply fertilizer to the soil over the feeder roots and in accordance with label instructions, but never closer than 3 ft to the trunk. Increase the fertilized area by one-fourth of the crown area for conifers that have extended root systems.
- Retain protective measures until all other construction activity is complete to avoid damage during site cleanup and stabilization.

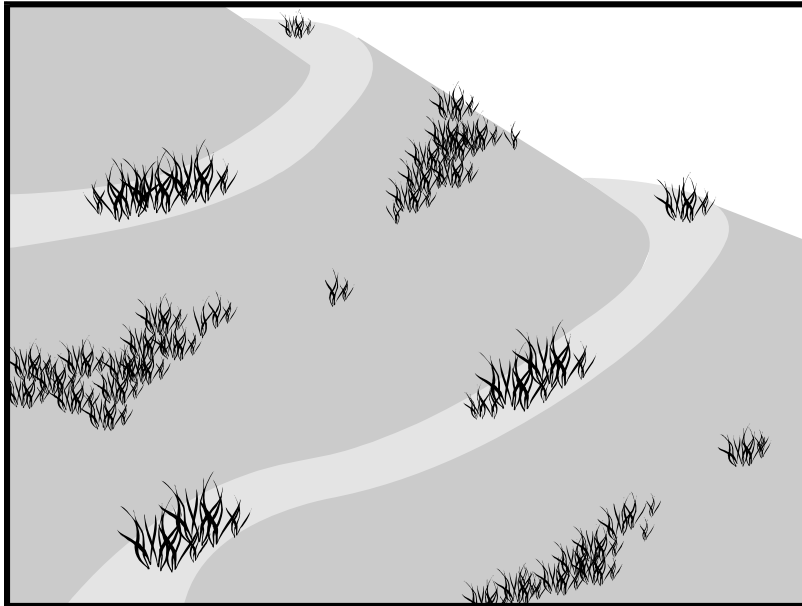
References

County of Sacramento Tree Preservation Ordinance, September 1981.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Water Quality Management Plan for The Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.



Description and Purpose

Hydroseeding typically consists of applying a mixture of a hydraulic mulch, seed, fertilizer, and stabilizing emulsion with a hydraulic mulcher, to temporarily protect exposed soils from erosion by water and wind. Hydraulic seeding, or hydroseeding, is simply the method by which temporary or permanent seed is applied to the soil surface.

Suitable Applications

Hydroseeding is suitable for disturbed areas requiring temporary protection until permanent stabilization is established, for disturbed areas that will be re-disturbed following an extended period of inactivity, or to apply permanent stabilization measures. Hydroseeding without mulch or other cover (e.g. EC-7, Erosion Control Blanket) is not a stand-alone erosion control BMP and should be combined with additional measures until vegetation establishment.

Typical applications for hydroseeding include:

- Disturbed soil/graded areas where permanent stabilization or continued earthwork is not anticipated prior to seed germination.
- Cleared and graded areas exposed to seasonal rains or temporary irrigation.
- Areas not subject to heavy wear by construction equipment or high traffic.

Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	<input checked="" type="checkbox"/>
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Category**
- Secondary Category**

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

- EC-3 Hydraulic Mulch
- EC-5 Soil Binders
- EC-6 Straw Mulch
- EC-7 Geotextiles and Mats
- EC-8 Wood Mulching
- EC-14 Compost Blanket
- EC-16 Non-Vegetative Stabilization



Limitations

- Availability of hydroseeding equipment may be limited just prior to the rainy season and prior to storms due to high demand.
- Hydraulic seed should be applied with hydraulic mulch or a stand-alone hydroseed application should be followed by one of the following:
 - Straw mulch (see Straw Mulch EC-6)
 - Rolled erosion control products (see Geotextiles and Mats EC-7)
 - Application of Compost Blanket (see Compost Blanket EC-14)

Hydraulic seed may be used alone only on small flat surfaces when there is sufficient time in the season to ensure adequate vegetation establishment and coverage to provide adequate erosion control.

- Hydraulic seed without mulch does not provide immediate erosion control.
- Temporary seeding may not be appropriate for steep slopes (i.e., slopes readily prone to rill erosion or without sufficient topsoil).
- 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 may not be appropriate for short term inactivity (i.e. less than 3-6 months).

Implementation

In order to select appropriate hydraulic seed mixtures, an evaluation of site conditions should be performed with respect to:

- | | |
|---|----------------------------------|
| - Soil conditions | - Maintenance requirements |
| - Site topography and exposure (sun/wind) | - Sensitive adjacent areas |
| - Season and climate | - Water availability |
| - Vegetation types | - Plans for permanent vegetation |

The local office of the U.S.D.A. Natural Resources Conservation Service (NRCS) is an excellent source of information on appropriate seed mixes.

The following steps should be followed for implementation:

- Where appropriate or feasible, soil should be prepared to receive the seed by disking or otherwise scarifying (See EC-15, Soil Preparation) the surface to eliminate crust, improve air and water infiltration and create a more favorable environment for germination and growth.

