Site Management Plan

(Tier 2, High Risk)

WDID-1_12CC415333

Humboldt County
APN: 223-061-043-000, 223-061-038-000, 223-073-005-000, 223-073-004-000

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Purpose

This Site Management Plan (SMP) has been prepared on behalf of the cannabis cultivator for the Humboldt County property identified as assessor parcel numbers 223-061-043-000, 223-061-038-000, 223-073-005-000, 223-073-004-000, by agreement and in response to the State Water Resources Control Board Cannabis Cultivation Policy (Cannabis Policy), in congruence with Order WQ 2019-0001-DWQ General Waste Discharge Requirements for Discharges of Waste Associated with Cannabis Cultivation Activities (General Order). The General Order implements the Cannabis Policy requirements, specifically those requirements that address waste discharges associated with cannabis cultivation activities. Cannabis cultivators covered under the General Order are subject to the requirements of the Cannabis Policy in its entirety. The Cannabis Policy provides a statewide tiered approach for permitting discharges and threatened discharges of waste from cannabis cultivation and associated activities, establishes a personal use exemption standard, and provides conditional exemption criteria for activities with a low threat to water quality.

Tier Designation

Tiers are defined by the amount of disturbed area. Tier 1 outdoor commercial cultivation activities disturb an area equal to or greater than 2,000 square feet and less than 1 acre (43,560 square feet). Tier 2 outdoor commercial cultivation activities disturb an area equal to or greater than 1 acre. Risk designation for Tier 1 and Tier 2 enrollees under the Cannabis Policy is based on the slope of disturbed areas and the proximity to a surface water body. Characterization is based on the risk designation summarized in Table 1 below.

Table 1: Summary of Risk Designation

Low Risk	Moderate Risk	High Risk
• No portion of the disturbed area is located on a slope greater than 30 percent, and • All of the disturbed area complies with the setback requirements.	• Any portion of the disturbed area is located on a slope greater than 30 percent, and • All of the disturbed area complies with the setback requirements.	• Any portion of the disturbed area is located within the setback requirements.

Thorough assessment of the project area including roads, disturbed areas, legacy features, and cultivation areas classify this enrollment into the **Tier 2, High Risk** designation.

Scope of Report

Tier 1 and Tier 2 cannabis cultivators are required to submit and implement a Site Management Plan that describes how they are complying with the Requirements listed in Attachment A. The description shall describe how all applicable Best Practicable Treatment or Control (BPTC) measures are implemented. Cannabis cultivators within the North Coast Regional Water Quality Control Board jurisdiction are required to submit and implement Site Management Plans that describe how the Requirements are implemented property-wide, to include legacy activities. The SMP includes an Implementation Schedule to achieve compliance, but all work must be completed by the onset of the Winter Period each year. Projects designated as Moderate Risk are also required to have a Site Erosion and Sediment Control (plan) to achieve the goal of minimizing the discharge of sediment off-site. Projects designated as High Risk are also required to have a Disturbed Area Stabilization Plan to achieve the goal of stabilizing the disturbed area to minimize the discharge of sediment off-site and comply with the setback requirements. The cannabis cultivator shall ensure that all site operating personnel are familiar with the contents of the General Order and all technical reports prepared for the property. Projects which have over one acre of cannabis cultivation (total canopy area) are also required to have a Nitrogen Management Plan to describe how nitrogen is stored, used, and applied to crops in a way that is protective of water quality. A copy of the General Order, and technical reports required by the General Order, shall be kept at the cultivation site. Electronic copies of these documents are acceptable. Either format of maintained documents kept on site must be immediately presentable upon request.

Methods

The methods used to develop this SMP include both field and office components. The office component consisted of aerial photography review and interpretation, existing USGS quad map review, GIS mapping of field data, review of on-site photography points, streamflow calculations, general planning, and information gathered from the cannabis cultivator and/or landowner. The field component included mapping of all access roads, vehicle parking areas, Waters of the State, stream crossings, drainage features, cultivation sites, buildings, disturbed areas, and all other relevant site features within the project are and surrounding areas (as feasible). Cultivation areas, associated facilities, roads, and other developed and/or disturbed areas were assessed for discharges and related controllable water quality factors from the activities listed in the General Order. The field assessment also included an evaluation and determination of compliance with all applicable BPTC's per Section 2 of the General Order.

Property Description

The property assessed consists of four contiguous parcels totaling 436 acres located approximately 1.5 miles east of Garberville, California, at an elevation of approximately 1,200 feet above mean sea level. The property is located in Section 19 & 20, T4S, R4E, HB&M, Humboldt County, from the Garberville USGS 7.5' Quad. Bear Canyon Creek and unnamed Class II and III watercourses flow east-west through the property that drain to the South Fork Eel River.

Site Managment Plan

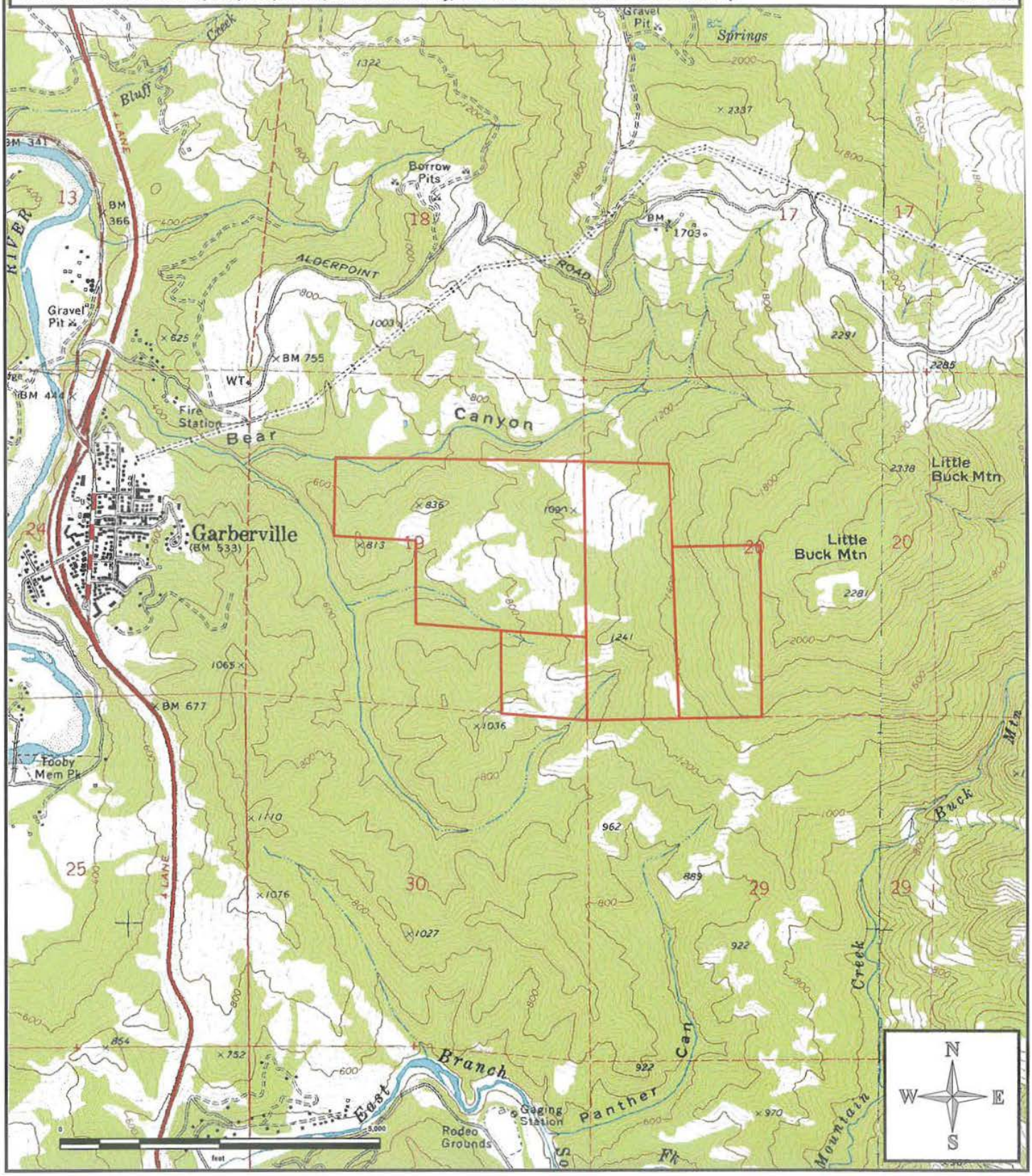
General Location Map [WDID - 1_12CC415333]

Timberland Resource Consultants

Property Boundary

Located in Section 19 & 20, T4S, R4E, HB&M, Humboldt County, from the Garberville 7.5' USGS Quad Map

TRC - 440



Project Description

Cannabis cultivation on the property consists of eighteen 10' x various length hoop-houses, four 20' x 96' greenhouses, and approximately 35,300 ft^2 of outdoor cultivation, for a total, general cultivation area[1] of 57,300 ft^2. The cultivation areas are located within 117,534 ft^2 of disturbed area. This total of disturbed area does not include the proposed development, and associated disturbed area, of the Proposed Cultivation Area. This project is being permitted by Humboldt County to cultivate cannabis. This project was previously enrolled in the North Coast Regional Water Quality Control Board Order No. R1-2015-0023 under WDID-1B16868CHUM and has since enrolled with State Water Recourses Control Board as WDID-1_12CC415333. This project is being classified as Tier 2, High Risk.

Table 1: Cultivation Site Parameters.

Cultivation Area	Land Disturbance Area (ft^2)	General Cultivation Area[1] (ft^2)	Adjoining Hillslopes (% Grade)
A/Zone 1	70,400	22,650	~20 – 25%
B/South 80	6,877	8,000	~25 – 30%
C/Road Side	14,140	6,300	~25%
D/Zone 2	14,470	5,950	~20%
E/Corral	4,802	6,900	~20 – 25%
F/Lower 40	6,845	7,500	~25%
Proposed Cultivation Area/Rock Pit	TBD	Max 20,000	~8 – 30%
Totals:	117,534	Currently 57,300 (2019) Max with full Proposed Cultivation area buildout ~65,940	

[1] Area refers to the total land disturbance area. The total cannabis canopy area may vary considerably than the disturbance area.

Table 2: Project Permitting

Additional Required Permits Related to Project, Type, and Status	
ISWDU	Initial Statement of Water Diversion and Use – #S026340, S026339, S026342, S026341, S027729, S027908, S027909, S027730
SIUR	Small Irrigation Use Registration – #H506212
LSAA/1600	Lake and Streambed Alteration Agreements from CDFW – Notification No. 1600-2015-0456-R1 & 1600-2018-0857-R1

Baseline Assessment of Requirements Related to Water Diversions and Waste Discharge for Cannabis Cultivation

This project was previously enrolled in the North Coast Regional Water Quality Control Board Order No. 2015-0023. A Water Resource Protection Plan (WRPP) was prepared by Pacific Watershed Associates. Some mitigations prescribed in the WRPP have since been completed. A re-assessment of the project was conducted and will be used as the baseline assessment for the preparation of this document.

Land Development and Maintenance, Erosion Control, and Drainage Features

Project Compliance Y☐/N☒

Roads are being classified as "permanent" (roads appurtenant to the project being used year-round), "seasonal" (roads appurtenant to the project being used primarily during summer months), "legacy" (roads not appurtenant to the project receiving little to no use), and "trail" (being rarely used for occasional access to features on the property).

Roads within the project area appear to have a low native rock component and high imported rock component and, based on observations of surface erosion relative to current surface drainage break frequency, are being classified as having moderate erodibility. This classification will be utilized to determine surface/ditch-line drainage break frequency based on Table 19 of the Handbook for Forest Ranch and Rural Roads, 2014.

TABLE 19. Recommended maximum rolling dip and ditch relief culvert spacing, in feet, based on road gradient and soil erodibility [1,2]

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

Currently, all permanent roads on the property have imported rock surfacing and do not require any more rock surfacing. All road segments within riparian setbacks are rock surfaced or see little to none winter time use.

Roads assessed by TRC were found to be in acceptable condition with imported rock surfacing. The majority of access roads, permanent and seasonal, are out-sloped with gentle gradients and adequately drained to allow surface/ditch-line water drainage. However, sections of permanent roads, seasonal roads, and trails require either the maintenance of existing drainage features or installation of new drainage features. No wheel ruts were observed on the majority of access roads on the date of the site visit. Only between Sites 50 & 51 were wheel ruts observed. This segment of road sees no wintertime use and will be further adequately developed pending the development of a cannabis cultivation relocation area north of Site 51. If this does not occur, this road segment will be laid to rest and allowed to revegetate naturally.

Controllable Sediment Delivery Sites (CSDS) were found on the property. Runoff and sediment from Sites 16, 17, 30, 36, 39, 46, & 65 was found discharging into surface waters. See the Mitigation Report, Treatment Implementation Schedule, and Site Map to follow for site specific details and treatments.

Proposed Relocation Area:
Cultivation Areas located within riparian setbacks will be relocated to this area, as shown on the attached Site Maps. Cultivation Areas E and F will be entirely relocated to the Proposed Relocation Area while portions of Cultivation Area A & B located within riparian setbacks will only be relocated. Cultivation Areas E and F are entirely being relocated to the proposed area because these cultivation areas are currently located in environmentally poor locations where they are accessed by trails and seasonal roads that threaten water quality and would require significant upgrading to be used. These cultivation areas, along with Past Cultivation Areas, are also being relocated to consolidate the number of cultivation areas on the property for multiple logistic and environmental reasons. This process of relocating and closing out of cultivation areas with take process over the next following years. Attached is the current proposed relocation timetable that outlines the cultivation area's square footages and where these square footages are being relocated.

An unstable area was observed on the property. A large, deep seated, unstable area is located approximately 420' west and downslope of Cultivation Area A.

Cleanup, Restoration, and Mitigation:
Project Compliance Y☒/N☐

No revegetation besides seeding and mulching disturbed areas or sediment catchment sites are being prescribed.

Stream Crossing Installation and Maintenance:
Project Compliance Y☐/N☒

Twenty-eight watercourse crossings were identified during the assessment of the property. One watercourse crossing (Site 71) shall be abandoned as the Cultivator plans to no longer use the crossing and Cultivation Area F it accesses. Nine watercourse crossings (Sites 22, 35, 39, 46, 47, 49, 51, 65, 67) shall have new drainage structures installed or the existing drainage structure upgraded or maintenanced as these crossings are used and required by the landowner.

Two Lake and Streambed Alteration Agreements (LSAA/1600) with California Department of Fish & Wildlife (CDFW) have been submitted as of the writing of this assessment for the proposed work on watercourse crossings. Any additional guidelines, treatments, or restrictions set forth under the finalized Lake and Stream Alteration Agreement shall be followed.

Table 3: Stream Crossing Hydrology

Site ID_NUMBER	(ac) D_AREA	K_VALUE	Elevation (ft) Culvert_Elevation	Elevation (ft) Drainage_Divide	(mi) LENGTH	(in) CMP_DIA
Site 01 (LSAA #01)	27	0.35	1160	2000		42
Site 03 (LSAA #03)	5	0.35				42
Site 16 (LSAA #21)	5	0.35				
Site 18 (LSAA #20)	10	0.35				30
Site 22 (LSAA #22)	9	0.35				15
Site 29 (LSAA #18)	8	0.35				24
Site 35 (LSAA #25)	1	0.35				
Site 37 (LSAA #23)	3	0.35				18
Site 38 (LSAA #24A)	6	0.35				24
Site 39 (LSAA #24B)	6	0.35				24
Site 42 (LSAA #8)	56	0.35	1000	2200		48
Site 43 (LSAA #7)	17	0.35				42
Site 45 (LSAA #6)	4	0.35				24
Site 46 (LSAA #5)	1	0.35				
Site 47 (LSAA #4)	3	0.35				
Site 49 (LSAA #9)	6	0.35				36
Site 53 (LSAA #10)	77	0.35	900	2200		60
Site 58 (LSAA #12)	1	0.35				18
Site 61 (LSAA #14)	83	0.35	760	2200		60
Site 65 (LSAA #13)	2	0.35				
Site 67 (LSAA #15)	3	0.35				
Site 69 (LSAA #16)	86	0.35	640	2200		60

Precipitation Depth-Duration-Frequency Values **Mean Annual Rainfall (in) =** 65

50-Year Storm			100-Year Storm		
Time, Min	Depth (in)	Inch/hr.	Time, Min.	Depth (in)	Inch/hr.
10	0.400	2.40	10	0.616	3.70

ID#	Runoff Coef. (K)	Altitude Index (1000's ft.)	Time of Concen. (min)	24-hr. Rainfall Intensity (in/hr)	Mean Annual Rainfall (in)	Drainage Area (ac)	Selected Discharge Method	Q 100 RATIONAL (cfs)	Q 100 USGS MF (cfs)
Site 01 (LSAA #01)	0.35	0.0	0	3.70	65	27	USGS MF	35	32
Site 03 (LSAA #03)	0.35	0.0	0	3.70	65	5	RATIONAL	6	7
Site 16 (LSAA #21)	0.35	0.0	0	3.70	65	5	RATIONAL	6	7
Site 18 (LSAA #20)	0.35	0.0	0	3.70	65	10	RATIONAL	12	13
Site 22 (LSAA #22)	0.35	0.0	0	3.70	65	9	RATIONAL	12	12
Site 29 (LSAA #18)	0.35	0.0	0	3.70	65	8	RATIONAL	10	11
Site 35 (LSAA #25)	0.35	0.0	0	3.70	65	1	RATIONAL	1	2
Site 37 (LSAA #23)	0.35	0.0	0	3.70	65	3	RATIONAL	3	4
Site 38 (LSAA #24A)	0.35	0.0	0	3.70	65	6	RATIONAL	8	9
Site 39 (LSAA #24B)	0.35	0.0	0	3.70	65	6	RATIONAL	8	9
Site 42 (LSAA #8)	0.35	0.0	0	3.70	65	56	USGS MF	72	60
Site 43 (LSAA #7)	0.35	0.0	0	3.70	65	17	RATIONAL	22	21
Site 45 (LSAA #6)	0.35	0.0	0	3.70	65	4	RATIONAL	5	5
Site 46 (LSAA #5)	0.35	0.0	0	3.70	65	1	RATIONAL	1	2
Site 47 (LSAA #4)	0.35	0.0	0	3.70	65	3	RATIONAL	4	5
Site 49 (LSAA #9)	0.35	0.0	0	3.70	65	6	RATIONAL	8	9
Site 53 (LSAA #10)	0.35	0.0	0	3.70	65	77	USGS MF	100	79
Site 58 (LSAA #12)	0.35	0.0	0	3.70	65	1	RATIONAL	1	1
Site 61 (LSAA #14)	0.35	0.0	0	3.70	65	83	USGS MF	107	84
Site 65 (LSAA #13)	0.35	0.0	0	3.70	65	2	RATIONAL	3	3
Site 67 (LSAA #15)	0.35	0.0	0	3.70	65	3	RATIONAL	3	4
Site 69 (LSAA #16)	0.35	0.0	0	3.70	65	86	USGS MF	111	87

ID#	Existing Culvert (D) Diameter (in)	Headwall (HW) Height (in)	HW/D (ratio)	Selected Discharge Method	Q100 (cfs)	Culvert Capacity (cfs)	Culvert is Undersized	Recommended Culvert Dia. (in)	Recommendation Based On
Site 01 (LSAA #01)	42	0	0.0	USGS MF	32	47		42	Q100
Site 03 (LSAA #03)	42	0	0.0	RATIONAL	6	47		24	Q100
Site 16 (LSAA #21)	0	0	0.0	RATIONAL	6	0	TRUE	18	Q100
Site 18 (LSAA #20)	30	0	0.0	RATIONAL	12	20		30	Q100
Site 22 (LSAA #22)	15	0	0.0	RATIONAL	12	0	TRUE	18	Q100
Site 29 (LSAA #18)	24	0	0.0	RATIONAL	10	12		24	Q100
Site 35 (LSAA #25)	0	0	0.0	RATIONAL	1	0	TRUE	18	Q100
Site 37 (LSAA #23)	18	0	0.0	RATIONAL	3	6		18	Q100
Site 38 (LSAA #24A)	24	0	0.0	RATIONAL	8	12		24	Q100
Site 39 (LSAA #24B)	24	0	0.0	RATIONAL	8	12		24	Q100
Site 42 (LSAA #8)	48	0	0.0	USGS MF	60	66		48	Q100
Site 43 (LSAA #7)	42	0	0.0	RATIONAL	22	47		42	Q100
Site 45 (LSAA #6)	24	0	0.0	RATIONAL	5	12		24	Q100
Site 46 (LSAA #5)	0	0	0.0	RATIONAL	1	0	TRUE	18	Q100
Site 47 (LSAA #4)	0	0	0.0	RATIONAL	4	0	TRUE	18	Q100
Site 49 (LSAA #9)	36	0	0.0	RATIONAL	8	32		36	Q100
Site 53 (LSAA #10)	60	0	0.0	USGS MF	79	115		60	Q100
Site 58 (LSAA #12)	18	0	0.0	RATIONAL	1	6		18	Q100
Site 61 (LSAA #14)	60	0	0.0	USGS MF	84	115		60	Q100
Site 65 (LSAA #13)	0	0	0.0	RATIONAL	3	0	TRUE	18	Q100
Site 67 (LSAA #15)	0	0	0.0	RATIONAL	3	0	TRUE	18	Q100
Site 69 (LSAA #16)	60	0	0.0	USGS MF	87	115		60	Q100

Soil Disposal and Spoils Management:
Project Compliance Y☒/N☐

Currently, no spoils are present on the property. Any/all spoils generated through development or maintenance of roads, driveways, earthen fill pads, or other cleared or filled areas have not been sidecast in any location where they can enter or be transported to surface waters. Any/all future spoils generated as a result of any future construction projects that are to be stored on the property shall be done so in accordance with the BTPC.

Riparian and Wetland Protection and Management:
Project Compliance Y☐/N☒

Disturbed areas were identified as being within riparian setbacks. The removal of sections of Cultivation Areas A, B, E, and F out of riparian setbacks, the continued implementation of prescribed storm water runoff mitigations at Cultivation Area A, the removal of remnant cultivation-related materials and wastes from the Past Cultivation Area located within riparian setbacks southwest of Site 56, and the completion of prescribed work at Sites 17 and 21 will lead to project compliance. See below and the attached mitigation report for details. (Cultivation Area A, B, E, F, Past Cultivation Areas, and Sites 17 & 21.)

Sections of disturbed area and cultivation area associated with Cultivation Areas A, B, E, and F were found to be within the riparian setbacks of either Class II or Class III watercourses. These areas within riparian setbacks are shown on attached maps and have been flagged in the field. No evidence of sidecast fill material or erosion, and associated sediment discharge, associated with Cultivation Areas B, E, and F was found entering the watercourses. However, at Cultivation Area A, signs of erosion of the cultivation area's northeastern cutbank were observed discharging into a Class IV drainage ditch that then discharges into a Class III watercourse. Also, at Cultivation Areas A, B, and F, evidence of surface runoff from the cultivation areas was found discharging into Class III watercourses. Cultivation Area's E and F will be entirely relocated to the Proposed Relocation Area, as shown on the attached Site Map, while portions of Cultivation Area A & B located within riparian setbacks will be relocated to the Proposed Relocation Area. See "Proposed Relocation Area" above under the section titled "Land Development and Maintenance, Erosion Control, and Drainage Features" and Cultivation Area A, B, E, F, and Site 17 on the attached Mitigation Report.

At Site 13 no riparian setbacks are being proposed on the Undefined watercourse located at this site. This watercourse was identified as an Undefined watercourse because it does have a defined bed, bank, and channel but does not connect to a higher order watercourse. Therefore, this watercourse is not capable of sediment transport to the waters of the state. The proposed action is to monitor this site during the winter and to be aware of potential storm water drainage needs at this location for future development of this area. See the attached photographs, Mitigation Report, Treatment Implementation Schedule, and Site Map to follow for site specific details and treatments.

Two Past Cultivation Areas are located on the property. One of these areas is no longer in use and has been removed. The other is no longer in use and has yet to be removed. The Past Cultivation Area that has yet to be removed is located within the riparian setbacks of an adjacent wet area and Class III watercourse and can be located approximately 600' southwest of Site 56.

Permanent roads and seasonally used roads and trails that are within riparian setbacks were found to be adequately rock surfaced and drained. Implementing the prescribed maintenance and installation of drainage structures and features

Table 4: Riparian and Wetland Protection and Management

Disturbed Area	Disturbance Area Distances and Riparian Setbacks[2]				
	Class I [Setback: 100'][2]	Class II [Setback: 100']	Class III [Setback: 50']	Perennial Spring or Wetland [Setback: 50'][2]	Disturbed Area Within Setbacks [ft²]
Cultivation Area A	>200'	>200'	160'	>200'	250 – 2,055
Cultivation Area B	>200'	>200'	>200'	>200'	1,100
Cultivation Area C	>200'	>200'	~120'	>200'	0
Cultivation Area D	>200'	~45'	~150'	>200'	0
Cultivation Area E	>200'	>200'	~45'	>200'	2,600
Cultivation Area F	>200'	~160'	0'	>200'	3,600
				Total =	7,550 - 9355

[2]This enrollment was previously enrolled in RWQCB Order No 2015-0023 and as such may retain reduced setbacks that were applicable under the previous Order.

Water Storage and Use:
Project Compliance Y☐/N☒

All water on the property is derived from a groundwater well, one off-stream rain catchment pond, one on-stream rain catchment pond, and four Points of Diversion (PODs) located on the property. The groundwater well was installed in the latter half of 2019 and will be the sole source of water used for the irrigation of cannabis starting in 2020. It is expected that the groundwater well will meet and exceed the required water demands for agricultural use. POD A, B, and C are diversions that have been used for agriculture in the past but have not been used since 2017 upon installation of the off-stream rain catchment pond. Use of POD B will be permanently discontinued. Use of POD A and C will be strictly used for livestock ranching. POD D is used for domestic use at the residences to the southwest. At present there are no metering devices in place to record water usage associated with the irrigation of cannabis. Metering devices shall be to record all water used for the irrigation of cannabis. Monthly water usage shall be recorded for annual reporting purposes.

Water is stored in an off-stream rain catchment pond (Upper Pond) with the volume of approximately 2,000,000 to 2,500,000 gallons. There is also an on-stream pond (Lower Pond) located adjacent to the Upper Pond that is not used by the Cultivator. Water is also stored and transferred multiple hard plastic tanks including one 350-gallon tank, twelve 550-gallon tanks, one 1,550-gallon tank, three 2,500-gallon tanks, four 3,000-gallon tanks, and three 5,000-gallon tanks. Fertilizer mixing occurs in multiple, separate, hard plastic tanks including one 550-gallon tank and one 1100-gallon tank. Tank lids shall be kept closed at all times when access is not needed. Tanks that do not utilize lids shall be retrofitted to be enclosed from wildlife. Overflow prevention measures shall be installed on diversion infrastructure or water storage tanks to prevent the overflowing of tanks and unnecessary diversion of water resources when water storage infrastructure has filled. Water conservation measures such as drip line irrigation, morning or evening watering, and mulch or cover cropping of cultivated top soils shall also be implemented.

At this time, the cannabis cultivator has approximately 2,043,000 to 2,543,000 gallons of water storage installed. Based on estimates, this volume of storage is sufficient to allow for full forbearance during the required period from April 1st to October 31st. Monthly water usage estimates and the season total are as follows below.

Table 5: Estimated Annual Water Use

	Jan	Feb	March	April (15%)	May (40%)	Jun (80%)	Jul (100%)	Aug (100%)	Sep (70%	Oct (20%)	Nov	Dec
Agriculture				13,322	34,380	68,760	85,950	85,950	60,165	17,190		
Sq. ft. =								% = percent of peak usage				
57,300												
									Total AG Water Use =		365,717	

Cannabis cultivators should be advised that transition to the state General Order will require additional infrastructure to use bladders for water storage.

There is domestic water use at this time on this property. Water meter(s) and water supply infrastructure shall be designed/installed in a manner such that water usage for the irrigation of cannabis can be recorded separately from water used for domestic use. Additionally, if there are multiple diversions of surface water, infrastructure/metering device(s) shall be design/installed in a manner that each source of surface water is recorded separately.

A Lake and Streambed Alteration Agreement with the California Department of Fish and Wildlife, as well as an Initial Statement of Water Diversion and Use and a Small Irrigation and Use Registration with the California State Water Resource Control Board Division of Water Rights, has been finalized as of the writing of this assessment. Any additional guidelines, treatments, or restrictions set forth under the finalized Lake and Stream Agreement shall be followed.

Irrigation Runoff:
During visits to the property, no irrigation runoff, or evidence of such runoff, was observed at any of the cultivation areas.

Fertilizers, Pesticides, and Petroleum Products:
Project Compliance Y☐/N☒

Fertilizers, pesticides, potting soils, compost, and other soils and soil amendments are currently stored in structures on the property in a manner in which they will not enter or be transported into surface waters and so that nutrients or other pollutants will not be leached into groundwater. Cultivation areas are currently maintained so as to prevent nutrients from leaving the site during the growing season and post-harvest.

Fertilizers and soil amendments shall be applied and used per the manufacturer's guidelines. The use of pesticide products shall be consistent with product labeling and all products on the property are to be stored in closed structures to ensure that they do not enter or are released into surface or ground waters.

Currently, bulk fuel storage or petroleum products are present on the property. Diesel fuel is stored in a 1000-gallon steel fuel tank and gasoline is stored in a 500-gallon steel fuel tank at Site 14. Both storage tanks have secondary containment and adequate protection from precipitation. Small quantiles of fuel and motor oil are stored within fuel canisters, or the original motor oil container, around the residences with secondary containment.

Any/all fuel canisters, motor oil containers, and generators (large or small) shall be stored in secondary containment (e.g. plastic totes, sealed metal boxes, drip pans, pre-fabricated portable containment berms or fabricated and lined containment basins) while being stored long term or not in immediate use, wherever these materials are used anywhere on the property. See the attached Generator, Fuel, and Oil Management BMPs, Treatment Implementation Schedule, and Mitigation Report to follow for site specific details and treatments.

Should the cannabis cultivator at any point in the future obtain fuel storage or petroleum products, any/all future petroleum products and other liquid chemicals, including but not limited to diesel, biodiesel, gasoline, and oils shall be stored so as to prevent their spillage, discharge, or seepage into receiving waters. Storage tanks and containers shall be of suitable material and construction to be compatible with the substance(s) stored and conditions of storage such as pressure and temperature. Above ground storage tanks and containers shall be provided with a secondary means of containment for the entire capacity of the largest single container and sufficient cover shall be provided to prevent any/all precipitation from entering said secondary containment vessel. Cannabis cultivators shall ensure that diked areas are sufficiently impervious to contain discharged chemicals. Cannabis cultivators shall implement spill prevention, control, and countermeasures (SPCC) and have appropriate cleanup materials available onsite if the volume of a fuel container is greater than 1,320 gallons. Underground storage tanks 110 gallons and larger shall be registered with the appropriate County department and comply with state and local requirements for leak detection, spill overflow, corrosion protection, and insurance coverage. On site storage of petroleum products, or other fuels used for commercial activities may require registration as hazardous materials through the California Environmental Reporting System (CERS). Additionally, any waste oil generated from commercial activities (generators) is considered by the state hazardous waste

and requires addition reporting. This cannabis cultivator is advised to contact local agencies to find out if such reporting is applicable to currently operations.

Cultivation-Related Wastes:
Project Compliance Y☒/N☐

No cultivation-related wastes, including, but not limited to, empty soil/soil amendment/ fertilizer/pesticide bags and containers, empty plant pots or containers, dead or harvested plant waste, and spent growth medium, are stored in locations where they can enter or be blown into surface waters, or in a manner that could result in residues and pollutants within such materials to migrate or leach into surface water or groundwaters.

Monofilament (e.g. plastic trellis netting and fencing) was observed on the property during the assessment. All monofilament netting or fencing is banned for future use. All existing monofilament netting shall be collected, secured with other refuse, and disposed of properly a waste disposal facility.

Organic cultivation-related wastes are collected from the cultivation areas and either disposed of properly with general waste, or composted or burned. The cannabis cultivator shall ensure that the locations where organic wastes are stored, composted, or burned are minimized in number and are sited outside of watercourse riparian areas and away from any form of surface runoff.

Non-organic cultivation-related wastes are stored in lidded trashcans and garbage bags adjacent to or in the residence, sheds, and cultivation areas and are disposed of regularly at a solid waste transfer station. The majority of non-organic cultivation-related wastes are stored adequately in a secured shed adjacent to the lower residence or in secured tote bags at Site 15. The cannabis cultivator shall continue to gather and properly dispose of cultivation-related wastes and ensure that wastes are adequately contained from scavenging wildlife, and cannot be transported away from storage areas by wind or surface runoff.

Refuse and Domestic Waste:
Project Compliance Y☒/N☐

Garbage and refuse are stored on the property within lidded trash cans and garbage bags and are disposed of regularly at the nearest solid waste transfer station. The majority of refuse and domestic wastes are stored adequately in a secured shed adjacent to the lower residence or in secured tote bags at Site 15. The cannabis cultivator shall continue to gather and properly dispose of refuse and ensure that refuse is adequately contained from scavenging wildlife, and cannot be transported away from storage areas by wind or surface runoff.

Human waste is managed by a septic system on site as well as portable chemical toilets. It is the cannabis cultivator's responsibility to ensure compliance of such action with the Humboldt County Department of Environmental Health and Human Services.