- Avoid use of hydraulic seed in areas where the BMP would be incompatible with future earthwork activities.
- Hydraulic seed can be applied using a multiple step or one step process.
 - In a multiple step process, hydraulic seed is applied first, followed by mulch or a Rolled Erosion Control Product (RECP).
 - In the one step process, hydraulic seed is applied with hydraulic mulch in a hydraulic matrix. When the one step process is used to apply the mixture of fiber, seed, etc., the seed rate should be increased to compensate for all seeds not having direct contact with the soil.
- All hydraulically seeded areas should have mulch, or alternate erosion control cover to keep seeds in place and to moderate soil moisture and temperature until the seeds germinate and grow.
- All seeds should be in conformance with the California State Seed Law of the Department of Agriculture. Each seed bag should be delivered to the site sealed and clearly marked as to species, purity, percent germination, dealer's guarantee, and dates of test. The container should be labeled to clearly reflect the amount of Pure Live Seed (PLS) contained. All legume seed should be pellet inoculated. Inoculant sources should be species specific and should be applied at a rate of 2 lb of inoculant per 100 lb seed.
- Commercial fertilizer should conform to the requirements of the California Food and Agricultural Code, which can be found at http://www.leginfo.ca.gov/.html/fac_table_of_contents.html. Fertilizer should be pelleted or granular form.
- Follow up applications should be made as needed to cover areas of poor coverage or germination/vegetation establishment and to maintain adequate soil protection.
- Avoid over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.
- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

Costs

Average cost for installation and maintenance may vary from as low as \$1,900 per acre for flat slopes and stable soils, to \$4,000 per acre for moderate to steep slopes and/or erosive soils. Cost of seed mixtures vary based on types of required vegetation.

BMP	Installed Cost per Acre
Hydraulic Seed	\$1,900-\$4,000

Source: Caltrans Soil Stabilization BMP Research for Erosion and Sediment Controls, July 2007

Inspection and Maintenance

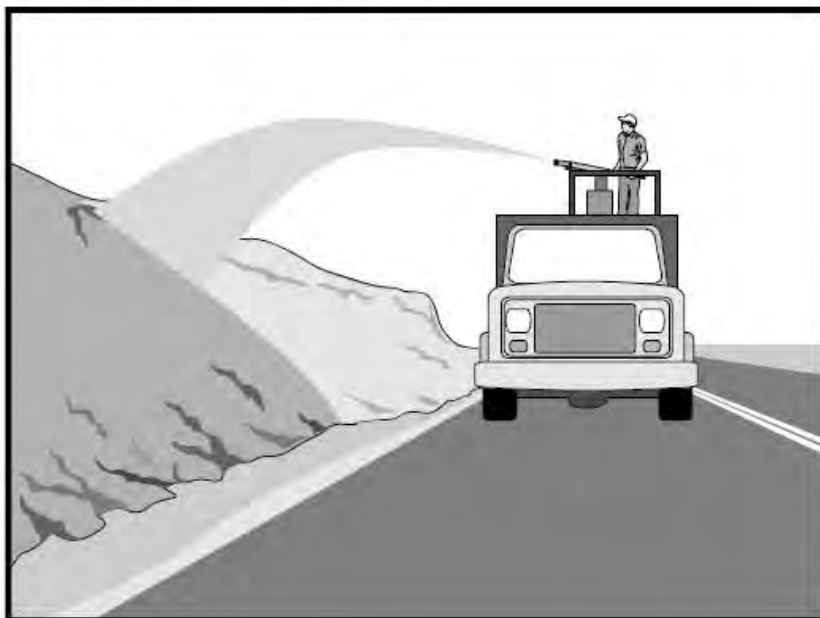
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Areas where erosion is evident should be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs.
- Where seeds fail to germinate, or they germinate and die, the area must be re-seeded, fertilized, and mulched within the planting season, using not less than half the original application rates.
- Irrigation systems, if applicable, should be inspected daily while in use to identify system malfunctions and line breaks. When line breaks are detected, the system must be shut down immediately and breaks repaired before the system is put back into operation.
- Irrigation systems should be inspected for complete coverage and adjusted as needed to maintain complete coverage.

References

Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Guidance Document: Soil Stabilization for Temporary Slopes, State of California Department of Transportation (Caltrans), November 1999.



Description and Purpose

Straw mulch consists of placing a uniform layer of straw and incorporating it into the soil with a studded roller or crimper, or anchoring it with a tackifier or stabilizing emulsion. Straw mulch protects the soil surface from the impact of rain drops, preventing soil particles from becoming dislodged.

Suitable Applications

Straw mulch is suitable for disturbed areas requiring temporary protection until permanent stabilization is established. Straw mulch can be specified for the following applications:

- As a stand-alone BMP on disturbed areas until soils can be prepared for permanent vegetation. The longevity of straw mulch is typically less than six months.
- Applied in combination with temporary seeding strategies
- Applied in combination with permanent seeding strategies to enhance plant establishment and final soil stabilization
- Applied around containerized plantings to control erosion until the plants become established to provide permanent stabilization

Limitations

- Availability of straw and straw blowing equipment may be limited just prior to the rainy season and prior to storms due to high demand.

Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	<input checked="" type="checkbox"/>
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Category
- Secondary Category

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

- EC-3 Hydraulic Mulch
- EC-4 Hydroseeding
- EC-5 Soil Binders
- EC-7 Geotextiles and Mats
- EC-8 Wood Mulching
- EC-14 Compost Blanket



- There is a potential for introduction of weed seed and unwanted plant material if weed-free agricultural straw is not specified.
- Straw mulch applied by hand is more time intensive and potentially costly.
- Wind may limit application of straw and blow straw into undesired locations.
- May have to be removed prior to permanent seeding or prior to further earthwork.
- “Punching” of straw does not work in sandy soils, necessitating the use of tackifiers.
- Potential fugitive dust control issues associated with straw applications can occur. Application of a stabilizing emulsion or a water stream at the same time straw is being blown can reduce this problem.
- Use of plastic netting should be avoided in areas where wildlife may be entrapped and may be prohibited for projects in certain areas with sensitive wildlife species, especially reptiles and amphibians.

Implementation

- Straw should be derived from weed-free wheat, rice, or barley. Where required by the plans, specifications, permits, or environmental documents, native grass straw should be used.
- Use tackifier to anchor 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 can be used where other methods are impractical.
- Avoid placing straw onto roads, sidewalks, drainage channels, sound walls, existing vegetation, etc.
- Straw mulch with tackifier should not be applied during or immediately before rainfall.
- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

Application Procedures

- When using a tackifier to anchor the straw mulch, 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.
- Apply straw at a rate of between 3,000 and 4,000 lb/acre, either by machine or by hand distribution and provide 100% ground cover. A lighter application is used for flat surfaces and a heavier application is used for slopes.
- Evenly distribute straw mulch on the soil surface.
- Anchoring straw mulch to the soil surface by “punching” it into the soil mechanically (incorporating) can be used in lieu of a tackifier.

- Methods for holding the straw mulch in place depend upon the slope steepness, accessibility, soil conditions, and longevity.
 - A tackifier acts to glue the straw fibers together and to the soil surface. The tackifier should be selected based on longevity and ability to hold the fibers in place. A tackifier is typically applied at a rate of 125 lb/acre. In windy conditions, the rates are typically 180 lb/acre.
 - On very small areas, a spade or shovel can be used to punch in straw mulch.
 - On slopes with soils that 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 coultter, known commercially as a "crimper."

Costs

Average annual cost for installation and maintenance is included in the table below. Application by hand is more time intensive and potentially more costly.

BMP	Unit Cost per Acre
Straw mulch, crimped or punched	\$2,458-\$5,375
Straw mulch with tackifier	\$1,823-\$4,802

Source: Caltrans Soil Stabilization BMP Research for Erosion and Sediment Controls, July 2007

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Areas where erosion is evident should be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs.
- The key consideration in inspection and maintenance is that the straw needs to last long enough to achieve erosion control objectives. Straw mulch as a stand-alone BMP is temporary and is not suited for long-term erosion control.
- Maintain an unbroken, temporary mulched ground cover while disturbed soil areas are inactive. Repair any damaged ground cover and re-mulch exposed areas.
- Reapplication of straw mulch and tackifier may be required to maintain effective soil stabilization over disturbed areas and slopes.

References

Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Controlling Erosion of Construction Sites, Agricultural Information Bulletin #347, U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) (formerly Soil Conservation Service – SCS).

Guides for Erosion and Sediment Control in California, USDA Soils Conservation Service, January 1991.

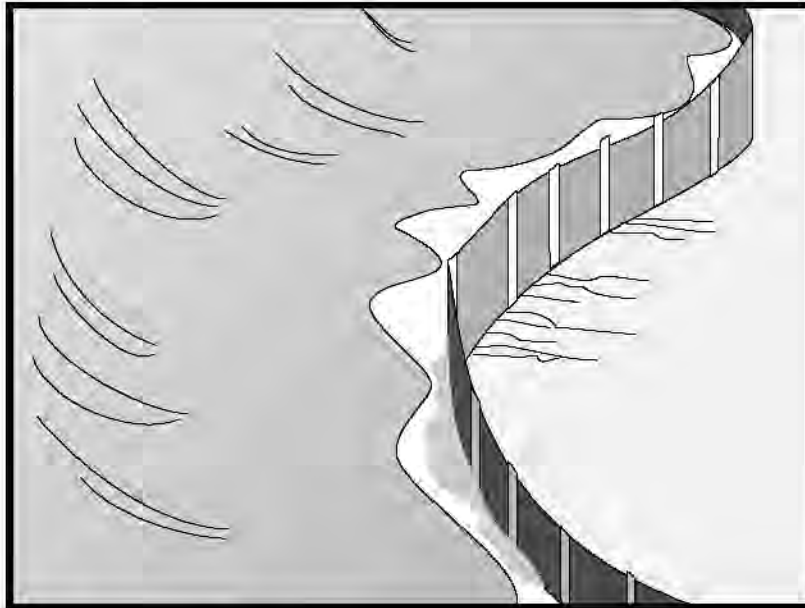
Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

Soil Erosion by Water, Agricultural Information Bulletin #513, U.S. Department of Agriculture, Soil Conservation Service.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.



Description and Purpose

A silt fence is made of a woven geotextile that has been entrenched, attached to supporting poles, and sometimes backed by a plastic or wire mesh for support. The silt fence detains sediment-laden water, promoting sedimentation behind the fence.

Suitable Applications

Silt fences are suitable for perimeter control, placed below areas where sheet flows discharge from the site. They could also be used as interior controls below disturbed areas where runoff may occur in the form of sheet and rill erosion and around inlets within disturbed areas (SE-10). Silt fences are generally ineffective in locations where the flow is concentrated and are only applicable for sheet or overland flows. Silt fences are most effective when used in combination with erosion controls. Suitable applications include:

- Along the perimeter of a project.
- Below the toe or down slope of exposed and erodible slopes.
- Along streams and channels.
- Around temporary spoil areas and stockpiles.
- Around inlets.
- Below other small cleared areas.