Annual Winterization Measures

Winterization measures consist of general cleanup and winter-preparation activities that both prepare for, and utilize, anticipated, local winter weather.

- Any exposed soils resulting from winterization activities shall be seeded and straw mulched.
- Any/all areas of exposed soils in and around cultivation areas be seeded and either straw mulched with weed free straw or woodchips.
- All existing culvert inlets, interiors, and outlets shall be cleared of any existing or potential obstructions to include; debris upstream of the culvert such as sediment, loose, moveable rocks, and raftable, small, woody debris.
- Damage or wear resulting from vehicular use to road surfaces (such as rutting or wheel tracks) and/or road surfacing (such as rock) that would impair road surface drainage or drainage features (such as outsloping, waterbars, rolling dips, etc.) shall be repaired prior to the Winter Period.
- All existing surface drainage features and sediment capture features shall be maintained if needed to ensure continued function through the Winter Period.
- All fertilizers and petroleum products will be stored in an area located outside of riparian setbacks, completely sealed, placed in a secondary containment (liquids), and stored in a manner that prevents contact with precipitation and surface runoff.
- Chemical toilets will be removed from the property until need resumes the following cultivation season, or at a minimum serviced and left unused during periods when not in use.
- Water storage tank lids shall be appropriately closed to prevent the access of wildlife.
- All refuse/trash shall be removed and disposed of appropriately.
- All inorganic material capable of being transported by wind or rain shall be secured and stored appropriately.

STATEMENT OF CONTINGENT AND LIMITING CONDITIONS CONCERNING THE PREPARATION AND USE OF REPORTS ADDRESSING GENERAL WASTE DISCHARGE REQUIREMENTS UNDER ORDER WQ 2017-0023-DWQ

Prepared by Timberland Resource Consultants

1. This document has been prepared for the property within APN 223-061-043-000, 223-061-038-000, 223-073-005-000, 223-073-004-000, in Humboldt County, for enrollment in the General Waste Discharge Order WQ 2019-0001-DWQ.

2. Timberland Resource Consultants does not assume any liability for the use or misuse of the information in this document.

3. The information is based upon conditions apparent to Timberland Resource Consultants at the time inspection(s) were conducted. Changes due to land use activities or environmental factors occurring after inspection, have not been considered in this document.

4. Maps, photos, and any other graphical information presented in this report are for illustrative purposes. Their scales are approximate, and they are not to be used for locating and establishing boundary lines.

5. The conditions presented in this document may differ from those made by others or from changes on the property occurring after inspections were conducted. Timberland Resource Consultants does not guarantee this work against such differences.

6. Timberland Resource Consultants did not conduct an investigation on a legal survey of the property.

7. Persons using this document are advised to contact Timberland Resource Consultants prior to such use.

8. Timberland Resource Consultants will not discuss this document or reproduce it for anyone other than the Client for which this document was prepared without authorization from the Client.

Forrest Hansen

Timberland Resource Consultants

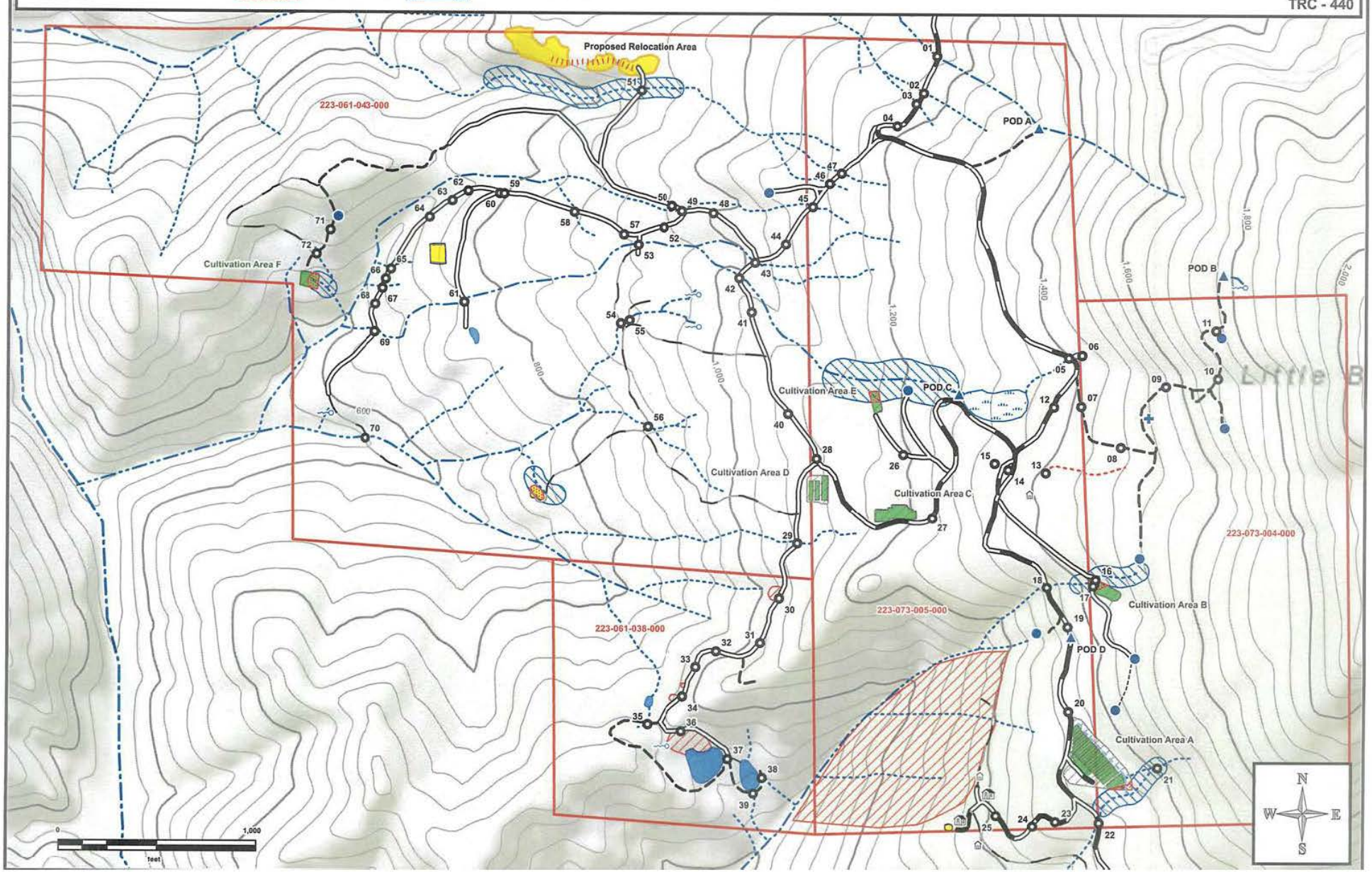
Site Management Plan

Site Map (WDID - 1_12CC415333)

Timberland Resource Consultants

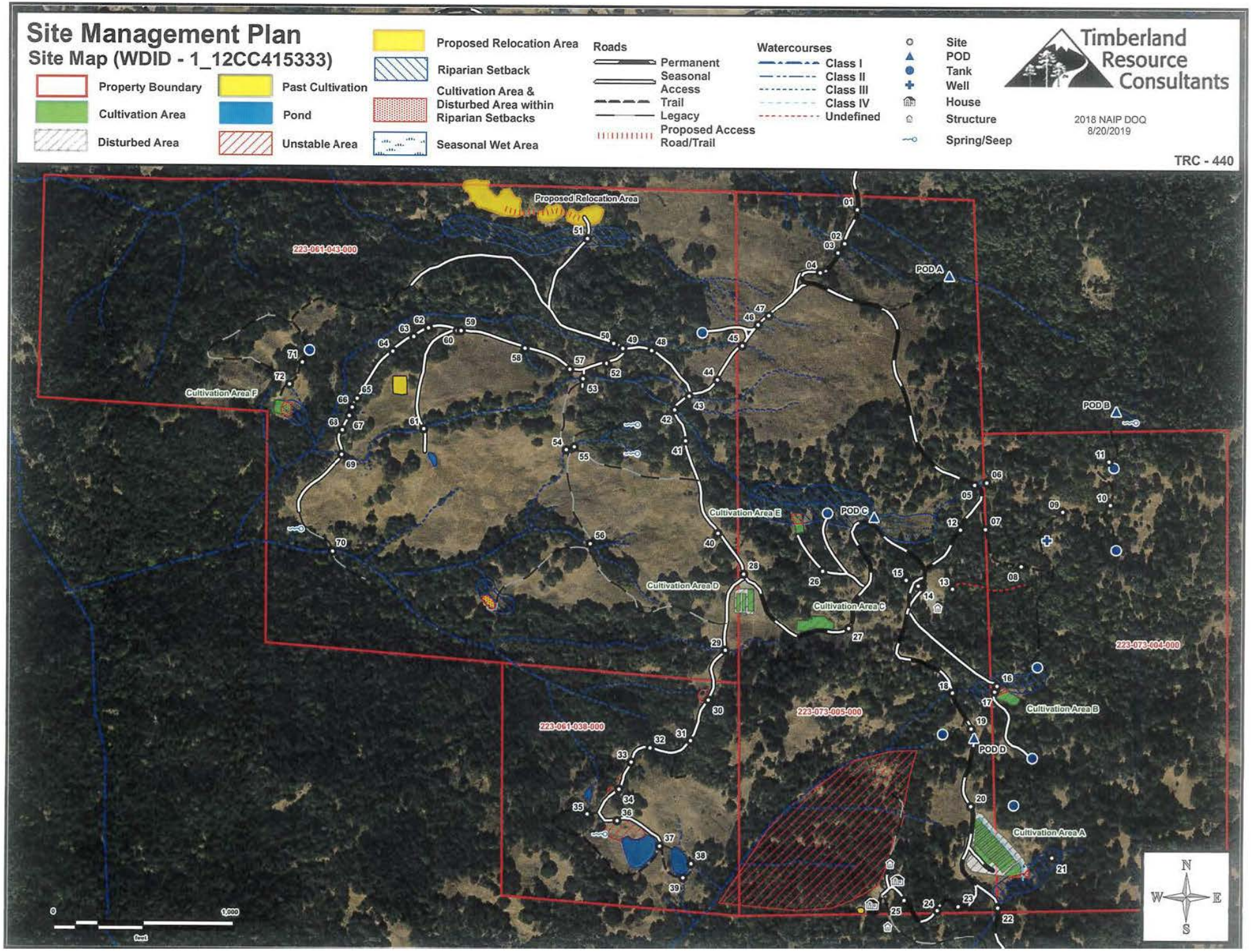
40' contour intervals
8/20/2019

TRC - 440



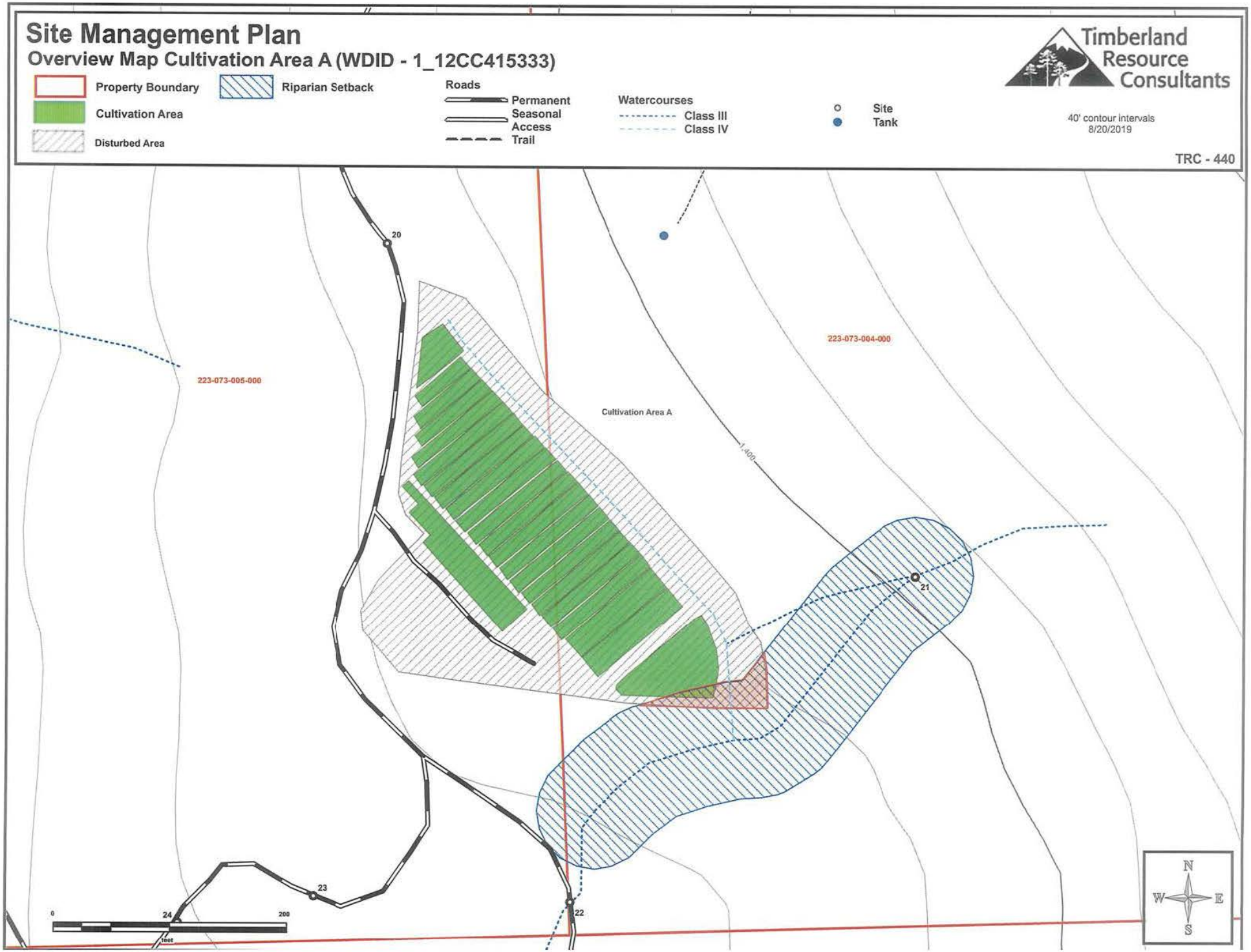
Site Management Plan

Site Map (WDID - 1_12CC415333)



Site Management Plan

Overview Map Cultivation Area A (WDID - 1_12CC415333)



Site Management Plan

Overview Map Cultivation Area A (WDID - 1_12CC415333)

Timberland Resource Consultants

Property Boundary
Cultivation Area
Disturbed Area
Riparian Setback

Roads
Permanent
Seasonal
Access
Trail

Watercourses
Class III
Class IV

Site
Tank

2018 NAIP DOQ
8/20/2019

TRC - 440

Site Management Plan

Overview Map Cultivation Area B (WDID - 1_12CC415333)

Timberland Resource Consultants

Property Boundary
Cultivation Area
Disturbed Area
Riparian Setback
Cultivation Area & Distrubed Area within Riparian Setbacks

Roads
Permanent
Seasonal
Access
Trail

Watercourses
Class II
Class III

Site
POD
Tank

40' contour intervals
8/20/2019

TRC - 440

Site Management Plan

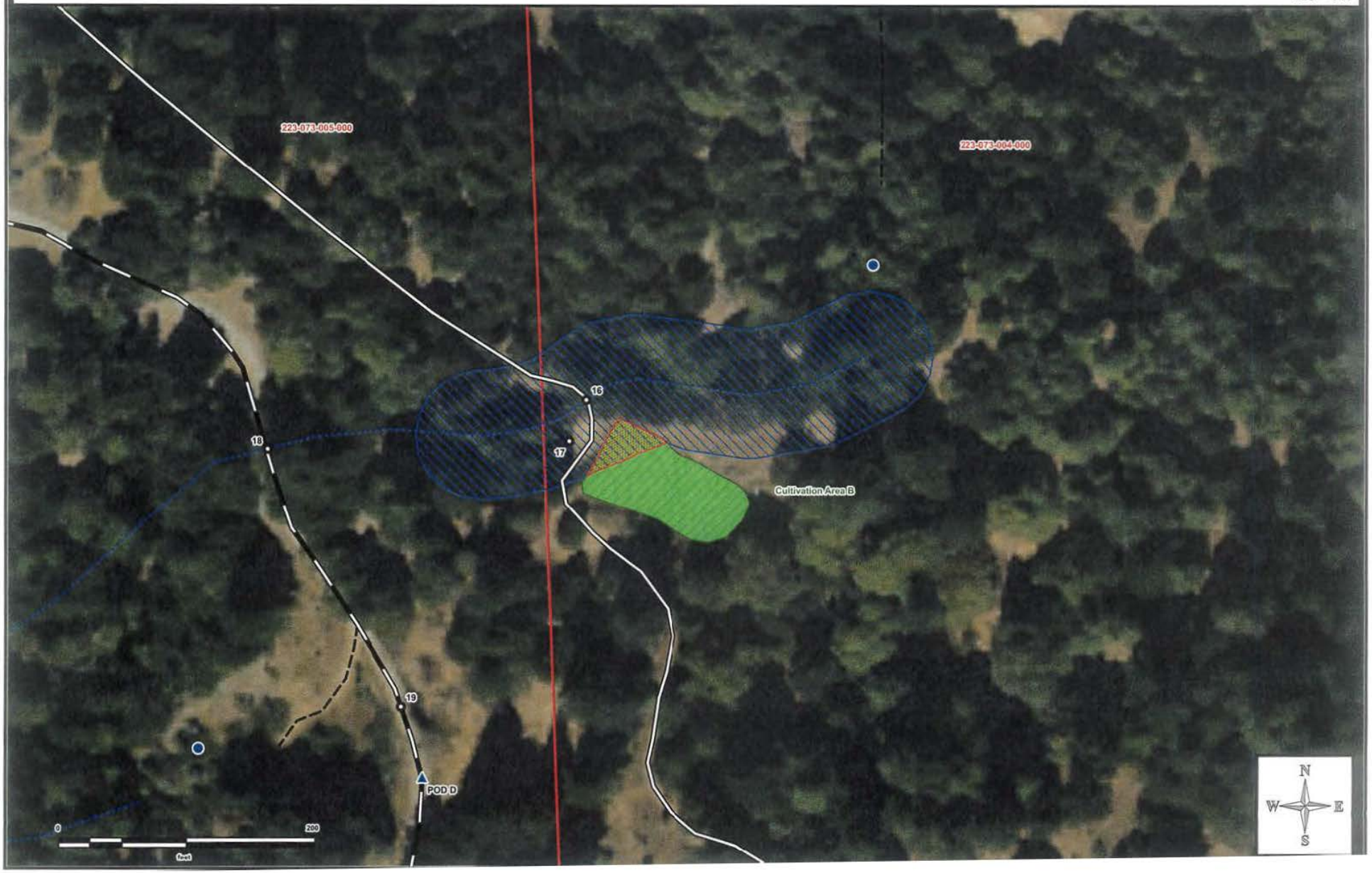
Overview Map Cultivation Area B (WDID - 1_12CC415333)

Timberland Resource Consultants

Property Boundary
Cultivation Area
Disturbed Area
Riparian Setback
Cultivation Area & Distrubed Area within Riparian Setbacks
Roads
Permanent
Seasonal Access
Trail
Watercourses
Class II
Class III
Site
POD
Tank

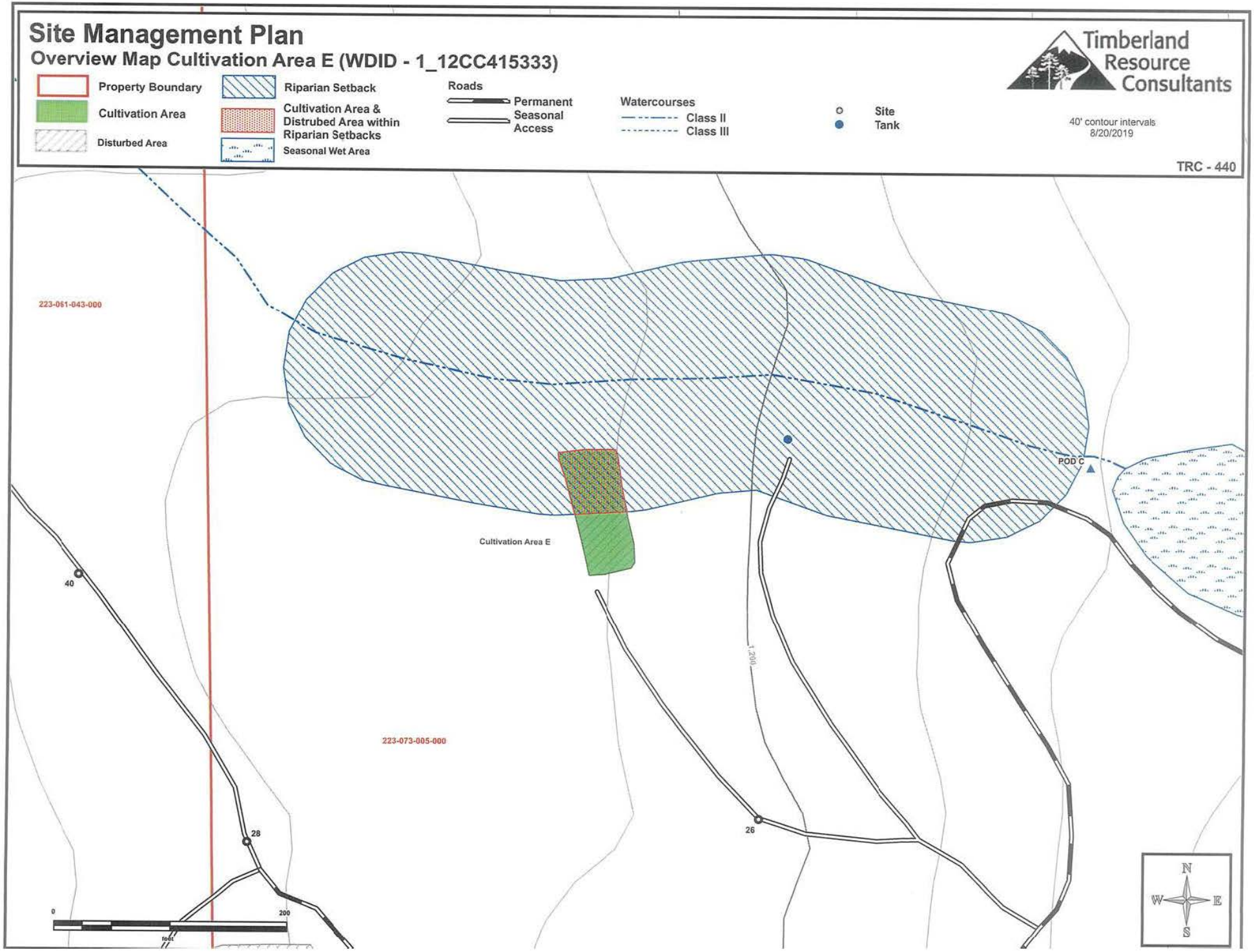
2018 NAIP DOQ
8/20/2019

TRC - 440



Site Management Plan

Overview Map Cultivation Area E (WDID - 1_12CC415333)



Site Management Plan

Overview Map Cultivation Area E (WDID - 1_12CC415333)

Timberland Resource Consultants

- Property Boundary
- Cultivation Area
- Disturbed Area
- Riparian Setback
- Cultivation Area & Distrubed Area within Riparian Setbacks
- Seasonal Wet Area

Roads
- Permanent
- Seasonal Access

Watercourses
- Class II
- Class III

- Site
- Tank

2018 NAIP DOQ
8/20/2019

TRC - 440

Site Management Plan

Overview Map Cultivation Area F (WDID - 1_12CC415333)

Timberland Resource Consultants

- Property Boundary
- Cultivation Area
- Disturbed Area
- Riparian Setback
- Cultivation Area & Distrubed Area within Riparian Setbacks

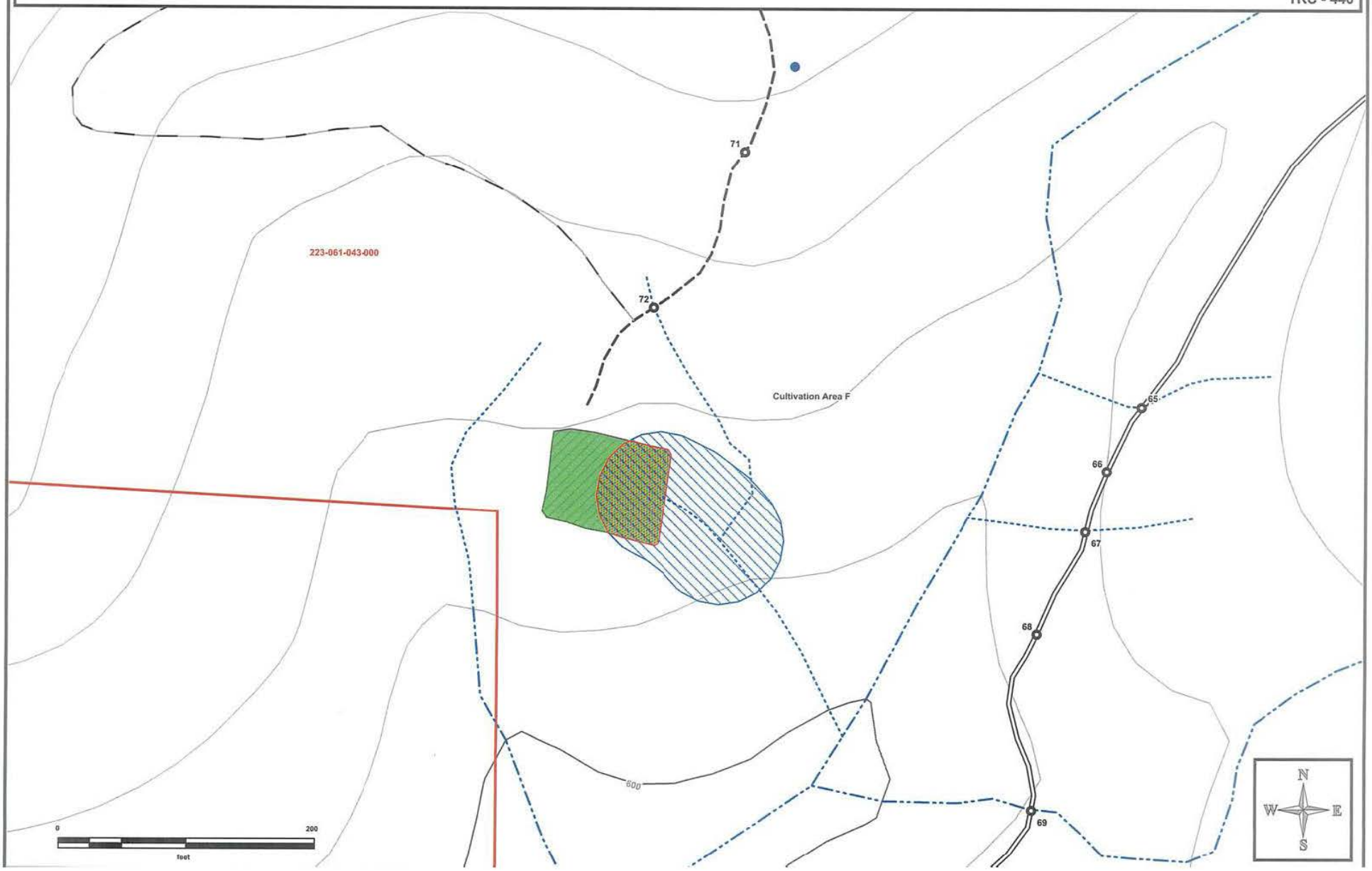
Roads
- Seasonal Access
- Trail
- Legacy

Watercourses
- Class II
- Class III

- Site
- Tank

40' contour intervals
8/20/2019

TRC - 440



Site Management Plan

Overview Map Cultivation Area F (WDID - 1_12CC415333)

Timberland Resource Consultants

Property Boundary
Cultivation Area
Disturbed Area
Riparian Setback
Cultivation Area & Distrubed Area within Riparian Setbacks

Roads
Seasonal Access
Trail
Legacy

Watercourses
Class II
Class III

Site
Tank

2018 NAIP DOQ
8/20/2019

TRC - 440

Timberland Resource Consultants

Treatment Implementation Schedule

Unique Point	Proposed Work Completion Date
Immediately	
Cultivation Area A	Immediately
Cultivation Area B	Immediately
Cultivation Area E	Immediately
Cultivation Area F	Immediately
Past Cultivation Areas	Immediately
2019	
Site 17	Interim measures Immediately; Mitigation measures prior to 10/15/20 pending the approval of any required permits
2020	
Site 12	Prior to 10/15/20
Site 14	Prior to 10/15/20
Site 16	Prior to 10/15/20
Site 30	Prior to 10/15/20
Site 46	Prior to 10/15/20 pending the approval of any required permits
Site 47	Prior to 10/15/20 pending the approval of any required permits
2021	
Site 7	Prior to 10/15/21
Site 8	Prior to 10/15/21
Site 9	Prior to 10/15/21
Site 10	Prior to 10/15/21
Site 11	Prior to 10/15/21
Site 21	Prior to 10/15/21
Site 22	Prior to 10/15/21 pending the approval of any required permits
Site 23	Prior to 10/15/21
Site 24	Prior to 10/15/21
Site 25	Prior to 10/15/21
Site 27	Prior to 10/15/21
Site 34	Prior to 10/15/21
Site 35	Prior to 10/15/21 pending the approval of any required permits
Site 37	Prior to 10/15/21 pending the approval of any required permits
Site 38	Prior to 10/15/21 pending the approval of any required permits
Site 39	Prior to 10/15/21 pending the approval of any required permits
Site 51	Prior to 10/15/21 pending the approval of any required permits
Site 66	Prior to 10/15/21
Site 67	Prior to 10/15/21 pending the approval of any required permits
Site 72	Prior to 10/15/21

As Required	
Site 1	As required
Site 2	As required
Site 3	As required
Site 4	As required
Site 5	As required
Site 6	-
Site 13	As required
Site 15	As required
Site 18	As required
Site 19	As required
Site 20	As required
Site 26	-
Site 28	As required
Site 29	As required
Site 31	As required
Site 32	As required
Site 33	As required
Site 36	As required
Site 40	As required
Site 41	As required
Site 42	As required
Site 43	As required
Site 44	As required
Site 45	As required
Site 48	As required
Site 49	As required
Site 50	As required
Site 52	As required
Site 53	As required
Site 54	-
Site 55	As required
Site 56	-
Site 57	As required
Site 58	As required
Site 59	As required
Site 60	As required
Site 61	As required
Site 62	As required
Site 63	-
Site 64	As required
Site 65	As required
Site 68	As required
Site 69	As required
Site 70	As required
Site 71	As required

Timberland Resource Consultants

SMP - Mitigation Report

WDID# - 1_12CC415333

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 1	-123.765273 40.102847	Permanent	-	X	X	As required	
Current Condition: Class II watercourse crossing consisting of a 42" D x 50' L corrugated metal culvert that is installed correctly and sized adequately for the 100-year storm event.						Prescribed Action: None. Maintain and monitor for plugging.	

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 2	-123.765515 40.102333	Permanent	-	X	X	As required	
Current Condition: Class III watercourse crossing consisting of a rocked ford.						Prescribed Action: None. Maintain and monitor for scouring of rock surfacing. Re-apply adequate sized rock surfacing if the existing surfacing is lost.	

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 3	-123.765646 40.102187	Permanent	-	X	X	As required	
Current Condition: Class III watercourse crossing consisting of a 42" D x 30' L corrugated metal culvert that is installed correctly and sized adequately for the 100-year storm event.						Prescribed Action: None. Maintain and monitor for plugging.	

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 4	-123.765992 40.101877	Permanent	-	X	-	As required	
Current Condition: Existing road outsloping and kickout drainage features located on the permanent access road from this Site to Site 05 require maintenance.						Prescribed Action: Maintenance road outsloping, crowning, and existing inside ditch leadout/kickouts or install kickout drainage features every 50-75 feet in segments where there are none of these drainage features.	

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 5	-123.762847 40.098656	Permanent	-	X	X	As required	
Current Condition: Class II watercourse crossing consisting of a 12" D x 40' L corrugated plastic culvert that drains a small wet area seep. This culvert is correctly installed and sized adequately as there is no potential for woody debris blockages.						Prescribed Action: None. Maintain and monitor for plugging.	

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 6	-123.762607 40.098692	-	-	-	X	-	
Current Condition: Point of Diversion that is no longer used.						Prescribed Action: None. Site for reference.	

Timberland Resource Consultants

SMP - Mitigation Report

WDID# - 1_12CC415333

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 7	-123.762617 40.09798	Seasonal	X	X	-	Prior to 10/15/21	

Current Condition: Concentrated road surface runoff is being constrained to the trail surface.

Prescribed Action: Install and maintain two waterbars 100' apart per the specifications outlined in the attached BMPs: See Waterbar Construction, General Operations BMPs, and General Erosion Control specifications. Maintain as needed.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 8	-123.761898 40.097412	Trail	X	X	-	Prior to 10/15/21	

Current Condition: Concentrated road surface runoff is being constrained to the trail surface.

Prescribed Action: Install and maintain three waterbars 100' apart per the specifications outlined in the attached BMPs: See Waterbar Construction, General Operations BMPs, and General Erosion Control specifications. Maintain as needed.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 9	-123.761088 40.098262	Trail	X	X	-	Prior to 10/15/21	

Current Condition: Concentrated road surface runoff is being constrained to the trail surface.