Categories

EC	Erosion Control	
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Category
- Secondary Category

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

- SE-5 Fiber Rolls
- SE-6 Gravel Bag Berm
- SE-8 Sandbag Barrier
- SE-10 Storm Drain Inlet Protection
- SE-14 Biofilter Bags



Limitations

- Do not use in streams, channels, drain inlets, or anywhere flow is concentrated.
- Do not use in locations where ponded water may cause a flooding hazard. Runoff typically ponds temporarily on the upstream side of silt fence.
- Do not use silt fence to divert water flows or place across any contour line. Fences not constructed on a level contour, or fences used to divert flow will concentrate flows resulting in additional erosion and possibly overtopping or failure of the silt fence.
- Improperly installed fences are subject to failure from undercutting, overtopping, or collapsing.
- Not effective unless trenched and keyed in.
- Not intended for use as mid-slope protection on slopes greater than 4:1 (H:V).
- Do not use on slopes subject to creeping, slumping, or landslides.

Implementation

General

A silt fence is a temporary sediment barrier consisting of woven geotextile stretched across and attached to supporting posts, trenched-in, and, depending upon the strength of fabric used, supported with plastic or wire mesh fence. Silt fences trap sediment by intercepting and detaining small amounts of sediment-laden runoff from disturbed areas in order to promote sedimentation behind the fence.

The following layout and installation guidance can improve performance and should be followed:

- Use principally in areas where sheet flow occurs.
- Install along a level contour, so water does not pond more than 1.5 ft at any point along the silt fence.
- The maximum length of slope draining to any point along the silt fence should be 200 ft or less.
- The maximum slope perpendicular to the fence line should be 1:1.
- Provide sufficient room for runoff to pond behind the fence and to allow sediment removal equipment to pass between the silt fence and toes of slopes or other obstructions. About 1200 ft² of ponding area should be provided for every acre draining to the fence.
- Turn the ends of the filter fence uphill to prevent stormwater from flowing around the fence.
- Leave an undisturbed or stabilized area immediately down slope from the fence where feasible.

- Silt fences should remain in place until the disturbed area is permanently stabilized, after which, the silt fence should be removed and properly disposed.
- Silt fence should be used in combination with erosion source controls up slope in order to provide the most effective sediment control.
- Be aware of local regulations regarding the type and installation requirements of silt fence, which may differ from those presented in this fact sheet.

Design and Layout

The fence should be supported by a plastic or wire mesh if the fabric selected does not have sufficient strength and bursting strength characteristics for the planned application (as recommended by the fabric manufacturer). Woven geotextile material should contain ultraviolet inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0 °F to 120 °F.

- Layout in accordance with attached figures.
- For slopes steeper than 2:1 (H:V) 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 sensitive receiving waters or Environmentally Sensitive Areas (ESAs), silt fence should be used in conjunction with erosion control BMPs.

Standard vs. Heavy Duty Silt Fence

Standard Silt Fence

- Generally applicable in cases where the slope of area draining to the silt fence is 4:1 (H:V) or less.
- Used for shorter durations, typically 5 months or less
- Area draining to fence produces moderate sediment loads.

Heavy Duty Silt Fence

- Use is generally limited to 8 months or less.
- Area draining to fence produces moderate sediment loads.
- Heavy duty silt fence usually has 1 or more of the following characteristics, not possessed by standard silt fence.
 - Fence fabric has higher tensile strength.
 - Fabric is reinforced with wire backing or additional support.
 - Posts are spaced closer than pre-manufactured, standard silt fence products.
 - Posts are metal (steel or aluminum)

Materials

Standard Silt Fence

- Silt fence material should be woven geotextile with a minimum width of 36 in. and a minimum tensile strength of 100 lb force. The fabric should conform to the requirements in ASTM designation D4632 and should have an integral reinforcement layer. The

reinforcement layer should be a polypropylene, or equivalent, net provided by the manufacturer. The permittivity of the fabric should be between 0.1 sec^{-1} and 0.15 sec^{-1} in conformance with the requirements in ASTM designation D4491.

- Wood stakes should be commercial quality lumber of the size and shape shown on the plans. Each stake should be free from decay, splits or cracks longer than the thickness of the stake or other defects that would weaken the stakes and cause the stakes to be structurally unsuitable.
- Staples used to fasten the fence fabric to the stakes should be not less than 1.75 in. long and should be fabricated from 15 gauge or heavier wire. The wire used to fasten the tops of the stakes together when joining two sections of fence should be 9 gauge or heavier wire. Galvanizing of the fastening wire will not be required.

Heavy-Duty Silt Fence

- Some silt fence has a wire backing to provide additional support, and there are products that may use prefabricated plastic holders for the silt fence and use metal posts or bar reinforcement instead of wood stakes. If bar reinforcement is used in lieu of wood stakes, use number four or greater bar. Provide end protection for any exposed bar reinforcement for health and safety purposes.

Installation Guidelines – Traditional Method

Silt fences are to be constructed on a level contour. Sufficient area should exist behind the fence for ponding to occur without flooding or overtopping the fence.

- A trench should be excavated approximately 6 in. wide and 6 in. deep along the line of the proposed silt fence (trenches should not be excavated wider or deeper than necessary for proper silt fence installation).
- Bottom of the silt fence should be keyed-in a minimum of 12 in.
- Posts should be spaced a maximum of 6 ft apart and driven securely into the ground a minimum of 18 in. or 12 in. below the bottom of the trench.
- When standard strength geotextile is used, a plastic or wire mesh support fence should be fastened securely to the upslope side of posts using heavy-duty wire staples at least 1 in. long. The mesh should extend into the trench.
- When extra-strength geotextile and closer post spacing are used, the mesh support fence may be eliminated.
- Woven geotextile should be purchased in a long roll, then cut to the length of the barrier. When joints are necessary, geotextile should be spliced together only at a support post, with a minimum 6 in. overlap and both ends securely fastened to the post.
- The trench should be backfilled with native material and compacted.
- Construct silt fences with a setback of at least 3 ft from the toe of a slope. Where, due to specific site conditions, a 3 ft setback is not available, the silt fence may be constructed at the

toe of the slope, but should be constructed as far from the toe of the slope as practicable. Silt fences close to the toe of the slope will be less effective and more difficult to maintain.

- 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 should the reach exceed 500 ft.
- Cross barriers should be a minimum of $1/3$ and a maximum of $1/2$ the height of the linear barrier.
- See typical installation details at the end of this fact sheet.

Installation Guidelines - Static Slicing Method

- Static Slicing is defined as insertion of a narrow blade pulled behind a tractor, similar to a plow blade, at least 10 inches into the soil while at the same time pulling silt geotextile fabric into the ground through the opening created by the blade to the depth of the blade. Once the geotextile is installed, the soil is compacted using tractor tires.
- This method will not work with pre-fabricated, wire backed silt fence.
- Benefits:
 - Ease of installation (most often done with a 2 person crew). In addition, installation using static slicing has been found to be more efficient on slopes, in rocky soils, and in saturated soils.
 - Minimal soil disturbance.
 - Greater level of compaction along fence, leading to higher performance (i.e. greater sediment retention).
 - Uniform installation.
 - Less susceptible to undercutting/undermining.

Costs

- It should be noted that costs vary greatly across regions due to available supplies and labor costs.
- Average annual cost for installation using the traditional silt fence installation method (assumes 6 month useful life) is \$7 per linear foot based on vendor research. Range of cost is \$3.50 - \$9.10 per linear foot.
- In tests, the slicing method required 0.33 man hours per 100 linear feet, while the trenched based systems required as much as 1.01 man hours per linear foot.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair undercut silt fences.

- Repair or replace split, torn, slumping, or weathered fabric. The lifespan of silt fence fabric is generally 5 to 8 months.
- Silt fences that are damaged and become unsuitable for the intended purpose should be removed from the site of work, disposed, and replaced with new silt fence barriers.
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Silt fences should be left in place until the upstream area is permanently stabilized. Until then, the silt fence should be inspected and maintained regularly.
- Remove silt fence when upgradient areas are stabilized. Fill and compact post holes and anchor trench, remove sediment accumulation, grade fence alignment to blend with adjacent ground, and stabilize disturbed area.

References

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, United States Environmental Protection Agency, 2002.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group-Working Paper, USEPA, April 1992.

Sedimentation and Erosion Control Practices, and Inventory of Current Practices (Draft), UESPA, 1990.

Southeastern Wisconsin Regional Planning Commission (SWRPC). Costs of Urban Nonpoint Source Water Pollution Control Measures. Technical Report No. 31. Southeastern Wisconsin Regional Planning Commission, Waukesha, WI. 1991