Prescribed Action: Install and maintain three waterbars 100' apart per the specifications outlined in the attached BMPs: See Waterbar Construction, General Operations BMPs, and General Erosion Control specifications. Maintain as needed.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 10	-123.760145 40.098376	Trail	X	X	-	Prior to 10/15/21	

Current Condition: Concentrated road surface runoff is being constrained to the trail surface.

Prescribed Action: Install and maintain two waterbars 100' apart per the specifications outlined in the attached BMPs: See Waterbar Construction, General Operations BMPs, and General Erosion Control specifications. Maintain as needed.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 11	-123.760183 40.099039	Trail	X	X	-	Prior to 10/15/21	

Current Condition: Concentrated road surface runoff is being constrained to the trail surface.

Prescribed Action: Install and maintain a waterbar 100' apart per the specifications outlined in the attached BMPs: See Waterbar Construction, General Operations BMPs, and General Erosion Control specifications. Maintain as needed.

Timberland Resource Consultants

SMP - Mitigation Report

WDID# - 1_12CC415333

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 12	-123.763112 40.09797	Permanent	X	X	-	Prior to 10/15/20	

Current Condition: Existing rocked rolling dip that shows signs of being bypassed and requiring maintenance.

Prescribed Action: Maintenance the rocked rolling dip to the specifications outlined in the attached BMPs. See attached BMPs: Rocked/Rolling Dip Design and Placement, General Operations BMPs, and General Erosion Control specifications.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 13	-123.763256 40.097055	-	-	X	-	As required	

Current Condition: Undefined watercourse terminates at this location.

Prescribed Action: None. Monitor during the wet season and determine if a catchment basin or other drainage features are needed.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 14	-123.763936 40.097097	-	X	X	-	Immediately	

Current Condition: Bulk fuel storage consisting of a 1000-gallon diesel and 500-gallon gasoline steel fuel tanks with adequate secondary containment and cover. No oil spill cleanup materials were observed nearby.

Prescribed Action: Obtain adequate quantities of absorbent materials (e.g. purpose made materials for oil and fuel spills, cat litter).

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 15	-123.76418 40.097183	-	-	X	-	As required	

Current Condition: Cultivation-related material storage area and shipping container used for storage. Refuse is being stored in wrapped up tote bags. Fertilizers, fungicides, and pesticides are stored adequately in the shipping container.

Prescribed Action: None. Site for reference. Continue secured containment of cultivation-related materials and refuse.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 16	-123.762341 40.095568	Seasonal	X	X	X	Prior to 10/15/20	

Current Condition: Class III watercourse crossing consisting of a dirt ford. The outboard edge of the ford crossing is down cutting the road fill at the outlet.

Prescribed Action: Rock surface the approaches to the crossing and upgrade the existing crossing by installing an 18" D x 30' - 40' L culvert per the specifications outlined in the attached BMPs: See Permanent Culvert Crossing, Permanent Culvert Crossing Design: Critical Dip and Hydrologic Disconnect Placement, Critical Dip, Culvert Orientation, Inlet and Outlet Armoring, General Operations BMPs, and General Erosion Control specifications.

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SMP - Mitigation Report

WDID# - 1_12CC415333

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 17	-123.762387 40.09548	Seasonal	X	X	-	Interim measures Immediately; Mitigation measures prior to 10/15/20 pending the approval of any required permits	

Current Condition: Evidence of surface runoff from the cultivation area and associated access road was found discharging into the adjacent Class III watercourse.

Prescribed Action: Interim Measures: Install a series of two staked wattles, as flagged in the field, per the attached specifications at low point above the watercourse at the edge of the tree line. See General Erosion Control (Straw Wattles). Permanent Measures: Rock surface approximately 50' - 60' of the access road outside the entrance to the adjacent cultivation area.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 18	-123.763226 40.095458	Permanent	X	X	X	As required	

Current Condition: Class III watercourse crossing consisting of a 30" D x 40' L smooth-walled plastic culvert that is installed correctly and sized adequately for the 100-year storm event.

Prescribed Action: None. Maintain and monitor for plugging.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 19	-123.762847 40.094909	Permanent	X	X	-	As required	

Current Condition: Ditch relief culvert consisting of a 15" diameter smooth-walled plastic culvert that is functioning adequately.

Prescribed Action: None. Maintain and monitor for plugging.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 20	-123.76282 40.093738	Permanent	X	X	-	As required	

Current Condition: Ditch relief culvert consisting of a 15" diameter smooth-walled plastic culvert that is functioning adequately.

Prescribed Action: None. Maintain and monitor for plugging.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 21	-123.761196 40.092963	-	X	X	X	Prior to 10/15/21	

Current Condition: Class III watercourse is dispersing out (alluvial fan) at a change in grade. The result is that the watercourse has migrated onto a cutbank above the cultivation area. realign the class iii to allow the water to flow into its historic flow path. 40 to 60 feet long 2' D x 2-4' W

Prescribed Action: Re-align the diverted watercourse to allow the water to flow into the historic flow path to the south. This will require the excavation of a ditch approximately 40 - 60' Long x 2' Deep x 4' Wide.

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SMP - Mitigation Report

WDID# - 1_12CC415333

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 22	-123.76225 40.0922	Permanent	X	X	X	Prior to 10/15/21 pending the approval of any required permits	

Current Condition: Class III watercourse crossing consisting of a 15" D x 20' L corrugated plastic culvert that is functioning adequately but too short in the fill and undersized for the 100-year storm event.

Prescribed Action: Upgrade the existing culvert with a minimum 18" D x 30' - 40' L culvert per the specifications outlined in the attached BMPs: See Permanent Culvert Crossing, Permanent Culvert Crossing Design: Critical Dip and Hydrologic Disconnect Placement, Critical Dip, Culvert Orientation, Inlet and Outlet Armoring, General Operations BMPs, and General Erosion Control specifications.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 23	-123.763037 40.092213	Permanent	X	X	-	Prior to 10/15/21	

Current Condition: Concentrated road surface runoff is bypassing and existing kickout drainage feature and eroding the road surface here and further down grade.

Prescribed Action: Install a Type 1 rocked rolling dip that drains into the existing kickout drainage feature, as flagged in the field, to the specifications outlined in the attached BMPs: See Rocked/Rolling Dip Design and Placement, General Operations BMPs, and General Erosion Control specifications.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 24	-123.763452 40.092151	Permanent	X	X	-	Prior to 10/15/21	

Current Condition: Concentrated road surface runoff is eroding the road surface here and further down grade.

Prescribed Action: Install a Type 1 rocked rolling dip that drains into the existing kickout drainage feature, as flagged in the field, to the specifications outlined in the attached BMPs: See Rocked/Rolling Dip Design and Placement, General Operations BMPs, and General Erosion Control specifications.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 25	-123.764116 40.092298	Permanent	X	X	-	Prior to 10/15/21	

Current Condition: Concentrated road surface runoff is eroding the road surface here and further down grade.

Prescribed Action: Install a Type 3 rocked rolling dip to the specifications outlined in the attached BMPs: See Rocked/Rolling Dip Design and Placement, General Operations BMPs, and General Erosion Control specifications.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 26	-123.765855 40.097303	-	-	X	-	-	

Current Condition: Existing Waterbar.

Prescribed Action: None. Maintain.

Timberland Resource Consultants

SMP - Mitigation Report

WDID# - 1_12CC415333

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 27	-123.765433 40.096352	Permanent	X	X	-	Prior to 10/15/21	

Current Condition: Concentrated road surface runoff is concentrating in the inside ditch and discharging into the head of a Class III watercourse to the west.

Prescribed Action: Install a 18" diameter ditch relief culvert per the specifications outlined in the attached BMPs: See Ditch Relief Culvert, Permanent Culvert Crossing Design (Inlet and Outlet Armoring), General Operations BMPs, and General Erosion Control specifications.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 28	-123.767425 40.097244	Seasonal	X	X	-	As required	

Current Condition: Ditch relief culvert consisting of an 18" diameter corrugated metal culvert. The culvert is functioning adequately.

Prescribed Action: None. Maintain and monitor for plugging.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 29	-123.767769 40.096066	Seasonal	X	X	X	As required	

Current Condition: Class III watercourse crossing consisting of a 24" D x 40' L smooth-walled plastic culvert that is installed correctly and sized adequately for the 100-year storm event.

Prescribed Action: None. Maintain and monitor for plugging.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 30	-123.768092 40.095302	Seasonal	X	X	-	Prior to 10/15/20	

Current Condition: Road fillslope failure resulting in sediment delivery to the head of a Class III watercourse.

Prescribed Action: Re-construct the road fillslope to the specifications outlined in the attached BMPs: See Unstable Fill Removal and Treatment.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 31	-123.768437 40.09468	Seasonal	X	X	-	As required	

Current Condition: Functioning rolling dip.

Prescribed Action: Maintain the rolling dip to the specifications outlined in the attached BMPs. See attached BMPs: Rocked/Rolling Dip Design and Placement, General Operations BMPs, and General Erosion Control specifications.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 32	-123.769237 40.09456	Seasonal	-	X	-	As required	

Current Condition: Functioning rolling dip.

Prescribed Action: Maintain the rolling dip to the specifications outlined in the attached BMPs. See attached BMPs: Rocked/Rolling Dip Design and Placement, General Operations BMPs, and General Erosion Control specifications.

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Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 33	-123.769605 40.094343	Seasonal	-	X	-	As required	

Current Condition: Functioning rolling dip.

Prescribed Action: Maintain the rolling dip to the specifications outlined in the attached BMPs. See attached BMPs: Rocked/Rolling Dip Design and Placement, General Operations BMPs, and General Erosion Control specifications.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 34	-123.76984 40.093938	Seasonal	X	X	-	Prior to 10/15/21	

Current Condition: Road fillslope failure. No delivery of sediment to surface waters was observed.

Prescribed Action: Re-construct the road fillslope to the specifications outlined in the attached BMPs: See Unstable Fill Removal and Treatment.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 35	-123.770478 40.093554	Trail	X	X	X	Prior to 10/15/21 pending the approval of any required permits	

Current Condition: Class III watercourse crossing consisting of a dirt ford.

Prescribed Action: Upgrade the existing crossing by installing an 18" D x 30' - 40' L culvert per the specifications outlined in the attached BMPs: See Permanent Culvert Crossing, Permanent Culvert Crossing Design: Critical Dip and Hydrologic Disconnect Placement, Critical Dip, Culvert Orientation, Inlet and Outlet Armoring, General Operations BMPs, and General Erosion Control specifications.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 36	-123.769862 40.093457	Seasonal	-	X	-	As required	

Current Condition: Road fillslope failure resulting in sediment delivery to an off-stream rain catchment pond that drains to an on-stream pond.

Prescribed Action: Re-construct the road fillslope to the specifications outlined in the attached BMPs: See Unstable Fill Removal and Treatment.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 37	-123.769009 40.093077	Seasonal	X	X	X	Prior to 10/15/21 pending the approval of any required permits	

Current Condition: Off-stream rain catchment pond overflow consisting of a 18" x 80' long anchored corrugated metal culvert that drains into the Lower Pond. Per CDFW and NCWQB request, this pond overflow is to become the secondary a new primary overflow culvert and rocked emergency spillway shall be installed on the pond to the southwest.

Prescribed Action: Install the new primary overflow and emergency overflow spillway per the specifications outlined in the LSAA with CDFW (1600-2018-0857-R1). Maintain and monitor both the existing and to be installed pond overflow for plugging and blockages from vegetation.

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Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 38	-123.768381 40.092813	Trail	X	X	X	Prior to 10/15/21 pending the approval of any required permits	

Current Condition: On-stream pond overflow consisting of a 24" x 200' L smooth-walled plastic culvert.

Prescribed Action: Per CDFW request, remove this culvert during the reconstruction of the Lower Pond and the secondary spillway, which is to become the primary spillway.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 39	-123.768535 40.0926	Trail	X	X	X	Prior to 10/15/21 pending the approval of any required permits	

Current Condition: On-stream pond overflow consisting of two 18" D x 40' L single walled plastic culverts. The culverts have become disconnected from the outlet headwalls resulting in the erosion of the pond fillslope and channel below.

Prescribed Action: Reconstruct the ponds embankment per the "Water Storage Pond Embankment Stabilization" report provided by SHN Consulting Engineers & Geologists of Eureka, CA. (Reference #: 018064) Concurrently, replace the double-barreled secondary pond spillway at this location with a new, primary, pond spillway per the specifications outlined in the LSAA with CDFW (1600-2018-0857-R1).

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 40	-123.767947 40.097868	Seasonal	-	X	-	As required	

Current Condition: Functioning rocked rolling dip.

Prescribed Action: Maintain the rolling dip to the specifications outlined in the attached BMPs. See attached BMPs: Rocked/Rolling Dip Design and Placement, General Operations BMPs, and General Erosion Control specifications.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 41	-123.768617 40.099272	Seasonal	-	X	-	As required	

Current Condition: Functioning rocked rolling dip.

Prescribed Action: Maintain the rolling dip to the specifications outlined in the attached BMPs. See attached BMPs: Rocked/Rolling Dip Design and Placement, General Operations BMPs, and General Erosion Control specifications.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 42	-123.768846 40.099745	Seasonal	-	X	X	As required	

Current Condition: Class II watercourse crossing consisting of a 48" D x 40' L corrugated metal culvert that is installed correctly and sized adequately for the 100-year storm event.

Prescribed Action: None. Maintain and monitor for plugging.

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Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 43	-123.768559 40.09996	Seasonal	-	X	X	As required	
Current Condition: Class III watercourse crossing consisting of a 42" D x 50' L corrugated metal culvert that is installed correctly and sized adequately for the 100-year storm event.						Prescribed Action: None. Maintain and monitor for plugging.	

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 44	-123.768006 40.100216	Seasonal	-	X	X	As required	
Current Condition: Functioning rocked rolling dip.						Prescribed Action: Maintain the rolling dip to the specifications outlined in the attached BMPs. See attached BMPs: Rocked/Rolling Dip Design and Placement, General Operations BMPs, and General Erosion Control specifications.	

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 45	-123.767519 40.100737	Seasonal	-	X	X	As required	
Current Condition: Class II watercourse crossing consisting of a 24" D 40' L smooth-walled plastic culvert that is installed correctly and sized adequately for the 100-year storm event.						Prescribed Action: None. Maintain and monitor for plugging.	

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 46	-123.767211 40.101056	Seasonal	X	X	X	Prior to 10/15/20 pending the approval of any required permits	
Current Condition: Class III watercourse crossing consisting of a dirt ford.						Prescribed Action: Upgrade the existing crossing by installing an 18" D x 30' - 40' L culvert per the specifications outlined in the attached BMPs: See Permanent Culvert Crossing, Permanent Culvert Crossing Design: Critical Dip and Hydrologic Disconnect Placement, Critical Dip, Culvert Orientation, Inlet and Outlet Armoring, General Operations BMPs, and General Erosion Control specifications.	

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 47	-123.766999 40.101202	Seasonal	X	X	X	Prior to 10/15/20 pending the approval of any required permits	
Current Condition: Class III watercourse crossing consisting of a dirt ford.						Prescribed Action: Upgrade the existing crossing by installing an 18" D x 30' - 40' L culvert per the specifications outlined in the attached BMPs: See Permanent Culvert Crossing, Permanent Culvert Crossing Design: Critical Dip and Hydrologic Disconnect Placement, Critical Dip, Culvert Orientation, Inlet and Outlet Armoring, General Operations BMPs, and General Erosion Control specifications.	

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Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 48	-123.769322 40.100643	Seasonal	-	X	-	As required	

Current Condition: Functioning rocked rolling dip.

Prescribed Action: Maintain the rolling dip to the specifications outlined in the attached BMPs. See attached BMPs: Rocked/Rolling Dip Design and Placement, General Operations BMPs, and General Erosion Control specifications.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 49	-123.769896 40.100671	Seasonal	X	X	X	As required	

Current Condition: Class III watercourse crossing consisting of a 36" D x 50' L corrugated metal culvert that is installed correctly and sized adequately for the 100-year storm event and has a has critical dip in the form of a rocked rolling dip immediately down grade from the crossing.

Prescribed Action: None. Maintain and monitor for plugging.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 50	-123.770079 40.100743	Seasonal	-	X	-	As required	

Current Condition: Functioning rocked rolling dip.

Prescribed Action: Maintain the rolling dip to the specifications outlined in the attached BMPs. See attached BMPs: Rocked/Rolling Dip Design and Placement, General Operations BMPs, and General Erosion Control specifications.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 51	-123.770646 40.102354	Seasonal	X	X	X	Prior to 10/15/21 pending the approval of any required permits	

Current Condition: Class III watercourse crossing consisting of a dirt ford.

Prescribed Action: Upgrade the existing crossing by installing an 36" D x 30' - 40' L culvert per the specifications outlined in the attached BMPs: See Permanent Culvert Crossing, Permanent Culvert Crossing Design: Critical Dip and Hydrologic Disconnect Placement, Critical Dip, Culvert Orientation, Inlet and Outlet Armoring, General Operations BMPs, and General Erosion Control specifications.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 52	-123.770227 40.100442	Seasonal	-	X	-	As required	

Current Condition: Functioning rocked rolling dip.

Prescribed Action: Maintain the rolling dip to the specifications outlined in the attached BMPs. See attached BMPs: Rocked/Rolling Dip Design and Placement, General Operations BMPs, and General Erosion Control specifications.

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Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 53	-123.770693 40.100202	Seasonal	-	X	X	As required	
Current Condition: Class II watercourse crossing consisting of a 60" D x 50' L corrugated metal culvert that is installed correctly and sized adequately for the 100-year storm event.						Prescribed Action: None. Maintain and monitor for plugging.	

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 54	-123.771006 40.099112	Legacy	-	-	-	-	
Current Condition: Legacy ATV trail ford crossing. No sediment discharge issues were observed. This crossing is seldomly used during summer months and requires no treatment.						Prescribed Action: None. Do not use during the presence of surface water in the crossing.	

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 55	-123.770848 40.099157	Seasonal	-	X	-	As required	
Current Condition: Legacy ATV trail ford crossing. No sediment discharge issues were observed. This crossing is seldomly used during summer months and requires no treatment.						Prescribed Action: None. Do not use during the presence of surface water in the crossing.	

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 56	-123.770502 40.097682	Seasonal	-	-	-	-	
Current Condition: Legacy ATV trail ford crossing. No sediment discharge issues were observed. This crossing is seldomly used during summer months and requires no treatment.						Prescribed Action: None. Do not use during the presence of surface water in the crossing.	

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 57	-123.770956 40.100345	Seasonal	-	X	-	As required	
Current Condition: Functioning rocked rolling dip.						Prescribed Action: Maintain the rolling dip to the specifications outlined in the attached BMPs. See attached BMPs: Rocked/Rolling Dip Design and Placement, General Operations BMPs, and General Erosion Control specifications.	

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 58	-123.771858 40.100652	Seasonal	-	X	X	As required	
Current Condition: Class III watercourse crossing consisting of a 24" D x 40' L smooth-walled plastic culvert that is installed correctly and sized adequately for the 100-year storm event.						Prescribed Action: None. Maintain and monitor for plugging.	

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Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 59	-123.77313 40.1009	Seasonal	-	X	-	As required	

Current Condition: Ditch relief culvert consisting of an 18" diameter smooth-walled plastic culvert that is installed correctly and sized adequately for the 100-year storm event.

Prescribed Action: None. Maintain and monitor for plugging.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 60	-123.773211 40.100902	Seasonal	-	X	-	As required	

Current Condition: Inside ditch crossing that lacks a drainage structure. Currently the access road is not regularly used.

Prescribed Action: If this road becomes regularly used in the future, install an 15" D x 30' - 40' L culvert in the ditch crossing.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 61	-123.773843 40.099397	Seasonal	-	X	X	As required	

Current Condition: Class II watercourse crossing consisting of a 60" D x 40' L corrugated metal culvert that is installed correctly and sized adequately for the 100-year storm event.

Prescribed Action: None. Maintain and monitor for plugging.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 62	-123.773781 40.100936	Seasonal	-	X	-	As required	

Current Condition: Functioning rocked rolling dip.

Prescribed Action: Maintain the rolling dip to the specifications outlined in the attached BMPs. See attached BMPs: Rocked/Rolling Dip Design and Placement, General Operations BMPs, and General Erosion Control specifications.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 63	-123.77407 40.100802	Seasonal	-	-	-	-	

Current Condition: A legacy gully from concentrated road surface has formed on the outboard side of the road. The installation of drainage feature up grade have adequately drained concentrated road surface runoff away from this feature.

Prescribed Action: None.

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Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 64	-123.77448 40.100574	Seasonal	-	X	-	As required	
Current Condition: Functioning rocked rolling dip.						Prescribed Action: Maintain the rolling dip to the specifications outlined in the attached BMPs. See attached BMPs: Rocked/Rolling Dip Design and Placement, General Operations BMPs, and General Erosion Control specifications.	

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 65	-123.775175 40.099852	Seasonal	-	X	X	As required	
Current Condition: Class II watercourse crossing consisting of a 60" D x 40' L corrugated metal culvert that is installed correctly and sized adequately for the 100-year storm event.						Prescribed Action: None. Maintain and monitor for plugging.	

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 66	-123.77527 40.099714	Seasonal	X	X	X	Prior to 10/15/21	
Current Condition: Functioning rocked rolling dip.						Prescribed Action: Maintain the rolling dip to the specifications outlined in the attached BMPs. See attached BMPs: Rocked/Rolling Dip Design and Placement, General Operations BMPs, and General Erosion Control specifications.	

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 67	-123.775328 40.099584	Seasonal	X	X	X	Prior to 10/15/21 pending the approval of any required permits	
Current Condition: Class III watercourse crossing consisting of a rocked ford.						Prescribed Action: Upgrade the existing crossing by installing an 18" D x 30' - 40' L culvert per the specifications outlined in the attached BMPs: See Permanent Culvert Crossing, Permanent Culvert Crossing Design: Critical Dip and Hydrologic Disconnect Placement, Critical Dip, Culvert Orientation, Inlet and Outlet Armoring, General Operations BMPs, and General Erosion Control specifications.	

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 68	-123.775459 40.099364	Seasonal	-	X	-	As required	
Current Condition: Rocked and outsloped section of road.						Prescribed Action: None. Maintain.	

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 69	-123.775466 40.098988	Seasonal	-	X	X	As required	
Current Condition: Class II watercourse crossing consisting of a 60" D x 40' L corrugated metal culvert that is installed correctly and sized adequately for the 100-year storm event.						Prescribed Action: None. Maintain and monitor for plugging.	

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Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 70	-123.775634 40.097512	Legacy	-	X	-	As required	

Current Condition: Legacy crossing on a Class II watercourse that has since been removed or failed.

Prescribed Action: None. Monitor the northern approach for instability.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 71	-123.776289 40.100389	Seasonal	-	X	-	As required	

Current Condition: Steep ATV access trail that lacks drainage features and surfacing.

Prescribed Action: Install three water bars spaced approximately 75' apart starting at the water tanks down to the watercourse crossing at Site 72 per the specifications outlined in the attached BMPs: See Waterbar Construction, General Operations BMPs, and General Erosion Control specifications. Maintain as needed.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Site 72	-123.77654 40.100054	Trail	X	X	-	Prior to 10/15/21	

Current Condition: Class III watercourse crossing consisting of a dirt ford.

Prescribed Action: The crossing will be abandoned upon removal and relocation of Cultivation Area F.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Cultivation Area A	N/A	-	X	X	-	Immediately	

Current Condition: Runoff from this cultivation area is draining to a ditch along northeastern side of the area at the base of a cutbank. This drainage ditch then drains into a Class III watercourse to the southeast.

Prescribed Action: Remove the cultivation area and any remaining fencing, pots, or other cultivation-related wastes and materials from areas labled "Cultivation Area & Distrubed Area within Riparian Setback" on attached Site and Overview Maps. Install eight rock check dams in the drainage ditch at approximately 50' intervals to capture and slow concentrated runoff. Promote vegetation growth within the drainage ditch and do not remove any vegetation growth. A series of three straw/fiber wattle rows (not containing monofilament netting) shall be installed within the area labled "Cultivation Area & Distrubed Area within Riparian Setback" on attached Site and Overview Maps, perpendicular to the slope direction facing the relevant watercourse with 3' - 5' spacing per the Erosion Control BMP's.

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Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Cultivation Area B	N/A	-	X	X	-	Immediately	

Current Condition: Portions of this cultivation area is located within riparian setbacks of the adjacent watercourse.

Prescribed Action: Remove the cultivation area and any remaining fencing, pots, or other cultivation-related wastes and materials from areas labled "Cultivation Area & Distrubed Area within Riparian Setback" on attached Site and Overview Maps. Seed and mulch the cultivation area that was removed, and any Disturbed Area associated with its removal, with a mix of erosion control grass and native grass seed and weed free straw(or woodchips). If cultivation soil is not re-used, contour the cultivation-related soils into the ground outside of any riparian buffer areas, and seed and mulch the contoured soils with native grass seed and weed free straw. A series of three straw/fiber wattle rows (not containing monofilament netting) shall be installed within the area labled "Cultivation Area & Distrubed Area within Riparian Setback" on attached Site and Overview Maps, perpendicular to the slope direction facing the relevant watercourse with 3' - 5' spacing per the Erosion Control BMP's.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Cultivation Area E	N/A	-	X	X	-	Immediately	

Current Condition: Portions of this cultivation area is located within riparian setbacks of the adjacent watercourse.

Prescribed Action: Remove the cultivation area and any remaining fencing, pots, or other cultivation-related wastes and materials from areas labled "Cultivation Area & Distrubed Area within Riparian Setback" on attached Site and Overview Maps. Seed and mulch the cultivation area that was removed, and any Disturbed Area associated with its removal, with a mix of erosion control grass and native grass seed and weed free straw(or woodchips). If cultivation soil is not re-used, contour the cultivation-related soils into the ground outside of any riparian buffer areas, and seed and mulch the contoured soils with native grass seed and weed free straw.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Cultivation Area F	N/A	-	X	X	-	Immediately	

Current Condition: Portions of this cultivation area is located within riparian setbacks of the adjacent watercourse.

Prescribed Action: Remove the cultivation area and any remaining fencing, pots, or other cultivation-related wastes and materials from areas labled "Cultivation Area & Distrubed Area within Riparian Setback" on attached Site and Overview Maps. Seed and mulch the cultivation area that was removed, and any Disturbed Area associated with its removal, with a mix of erosion control grass and native grass seed and weed free straw(or woodchips). If cultivation soil is not re-used, contour the cultivation-related soils into the ground outside of any riparian buffer areas, and seed and mulch the contoured soils with native grass seed and weed free straw. A series of three straw/fiber wattle rows (not containing monofilament netting) shall be installed within the area labled "Cultivation Area & Distrubed Area within Riparian Setback" on attached Site and Overview Maps, perpendicular to the slope direction facing the relevant watercourse with 3' - 5' spacing per the Erosion Control BMP's.

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Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Past Cultivation Areas	N/A	-	X	X	-	Immediately	

Current Condition: Past cultivation areas that are no longer used with remaining cultivation-related materials, fencing, wastes, and soils.

Prescribed Action: Remove the cultivation area and any remaining fencing, pots, or other cultivation-related wastes and materials from these areas. Seed and mulch the cultivation area that was removed, and any Disturbed Area associated with its removal, with a mix of erosion control grass and native grass seed and weed free straw(or woodchips). If cultivation soil is not re-used, contour the cultivation-related soils into the ground outside of any riparian buffer areas, and seed and mulch the contoured soils with native grass seed and weed free straw.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Water Storage and Use	N/A	-	X	X	-	Immediately	

Current Condition: At present there are no devices or procedures in place to record water usage associated with the irrigation of cannabis and domestic use.

Prescribed Action: Water metering devices, or procedures for the wells, shall be installed to record all water diverted, pumped, and used water for the irrigation of cannabis and domestic use. Water meter(s) and water supply infrastructure shall be designed/installed in a manner such that water usage for the irrigation of cannabis can be recorded separately from water used for domestic use. Additionally, if there are multiple sources of water, infrastructure/metering device(s) shall be design/installed in a manner that each source of water is recorded separately. Monthly water usage shall be recorded for annual reporting purposes. Also, water storage tank lids shall be appropriately closed to prevent the access of wildlife and, if not currently implemented, water conservation measures such as drip line irrigation, morning or evening watering, and mulch or cover cropping of cultivated top soils shall also be implemented.

Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Liquid Petroleum Products	N/A	-	X	X	-	Immediately	

Current Condition: All liquid petroleum products (e.g. any size container of any petroleum product) requires secondary containment while not in immediate use and cover from precipitation during the wet season. Adequate quantities of absorbent materials shall also be stored at all locations where these types of materials are used and stored.

Prescribed Action: Any/all liquid petroleum products and their containers shall be stored in secondary containment (e.g. plastic totes or sealed metal boxes) while being stored long term or not in immediate use, wherever these materials are used anywhere on the property. Adequate quantities of absorbent materials (e.g. purpose made materials for oil and fuel spills, cat litter) shall be stored at all locations where these types of materials are used and stored. Should a spill of these materials occur, absorbent materials will be applied immediately and allowed enough time to absorb as much material as possible. Following treatment, absorbent materials applied as well as any contaminated soil will be removed and disposed of appropriately for the spilled material. See attached BMPs: Generator, Fuel, and Oil Management for further details.

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Unique Point	Lat-Long NAD 83	Road Type	Mitigation Planned	Monitor	1600	Treatment Priority	Date Completed
Generators and Gas Powered Pumps	N/A	-	X	X	-	Immediately	

Current Condition: All liquid petroleum powered generators and pumps require secondary containment, and cover from precipitation during the wet season. Adequate quantities of absorbent materials shall also be stored at all locations where the generators and gas powered pumps are used and stored.	Prescribed Action: Any/all liquid petroleum powered generators or pumps (large or small) shall be stored in secondary containment (e.g. plastic totes, sealed metal boxes, drip pans, pre-fabricated portable containment berms or fabricated and lined containment basins) while being stored long term or not in immediate use, wherever these materials are used anywhere on the property. Adequate quantities of absorbent materials shall be stored at all locations where these types of materials are used and stored. Should a spill of these materials occur, absorbent materials will be applied immediately and allowed enough time to absorb as much material as possible. Following treatment, absorbent materials applied as well as any contaminated soil will be removed and disposed of appropriately for the spilled material. See attached BMPs: Generator, Fuel, and Oil Management for further details.

WDID: _____
Date: _____

Monthly Water Tracking

Timberland Resource Consultan
165 South Fortuna Boulevard, Fortuna, CA 9554(
707-725-1897 • fax 707-725-0972
trc@timberlandresource.com

Month	Total Surface Water Diversion	Water input to Storage by Source	Water use by Source
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			

WDID: _____

Date: _____

Monthly Water Tracking

Timberland Resource Consultan
165 South Fortuna Boulevard, Fortuna, CA 95540
707-725-1897 • fax 707-725-0972
trc@timberlandresource.com

BMP: Generator, Fuel, and Oil Management

All bulk fuel storage or petroleum products, any/all future petroleum products and other liquid chemicals, including but not limited to diesel, biodiesel, gasoline, and oils shall be stored so as to prevent their spillage, discharge, or seepage into receiving waters. Storage tanks and containers shall be of suitable material and construction to be compatible with the substance(s) stored and conditions of storage such as pressure and temperature. Above ground storage tanks and containers shall be provided with a secondary means of containment for the entire capacity of the largest single container and sufficient cover shall be provided to prevent any/all precipitation from entering said secondary containment vessel.

If the volume of a fuel container is greater than 1,320 gallons, a Spill Prevention, Control, and Countermeasures (SPCC) plan will be required for the use the fuel tank.

On-site storage of petroleum products, or other fuels used for commercial activities may require registration as hazardous materials through the California Environmental Reporting System (CERS). Additionally, the waste oil generated from commercial activities (generators) and their used oil filters are considered hazardous waste and requires additional reporting. The discharger is advised to contact local agencies to find out if such reporting is applicable to currently operations

Used motor oil is recommended to be stored in sealed containers that the oil was originally packaged in, e.g. sealed buckets/quart or gallon jugs, or other sealed containers designed to store motor oil. Stored used oil is recommended to be regularly disposed of at hazardous waste disposal sites. Used oil filters are also recommended to be stored in sealed containers, e.g. sealed plastic totes/buckets, for later disposal at a hazardous waste disposal site. These storage containers are recommended to be stored in structures where they are protected from precipitation.

Further information regarding the State of California's requirements for the managing of Used Oil and Oil Filters can be found by entering the links below or searching the corresponding titles to the links.

California Department of Toxic Substances Control - Used Oil Generator Requirements

- https://www.dtsc.ca.gov/InformationResources/upload/RAG-UsedOilforGenerators.pdf

Department of Toxic Substances Control - Managing Used Oil Filters for Generator

- https://www.dtsc.ca.gov/InformationResources/upload/RAG_Used-Oil-Filters_Generators1.pdf

BMP: Generator, Fuel, and Oil Management (Generators and Pumps)

All generators and petroleum powered pumps shall have spill trays or secondary containment placed underneath them when using, fueling, or changing oil on them to prevent the potential for leeching, seepage or spillage of petroleum products. All spill trays and containment structures require cover from precipitation if used or left out over the winter period. All generators and petroleum powered pump locations shall have spill cleanup kits on hand.

Pre-fabricated secondary containment structures and spill trays can be purchased online or from local wholesalers of petroleum products. As an alternative to pre-fabricated secondary containment structures, structures can be constructed from wooden, cinderblock, concrete, or metal frames lined with PVC liners, e.g. pond liner/water bladder material, as long as the containment is fully sealed and constructed in a similar manner to examples of pre-fabricated containment structures found below. Ensure that diked areas are sufficiently impervious to contain discharged chemicals. All containment structures require cover from precipitation to prevent the containment from filling with water. Secondary containment for fuel tanks shall not be constructed.

As an alternative to pre-fabricated spill kits, kits can consist of sealed trashcans or buckets with industrial absorbent material (e.g. cat litter) and shovels, placed nearby any location where generators, pumps, or other petroleum products or chemicals are used.

Examples of industry standard pre-fabricated spill containment and clean-up kits can be found following or entering the links below. Pre-fabricated spill containment and clean-up kits can be purchased online, from Renner Petroleum, or other similar industry providers.

Ultratech Spill Containment

- http://www.spillcontainment.com/categories/spill-containment/

New Pig Portable and Collapsible Spill Containment

- https://www.newpig.com/collapsible-berms/c/5142?show=All

BMP: Generator, Fuel, and Oil Management

Example of a small, portable, and compact containment berm.

Example of a portable utility spill tray.

BMP: Generator, Fuel, and Oil Management

Example of secondary containment for a fuel tank. This container requires cover from precipitation.

Example of spill pallets for unused or used oil drums and other petroleum products.

BMP: Winterization and Interim Treatments for Erosion Control

- **Roads**
  - Existing or newly installed road surface drainage structures such as water bars, rolling dips, ditch relief culverts, and intentionally in/out-sloped segments of road shall be maintained to ensure continued function of capturing and draining surface runoff.
  - Hand tool kick-outs (lead out ditch) for existing wheel rut, surface run-off confinement.
  - Temporary waterbar/cross-wattles installed on road/trail sections of concentrating surface runoff.
  - Clean existing ditch relief culvert inlets, outlets, and contributing ditch lines of current and potential blockage debris by hand.
  - Hand place energy dissipating rock/small woody debris at ditch relief culvert outlets where erosion is occurring.
  - Wattles/straw bales placed at road runoff delivery sites.
  - Touch-up with hand tools of existing surface drainage structures (kick-outs, rolling dips, and waterbars).
  - Seed and straw un-used, or to be abandoned, road surfaces where erosion is occurring.
  - Frequent use of un-surfaced roads should be avoided, particularly when road surfaces are soft/saturated.

- **Crossings**
  - Clean inlets, outlets, and channels above of current and potential blockage debris by hand.
  - Hand place energy dissipating rock/small woody debris at ditch relief culvert outlets.
  - Hand placement of rock armor around culvert inlets.
  - Install staked wattles along the outboard road edge of out-sloped watercourse crossings where direct delivery of road surface runoff is occurring.
  - Hand placement of rock on crossing fill faces where erosion is/may occur as a result of poor crossing construction.

- **Cultivation Areas**
  - Use hand tools to capture cultivation related soils that are not contained (soil from post-harvest plant removal, soil/planter removal, general spillage).
  - Treat beds, pots, new soil storage piles, spent soil piles, and soil disposal piles with cover crops for soil stability and potentially nitrogen fixing/soil amendment.
  - Bagged potting soil should be covered.
  - Install staked wattles or an earthen berm around cultivation soils piles prior to the winter period, annually.
  - Any soil amendment, fertilizer, herbicide, or pesticide that is not 100% sealed should be stored under cover.
  - Cultivation sites with poor or concentrating drainage can have wattles or bales installed prior to winter to help prevent sediment and nutrients from leaving the site.
  - Plastic netting shall be disposed of or stored where it is inaccessible to wildlife.
  - Tarps/dep covers shall be stored so they cannot be blown away.
  - General waste from growing season gathered up and disposed of.
  - Exposed soil surfaces in the cultivation area, as well as graded fill slopes should be seeded, strawed, mulched, jute netted as needed.

- **General Areas**
  - Remove all refuse prior to leaving property for the season.
  - Back fill pit toilets to be abandoned.

BMP: General Recommendations

- **Fertilizers, soil amendments, and pesticides**
  - Fertilizer, soil amendments, and pesticide use it to be recorded in such a manner that cumulative annual totals are recorded for annual reporting.
  - Store in-use fertilizers in a securable storage container, such as a tote or deck box, adjacent to the mixing tanks.

- **Petroleum products and hazardous materials**
  - Utilize spill trays/containment structures and cover over the containment when using, fueling, changing oil on portable generators or petroleum powered water pumps to prevent the potential for leeching, seepage or spillage of petroleum products.
  - It is recommended that all petroleum products and other chemicals are registered with the California Environmental Reporting System (CERS) to satisfy future licensing requirements.

- **Water storage and Use**
  - Water use shall be designed and metered such that water used for the irrigation of cannabis will be recorded separately from domestic use. Water use for the irrigation of cannabis is to be recorded monthly for annual reporting.
  - Ensure lids are secured on all water storage tanks to prevent wildlife from becoming entrapped within the tank.
  - Install float valves, or implement another equivalent system, on all applicable water storage and transfer tanks to prevent unnecessary water diversion and the overflowing of water tanks.

BMP: General Operations BMPs

- If operations require moving of equipment across a flowing stream, such operations shall be conducted without causing a prolonged visible increase in stream turbidity. For repeated crossings, the operator shall install a bridge, culvert, or rock-lined crossing.

- During construction in flowing water, which can transport sediment downstream, the flow shall be diverted around the work area by pipe, pumping, temporary diversion channel or other suitable means. When any dam or artificial obstruction is being constructed, maintained, or placed in operation, sufficient water shall at all times be allowed to pass downstream to maintain fish life below the dam. Equipment may be operated in the channel of flowing live streams only as necessary to construct the described construction.

- Disturbance or removal of vegetation shall not exceed the minimum necessary to complete operations. The disturbed portion of any stream channel shall be restored to as near their original condition as possible. Restoration shall include the mulching of stripped or exposed dirt areas at crossing sites prior to the end of the work period.

- Structures and associated materials not designed to withstand high seasonal flow shall be removed to areas above the high-water mark before such flows occur.

- No debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete washing, oil or petroleum products, or other organic or earthen material from any logging, construction, or associated activity of whatever nature shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into waters of the State. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high-water mark of any stream.

BMP: General Erosion Control

- Timing for soil stabilization measures within the 100 feet of a watercourse or lake: For areas disturbed from May 1 through October 15, treatment shall be completed prior to the start of any rain that causes overland flow across or along the disturbed surface. For areas disturbed from October 16 through April 30, treatment shall be completed prior to any day for which a chance of rain of 30 percent or greater is forecast by the National Weather Service or within 10 days, whichever is earlier.

- Within 100 feet of a watercourse or lake, the traveled surface of logging roads shall be treated to prevent waterborne transport of sediment and concentration of runoff that results from operations. Treatment may consist of, but not limited to, rocking, out sloping, rolling dips, cross drains, water bars, slope stabilization measures, or other practices appropriate to site-specific conditions.

- The treatment for other disturbed areas within 100 feet of a watercourse or lake, including: (A) areas exceeding 100 contiguous square feet where operations have exposed bare soil, (B) approaches to road watercourse crossings out to 100 feet or the nearest drainage facility, whichever is farthest, (C) road cut banks and fills, and (D) any other area of disturbed soil that threatens to discharge sediment into waters in amounts deleterious to the quality and beneficial uses of water, shall be grass seeded and mulched with straw or fine slash. Grass seed shall be applied at a rate exceeding 100 pounds per acre. Straw mulch shall be applied in amounts sufficient to provide at least 2- 4-inch depth of straw with minimum 90% coverage. Slash may be substituted for straw mulch provided the depth, texture, and ground contact are equivalent to at least 2 – 4 inches of straw mulch. Any treated area that has been subject to reuse or has less than 90% surface cover shall be treated again prior to the end of operations.

- Within 100 feet of a watercourse or lake, where the undisturbed natural ground cover cannot effectively protect beneficial uses of water from operations, the ground shall be treated with slope stabilization measures described in #3 above per timing described in #1 above.

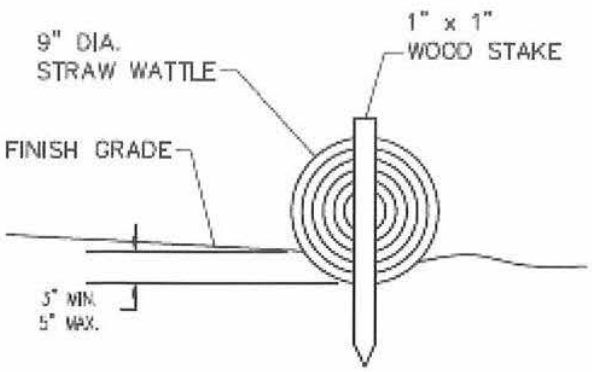
- Side cast or fill material extending more than 20 feet in slope distance from the outside edge of a landing which has access to a watercourse or lake shall be treated with slope stabilization measures described in #3 above. Timing shall occur per #1 above unless outside 100 feet of a watercourse or lake, in which completion date is October 15.

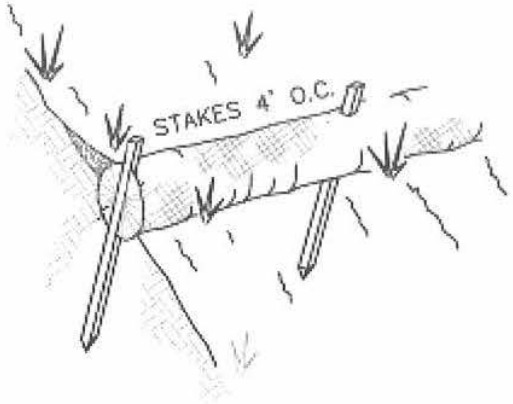
- All roads shall have drainage and/or drainage collection and storage facilities installed as soon as practical following operations and prior to either (1) the start of any rain which causes overland flow across or along the disturbed surface within 100 feet of a watercourse or lake protection, or (2) any day with a National Weather Service forecast of a chance of rain of 30 percent or more, a flash flood warning, or a flash flood watch.

BMP: General Erosion Control (Cont.)

- Erosion control and sediment detention devices and materials shall be incorporated into the cleanup/restoration work design and installed prior to the end of project work and before the beginning of the rainy season. Any continuing, approved project work conducted after October 15 shall have erosion control works completed up-to-date and daily.
- Erosion control materials shall be, at minimum, stored on-site at all times during approved project work between May 1 and October 15.
- Approved project work within the 5-year flood plain shall not begin until all temporary erosion controls (straw bales or silt fences that are effectively keyed-in) are installed downslope of cleanup/restoration activities.
- Non-invasive, non-persistent grass species (e.g., barley grass) may be used for their temporary erosion control benefits to stabilize disturbed slopes and prevent exposure of disturbed soils to rainfall.
- Upon work completion, all exposed soil present in and around the cleanup/restoration sites shall be stabilized within 7 days.
- Soils exposed by cleanup/restoration operations shall be seeded and mulched to prevent sediment runoff and transport.
- Straw Wattles (if used) shall be installed with 18 or 24-inch wood stakes at four feet on center. The ends of adjacent straw wattles shall be abutted to each other snugly or overlapped by six inches. Wattles shall be installed so that the wattle is in firm contact with the ground surface.

BMP: General Erosion Control (Cont.)



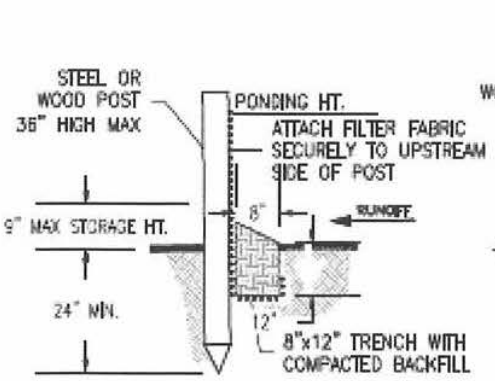


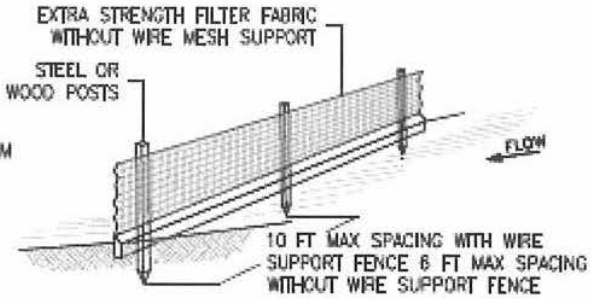
STRAW WATTLE NOTES:

1. STRAW WATTLES SHALL BE INSTALLED WITH 18 OR 24 INCH WOOD STAKES AT FOUR FEET ON CENTER. THE ENDS OF ADJACENT STRAW WATTLES SHALL BE ABUTTED TO EACH OTHER SNUGLY OR OVERLAPPED BY SIX INCHES.
2. STRAW ROLL INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE ROLL IN A TRENCH, 3"–5" DEEP. RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND THE ROLL.

STRAW WATTLE INSTALLATION DETAIL

NTS





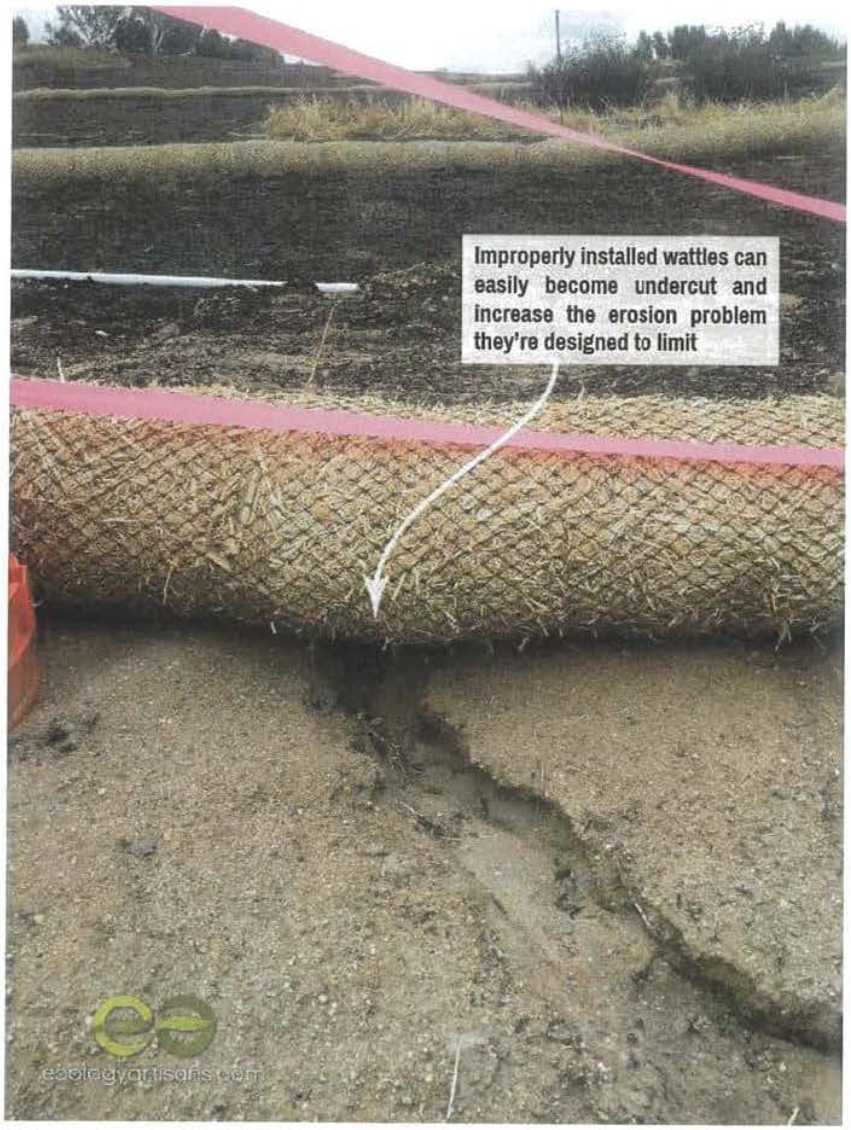
SILT FENCE NOTES:

1. THE CONTRACTOR SHALL INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT.
2. CONTRACTOR SHALL REMOVE SEDIMENT AS NECESSARY. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF–SITE AND IN AN AREA THAT CAN BE PERMANENTLY STABILIZED.
3. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.

SILT FENCE DETAILS

NTS

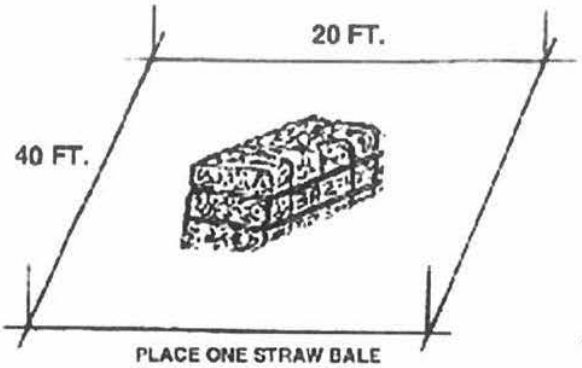
BMP: General Erosion Control (Cont.)



BMP: General Erosion Control (Cont.)

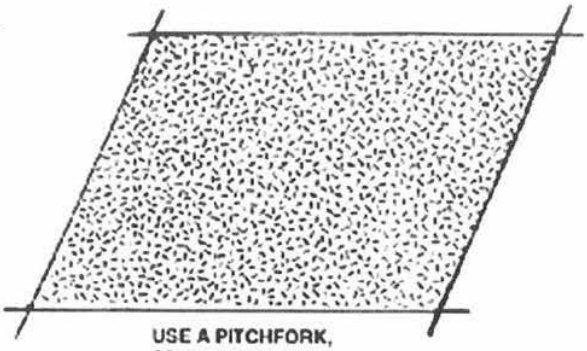
SPREAD THE STRAW

MARK OFF 800 SQ FT. PLOTS



PLACE ONE STRAW BALE PER PLOT (~74 POUNDS). THIS IS EQUIVALENT TO 2 TONS PER ACRE.

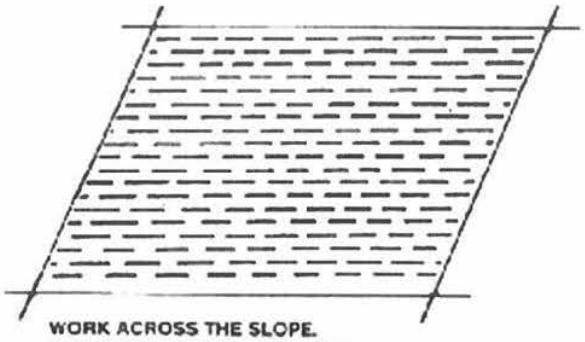
SPREAD EVENLY



USE A PITCHFORK, SPADING FORK, OR BY HAND

ANCHOR THE STRAW

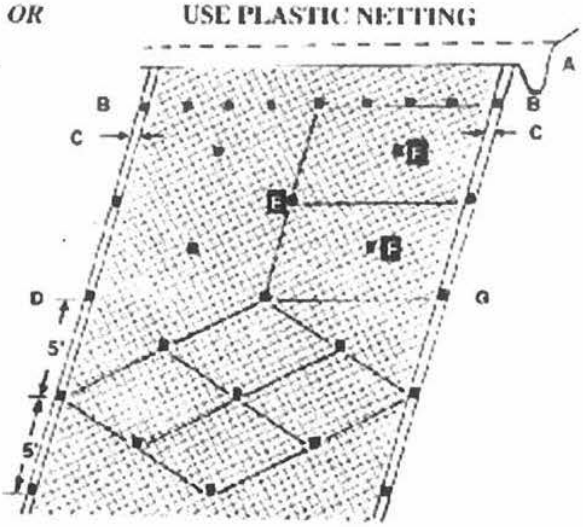
CRIMP BY HAND



WORK ACROSS THE SLOPE.
PUNCH STRAW 4 INCHES DEEP.
A SQUARE END SPADE WORKS WELL.
MAKE PUNCH EVERY 12 INCHES.

OR

USE PLASTIC NETTING



A. LAY BIRD CONTROL NETTING OR SIMILAR MATTING IN STRIPS DOWN THE SLOPE OVER THE STRAW. BURY UPPER END IN 6-8 INCH DEEP AND WIDE TRENCH.. MOST NETTING COMES IN 14 TO 17 FT. WIDE ROLLS.

B. SECURE THE UPPER END WITH STAKES EVERY 2 FEET.

C. OVERLAP SEAMS ON EACH SIDE 4-5 INCHES.

D. SECURE SEAMS WITH STAKES EVERY 5 FEET.

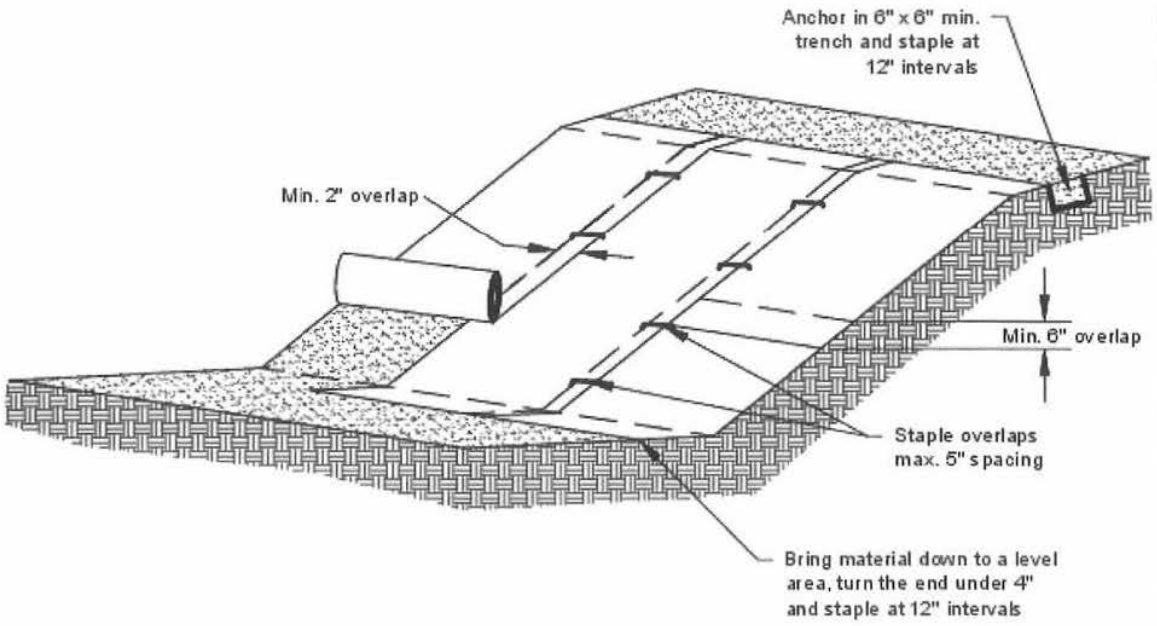
E. STAKE DOWN THE CENTER EVERY 5 FEET.

F. STAKE MIDDLES TO CREATE DIAMOND PAT TERN THAT PROVIDES STAKES SPACED 4-5 FEET APART.

G. USE POINTED 1X2 INCH STAKES 8 TO 9 INCHES LONG. LEAVE 1 TO 2 INCH TOP ABOVE NETTING, OR USE "U" SHAPED METAL PINS AT LEAST 9 INCHES LONG.

NOTE: WHEN JOINING TWO STRIPS, OVERLAP UPPER STRIP 3 FEET OVER LOWER STRIP AND SECURE WITH STAKES EVERY 2 FEET LIKE IN "B" ABOVE

BMP: General Erosion Control (Cont.)



Notes:

1. Slope surface shall be smooth before placement for proper soil contact.
2. Stapling pattern as per manufacturer's recommendations.
3. Do not stretch blankets/mattings tight - allow the rolls to mold to any irregularities.
4. For slopes less than 3H:1V, rolls may be placed in horizontal strips.
5. If there is a berm at the top of the slope, anchor upslope of the berm.
6. Lime, fertilize, and seed before installation. Planting of shrubs, trees, etc. should occur after installation.

NOT TO SCALE

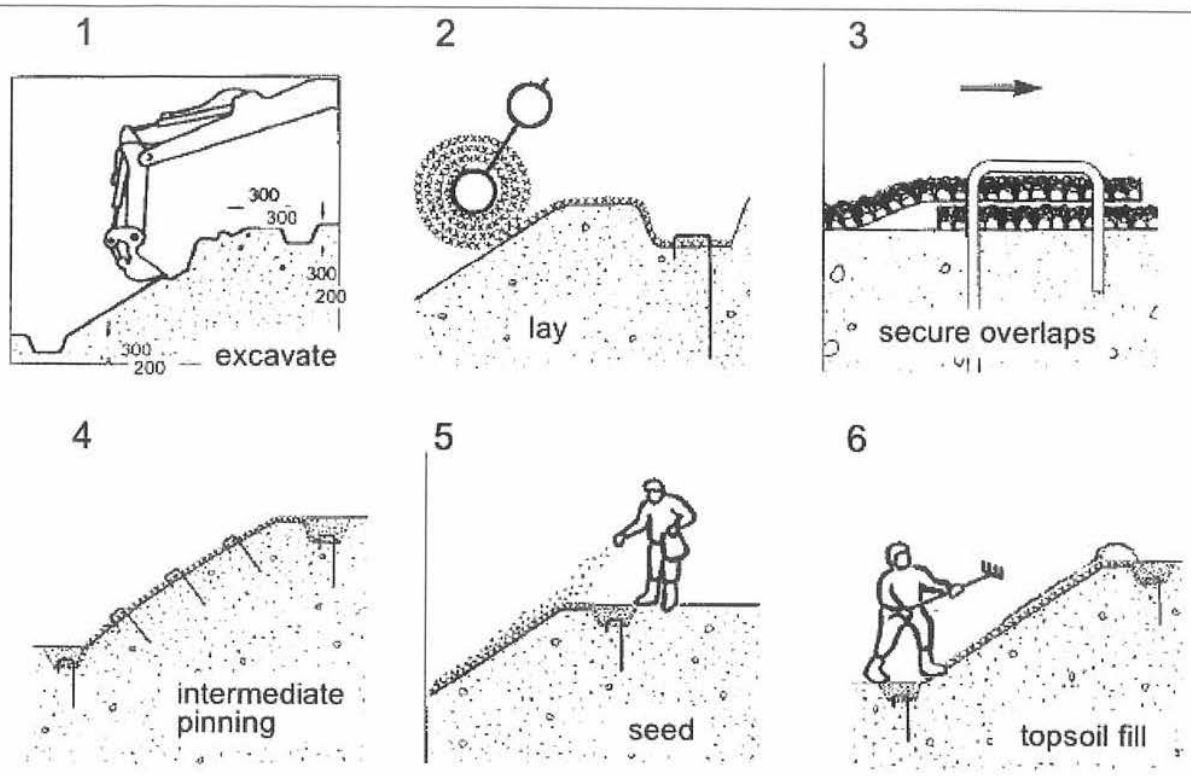
DEPARTMENT OF ECOLOGY
State of Washington

Slope Installation

Revised June 2016

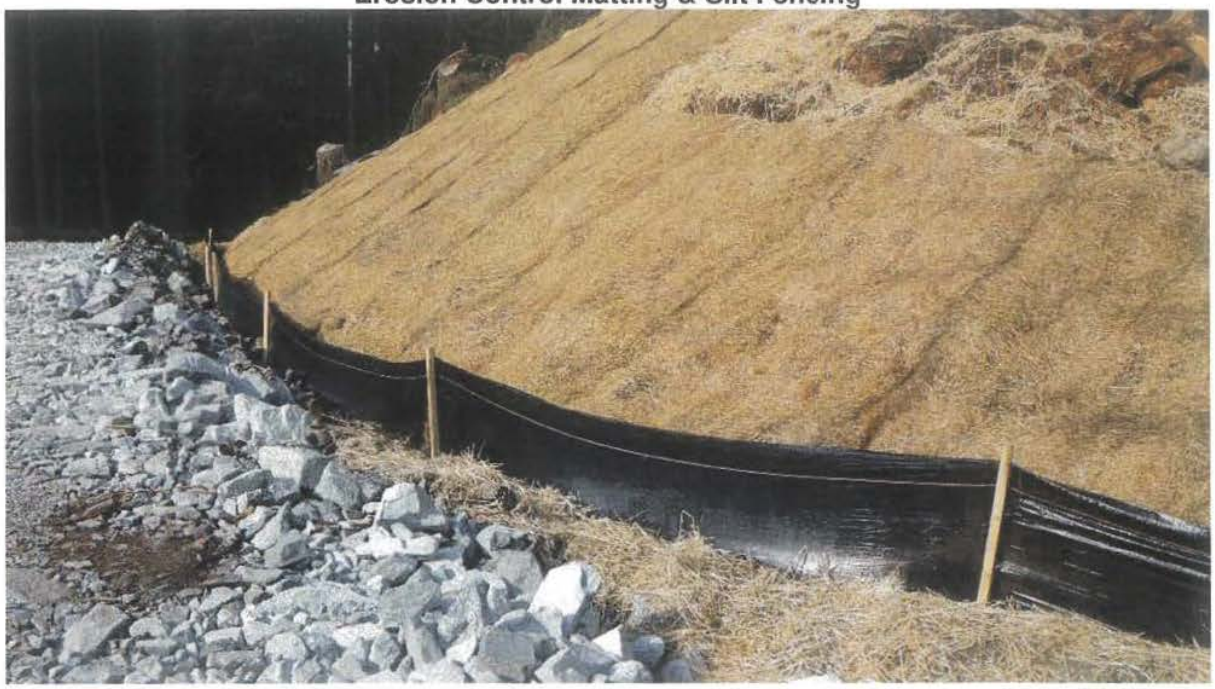
BMP: General Erosion Control (Cont.)

Installation of a geosynthetics mat - Enkamat



Erosion Control Measures (Cont.)

Erosion Control Matting & Silt Fencing



Jute netting & Straw-wattles

BMP: General Erosion Control (Cont.)

TABLE 34. Guidelines for erosion and sediment control application

Timing of application	Technique	Portion of road and construction area treated
Erosion control during construction	Hydromulching, hydroseeding	Road fill slopes, cut slopes, bare soil areas
	Dry seeding	Road fill slopes, cut slopes, bare soil areas
	Wood chip, straw, Excelsior or tackified mulch	Road fill slopes, cut slopes, bare soil areas
	Straw wattles	Road fill slopes and cut slopes
	Gravel surfacing	Road, landing and turnout surfaces
	Dust palliative	Road surfaces
	Minimize disturbance (soil and vegetation)	All areas peripheral to construction
Sediment control during construction	Sediment basin	Roadside ditches, turnouts and small stream crossings
	Sediment traps (e.g., silt fences, straw bales barriers, woody debris barriers)	Road fill slopes, cutbanks, bare soil areas and ditches
	Straw bale dams	Ditches and small streams
	Sumps and water pumps	Stream channels and stream crossings
	Streamflow diversions (e.g., temporary culverts, flex pipe, etc.)	Stream channels and stream crossings
	Surface diversion and dispersion devices (pipes, ditches, etc.)	All disturbed bare soil areas
Permanent erosion control	Road shaping	Road and landing surfaces
	Gravel surfacing	Road, landing and turnout surfaces
	Bituminous or asphalt surfacing	Road surface
	Rolling dips	Road surface
	Ditch relief culverts	Roadbed and road fill
	Downspouts and berm drains	Road fill slopes
	Waterbars	Road and landing surfaces
	Berms	Road surface and roadside areas
	Ditches	Road and landing surfaces
	Riprap	Road fill slopes, stream crossing fills, cutbanks, stream and lake banks
	Soil bioengineering	Road fill slopes, cut slopes, stream crossings, streambanks
	Tree planting	Road fill slopes, cutbanks, bare soil areas, stream crossings, streambanks

HANDBOOK FOR FOREST, RANCH AND RURAL ROADS

BMP: Permanent Culvert Crossing

- New culvert installations shall be sized to accommodate flows associated with a 100-year storm event.
- If the new culvert is replacing a poorly installed old culvert, the crossing may need to be abandoned to the following standard:
  - When fills are removed they shall be excavated to form a channel that is as close as feasible to natural watercourse grade and orientation, and that is wider than the natural channel.
  - Excavated banks shall be laid back to a 2:1 (50%) or natural slope.
- New culverts shall be placed at stream gradient, or have downspouts, or have energy dissipaters at outfall.
  - Align culverts with the natural stream channel orientation to ensure proper function, prevent bank erosion, and minimize debris plugging. See Figure 97 below.
  - Place culverts at the base of the fill and at the grade of the original streambed or install a downspout past the base of the fill. Downspouts should only be installed if there are no other options.
  - Culverts should be set slightly below the original stream grade so that the water drops several inches as it enters the pipe.
  - Culvert beds should be composed of rock-free soil or gravel, evenly distributed under the length of the pipe.
  - Compact the base and sidewall material before placing the pipe in its bed.
  - Lay the pipe on a well-compacted base. Poor basal compaction will cause settling or deflection in the pipe and can result in separation at a coupling or rupture in the pipe wall.
  - Backfill material should be free of rocks, limbs, or other debris that could dent or puncture the pipe or allow water to seep around the pipe.
  - Cover one end of the culvert pipe, then the other end. Once the ends are secure, cover the center.
  - Tamp and compact backfill material throughout the entire process, using water as necessary for compaction.
  - Backfill compacting will be done in 0.5 – 1.0 foot lifts until 1/3 of the diameter of the culvert has been covered.
  - Push layers of fill over the crossing to achieve the final design road grade, road fill above the culvert should be no less than one-third to one-half the culvert diameter at any point on the drivable surface.
- Critical dips shall be installed on culvert crossings to eliminate diversion potential. Refer to Figure 84 below.
- Road approaches to crossings shall be treated out to the first drainage structure (i.e. waterbar, rolling dip, or hydrologic divide) to prevent transport of sediment.
- Road surfaces and ditches shall be disconnected from streams and stream crossings to the greatest extent feasible. Ditches and road surfaces that cannot be feasible disconnected from streams or stream crossings shall be treated to reduce sediment transport to streams.
- If downspouts are used, they shall be secured to the culvert outlet and shall be secure on fill slopes.
- Culverts shall be long enough so that road fill does not extend or slough past the culvert ends.
- Inlet of culverts, and associate fill, shall be protected with appropriate measures that extend at least as high as the top of the culvert.
- Outlet of culverts shall be armored with rock if road fill sloughing into channel can occur.
- Armor inlets and outlets with rock, or mulch and seed with grass as needed (not all stream crossings need to be armored).
- Where debris loads could endanger the crossing, a debris catchment structure shall be constructed upstream of the culvert inlet.
- Bank and channel armoring may occur, when appropriate, to provide channel and bank stabilization.