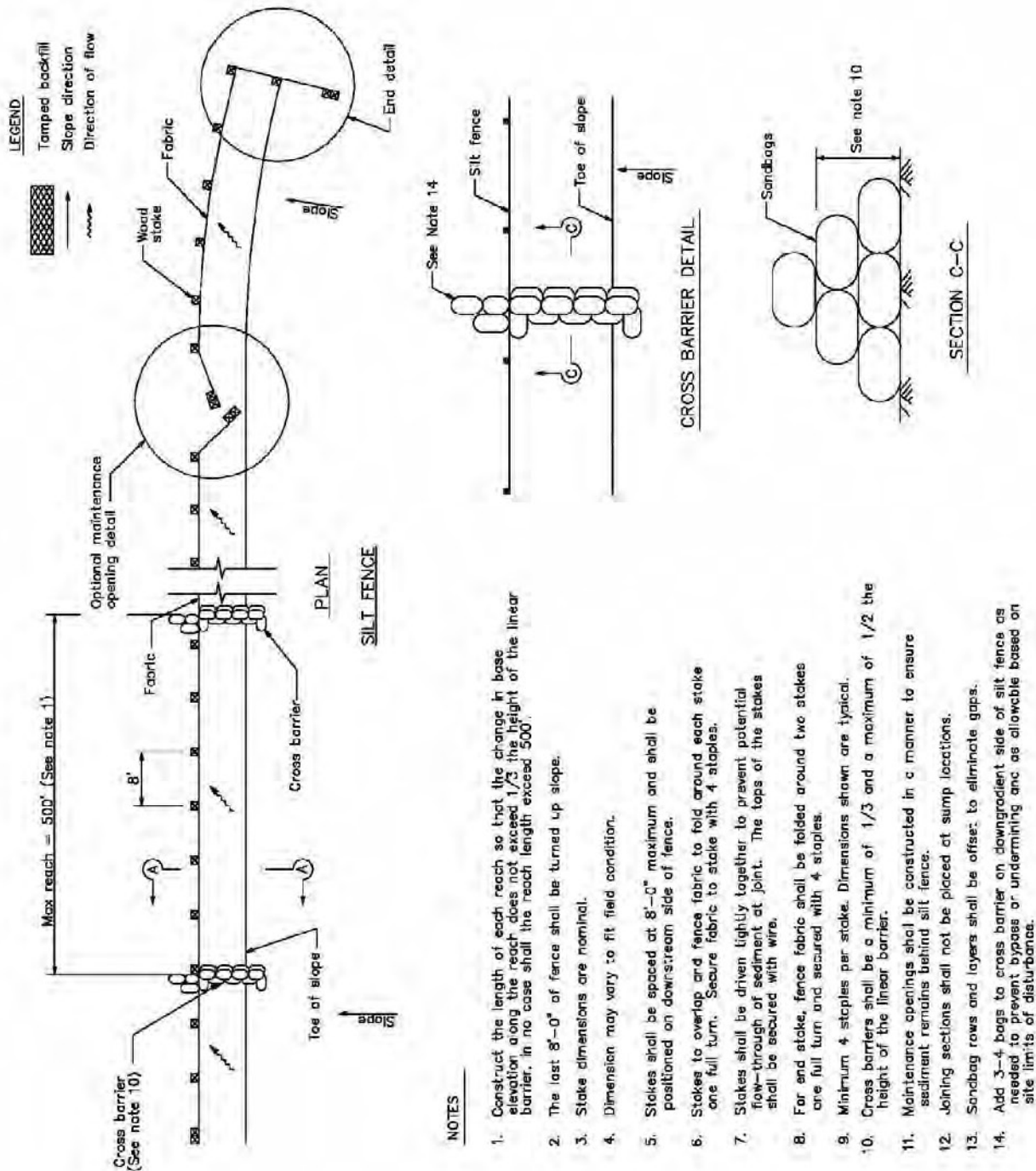
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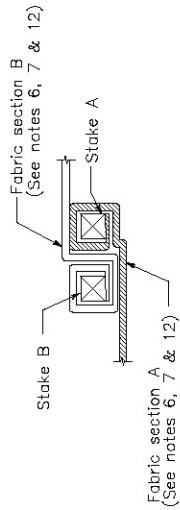
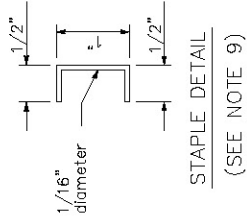
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U.S. Environmental Protection Agency (USEPA). Stormwater Management for Industrial Activities: Developing Pollution Prevention Plans and Best Management Practices. U.S. Environmental Protection Agency, Office of Water, Washington, DC, 1992.

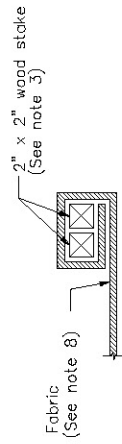
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Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

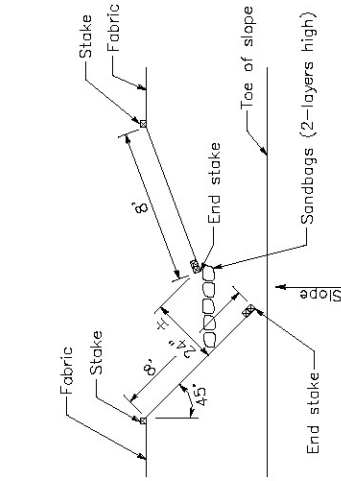




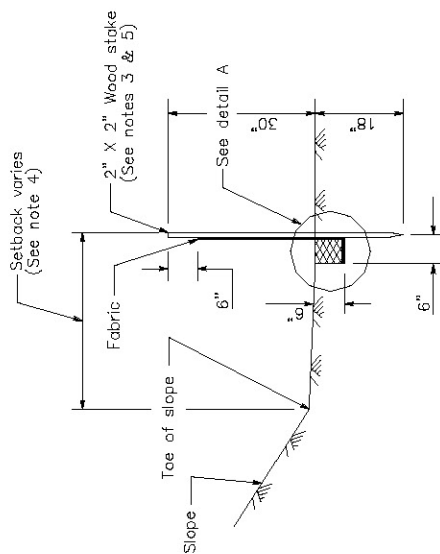
JOINING SECTION DETAIL (TOP VIEW)



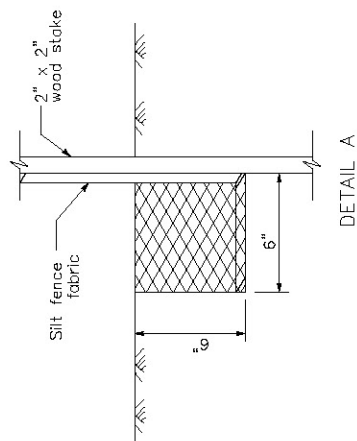
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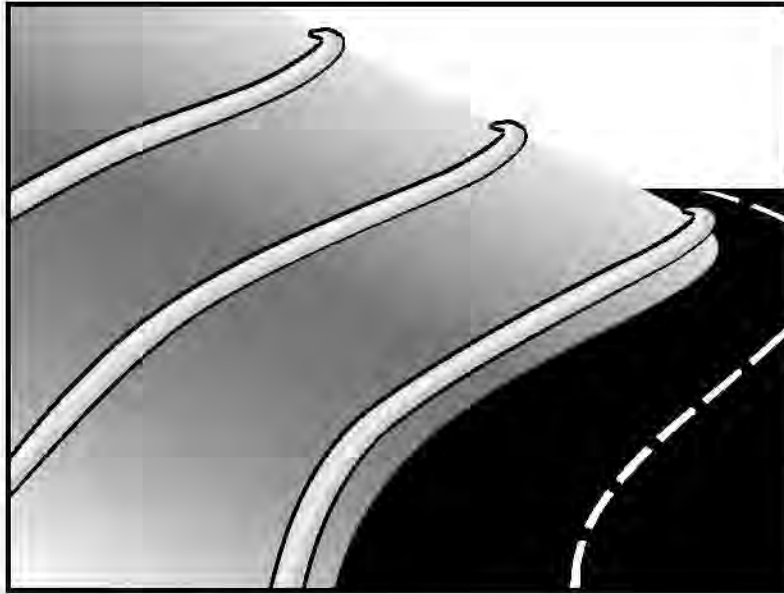
OPTIONAL MAINTENANCE OPENING DETAIL
(SEE NOTE 11)



SECTION A-A



END DETAIL



Description and Purpose

A fiber roll consists of straw, coir, or other biodegradable materials bound into a tight tubular roll wrapped by netting, which can be photodegradable or natural. Additionally, gravel core fiber rolls are available, which contain an imbedded ballast material such as gravel or sand for additional weight when staking the rolls are not feasible (such as use as inlet protection). When fiber rolls are placed at the toe and on the face of slopes along the contours, they intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from the runoff (through sedimentation). By interrupting the length of a slope, fiber rolls can also reduce sheet and rill erosion until vegetation is established.

Suitable Applications

Fiber rolls may be suitable:

- Along the toe, top, face, and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.
- At the end of a downward slope where it transitions to a steeper slope.
- Along the perimeter of a project.
- As check dams in unlined ditches with minimal grade.
- Down-slope of exposed soil areas.
- At operational storm drains as a form of inlet protection.

Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

- Primary Category
- Secondary Category

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

- SE-1 Silt Fence
- SE-6 Gravel Bag Berm
- SE-8 Sandbag Barrier
- SE-14 Biofilter Bags



- Around temporary stockpiles.

Limitations

- Fiber rolls are not effective unless trenched in and staked.
- Not intended for use in high flow situations.
- Difficult to move once saturated.
- If not properly staked and trenched in, fiber rolls could be transported by high flows.
- Fiber rolls have a very limited sediment capture zone.
- Fiber rolls should not be used on slopes subject to creep, slumping, or landslide.
- Rolls typically function for 12-24 months depending upon local conditions.

Implementation

Fiber Roll Materials

- Fiber rolls should be prefabricated.
- Fiber rolls may come manufactured containing polyacrylamide (PAM), a flocculating agent within the roll. Fiber rolls impregnated with PAM provide additional sediment removal capabilities and should be used in areas with fine, clayey or silty soils to provide additional sediment removal capabilities. Monitoring may be required for these installations.
- Fiber rolls are made from weed free rice straw, flax, or a similar agricultural material bound into a tight tubular roll by netting.
- Typical fiber rolls vary in diameter from 9 in. to 20 in. Larger diameter rolls are available as well.

Installation

- Locate fiber rolls on level contours spaced as follows:
 - Slope inclination of 4:1 (H:V) or flatter: Fiber rolls should be placed at a maximum interval of 20 ft.
 - Slope inclination between 4:1 and 2:1 (H:V): Fiber Rolls should be placed at a maximum interval of 15 ft. (a closer spacing is more effective).
 - Slope inclination 2:1 (H:V) or greater: Fiber Rolls should be placed at a maximum interval of 10 ft. (a closer spacing is more effective).
- Prepare the slope before beginning installation.
- Dig small trenches across the slope on the contour. The trench depth should be $\frac{1}{4}$ to $\frac{1}{3}$ of the thickness of the roll, and the width should equal the roll diameter, in order to provide area to backfill the trench.

- It is critical that rolls are installed perpendicular to water movement, and parallel to the slope contour.
- Start building trenches and installing rolls from the bottom of the slope and work up.
- It is recommended that pilot holes be driven through the fiber roll. Use a straight bar to drive holes through the roll and into the soil for the wooden stakes.
- Turn the ends of the fiber roll up slope to prevent runoff from going around the roll.
- Stake fiber rolls into the trench.
 - Drive stakes at the end of each fiber roll and spaced 4 ft maximum on center.
 - Use wood stakes with a nominal classification of 0.75 by 0.75 in. and minimum length of 24 in.
- If more than one fiber roll is placed in a row, the rolls should be overlapped, not abutted.
- See typical fiber roll installation details at the end of this fact sheet.