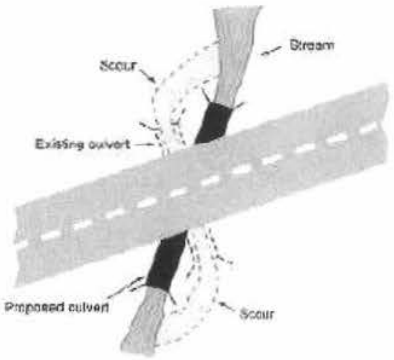
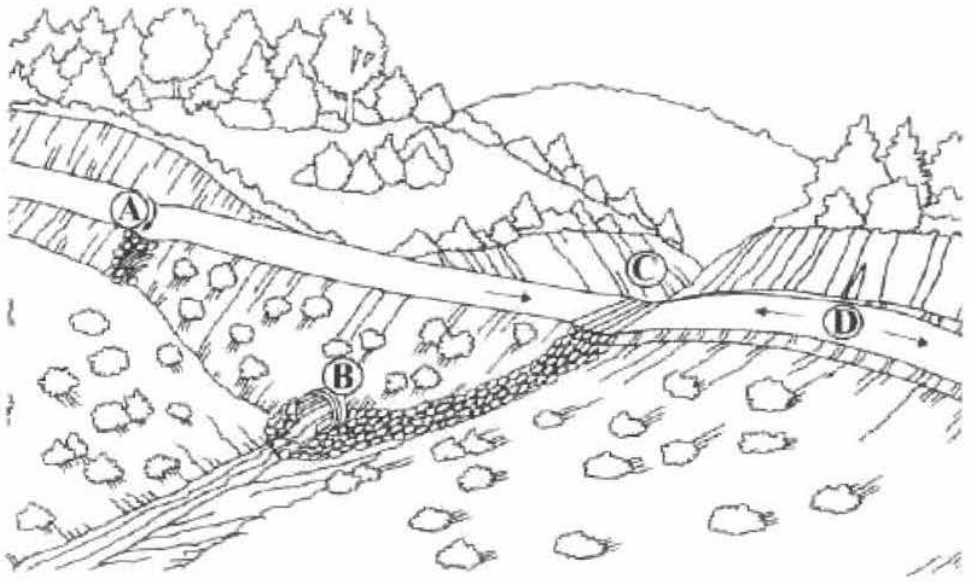


FIGURE 97. *Culvert alignment should be in relation to the stream and not the road. It is important that the stream enters and leaves the culvert in a relatively straight horizontal alignment so streamflow does not have to turn to enter the inlet or discharge into a bank as it exits. This figure shows a redesigned culvert installation that replaces the bending alignment that previously existed. Channel turns at the inlet increase plugging potential because wood going through the turn will not align with the inlet. Similarly, channel turns at the inlet and outlet are often accompanied by scour against the channel banks (Wisconsin Transportation Information Center, 2004).*

HANDBOOK FOR FOREST, RANCH AND RURAL ROADS

BMP: Permanent Culvert Crossing Design (Critical Dip and Hydrologic Disconnect Placement)



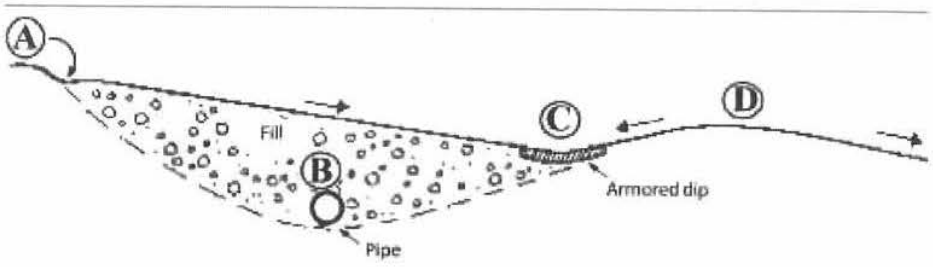
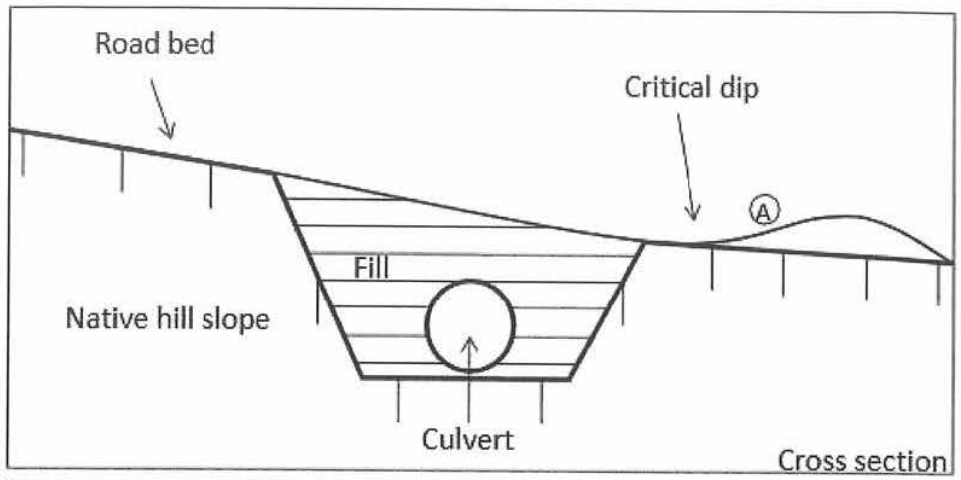


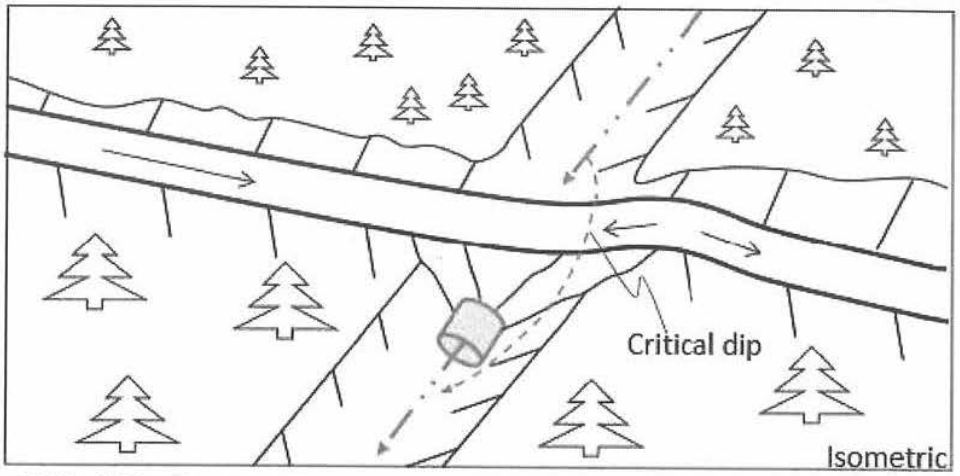
FIGURE 84. *Critical dips or dipped crossing fills should be centered near a stream crossing's down-road hingeline, not over the centerline of the crossing where overtopping could cause washout or severe erosion of the fill. If the stream crossing culvert (B) plugs, water will pond behind the fill until reaching the critical dip or low point in the crossing (C) and flowing back down into the natural stream channel. The down-road ditch must be plugged to prevent streamflow from diverting down the ditch line. For extra protection in this sketch, riprap armor has been placed at the critical dip outfall and extending downslope to the stream channel. This is only required or suggested on stream crossings where the culvert is highly likely to plug and the crossing fill overtopped. The dip at the hinge line is usually sufficient to limit erosional damage during an overtopping event. Road surface and ditch runoff is disconnected from the stream crossing by installing a rolling dip and ditch relief culvert just up-road from the crossing (A) (Keller and Sherar, 2003).*

HANDBOOK FOR FOREST, RANCH AND RURAL ROADS

BMP: Permanent Culvert Crossing Design (Critical Dip)

Typical Critical Dip Design for Stream Crossings with Diversion Potential



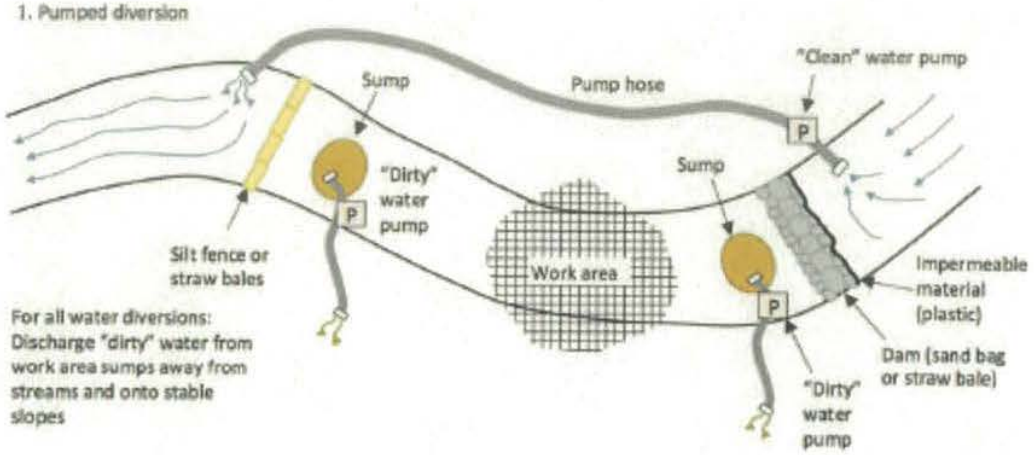


Critical Dip Construction:

1. Critical dip will be constructed on the lower side of crossing.
2. Critical dip will extend from the cutbank to the outside edge of the road surface. Be sure to fill inboard ditch, if present.
3. Critical dip will have a reverse grade Ⓐ from cutbank to outside edge of road to ensure flow will not divert outside of crossing.
4. The rise in the reverse grade will be carried for about 10 to 20 feet and then return to original slope.
5. The transition from axis of bottom, through rising grade, to falling grade, will be in the road distance of at least 15 to 30 feet.
6. Critical dips are usually built perpendicular to the road surface to ensure that flow is directed back into the stream channel.

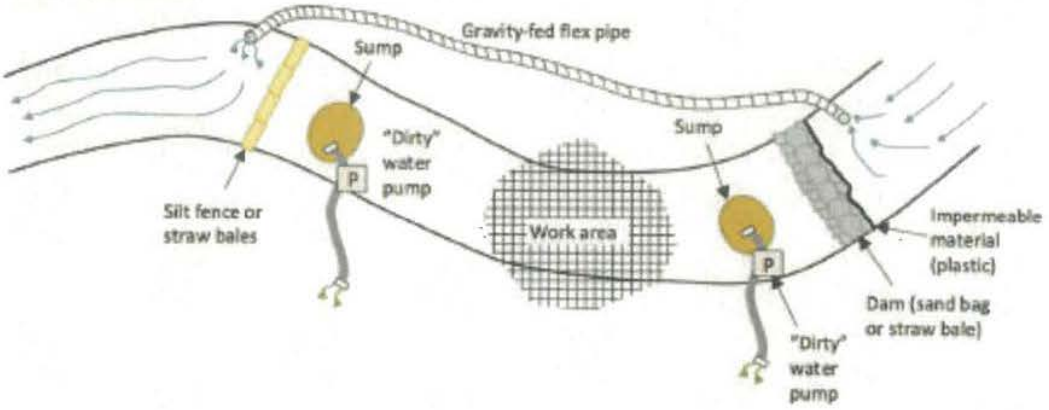
BMP: Permanent Culvert Crossing Design (Cofferdam Construction and Use Specifications)

1. Pumped diversion

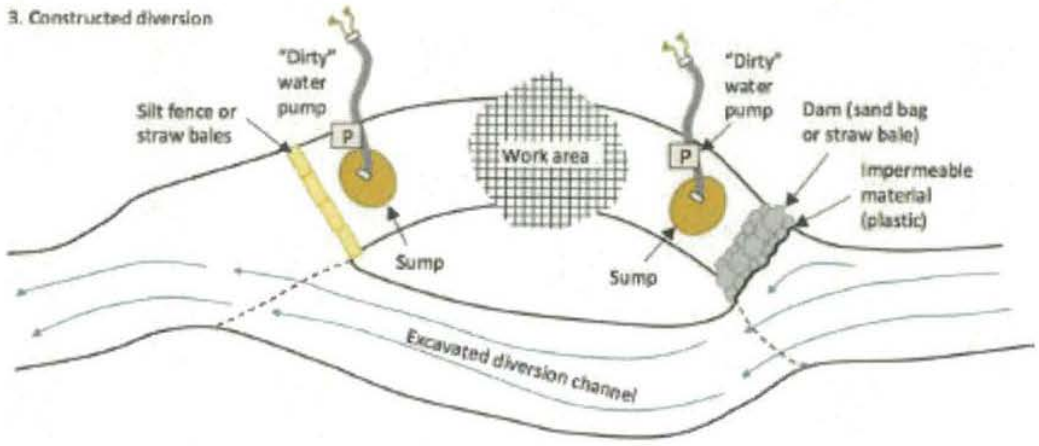


For all water diversions: Discharge "dirty" water from work area sumps away from streams and onto stable slopes

2. Gravity-fed diversion



3. Constructed diversion



BMP: Permanent Culvert Crossing Design (Cofferdam Construction and Use Specifications)

FIGURE 197. *Flex pipe stream diversion around a road construction site. The inlet to this 6 inch diameter flex pipe inlet collects clear streamflow from a retention dam above the project site and gravity feeds it around the project area and back into the natural channel downstream from construction work (see photo).*

FIGURE 198. *Sand bag retention dam on this small stream was used to pond streamflow so it could be pumped around a culvert installation site. The green intake hose is screened to keep out rocks and debris while the red pump hose extends several hundred feet around the project work area.*

FIGURE 199. *For larger streams, pump trucks, large pumps or multiple small pumps can be used to pump streamflow around project work sites. Here, a pump truck is used to temporarily divert flow in a fish bearing stream where dual culverts are being replaced with a railcar bridge. Young fish were removed from this fish bearing stream before project work started.*

BMP: Permanent Culvert Crossing Design (Culvert Orientation)

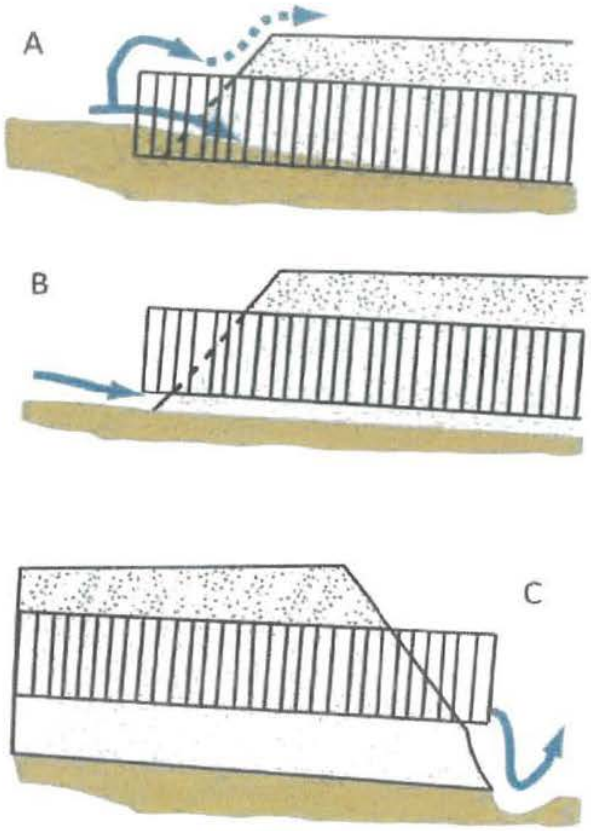
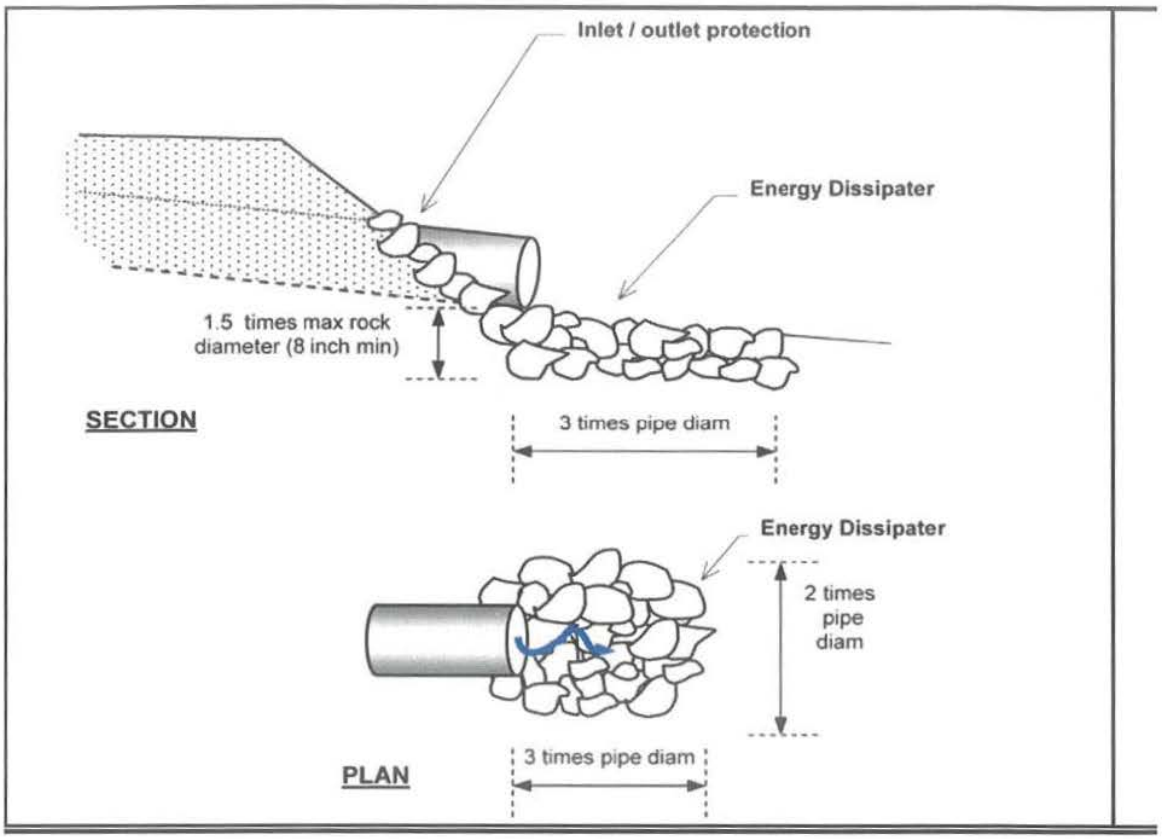
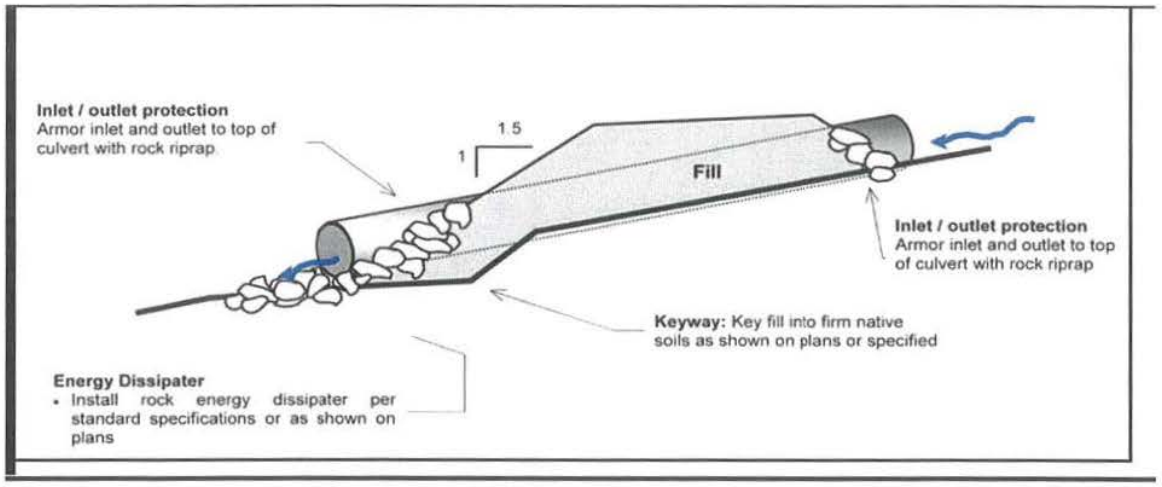


FIGURE 155. *Proper culvert installation involves correct culvert orientation, setting the pipe slightly below the bed of the original stream, and backfilling and compacting the fill as it is placed over the culvert. Installing the inlet too low in the stream (A) can lead to culvert plugging, yet if set too high (B) flow can undercut the inlet. If the culvert is placed too high in the fill (C), flow at the outfall will erode the fill. Placed correctly (D), the culvert is set slightly below the original stream grade and protected with armor at the inlet and outlet. Culverts installed in fish-bearing stream channels must be inset into the streambed sufficiently (>25% embedded) to have a natural gravel bottom throughout the culvert (Modified from: MDSL, 1991).*

HANDBOOK FOR FOREST, RANCH AND RURAL ROADS

BMP: Permanent Culvert Crossing Design (Inlet and Outlet Armoring)





Riprap installed to protect the inlet and outlet of a stream crossing culvert from erosion or for energy dissipation should be keyed the natural channel bed and banks to an approximate depth of about 1.5x the maximum rock thickness. Riprap should be placed at le up to the top of the culvert at both the inlet and outlet to protect them from splash erosion and to trap any sediment eroded from newly constructed fill slope above.

BMP: Permanent Culvert Crossing Design (Inlet and Outlet Armoring) Cont.

- Inlets of culverts and associate fills shall be protected with rock armoring that extends at least as high as the top of the culvert.
- Outlets of culverts shall be provided a rocked energy dissipater at the outfall of the culvert.
- Outlets of culverts and associate fills shall be protected with rock armoring that extends at least as high as the top of the culvert if road fill sloughing into channel can occur.
- Prior to inlet and outlet rocking, the inlet and outlets shall be prepared. Preparation will include removal of vegetation and stored materials from the inlet and outlet.
- Inlets may require construction of an inlet basin.
- Slopes at the outlet should be shaped to a 2:1 or natural slope prior to placing rock armor.
- Rock used at culvert inlets and outlets should be a matrix of various sized rocks and rip-rap that range from a 3" dia. to a 2' dia.
- The largest rocks should be places at the base of the culvert or fill. Incrementally smaller rocks shall be placed over the larger rocks at the armoring extend up the slope. Voids and spaces shall be back filed with smaller gravels and rocks.

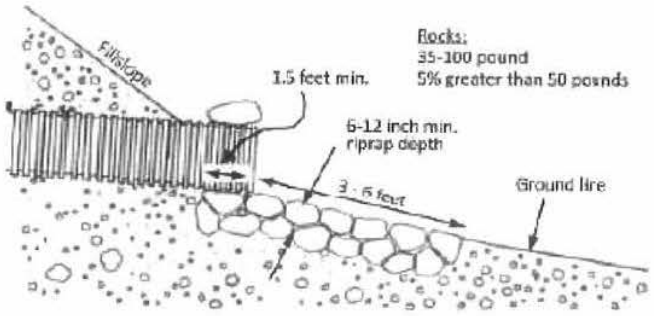


FIGURE 107A. *Riprap armor at culvert outlet (Modified from: Keller et al., 2011).*

FIGURE 107B. *Riprap armor at culvert inlet (Keller and Sherar, 2003).*

HANDBOOK FOR FOREST, RANCH AND RURAL ROADS

BMP: Stream Bank Armoring (Riprap)

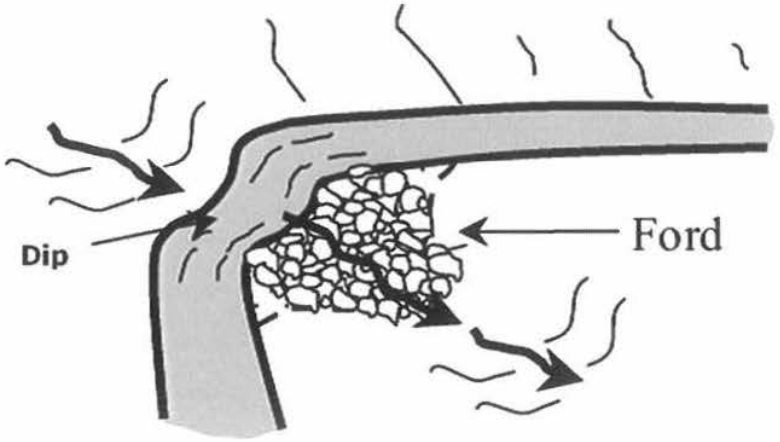
- Riprap should be installed on top of geotextile fabric or a clean mixture of coarse gravel and sand.
- The riprap should be keyed into the streambed and extend below the maximum expected scour depth with an adequately sized key base width at a thickness of a minimum of 2x the median (D50) rock diameter with the largest stone sizes placed at the base of the riprap structure.
- The armor should be set into the streambank so it does not significantly protrude into, or constrict, the natural channel, or otherwise reduce channel capacity.
- The riprap should extend along the length of unstable or over steepened bank and up the bank sufficiently to encompass the existing bank instability and/or design flood elevations.

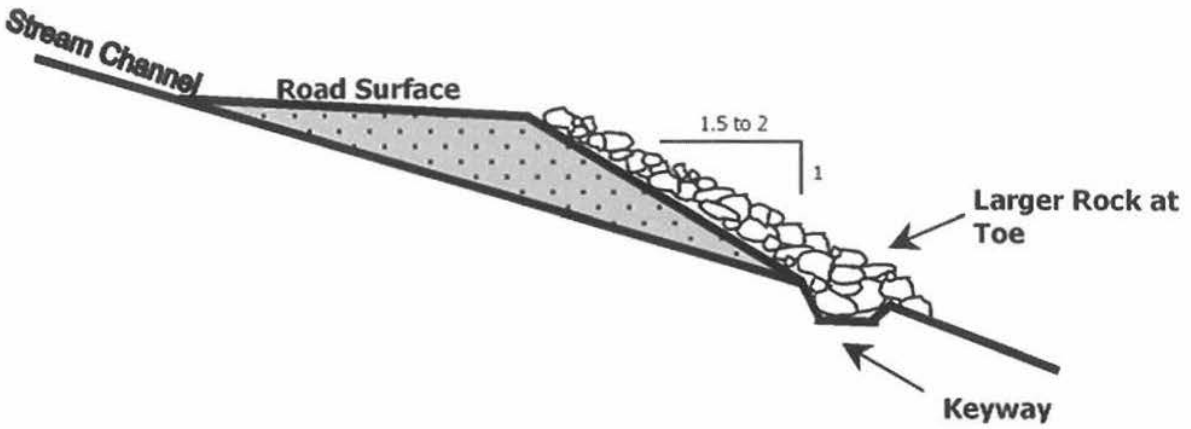
BMP: Rocked Ford

- Rocked fords are drainage structures designed to carry watercourses across roads where culvert crossings are not feasible or un-necessary.
- In channel constructed fords shall be of appropriate material that shall withstand erosion by expected velocities and placed in a U-shaped channel to create a drivable crossing.
  - The road shall dip into and out of the rocked ford to minimize diversion potential. Construct a broad rolling dip across the roadbed, centered at the crossing, which is large enough to contain the expected 100-yr flood discharge while preventing flood flow from diverting down the road or around the rock armor.
- The road surface at the ford shall be constructed with clean rock. The rock shall be applied to a minimum depth of 6 inches.
  - A range of interlocking rock armor sizes should be selected and sized so that peak flows will not pluck or transport the armor off the roadbed or the sloping fill face of the armored fill.
- The ford's outlet shall be rock armored to resist downcutting and erosion.
  - *Excavate the keyway and armored area* - Excavate a two to three-foot-deep "bed" into the dipped road surface and adjacent fillslope (to place the rock in) that extends from approximately the middle of the road, across the outer half of the road, and down the outboard road fill to where the base of the fill meets the natural channel. At the base of the fill, excavate a keyway trench extending across the channel bed.
  - *Armor the basal keyway* - Put aside the largest rock armoring to create the buttresses. Use the largest rock armor to fill the basal trench and create a buttress at the base of the fill. This should have a "U" shape to it and it will define the outlet where flow leaves the armored fill and enters the natural channel.
  - *Armor the fill* - Backfill the fill face with the remaining rock armor making sure the final armor is unsorted and well placed, the armor is two coarse-rock layers in thickness, and the armored area on the fill face also has a "U" shape that will accommodate the largest expected flow.
  - *Armor the top of the fill* - Install a second trenched buttress for large rock at the break-in-slope between the outboard road edge and the top of the fill face.
- If water is expected during the time of use, an adequately sized pipe shall be installed to handle the flow if present (min. 6 inch).
  - The pipe shall be laid over the rocked ford surface.
  - The inlet should be at grade with the upstream flow.
  - The outlet shall drain onto the outlet armoring of the rocked ford.
  - A layer of clean rock/gravel shall be installed over the pipe to establish the running surface of the truck road.
  - Following use, the temporary pipe shall be removed and the placed rock/gravel shall be graded out of the ford and used on the approaches.
  - No significant alteration to the bed and bank of the stream shall occur.
- Road approaches to rocked fords shall be rock surfaced out to the first drainage structure (i.e. waterbar) or hydrologic divide to prevent transport of sediment using rock.
- Bank and channel armoring may occur when appropriate to provide channel and bank stabilization.
- Road approach rock and rock ford armoring shall be reapplied following use as needed to maintain a permanent crossing.

BMP: Rocked Ford (Cont.)

FORD: A large dip is graded into the road at the axis of the stream channel. The outside fill face is dished out to form a spillway with large rock. On large watercourses, rock is keyed several feet into firm native soils. The road surface is rocked with 6" of minus rock .





BMP: Armored Ford [Fill]

- Armored fords are drainage structures designed to carry watercourses across roads.
- Armored fords shall have a U-shaped channel to create a drivable crossing.
  - The road shall dip into and out of the armored ford to minimize diversion potential. Construct a broad rolling dip across the roadbed, centered at the crossing, which is large enough to contain the expected 100-yr flood discharge while preventing flood flow from diverting down the road or around the rock armor.
- The road surface at the armored ford shall utilize native soils.
- The ford's inlet shall be rocked if a threat of head cutting exists.
  - *Excavate the keyway* - Excavate a one to three-foot-deep "bed" into the inboard edge of the road
  - *Armor the basal keyway* – place various sized rock in the constructed keyway to prevent head cutting. Use the largest rock armor to fill the keyway trench and create a buttress along the inboard edge of the road. This should have a "U" shape to it and it will define the inlet where flow leaves the natural channel and enters the road.
- The ford's outlet shall be rock armored to resist downcutting and erosion.
  - *Excavate the keyway and armored area* - Excavate a two to three-foot-deep "bed" into the dipped road surface and adjacent fillslope (to place the rock in) that extends from approximately the middle of the road, across the outer half of the road, and down the outboard road fill to where the base of the fill meets the natural channel. At the base of the fill, excavate a keyway trench extending across the channel bed.
  - *Armor the basal keyway* - Put aside the largest rock armoring to create the buttresses. Use the largest rock armor to fill the basal trench and create a buttress at the base of the fill. This should have a "U" shape to it and it will define the outlet where flow leaves the armored fill and enters the natural channel.
  - *Armor the fill* - Backfill the fill face with the remaining rock armor making sure the final armor is unsorted and well placed, the armor is two coarse-rock layers in thickness, and the armored area on the fill face also has a "U" shape that will accommodate the largest expected flow.
  - *Armor the top of the fill* - Install a second trenched buttress for large rock at the break-in-slope between the outboard road edge and the top of the fill face.
- If water is expected during the time of use, an adequately sized pipe shall be installed to handle the flow if present (min. 6 inch).
  - The pipe shall be laid over the armored ford surface.
  - The inlet should be at grade with the upstream flow.
  - The outlet shall drain onto the outlet armoring of the rocked ford.
  - A layer of clean native shall be installed over the pipe to establish the running surface of the truck road.
  - Following use, the temporary pipe shall be removed and the placed native soil shall be removed and drifted along the approaches.
  - No significant alteration to the bed and bank of the stream shall occur.
- Road approaches to armored fords shall be treated with seed and straw mulch out to the first drainage structure (i.e. waterbar) or hydrologic divide to prevent transport of sediment pursuant to Item 18, Section II.
- Bank and channel armoring may occur when appropriate to provide channel and bank stabilization.
- Armored ford armoring shall be reapplied following use as needed to maintain a permanent crossing.

BMP: Armored Ford [Fill] (Cont.)

FIGURE 120. *This armored fill crossing of a steep, ephemeral stream was constructed to provide a low maintenance crossing. The crossing has been deeply dipped to reduce the volume of road fill and to eliminate the potential for stream diversion. The fill slope has been heavily armored through the axis of the crossing to contain flood flows and prevent down-cutting. Armored fills cannot be used on fish bearing streams.*

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BMP: Armored Ford [Fill] (Cont.)

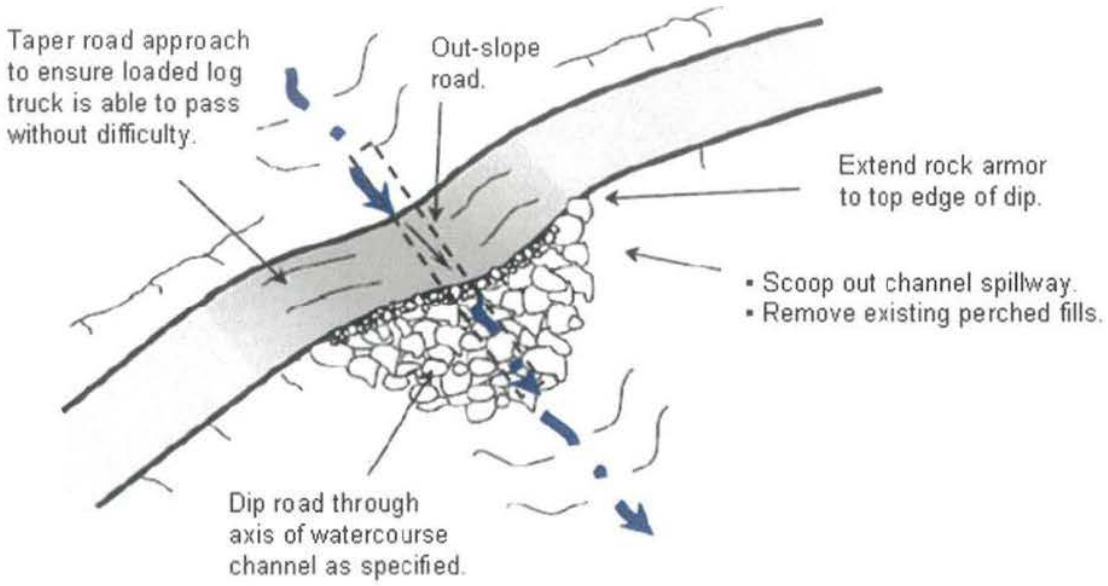
FIGURE 121D. *Well graded rock armor is then backfilled into the structure and spread across the breadth of the U-shaped stream crossing, and about one-third the way up the roadbed, so that streamflow will only flow over or come in contact with resistant armor material. The armor must be spread and compacted across the design width of the expected flood flow channel width so peak flows will not flank the armored structure.*

FIGURE 121E. *Two weeks after this armored fill was constructed, a storm flow event occurred and the structure maintained its function and integrity. The road approaches had not yet been compacted or surfaced with road rock.*

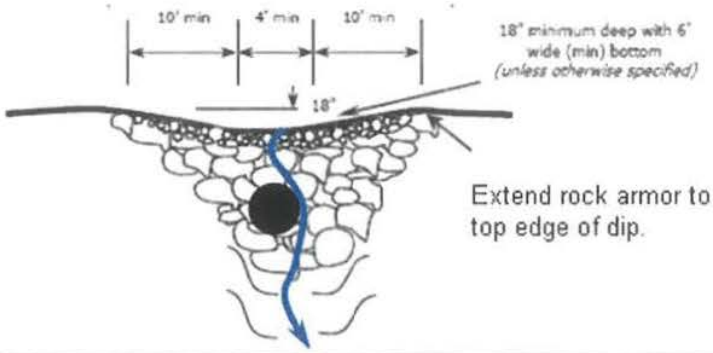
FIGURE 121F. *The same armored fill as it appeared after the first winter flood flows. No maintenance was required to reopen the road. It is also clear that no stream diversion is possible at this stream crossing site, and the volume of fill within the crossing has been reduced to the minimum amount needed to maintain a relatively smooth driving surface on this low volume road.*

BMP: Vented Ford

Vented Ford

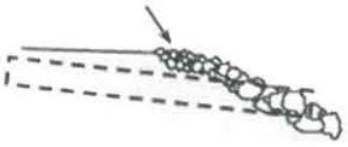


Dip area to accommodate a culvert sized for 100-year flow (minimum dimensions given below).



LIP

- Use smaller rock at lip of ford.
- Fill voids with smaller rock to prevent piping around the larger rock.



BMP: Crossing Abandonment

- Excavate and removing all fill materials placed in the stream channel when the crossing was originally built.
- Excavated banks shall be laid back to a 2:1 (50%) or natural slope to prevent slumping and soil movement.
- Fill material should be excavated to recreate the original channel grade (slope) and orientation.
- All bare soils should then be mulched, seeded, and planted to minimize erosion until vegetation can protect the soil surface.
- The approaching road segments shall be cross-road(waterbars) drained to prevent road runoff from discharging across the freshly excavated channel sideslopes.
- When fills are removed, they shall be excavated to form a channel that is as close as feasible to natural watercourse grade and orientation.
- The excavated channel bed should be as wide, or slightly wider than, the original watercourse channel.
  - This can be better determined by observing the channel width of the watercourse up slope of crossing to be removed at a point in which the crossing or any other disturbance has not affected the natural channel slope and width.
- Temporary crossings shall be removed by November 15.
  - Any temporary culvert crossing left in after October 15 or installed between October 15 and May 1, shall be sized to accommodate the estimated 100-year flow.
- In certain situations, bank and channel rock and woody debris armoring may be appropriate to provide channel and bank stabilization.

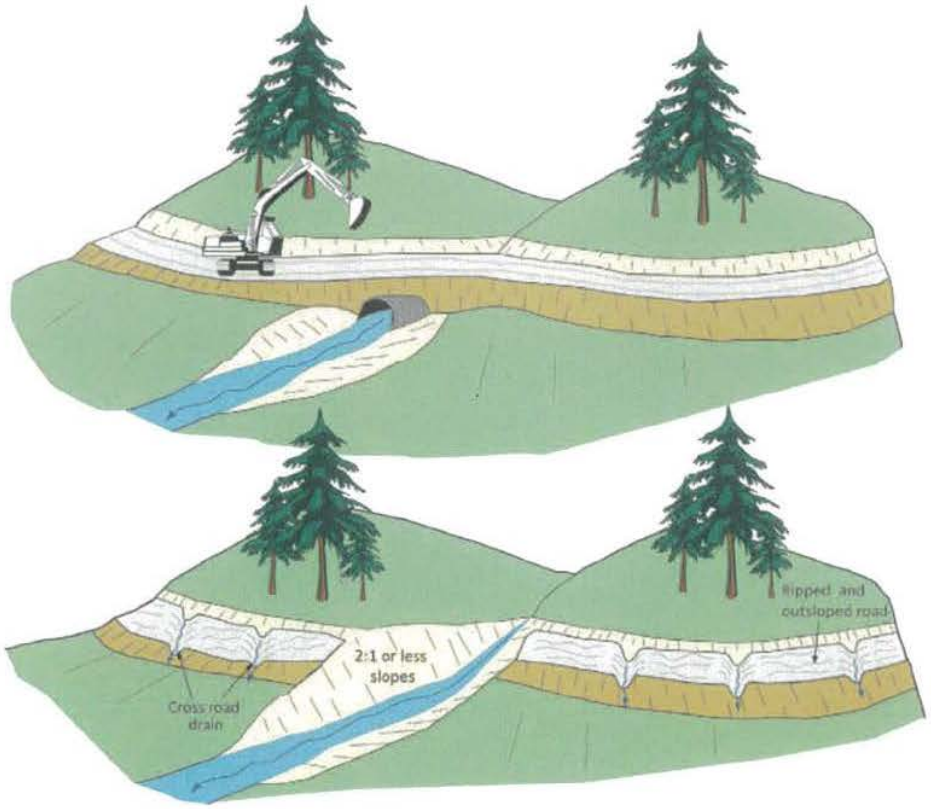


FIGURE 263. *On roads that are to be closed (decommissioned), all stream crossing culverts and fills should be removed. Stream crossing excavations are best performed using an excavator. The original channel should be excavated and exhumed down to the former streambed, with a channel width equal or greater than the natural channel above and below the crossing. Sideslopes should be laid back to a stable angle, typically a 2:1 (50%) gradient, or less. Spoil can be endhauled off-site or stored on the road bench adjacent the crossing, provided it is placed and stabilized where it will not erode or fail and enter the stream.*

BMP: Rolling Dip Design and Placement

- Rolling dips are drainage structures designed to force surface water to be drained from the road surface.
- The road shall dip into, and rise out of, the rolling dip to eliminate the potential of road surface runoff to run further down road way.
- The rolling dip shall be constructed with clean native materials or rock surfaced where specified.
- The rolling dips outlet may be armored to resist down-cutting and erosion of the outboard road fill.
- Do not discharge rolling dips into any areas that show signs of instability or active landsliding.
- If the rolling dip is designed to divert both road surface and ditch runoff, block the down-road ditch with compacted fill in order to force all ditch flows through the trough (low point) of the rolling dip.

BMP: Rocked Rolling Dip Design and Placement

- Rocked rolling dips are drainage structures designed to carry known sources of surface water across road ways or from known persistently wet segments of road such as swales without defined watercourses or road segments with heavy bank/road seepage.
- The road shall dip into, and rise out of, the rocked rolling dip to minimize diversion potential.
- The rocked rolling dip shall be constructed with clean rock that is large enough to remain in place during peak flows. Rock size shall vary relative to the anticipated flow through the dip with larger rock used in location where greater flow is anticipated.
- The rocked rolling dips inlet and outlet shall be armored to resist down-cutting and erosion.
- The entire width of the rocked rolling dip shall be rock armored to a minimum of 5-feet from the centerline of the dipped portion of the rolling dip.
- If a keyway is necessary, the rocked rolling dip keyway at the base of the dip shall be of sufficient size, depth and length to support materials used in the rocked rolling dip construction back up to the road crossing interface.
- Do not discharge rolling dips into any areas that show signs of instability or active landsliding.
- If the rolling dip is designed to divert both road surface and ditch runoff, block the down-road ditch with compacted fill.
- The rolling dip should be designed as a broad feature ranging from 10-100 feet long so that it is drivable by most types of vehicular traffic and not significantly inhibit traffic and road use.

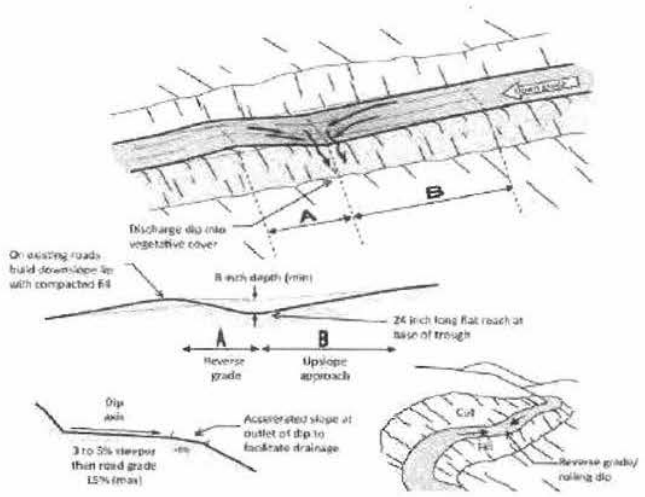


FIGURE 34. *A classic Type I rolling dip, where the excavated up-road approach (B) to the rolling dip is several percent steeper than the approaching road and extends for 60 to 80 feet to the dip axis. The lower side of the structure reverses grade (A) over approximately 15 feet or more, and then falls down to rejoin the original road grade. The dip must be deep enough that it is not obliterated by normal grading, but not so deep that it is difficult to negotiate or a hazard to normal traffic. The outward cross-slope of the dip axis should be 3% to 5% greater than the up-road grade (B) so it will drain properly. The dip axis should be out-sloped sufficiently to be self-cleaning, without triggering excessive downcutting or sediment deposition in the dip axis (Modified from: Best, 2013).*

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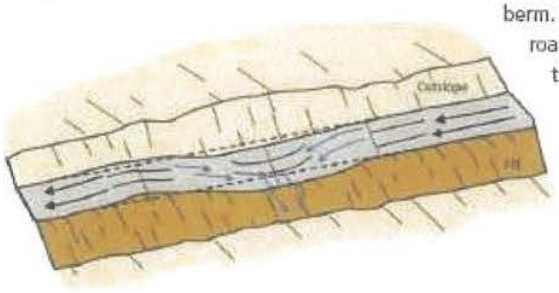
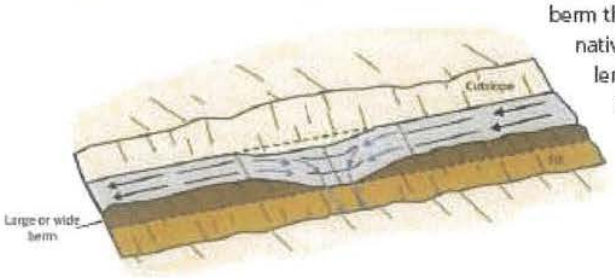
BMP: Rolling Dip Design and Placement (Types)

Type 1 Rolling Dip
(Standard)



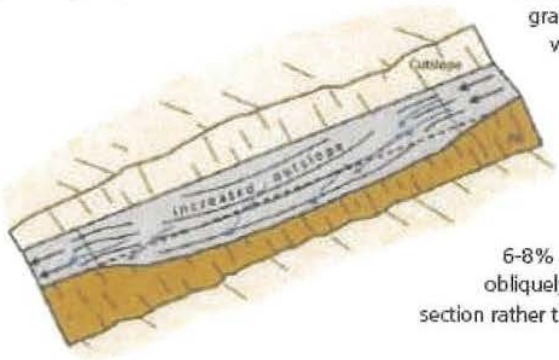
Type 1 rolling dips are used where road grades are less than about 12-14% and road runoff is not confined by a large through cut or berm. The axis of the dip should be perpendicular to the road alignment and sloped at 3-4% across the road tread. Steep roads will have longer and more abrupt dip dimensions to develop reverse grade through the dip axis. The road tread and/or the dip outlet can be rocked to protect against erosion, if needed.

Type 2 Rolling Dip
(Through-cut or thick berm road reaches)



Type 2 rolling dips are constructed on roads up to 12-14% grade where there is a through cut up to 3 feet tall, or a wide or tall berm that otherwise blocks road drainage. The berm or native through cut material should be removed for the length of the dip, or at least through the axis of the dip, to the extent needed to provide for uninterrupted drainage onto the adjacent slope. The berm and slope material can be excavated and endhauled, or the material can be sidecast onto native slopes up to 45%, provided it will not enter a stream.

Type 3 Rolling Dip
(Steep road grade)



Type 3 rolling dips are utilized where road grades are steeper than about 12% and it is not feasible to develop a reverse grade that will also allow passage of the design vehicle (steep road grades require more abrupt grade reversals that some vehicles may not be able to traverse without bottoming out).

Instead of relying on the dip's grade reversal to turn runoff off the roadbed, the road is built with an exaggerated outslope of 6-8% across the dip axis. Road runoff is deflected obliquely across the dip axis and is shed off the outsloped section rather than continuing down the steep road grade.

FIGURE 36. *Rolling dip types*

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BMP: Rolling Dip Design and Placement

FIGURE 33A. *Rolling dip constructed on a rock surfaced rural road. The rolling dip represents a change-in-grade along the road alignment and acts to discharge water that has collected on, or is flowing down, the road surface. This road was recently converted from a high maintenance, insloped, ditched road to a low maintenance, outsloped road with rolling dips.*

FIGURE 33B. *This side view of an outsloped road shows that the rolling dip does not have to be deep or abrupt to reverse road grade and effectively drain the road surface. This outsloped forest road has rolling dips that allow all traffic types to travel the route without changing speed.*

BMP: Waterbar/Rolling Dip Combined with DRC

FIGURE 39.
Waterbars are often used to drain surface runoff from seasonal, unsurfaced roads. Because they are easily broken down by vehicles, waterbars are only used on unsurfaced roads where there is little or no wet weather traffic. In this photo, a waterbar and ditch relief culvert are used to drain all road surface and ditch runoff from the insloped road prism.

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Diagram shows and discussed the use of a waterbar. However, a DRC combined with a rolling dip structure provides the same surface and ditch drainage for roads used year-round. Just as with the waterbar in the photo above, The DRC is installed just upslope from the rolling dip. This also creates a fail-safe should the DRC become plugged or overwhelmed.

FIGURE 238. *Traffic and surface runoff from graveled roads often produces surface erosion, turbid runoff and fine sediment transport that can be delivered to streams. Where ditches can't be eliminated, sediment traps and roadside settling basins can be installed to capture and remove most of the eroded sediment. This settling basin has been constructed along the inside ditch just before a stream crossing culvert inlet (see arrow). Eroded sediment from the road and ditch are deposited in the basin before flow is released to the stream. Fine sediments have filled about 1/3 of this basin and vegetation is now growing. Sediment basins require periodic maintenance to maintain their storage capacity.*

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BMP: Road Outsloping

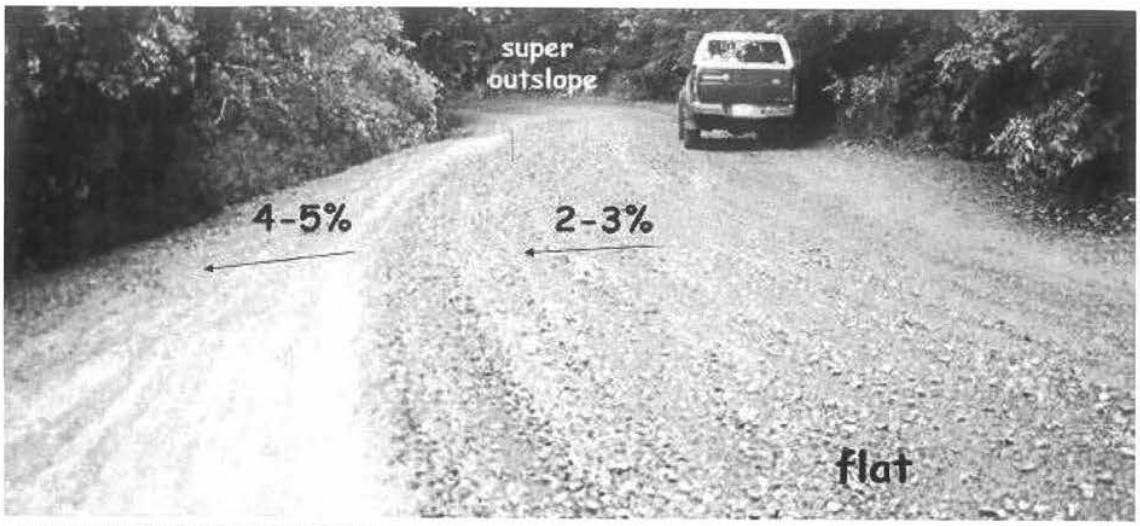

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FIGURE 29. *Road shape changes as the road travels through the landscape. For example, an outsloped road will have a steep or "banked" outslope through inside curves, a consistent outslope through straight reaches and a flat or slightly insloped shape as it goes through an outside curve. The road may have an outslope of 2-3% across the travel surface while the shoulder is more steeply outsloped to ensure runoff and sediment will leave the roadbed.*

BMP: Steep Road Drainage Structures

FIGURE 55. *Steep roads that go straight up or down a hillside are very difficult to drain. This steep, fall line road developed a through cut cross section that was drained using lead out ditches to direct runoff off the road and onto the adjacent, vegetated hillside. The road was "outsloped" to drain runoff to the right side, and the lead out ditch was built slightly steeper than the road grade, to be self-cleaning. Four lead out ditches have been constructed at 100-foot intervals to the bottom of the hillside.*

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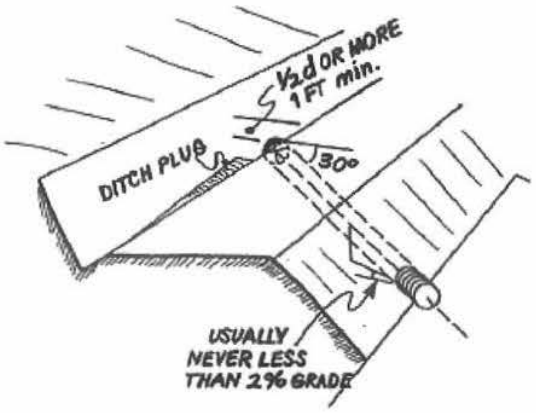
BMP: Ditch Relief Culvert

- Install ditch relief culverts at an oblique (typically 30 degree) angle to the road so that ditch flow does not have to make a sharp angle turn to enter the pipe. On low gradient roads (<5%), where ditch flow is slow, ditch relief culverts can be installed at right angles to the road.
- Install ditch relief culverts (DRC) to outlet at, and drain to, the base of the fill
- If it cannot be installed at the base of the fill, install the DRC with a grade steeper than the inboard ditch draining to the culvert inlet, and then install a downspout on the outlet to carry the culverted flow to the base of the fillslope or energy dissipater material at outlet to prevent erosion or the outboard road fill.
- Downspouts longer than 20 feet should be secured to the hillslope for stability.
- Ditch relief culverts should not carry excessive flow such that gullying occurs below the culvert outlet or such that erosion and down-cutting of the inboard ditch is occurring.
- Do not discharge flows from ditch relief culverts onto unstable areas or highly erodible hillslopes.
- If the ditch is on an insloped or crowned road, consider reshaping road outsloping to drain the road surface. The ditch and the ditch relief culvert would then convey only spring flow from the cutbank and hillslope runoff, and not turbid runoff from the road surface.



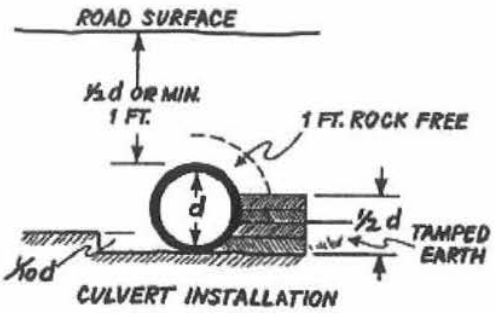


FIGURE 48. *The elements of a properly installed ditch relief culvert. The culvert is angled at about 30 degrees to the road alignment to help capture flow and prevent culvert plugging or erosion of the inlet area. It is set at the base of the fill (ideally) or with a grade slightly steeper than the grade of the contributing ditch (but never with a grade less than 2 percent) (USDA-SCS, 1983). At a minimum, the grade of the ditch relief culvert should be sufficient to prevent sediment accumulation at the inlet or deposition within the culvert itself (it should be self-cleaning) (USDA-SCS, 1983).*

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BMP: Waterbar Construction

FIGURE 40. *Waterbars are constructed on unsurfaced forest and ranch roads that will have little or no traffic during the wet season. The waterbar should be extended to the cutbank to intercept all ditch flow (1) and extend beyond the shoulder of the road. A berm (2) must block and prevent ditch flow from continuing down the road during flood flows. The excavated waterbar (3) should be constructed to be self-cleaning, typically with a 30° skew to the road alignment with the excavated material bermed on the downhill grade of the road (4). Water should always be discharged onto the downhill side on a stable slope protected by vegetation. Rock (shown in the figure) should not be necessary if waterbars are spaced close enough to prevent serious erosion. (5) The cross ditch depth (6) and width (7) must allow vehicle cross-over without destroying the function of the drain. Several alternate types of waterbars are possible, including one that drains only the road surface (not the ditch), and one that drains the road surface into the inside ditch (BCMF, 1991).*

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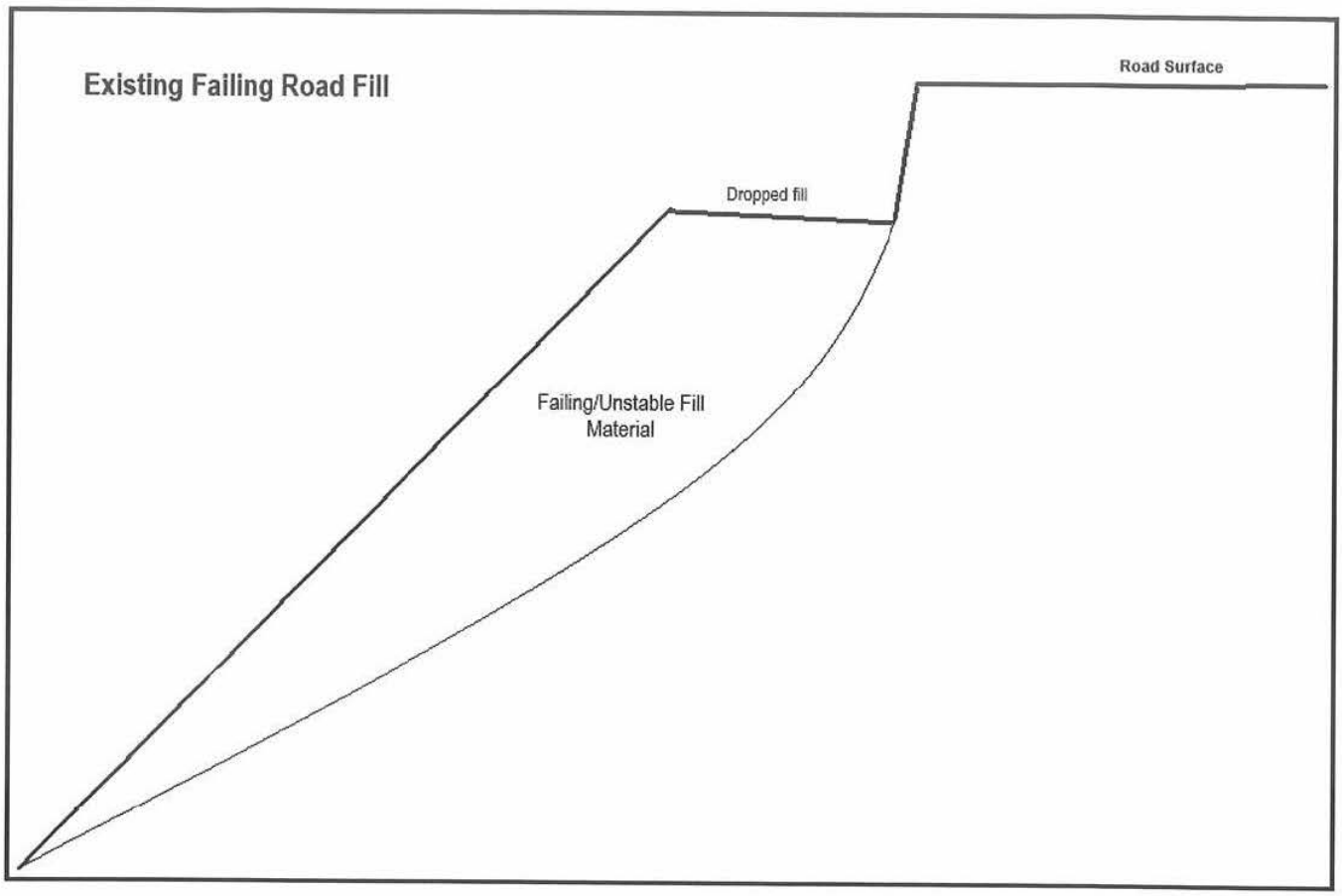
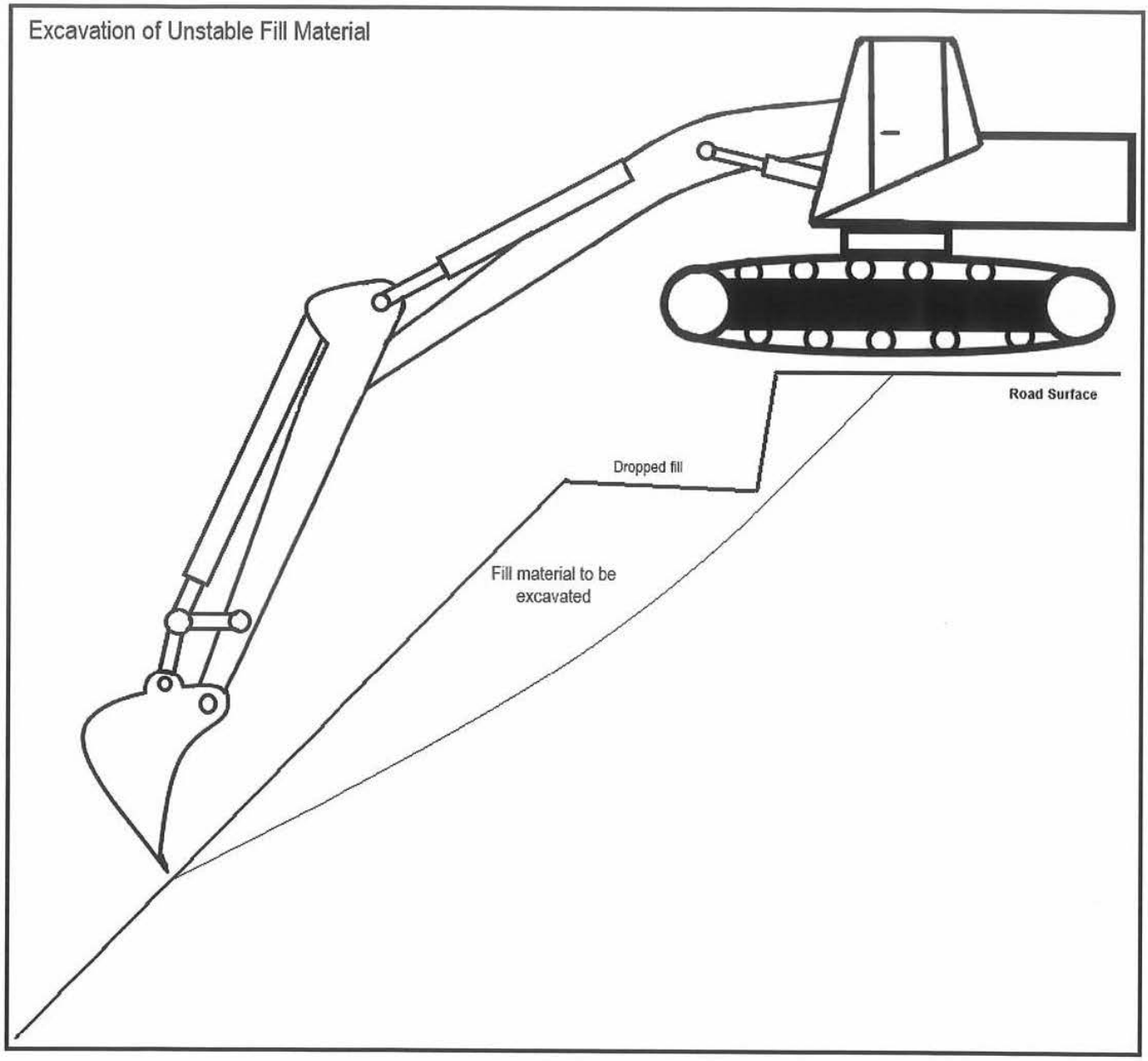
BMP: Unstable Fill Removal and Treatment

FIGURE 230. *The most cost-effective treatment for unstable fills along the outside of a forest, ranch or rural road is simply the direct excavation of the unstable material. If road width is too narrow, additional width can often be derived from cutting into the bank. The excavation should encompass the unstable fill materials, beginning at the inside crack or scarp, and extending out and down the fill slope as far as possible. For proper surface drainage, and to retrieve most of the unstable fill, the excavation should have a concave profile when completed. Typically, the bulk of the fill is within 20 to 25 feet of the outside edge of the road and is easily reached by a midsized excavator. Any remaining fill is likely to be small enough that it will not fail or travel far enough to reach the stream.*