Removal

- Fiber rolls can be left in place or removed depending on the type of fiber roll and application (temporary vs. permanent installation). Typically, fiber rolls encased with plastic netting are used for a temporary application because the netting does not biodegrade. Fiber rolls used in a permanent application are typically encased with a biodegradable material and are left in place. Removal of a fiber roll used in a permanent application can result in greater disturbance.
- Temporary installations should only be removed when up gradient areas are stabilized per General Permit requirements, and/or pollutant sources no longer present a hazard. But, they should also be removed before vegetation becomes too mature so that the removal process does not disturb more soil and vegetation than is necessary.

Costs

Material costs for regular fiber rolls range from \$20 - \$30 per 25 ft roll.

Material costs for PAM impregnated fiber rolls range between 7.00-\$9.00 per linear foot, based upon vendor research.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair or replace split, torn, unraveling, or slumping fiber rolls.
- If the fiber roll is used as a sediment capture device, or as an erosion control device to maintain sheet flows, sediment that accumulates in the BMP should be periodically removed

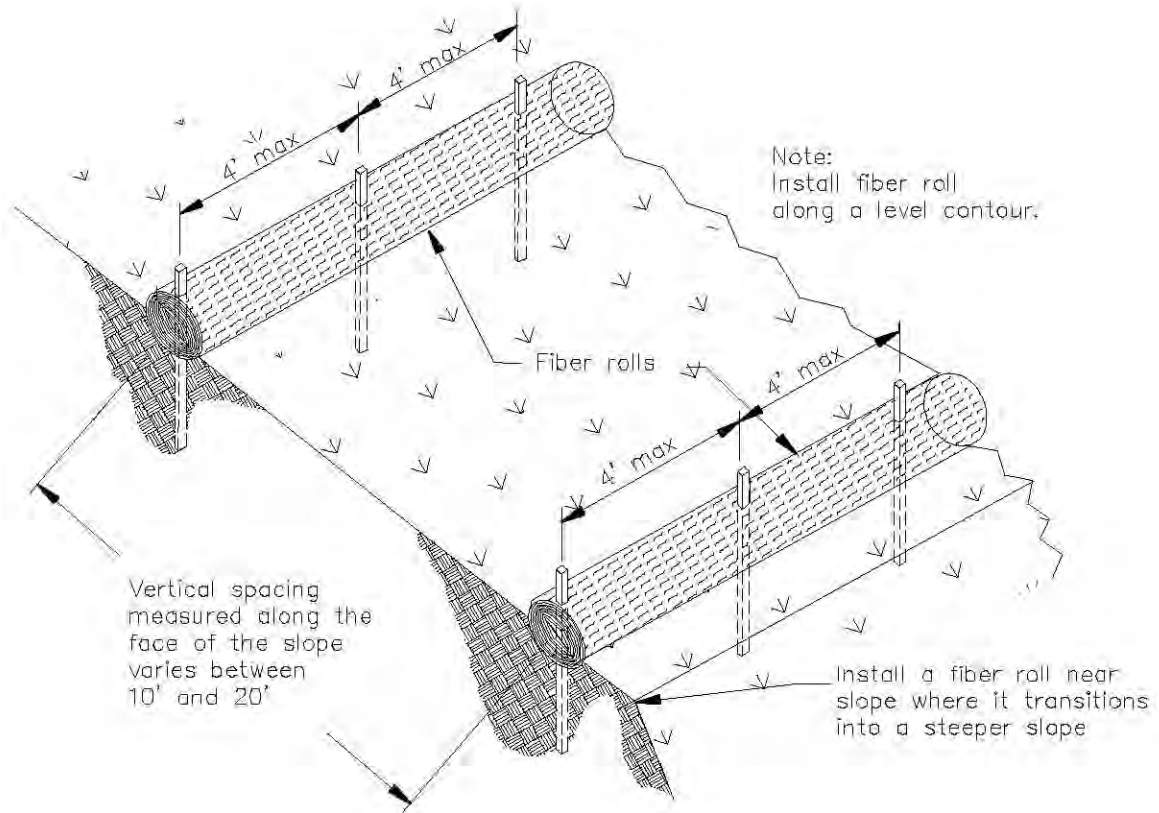
in order to maintain BMP effectiveness. Sediment should be removed when sediment accumulation reaches one-third the designated sediment storage depth.

- If fiber rolls are used for erosion control, such as in a check dam, sediment removal should not be required as long as the system continues to control the grade. Sediment control BMPs will likely be required in conjunction with this type of application.
- Repair any rills or gullies promptly.

References

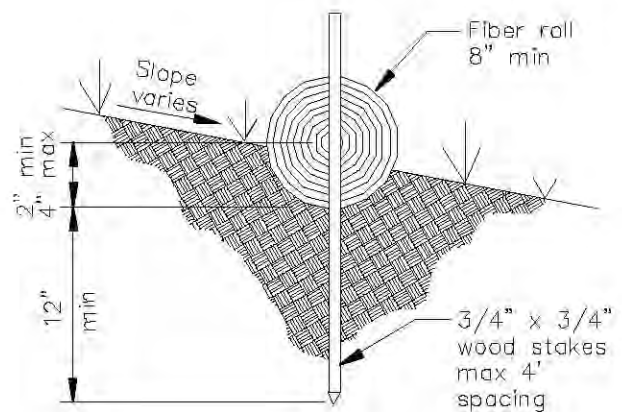
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



TYPICAL FIBER ROLL INSTALLATION

N.T.S.



ENTRENCHMENT DETAIL

N.T.S.