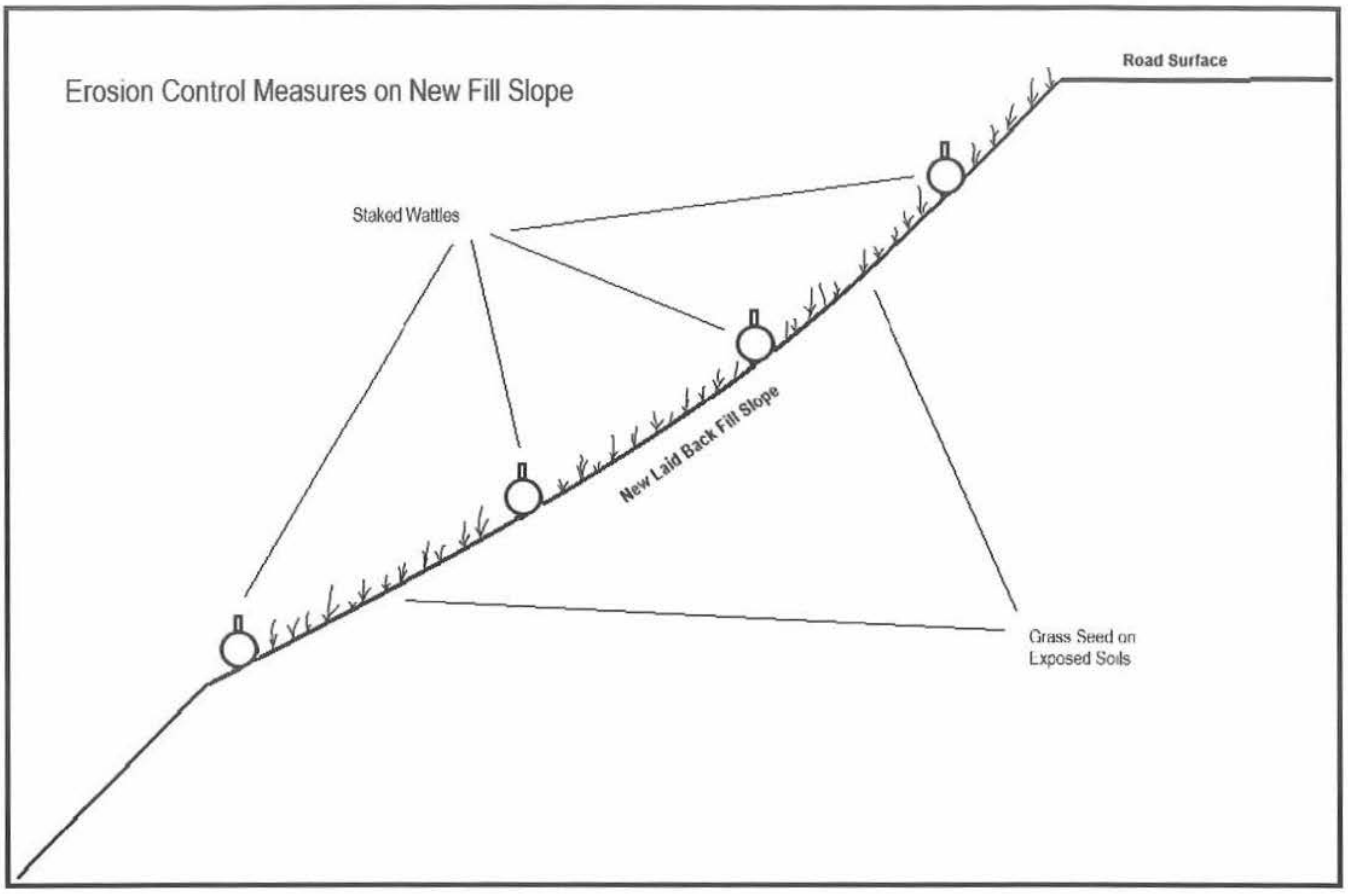
BMP: Unstable Fill Removal and Treatment



BMP: Unstable Fill Removal and Treatment



BMP: Unstable Fill Removal and Treatment



BMP: Rock Armor Cutbank

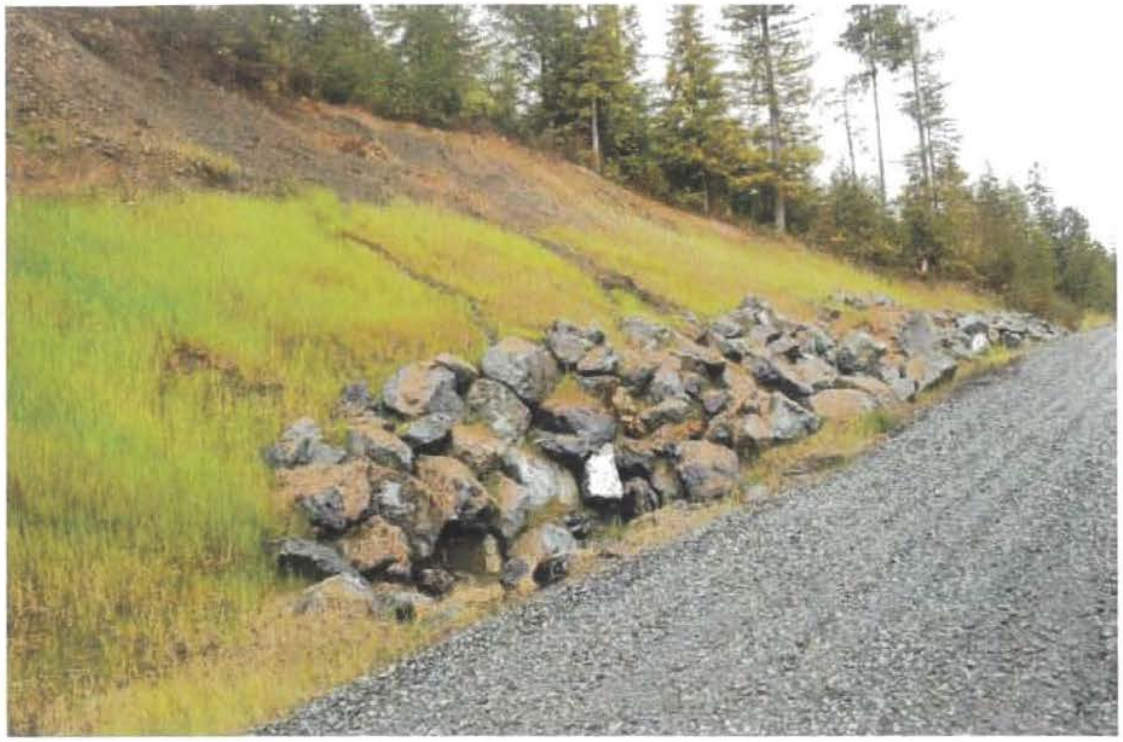


FIGURE 52. *This wet and potentially unstable cut slope on a newly constructed road was stabilized using a buttress of large rock armor. To assure their effectiveness, rock buttresses and other retaining structures should be designed by a qualified engineer or engineering geologist.*

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BMP: Rip-Rap Size Class Table

TABLE 25. Standard classification and gradation of riprap by size of rock[1]

Riprap size class	Median particle weight[2]	Median particle diameter[2] (in)	Minimum and maximum allowable particle size (in)[2]						
			D_{15}		D_{50}		D_{85}		D_{100}
			Min	Max	Min	Max	Min	Max	Max
Class I	20 lb	6	3.7	5.2	5.7	6.9	7.8	9.2	12.0
Class II	60 lb	9	5.5	7.8	8.5	10.5	11.5	14.0	18.0
Class III	150 lb	12	7.3	10.5	11.5	14.0	15.5	18.5	24.0
Class IV	300 lb	15	9.2	13.0	14.5	17.5	19.5	23.0	30.0
Class V	¼ ton	18	11.0	15.5	17.0	20.5	23.5	27.5	36.0
Class VI	3/8 ton	21	13.0	18.5	20.0	24.0	27.5	32.5	42.0
Class VII	½ ton	24	14.5	21.0	23.0	27.5	31.0	37.0	48.0
Class VIII	1 ton	30	18.5	26.0	28.5	34.5	39.0	46.0	60.0
Class IX	2 ton	36	22.0	31.5	34.0	41.5	47.0	55.5	72.0
Class X	3 ton	42	25.5	36.5	40.0	48.5	54.5	64.5	84.0

[1]Lagasse et al. (2006)
[2]Equivalent to spherical diameter

BMP: Storage Bladders

- Storage bladders shall be located and designed to minimize the potential for impacts due to rolling and/or failure. Storage bladders should be stored on flat slopes where stability will not be affected.
- Storage bladders shall be located to minimize the potential for water to flow into a watercourse in the event of a catastrophic failure.
- Bladders shall not be used unless the bladder is safely contained within a secondary containment system with sufficient capacity to capture 110 percent of a bladders maximum volume in the vent of bladder failure.
- Secondary containment is recommended in the form of a dirt berm, containment pit, combination of both, or impermeable material with skeletal support. The containment should be capable of holding 110 percent of the bladders volume.
- Secondary containment systems shall be of sufficient strength and stability to withstand the forces of released contents in the event of catastrophic bladder failure.
- Secondary containment systems that are exposed to precipitation shall be designed and maintained with sufficient capacity to accommodate precipitation and storm water inputs from a 25-year, 24-hour storm event.
- Bladders and containment systems shall be periodically inspected to ensure integrity.

This is an example of a containment pit which will assist in mitigating the impacts if this storage bladder failed.

BMP: Cultivation Site Restoration

- Remove all cultivation and associated materials from designated cultivation site.
  - This includes plant mass, root balls, potting containers, cultivation medium and any materials associated with the preparation, cultivation, and harvest of commercial cannabis.
  - Cultivation medium removed from the site shall be stored/disposed of in compliance with Order conditions related to spoils management.
- All disturbed and/or unstable slopes shall be stabilized and returned to pre-project conditions.
  - Slopes shall be contoured as close as feasible to natural grade and aspect.
  - Temporary erosion control shall be applied to prevent sediment run-off.
- Soil exposed as a result of project work, soil above rock riprap, and interstitial spaces between rocks shall be revegetated with native species by live planting, seed casting, or hydroseeding prior to the rainy season of the year work is completed.
  - Native plants characteristic of the local habitat shall be used for revegetation when implementing and maintaining cleanup/restoration work in riparian and other sensitive areas.
  - Native forbes and gramminoids shall be planted to replace sediment stabilization, sediment filtration and nutrient filtration
  - Native trees and shrubs shall be planted to replace bank stabilization, inputs of large woody debris and temperature control within riparian areas.
  - Restoration of the quality/health of the riparian stand shall promote: 1) shade and microclimate controls; 2) delivery of wood to channels, 3) slope stability and erosion control, 4) ground cover, and 5) removal of excess nutrients.

Monitoring Plan

Cannabis cultivators shall regularly inspect and maintain the condition of access roads, access road drainage features, and watercourse crossings. At a minimum, cannabis cultivators shall perform inspections prior to the onset of fall and winter precipitation and following storm events that produce at least 0.5 in/day or 1.0 inch/7 days of precipitation. See Required Monitoring tables below for site specific monitoring and reporting requirements. Cannabis cultivators are required to perform all of the following maintenance:

- Remove any wood debris that may restrict flow in a culvert.
- Remove sediment that impacts access road or drainage feature performance.
- Place any removed sediment in a location outside the riparian setbacks and stabilize the sediment.
- Maintain records of access road and drainage feature maintenance for annual reporting.

Cannabis cultivators that are operating in areas that are, or may become, inaccessible during winter months due to extreme weather such as snow, road closures, seasonal access roads to the property, or any other such conditions shall make additional efforts to enhance winterization measures in the absence of monitoring during storm events.

Monitoring Requirements

(Tier 2, High Risk, < 1 acre of cultivation)

Monitoring Requirement	Description
Winterization Measures Implemented	Report winterization procedures implemented, any outstanding measures, and the schedule for completion.
Tier Status Confirmation	Report any changes in the tier status.
Third Party Identification	Report any change in third party status as appropriate.

Annual Reporting

Annual Reports shall be submitted to the North Coast Regional Water Quality Control Board by March 1st following the year being monitored. The first Annual Report for this enrollment shall be submitted by March 1st, 2020 and report on monitoring done during the 2019 calendar year. Annual reporting is required each subsequent year of enrollment.

Attachments

Implementation of Applicable BPTC Measures
Assessment of applicable BPTC measures consisted of a field examination on July 18th and 30th, 2019. Anywhere applicable BPTC measures are not met on the property, descriptions of the assessments and the prescribed treatments are outlined following each associated section below.

Summary of BPTC Measures Compliance

1. Sediment Discharge BPTC Measures Y☐/N☒
2. Fertilizer, Pesticide, Herbicide, and Rodenticide BPTC Measures Y☒/N☐
3. Petroleum Product BPTC Measures Y☒/N☐
4. Trash/Refuse, and Domestic Wastewater BPTC Measures Y☒/N☐
5. Winterization BPTC Measures Y☐/N☒

1. Sediment Discharge BPTC Measures

1.1. Site Characteristics

1.1.1. Provide a map showing access roads, vehicle parking areas, streams, stream crossings, cultivation site(s), disturbed areas, buildings, and other relevant site features.

See attached Site Map.

1.1.2. 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.).

See sections "Land Development and Maintenance, Erosion Control, and Drainage Features" above, and the attached Mitigation Report, Site Maps, and Treatment Implementation Schedule for site specific descriptions, treatments, and the implementation schedule.

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

See the section titled "Stream Crossing Installation and Maintenance" or the attached Mitigation Report and Site Maps for site specific details and treatment schedules.

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

Multiple legacy roads were identified on the property as many roads were constructed for past timber harvest and current ranching activities. These roads have either already been

abandoned, or are to be abandoned following the removal and relocation of Cultivation Areas and Past Cultivation Areas. No legacy discharge issues were found on the property.

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)

1.2.1. Erosion Prevention BPTC Measures

1.2.1.1. Describe the BPTC measures that have been, or will be implemented to prevent or limit erosion. Provide an implementation schedule for BPTC measures that have not yet been implemented. Identify the erosion prevention BPTC measures on a site map.

See sections "Land Development and Maintenance, Erosion Control, and Drainage Features" and "Riparian and Wetland Protection and Management" above, and attached Mitigation Report, Site Maps, and Treatment Implementation Schedule for site specific descriptions of physical and biological BPTC measures being prescribed.

1.2.1.1.1. The description shall address physical BPTC measures, (e.g., placement of straw mulch, plastic covers, slope stabilization, soil binders, culvert outfall armoring, etc.) and biological BPTC measures (vegetation preservation/replacement, hydro seeding, etc.).

See sections "Land Development and Maintenance, Erosion Control, and Drainage Features" and "Riparian and Wetland Protection and Management" above, and the attached Mitigation Report and BMPs for descriptions of physical and biological BPTC measures being prescribed.

1.2.2. Sediment Control BPTC Measures

1.2.2.1. Describe the BPTC measures that have been, or will be implemented to capture sediment that has been eroded. Provide an implementation schedule for BPTC measures that have not yet been implemented. Identify the sediment control BPTC measures on a site map.

See the attached Mitigation Report, Site Maps, and Treatment Implementation Schedule for site specific descriptions, treatments, and the implementation schedule. (Cultivation Area A & Site 17)

1.2.2.1.1. The description shall address physical BPTC measures, (e.g., placement of silt fences, fiber rolls, or settling ponds/areas, etc.) and biological BPTC measures (vegetated outfalls, hydro seeding, etc.).

See the section titled "Riparian and Wetland Protection and Management" above, and the attached Mitigation Report and BMPs for descriptions of physical and biological BPTC measures being prescribed.

1.2.3. Maintenance Activities - Erosion Prevention and Sediment Control

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

Erosion prevention BPTC measures and all corresponding work shall be inspected prior to and in conjunction with winter monitoring, as described above under the "Monitoring Plan" to ensure proper placement, installation, and function remain intact prior to and throughout the Winter Period.

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

Any significant captured sediment behind the wattles at Site 17 or the rock check dams at Cultivation Area A shall be seeded and straw mulched. If the wattles or rocked check dams become backfilled with excessive sediment and begin to overtop, they shall be cleared out. This debris from the wattles shall be contoured into the grass hillside downslope, away from any surface runoff. The wattles or rocked check dams shall be replaced if they have degraded to the point that they no longer function as intended. Captured sediment by drainage features elsewhere on the property will be allowed to stabilize and vegetate in place.

1.2.4. Erosion control BPTC measures: 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.

Not applicable. There was no significant erosion observed at any of the disturbed areas and there are no improperly constructed features. Disturbed areas are located on gentle slopes surrounded by vegetation and grass buffers and will be allowed to vegetate naturally. See sections "Land Development and Maintenance, Erosion Control, and Drainage Features" and "Riparian and Wetland Protection and Management" above, and the attached Mitigation Report and BMPs for descriptions of physical and biological BPTC measures being prescribed.

2. Fertilizer, Pesticide, Herbicide, and Rodenticide BPTC Measures

2.1. 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 comprehensive table under 2.3

2.2. Provide a site map that locates storage locations.

See attached Site Map. Fertilizers and soil amendments are currently stored properly in shipping containers at Site 15 or next to mixing tanks while in use.

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

Fertilizer, Pesticides, and Herbicide Products used on Site

Product	Delivery and Storage	On-site usage	How removed or stored
YaraLiva CALCINIT	Brought to property as needed. Stored within the shipping containers with all other fertilizers and amendments.	Mixed into tank with water. It is then watered to plants as needed.	Stored within the shipping containers. Empty containers are disposed of at an appropriate waste disposal facility.
JR Peters Inc. Jack's Professional Water-Soluble Fertilizers	Brought to property as needed. Stored within the shipping containers with all other fertilizers and amendments.	Aerosol applied to plants as needed.	Stored within the shipping containers. Empty containers are disposed of at an appropriate waste disposal facility.
Giles Magriculture Epsom Salt	Brought to property as needed. Stored within the shipping containers with all other fertilizers and amendments.	Mixed into tank with water. It is then watered to plants as needed.	Stored within the shipping containers. Empty containers are disposed of at an appropriate waste disposal facility.
Grow More High Nitrogen Fertilizer	Brought to property as needed. Stored within the shipping containers with all other fertilizers and amendments.	Mixed into tank with water. It is then hand watered to plants as needed.	Stored within the shipping containers. Empty containers are disposed of at an appropriate waste disposal facility.
Grow More All-Purpose Fertilizer	Brought to property as needed. Stored within the shipping containers with all other fertilizers and amendments.	Mixed into tank with water. It is then hand watered to plants as needed.	Stored within the shipping containers. Empty containers are disposed of at an appropriate waste disposal facility.
BioSafe TerraGrow	Brought to property as needed. Stored within the shipping containers with all other fertilizers and amendments.	Mixed into tank with water. It is then hand watered to plants as needed.	Stored within the shipping containers. Empty containers are disposed of at an appropriate waste disposal facility.

KALIX Grow	Brought to property as needed. Stored within the shipping containers with all other fertilizers and amendments.	Mixed into tank with water. It is then hand watered to plants as needed.	Stored within the shipping containers. Empty containers are disposed of at an appropriate waste disposal facility.
Lost Coast's Plant Therapy	Brought to property as needed. Stored within the shipping containers with all other fertilizers and amendments.	Aerosol applied to plants as needed.	Stored within the shipping containers. Empty containers are disposed of at an appropriate waste disposal facility.
Azaguard	Brought to property as needed. Stored within the shipping containers with all other fertilizers and amendments.	Aerosol applied to plants as needed.	Stored within the shipping containers. Empty containers are disposed of at an appropriate waste disposal facility.
Sulfur	Brought to property as needed. Stored within the shipping containers with all other fertilizers and amendments.	Aerosol applied to plants as needed.	Stored within the shipping containers. Empty containers are disposed of at an appropriate waste disposal facility.
Pure Crop 1	Brought to property as needed. Stored within the shipping containers with all other fertilizers and amendments.	Aerosol applied to plants as needed.	Stored within the shipping containers. Empty containers are disposed of at an appropriate waste disposal facility.
Botaniguard	Brought to property as needed. Stored within the shipping containers with all other fertilizers and amendments.	Aerosol applied to plants as needed.	Stored within the shipping containers. Empty containers are disposed of at an appropriate waste disposal facility.

2.4. Describe procedures for spill prevention and cleanup.

Pesticides and liquid fertilizer containers are stored within a covered structure, within secured containers, with their lids secured after their use. The cannabis cultivator shall obtain adequate quantities of absorbent materials and ensure that they are stored at all locations where the materials above are used, stored, or mixed. Should a spill of these materials occur, absorbent materials will be applied immediately and allowed enough time to absorb as much material as possible. Following treatment, absorbent materials applied will be removed and disposed of appropriately as per the manufacturer's guidelines.

3. Petroleum Product BPTC Measures

3.1. 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 comprehensive table under 3.3.

3.2. Provide a site map that locates storage locations.

See attached Site Map.

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

Petroleum Products

Products used on site	When they are delivered to site	How they are stored and used	How removed or stored
Gasoline	Brought to site when needed throughout the year.	Stored in a 500-gallon steel fuel tank with secondary containment under cover from precipitation and standard 5-gallon gasoline canisters, separately from fertilizers, on the porch of the residences or where it is used. Used to fuel generators and equipment.	Stored in a 500-gallon steel fuel tank with secondary containment under cover from precipitation and standard 5-gallon gasoline canisters, separately from fertilizers, on the porch of the residences or where it is used.
Diesel	Brought to site when needed throughout the year.	Stored in a 1000-gallon steel fuel tank with secondary containment under cover from precipitation. Used to fuel generators and equipment.	Stored in a 1000-gallon steel fuel tank with secondary containment under cover from precipitation.
Motor oil	Brought to site when needed throughout the year.	Stored in the shipping container alongside the 500-gallon steel fuel tank and the generator. Used to lubricate internal combustion engines.	After oil changes, the used motor oil is stored in either the container it came in or in sealed 5-gallon buckets for later disposal at an appropriate waste disposal facility.

3.4. Describe procedures for spill prevention and cleanup.

Any/all fuel canisters and motor oil containers shall be stored in secondary containment (e.g. plastic totes or sealed metal boxes) while being stored long term or not in immediate use, wherever these materials are used anywhere on the property. Adequate quantities of absorbent materials shall be stored at all locations where these types of materials are used, stored, or mixed. Should a spill of these materials occur, absorbent materials will be applied immediately and allowed

enough time to absorb as much material as possible. Following treatment, absorbent materials applied as well as any contaminated soil will be removed and disposed of appropriately for the spilled material.

4. Trash/Refuse, and Domestic Wastewater BPTC Measures

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

Domestic and commercial cannabis refuse will be generated at the site. The refuse is securely stored in trash bags and trash bins at the cultivation areas, residences, and within a contained refuse storage shed adjacent to the residences prior to disposal at an appropriate waste disposal facility.

4.1.1. Provide a site map that locates the trash/refuse storage locations.

Refuse is securely stored in trash bags and trash bins at the cultivation areas, residences, and within a contained refuse storage shed adjacent to the residences prior to disposal at an appropriate waste disposal facility. See attached Site Map.

4.2. Describe the number of employees, visitors, or residents at the site.

There are several regular employees who are at the site during the cultivation season. Additional employees are brought onto the property for short periods of time to complete projects requiring additional employees. Visitors are occasionally on site, including consultants and regulatory agencies. There is also a full-time residence on the property as well.

4.2.1. Describe the types of domestic wastewater generated at the site (e.g., household generated wastewater or chemical toilet).

Domestic sewage and wastewater (greywater) are generated on site.

4.2.2. Describe how the domestic wastewater is disposed.

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

Domestic sewage is disposed via a septic system attached to residences. Greywater from sinks is disposed of nearby where it is generated and allowed to infiltrate.

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

Bread and Butter Portables provides and services two chemical toilets during the cultivation season. These facilities are serviced as needed.

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.

A single outhouse was found on the property north of the residences off of the legacy road during the site assessment. The cannabis cultivator intends to discontinue the outhouse and obtain portable chemical toilets as needed during the cultivation season.

4.2.2.3.1. Provide a site map that locates any domestic wastewater treatment, storage, or disposal area.

See attached Site Map for locations of residences with attached septic and greywater systems. The outhouse is mapped and can be found to the north of the residences off of the legacy road.

5. Winterization BPTC Measures

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

See Mitigation Report and Annual Winterization Measures for prescribed general winterization measures that will be performed prior to each Winter Period, and site-specific interim measures that will be performed prior to the Winter Period until permanent, prescribed treatments can be executed.

5.2. 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.

Existing drainage structures will be maintenanced or repaired as feasible and necessary with hand tools during annual winterization and winter monitoring. Prescribed repair and maintenance will be executed in accordance with the Mitigation Report and Treatment Implementation Schedules.

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

See attached Mitigation Report and Treatment Implementation Schedule above. (Cultivation Area A, B, E, F, & Past Cultivation Areas)

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

See the attached Mitigation Report and Treatment Implementation Schedule for site descriptions, treatments, and the implementation schedule.

5.5. 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.

Not applicable. No legacy waste discharge issues were identified during the assessment of the property.

Disturbed Area Stabilization Plan

(Tier 2, High Risk)

1. Site Description

1.1. Describe the site (e.g., topography, vegetation, elevation, historic precipitation patterns, soil types, surface waterbodies, etc.).

See the Property Description, Project Description, General Location Map, Site Maps, Overview Maps (if included), in the above pages.

1.2. Provide a site map that shows the location of all water bodies, the applicable setback(s), all disturbed areas within the setback(s), and the storm water runoff sampling location.

See the attached Site Map, General Location Map, Overview Maps (if included), in the above pages.

1.3. Describe how the area was disturbed (e.g., previously existing condition, timber harvest, grading activities, etc.) and the level of disturbance.

The Disturbed Areas within riparian setback occurs in four separate areas on the property. At Cultivation Areas A, B, E, and F Disturbed Areas and associated cannabis cultivation area is located within riparian setbacks. At Cultivation Area A change in the natural grade occurred within riparian setbacks of a Class III watercourse. At Cultivation Areas B, E, and F outdoor cultivation areas are located within riparian setbacks. However, at these locations no change in natural grade occurred.

1.4. Describe the native vegetation that typically exists in the disturbed area.

Cultivation Area A: Native and non-native annual grasses.

Cultivation Area B: Native and non-native annual grasses.

Cultivation Area E: Native and non-native annual grasses.

Cultivation Area E: Native and non-native annual grasses.

2. Erosion Prevention BPTC Measures

2.1. Describe the BPTC measures that have been, or will be implemented to prevent or limit erosion. Provide an implementation schedule for BPTC measures that have not yet been implemented. Identify the erosion prevention BPTC measures on a site map.

See the Mitigation Report, Treatment Implementation Schedule, and Site Map to follow for site specific details.

2.1.1. The description shall address physical BPTC measures, (e.g., placement of straw mulch, plastic covers, slope stabilization, soil binders, culvert outfall armoring, etc.) and biological BPTC measures (vegetation preservation/replacement, hydro seeding, etc.).

See Site Map, Treatment Implementation Schedule, Mitigation Report, and SMP section Cleanup, Restoration, and Mitigation above.

3. Sediment Control BPTC Measures

3.1. Describe the BPTC measures that have been, or will be, implemented to capture sediment that has been eroded. Provide an implementation schedule for BPTC measures that have not yet been implemented. Identify the sediment control BPTC measures on a site map.

See the Mitigation Report, Treatment Implementation Schedule, and Site Map to follow for site specific details.

3.1.1. The description shall address physical BPTC measures, (e.g., placement of silt fences, fiber rolls, or settling ponds/areas, etc.) and biological BPTC measures (vegetated outfalls, hydro seeding, etc.).

All exposed soil within the area of concern shall be seeded and straw mulched. Seed and mulch will be re-applied regularly until fully vegetated. Only at Cultivation Areas A and B, a series of two to three straw/fiber wattle rows (not containing monofilament netting) shall be installed perpendicular to the slope direction facing the relevant watercourse with 3' - 5' spacing per the Erosion Control BMP's. To decrease time for revegetation, it is recommended that supplemental water will be added to seed-treated areas during the dryer months to expedite full revegetation.

4. Maintenance Activities - Erosion Prevention and Sediment Control

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

All treatments and mitigations will be monitored for proper function throughout the Winter Period during required monitoring as required in the Monitoring Plan above.

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

Any sediment capture behind straw wattles will be stabilized in place by continued seeding and mulching.

4. Maintenance Activities - Erosion Prevention and Sediment Control

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

All treatments and mitigations will be monitored for proper function throughout the Winter Period during required monitoring as required in the Monitoring Plan above.

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

Any sediment capture behind straw wattles will be stabilized in place by continued seeding and mulching.

5. Long Term Stabilization Measures

5.1. Describe any revegetation activities designed to provide long term stabilization, that will occur either at the beginning or end of the precipitation season.

See 3.1.1 above.

SLR Cultivation Square Footages

Zone 1	2019	2020		2021	
Outdoor	4,650	10,500	Relocate Corral outdoor 6900 and keep existing outdoor on North and South sides of hoop houses	10,500	
Dep	18,000	24,000	Relocate Nursery in Zone 1 to Zone 2. Relocate 4,000 SF Light Dep in Zone 2 to Zone 1. Change 2,000 sf of existing outdoor in zone 1 to tier 1 mixed light	24,000	
Zone 2					
Outdoor	1,950	1,000	Exising	0	
Dep	4,000	0	Nursery only in greenhouses	0	
Corral	6,900	0	Relocated to Zone 1	0	
Roadside	6,300	6,300		6,300	
South 80	8,000	8,000	All or a portion to be relocated if 20,000 SF in rock pit area is approved in 2021	5,140	
Lower 40	7,500	7,500	All to be relocated if 20,000 SF in rock pit area is approved in 2021	0	
Rock Pit				20,000	This would be a new application submitted prior to 12/31/2019 under 2.0. It would allow to relocate 7,500 sf of lower 40 garden and utilize square footage that was grown prior to 2016 that has not been used.
Total Square Footage of Cultivation	57,300	57,300		65,940	65,940 is the original square footage that was grown prior to 2016

Timberland Resource Consultants

165 South Fortuna Boulevard, Fortuna, CA 95540
707-725-1897 • fax 707-725-0972
trc@timberlandresource.com

October 4, 2018

Attention: John Ford
Humboldt County Planning and Building Department
3015 H Street
Eureka, CA 95501

Dear John Ford,

Re: APN 223-061-038
Application #11463

This letter is in response to the Department's request for a professional opinion on the "on-stream" status of the two existing ponds (Upper Pond and Lower Pond) located within the S ½ of APN 223-061-038 as shown on the attached map.

This analysis shall attempt to determine whether the ponds were constructed in a "watercourse" per 14CCR 895.1 as follows:

> ***Watercourse*** *means any well-defined channel with distinguishable bed and bank showing evidence of having contained flowing water indicated by deposit of rock, sand, gravel, or soil, including but not limited to, streams as defined in PRC 4528(f). Watercourse also includes manmade watercourses.*

Upper Pond

The Upper Pond is approximately 220 feet long by 195 feet wide by 15 to 18 feet deep. Per Terra Server, the pond was constructed between July 2016 and March 2017, which can be inferred to have occurred late summer-fall 2016. Review of historic aerial imagery from 1998 to present reveals that the pond was constructed in a topographic swale feature, which depending upon photo year (ergo previous year's rainfall), was characterized by dark green or brown vegetation. The color of the grass was solely related to previous years rainfall. It is impossible to accurately determine whether this swale feature, the area of which now underlies the pond, was a watercourse. However, field evidence suggests that there was likely no "well-defined channel with distinguishable bed and bank showing evidence of having contained flowing water indicated by deposit of rock, sand, gravel, or soil". This is based upon the small size of the contributing watershed above the pond, its underlying geology, and analysis of similar grassland bowl-features located throughout the watershed. Consistent surface flow in a defined channel within Wildcat Group sediments would likely create a relatively downcut and distinguishable stream channel rather than a subtle swale feature as is visible on past aerial imagery. Its plausible that the well-cemented pebble conglomerate underlying the surface soil is resistant to the minimal flows generate by the small contributing watershed and thus no watercourse feature has distinctly formed.

Present conditions above the pond are distinctly different as a result of construction activities which have created a steep cut-bank, removed and/or disturbed surface soils, and compacted portions of the contributing watershed above the pond. These factors have likely contributed to the potential presence of several segments of overland flow reaching the newly constructed pond. However, these are essentially temporary man-made features, which are no different from a hydrologically connected inside ditch or graded surface. The disturbance of the soil, particularly where top soil and surface soil have been completely removed, has reduced its percolation rate relative to baseline conditions. This condition is expected to change as graded surfaces revegetate, compacted soils become restored, and surface soil/top soils develop. Minor visible surface runoff into the pond, if any, is expected to disappear and become less significant as time passes.

Lower Pond

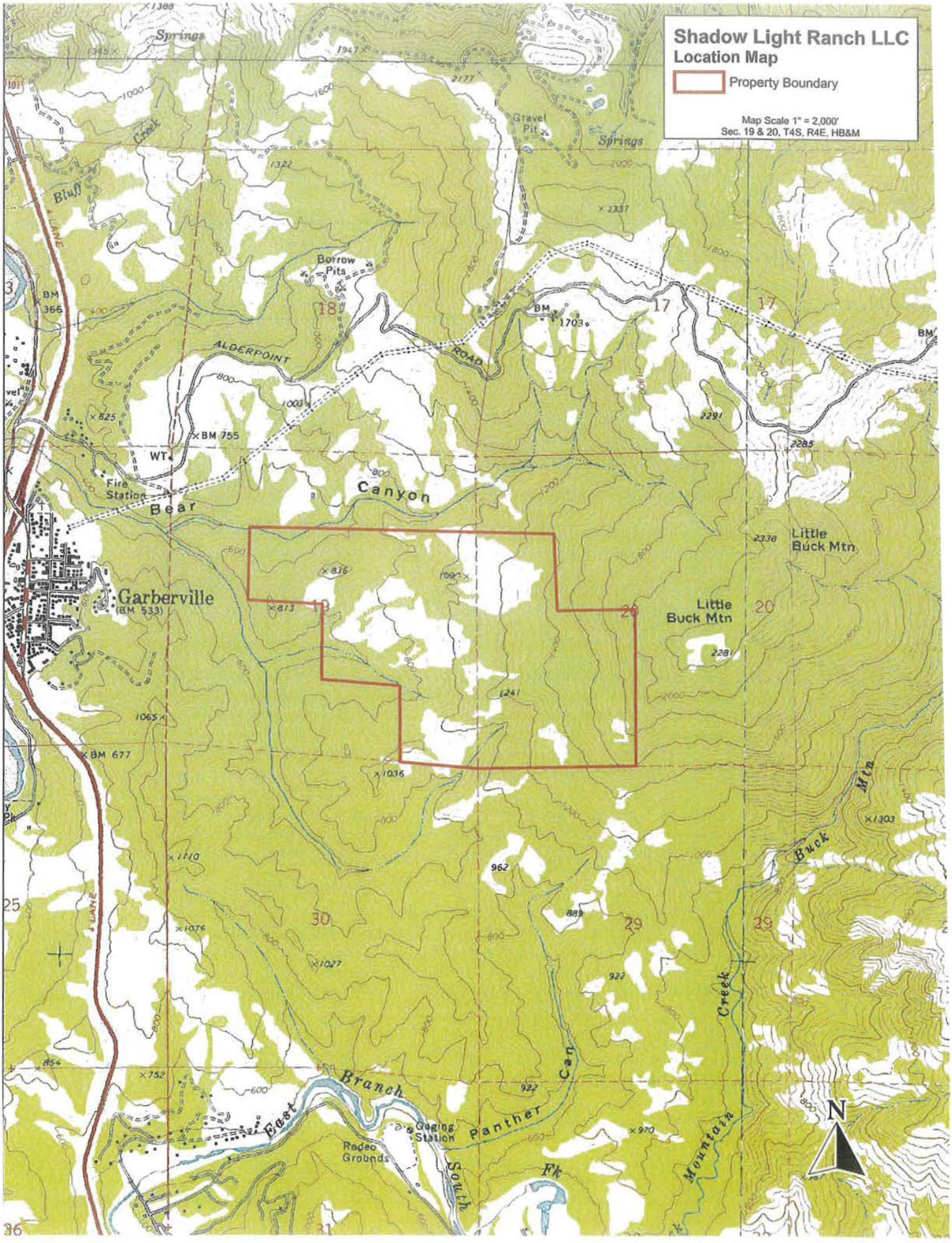
The Lower Pond is approximately 165 feet long by 90 feet wide by unknown depth. Per Google imagery, the pond was constructed between 2005 and 2006. Review of historic aerial imagery from 1998 to 2005 reveals that the pond was constructed on a mid-slope bench feature, with no clearly discernible watercourses. However, Google imagery from 12-30-2005 and 9-15-2010 reveals subtle signs of a topographic feature upslope, which resembles a watercourse. Field evidence from above the pond in summer 2018 revealed a semi-defined channel with evidence of having contained flowing water but no deposits of rock, sand, gravel, or soil. It is my opinion that the lower pond is "on-stream".

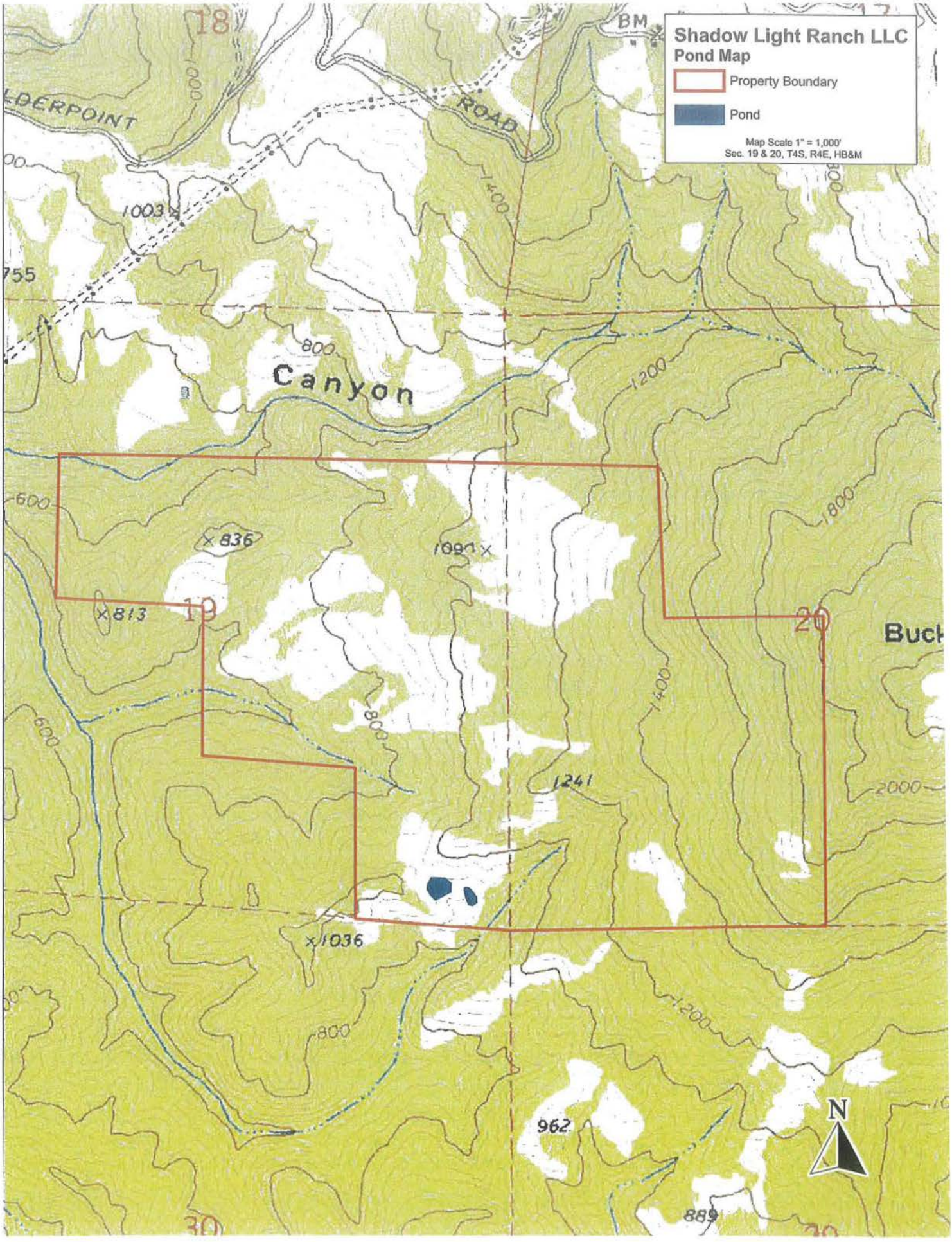
Summary

Based upon the use of historical aerial imagery, on-site physical evidence, and professional experience; the Upper Pond does not appear to have been constructed in a watercourse and is therefore not "on-stream". The Lower Pond however contains evidence to suggest it was constructed in a watercourse and is therefore "on-stream".

Sincerely,

Chris Carroll, RPF #2628
Timberland Resource Consultants


Shadow Light Ranch LLC
Location Map
Property Boundary
Map Scale 1" = 2,000'
Sec. 19 & 20, T4S, R4E, HB&M
Springs
Gravel Pit
Springs
Bluff Creek
LANE
Borrow Pits
BM 366
ALDERPOINT ROAD
BM 1703
BM
BM 755
WT
Fire Station
Bear Canyon
Little Buck Mtn
Garberville
(BM 533)
Little Buck Mtn
BM 677
Buck Mtn
LANE
Rodeo Grounds
Gaging Station
East Branch South Fk Panther Canyon
Mountain Creek
N


Shadow Light Ranch LLC
Pond Map
Property Boundary
Pond
Map Scale 1" = 1,000'
Sec. 19 & 20, T4S, R4E, HB&M
ROAD
Canyon
18
19
20
30
BM
1003
755
800
1200
1400
1800
600
836
813
1091
1241
2000
1036
962
889
N


N
Upper Pond
Lower Pond


N
Upper Pond
Runoff from compacted and graded cut-slope
collecting into swale feature creating overland flow


Upper Pond
N


N
Lower Pond

812 W. Wabash Ave., Eureka, CA 95501-2138 707-441-8855
Civil Engineering, Environmental Services, Geosciences, Planning & Permitting, Surveying

Reference: 018064

September 21, 2018

Mr. Josh Sweet
Shadow Light Ranch, LLC
P.O. Box 250
Garberville, CA 95542

Subject: Engineering Geologic Assessment of Existing Ponds, Shadow Light Ranch, Garberville, California; APN 223-061-038

Josh:

The purpose of this letter report is to describe the engineering geologic conditions associated with two existing ponds on your property (Shadow Light Ranch) outside Garberville, California. These ponds are undergoing regulatory review, so the information presented herein is intended to inform decision makers relative to the potential environmental impacts associated with these ponds. Our intent is to evaluate site conditions in the context of determining whether these ponds should be retained, modified, or removed. In that way, this evaluation is focused on identification of the superior option from an environmental standpoint. That is, how do potential impacts associated with retaining the ponds compare with those associated with removing or modifying them? Our analysis is based on multiple site visits over the past several months and review of published literature, maps, and aerial photographs.

Site Conditions

The site is located on ranch lands about 1.25 miles east-southeast of Garberville (Figure 1). The two ponds are adjacent to each other, and are located at the following location:

Latitude:	40.092902
Longitude:	-123.768910

The area is largely undeveloped land with a mix of grass-covered prairie ground and oak/Douglas fir woodlands.

Although much of the upper slopes in the Shadow Light Ranch are underlain by bedrock associated with the Central belt of the Franciscan Complex, the area around the subject ponds is underlain by Tertiary age sedimentary rocks of the Wildcat Group (Figures 1 and 2). We observed exposures of a well-cemented pebble conglomerate on the shoreline of the upper pond just upslope of the embankment, and in road cut exposures downslope of the embankment (in the area of the lower pond). Sandstone and siltstone exposures were observed along the western and northern shorelines of the upper pond. Exposures on the hills surrounding the ponds consist of Wildcat sediments as well.

Geologic and geomorphic mapping by CGS (Spittler, 1983) does not identify specific historical landslides in the vicinity of the ponds. Some areas of "disrupted ground," a generalized category showing areas of inferred, potential ground movement are shown locally in the vicinity of the pond, but no specific mass wasting feature is noted at the pond site.

Ponds

The subject ponds occur as a staggered pair of retention structures, a larger upper pond and a smaller lower pond (Figure 3). They are adjacent to each other, such that the lower pond is located just below the toe of the embankment of the upper pond. The spillway associated with the upper pond (24-inch corrugated metal culvert) drains into the lower pond; the lower pond subsequently drains into an adjacent Class II watercourse. The lower pond appears to clearly be an "in-stream" retention structure; determination as to whether the upper pond is "in-stream" is currently under consideration. The lower pond is not intended for use for agricultural purposes; the upper pond is intended as a water storage reservoir to supply a commercial cannabis operation on the property.

Lower Pond. The lower pond was apparently built by neighboring property owners at some point in the past; the timing is not currently known. It appears recently built (and not yet filled) in Google Earth imagery dated October 12, 2006. The pond is an oval-shaped structure about 165 feet long and 90 feet wide; its depth is not known. The pond was formed by excavating into what appears to have been a pre-existing bench and forming an earthen embankment along the downhill edge. The embankment is about 15 feet high. This pond drains directly to an adjacent Class II watercourse by means of a spillway consisting of a long 24-inch corrugated plastic pipe (Figure 3). It has a secondary spillway consisting of two side-by-side 24-inch corrugated plastic pipes that drain to the toe of the embankment. These pipes only carry water when the lower pond is relatively full. There is evidence for minor slumping around these secondary outlet pipes. A Class III watercourse extends up the slope north of the pond, which feeds into the pond; therefore, the lower pond is an "in-stream" retention structure.

Upper Pond. The upper pond was apparently built in 2017. It is not visible in Google Earth imagery dated May 28, 2014, but was present by October 2017, when it was observed during aerial inspections by California Department of Fish and Wildlife personnel. We understand that the pond was completed without permits. It is a tear-drop shaped retention structure created by excavating on a pre-existing bench and developing an earthen embankment around the downhill margin (Figure 3). The pond is estimated to be about 220 feet long and 195 feet wide, in maximum dimension; it was described as being 15 to 18 feet deep at the time of construction. The embankment is a significant structure with a crest width of about 10 feet. The outboard face of the embankment slopes at between 1.5:1 (horizontal:vertical) and 2:1. We estimate the embankment height to be on the order of 25 feet. As described above, the upper pond drains to the lower pond by means of a spillway consisting of a 24-inch corrugated metal culvert pipe; this flow occurs only when the upper pond is relatively full.

Excavation of the northern margin of the pond exposed siltstone and sandstone of the Wildcat Group. These materials appear to have become unstable when saturated in the cut along the shoreline; therefore, much of the northern shoreline has slumped toward the edge of the pond, leaving steep headscarps of up to 8 feet high. Areas underlain by siltstone appear to have been especially susceptible. There is no evidence that this area was unstable prior to the excavation and filling of the pond.

We understand that the determination whether the upper pond is connected to a stream will be made by others, considering factors in addition to those related to the geology or geomorphology of the site. We note, however, that there is no clear, definable channel visible in aerial photographs in the area now occupied by the upper pond. Based on the available geologic data, it is our professional opinion that the upper pond is not an "in-stream" feature.

Removing, Modifying, or Retaining the Ponds

Analysis of the environmental impacts associated with the options to remove, modify, or retain the existing ponds includes assessment of:

1) the integrity of the ponds in their existing setting, and
2) the relative impacts associated with demolition and relocation of the pond(s).

Integrity of Existing Ponds

The ponds are located in a favorable geologic setting, because they appear to be built on Wildcat Group sediments. The embankment for the upper pond, the primary structure of concern, is founded on cemented cobble conglomerate, which is suitable material from a bearing and stability standpoint. There is no evidence of instability of the upper pond embankment or adjacent native slopes that are supporting it.

The northern pond shoreline has experienced localized slumping where siltstone and sandstone sediments are exposed. These materials appear to have become destabilized due to over steepening of the cut slope and saturation of the susceptible sediments. Below we discuss the potential of reconstructing and reinforcing this slope, which, in short, appears feasible.

The lower pond appears to be in a reasonable setting, but the embankment appears inferior, shows signs of slumping, and should be repaired. Below, we discuss specific recommendations to repair this embankment. If the recommendations below are followed, we conclude that the pond would be a stable feature at the site.

To conclude, we find no significant issues related with the geologic setting or integrity of the ponds, assuming the repairs described below are completed.

Impacts Associated with Pond Removal

Removal of the existing ponds would be associated with environmental impacts in two forms:

1) impacts associated with the decommissioning of the existing ponds and
2) impacts associated with development of new ponds.

Removal of the existing ponds would be an extensive earthwork operation that would require ground disturbance over a large, multi-acre area. Presumably, decommissioning of the existing ponds would require draining all the water out, removing the embankments and associated plumbing, and replacing the material in the excavations currently occupied by the ponds. This earthwork operation would likely take several weeks to complete, and would require extensive use of heavy grading equipment (and the associated fuel and exhaust impacts). We assume the spoils would be replaced with some geotechnical requirements that would include a compaction standard and means to stabilize the ground surface at the completion of the earthwork. The resulting disturbed area would need to be treated with extensive erosion control for short-term mitigation prior to the re-establishment of native grasses at the site. It is likely that even careful, methodical work with extensive erosion control would result in some offsite sediment impacts, due to the magnitude of the disturbed area and proximity to watercourses.

Given that the upper pond is intended as a water storage reservoir to supply agricultural water to the property, it will need to be replaced with a pond elsewhere on the property if it is removed. The currently proposed alternative pond location is an upland site above "Cultivation Area 1," on the slopes of Little Buck Mountain. This area appears to be a favorable setting from a geotechnical standpoint (the area is mapped as being underlain by sandstone), but there is no existing road access to the site. In order to develop a pond at this upland site, extensive road building would be required. The proposed pond site is forested with mature Douglas fir trees; therefore development of the pond would require removal of these trees. This approach would result in extensive disturbance of currently undeveloped areas of the property that would not otherwise be subject to development.

Discussion

Assuming that deficiencies with the existing ponds are mitigated, the potential environmental impacts associated with retaining the ponds appear to pale in comparison to the potential impacts associated with removing them and establishing a pond elsewhere on the property. Given that the upper pond is currently only delivering water to the lower pond from the upper surface during periods of relatively high retention, it delivers only clean water with low sediment levels. Similarly, the lower pond only delivers water to the adjacent Class II watercourse from the pond surface when the pond is full; it also is delivering only clean water. As such, the ponds, in their current condition, are associated with low level environmental impacts.

Removal of the ponds and development of a new pond on the upland slopes above Cultivation Area #1 would be associated with substantial potential impacts. Decommissioning of the existing ponds would require a substantial earthwork operation that would result in a large disturbed area requiring extensive erosion control work. Development of the proposed pond on the upland slopes would require new road construction and earthwork in a currently undisturbed area.

Weighing the various options, it is our professional opinion that it will be less impactful to the environment to maintain the existing ponds (assuming some improvements are completed).

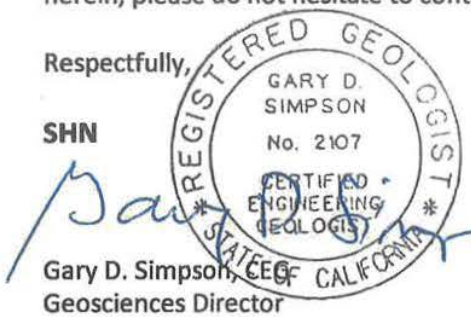
Recommendations

- Maintain the existing ponds in their current location.
- Develop a repair plan for the northern slope of the upper pond. This repair is likely to include reconstruction of the failed portion of the slope, incorporating geotextile reinforcement, with rock armoring and/or biological stabilization.
- Drain the lower pond and rebuild the outboard face of the embankment where slumping has occurred around the existing secondary spillway culverts.

We hope that this report provides useful information relative to the determination of an appropriate course of action to move this project forward. If we can provide additional information, or clarify the information herein, please do not hesitate to contact our office.

Respectfully,

SHN



Gary D. Simpson, CEG
Geosciences Director

GDS:lms

References

McLaughlin, R. J., and others. (2000). "Geology of the Cape Mendocino, Eureka, Garberville, and Southwestern Part of the Hayfork 30 x 60 Minute Quadrangles and Adjacent Offshore Area, Northern California," Scale 1:100,000. *U.S. Geological Survey Miscellaneous Field Studies MF2336*. 27 p., 6 plates. NR:USGS.

Spittler, T. (1983). Geology and Geomorphic Features Related to Landsliding, Garberville quadrangle, Humboldt County, California. California Division of Mines and Geology Open-file Report OFR 83-26 SF. Scale 1:24,000. Sacramento, CA:CDMG.

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GEOLOGY FROM SPITTLER (1983), MCLAUGHLIN ET AL. (2000)

Consulting Engineers & Geologists, Inc.

Shadow Light Ranch

Garberville, California

Aerial With Geology

SHN 018064

September 2018 | Figure1 LocationAndGeology | Figure 1

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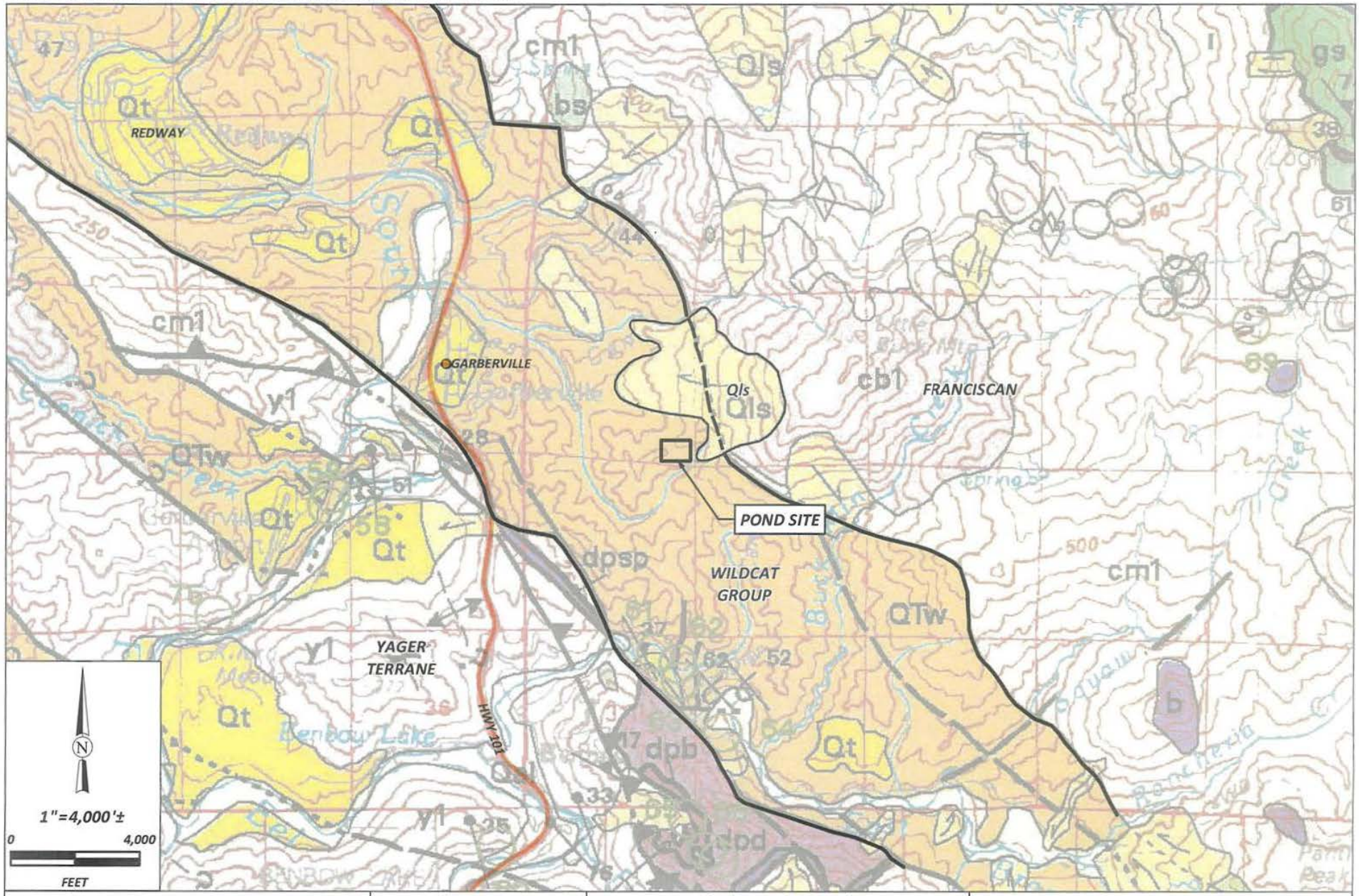

Consulting Engineers & Geologists, Inc.

Shadow Light Ranch

Garberville, California

Geology
(McLaughlin, 2000)
SHN 018064

September 2018 | Figure2_Geology | Figure 2

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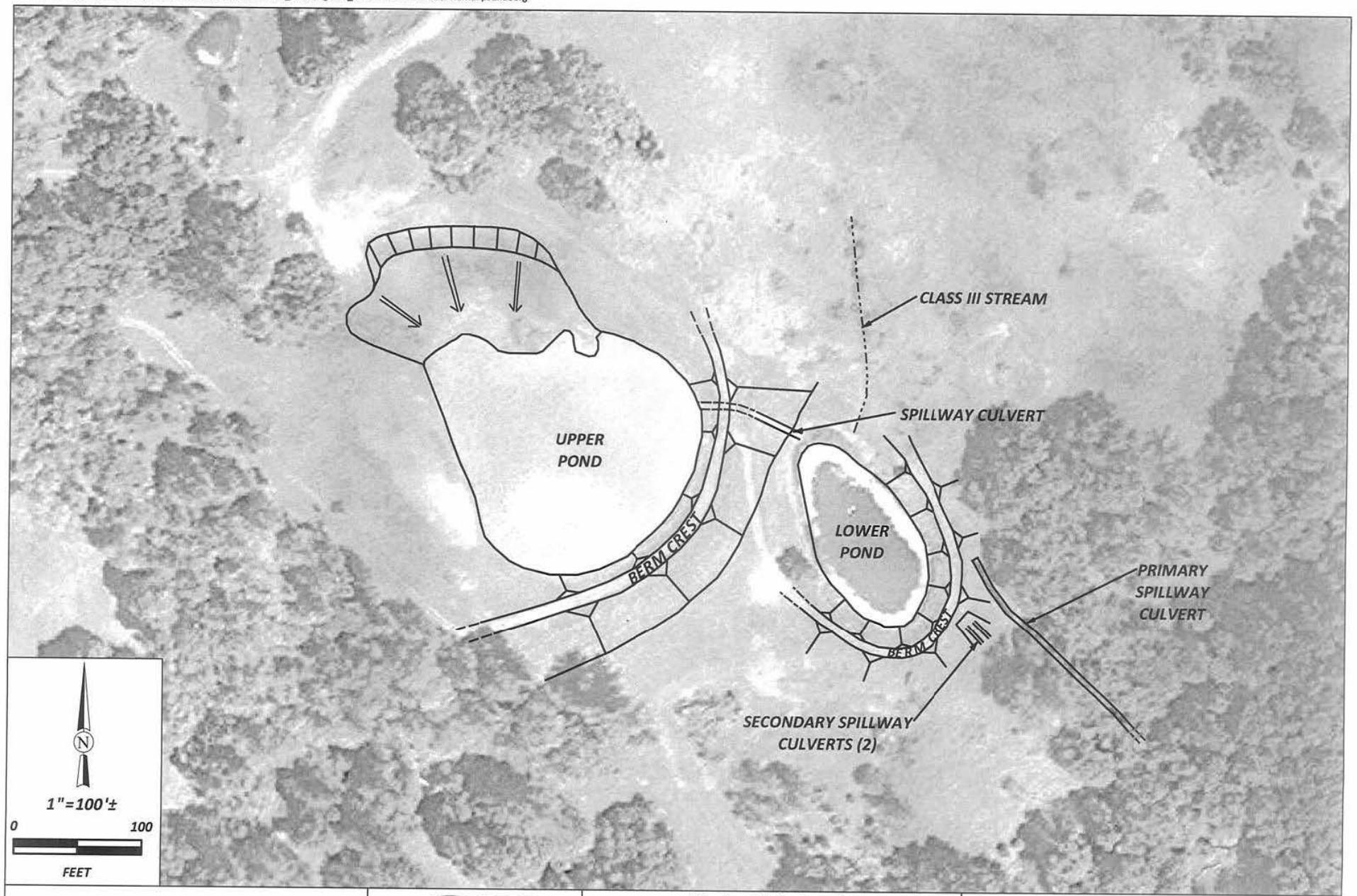


IMAGE SOURCE FROM TERRA SERVER, DATED 5/23/2018

SHN Consulting Engineers & Geologists, Inc.

Shadow Light Ranch

Garberville, California

Aerial Photo
Dated, 5/23/2018
SHN 018064

September 2018 | Figure3_AerialPhoto | Figure 3

Phone: (707) 441-8855 Email: info@shn-engr.com Web: shn-engr.com
812 W. Wabash Avenue, Eureka, CA 95501-2138

Reference: 018064

July 2, 2019

Josh Sweet
Shadow Light Ranch, LLC
P.O. Box 250
Garberville, CA 95542

Subject: **Water Storage Pond Embankment Stabilization, Shadow Light Ranch, APN 223-061-038, Garberville, California**

Josh:

As requested, SHN is providing these recommendations for the stabilization and reconstruction of the embankment associated with a pond on your property (APN 223-061-038) near Garberville, in southern Humboldt County. We understand you are engaged in the state and county cannabis compliance process, and that the subject pond is under regulatory review; as such, its future remains uncertain. If the subject pond were to be approved to be retained, the recommendations included herein would be applicable.

The subject pond is located at latitude 40.092811 and longitude -123.768636. Discussion regarding the history and environmental setting of this pond is included in previous reports for the site, and is not included herein. Within the ongoing regulatory dialogue, the subject pond is referred to as the "lower" pond.

As discussed previously, the site is underlain by sedimentary bedrock materials associated with the Neogene Wildcat Group. Exposures of pebbly conglomerate occur near the subject embankment; fine sandstone and siltstone sediments also occur nearby (at the adjacent "upper" pond).

Existing Condition

Little is known about the construction of the existing embankment, because it was built by neighbors without permits and, to our knowledge, without engineering. We assume the embankment was built from the spoils derived from excavation of the pond it retains, which is relatively small (160 feet x 90 feet). Embankment height is estimated at 10 to 12 feet. The embankment is thought to have been built in 2006, based on Google Earth imagery. This suggests the pond is 13 years old, and on visual inspection the embankment appears to have retained its integrity (no repairs are evident, and we are not aware that any have occurred).

The existing embankment deficiencies that require attention include the following:

- The outer embankment face is overly steep (on the order of 1:1 to 1½:1 [horizontal to vertical] in most areas).
- There is an erosion scar on the existing outboard embankment face at the outlet of an abandoned spillway (two disconnected side-by-side corrugated plastic pipes). The erosion scar extends from the crest to the toe of the embankment, is about 2 feet deep, and as much as 8 feet wide near the base of the slope.

Our recommendations for mitigating these deficiencies, are provided in the following section.

Reconstruction Recommendations

The outer embankment face needs to be reduced to a slope no steeper than 2:1. Reducing the slope gradient of the embankment face may occur by one of the following methods, which are depicted in Figure 1:

- adding additional fill material to the existing embankment face, thus maintaining the current crest position, but requiring the toe of the embankment to move outward from its current position;
- maintaining the current position of the embankment toe and laying the slope back, which would require moving the embankment crest back and rebuilding the embankment within the current pond footprint (thus reducing the size of the pond); or
- some combination of the two.

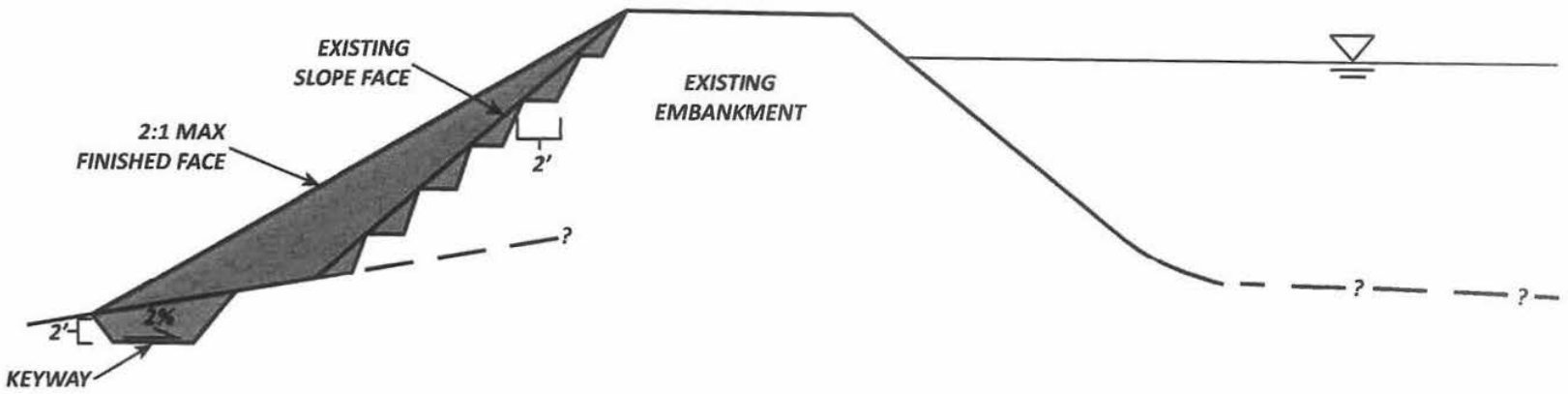
The relative benefit between the two alternatives may be dictated by the ability to move the embankment toe further down the slope (required for the first option) without encroaching on wetland soils or unstable slopes. The best solution may entail a combination of the two approaches. The project will require some field engineering, as the full scope of the reconstruction will not be apparent until the pond is drained.

Either of these approaches will result in the removal of the erosion scar described above and mitigation of any hazard associated with it.

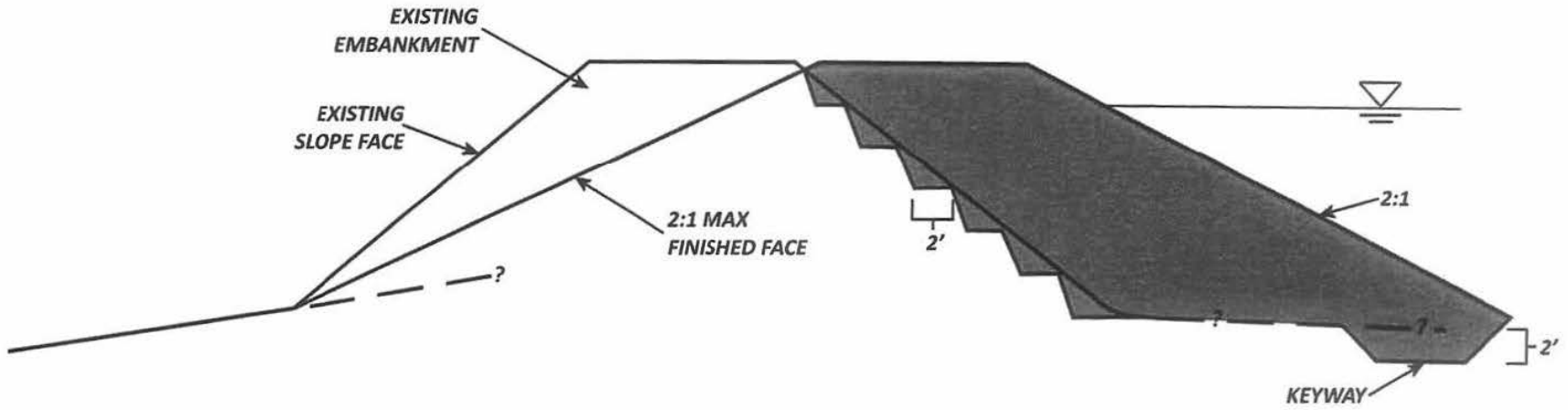
Regardless of the approach to reconstruction of the pond embankment, the following recommendations will apply:

- Drain the pond prior to the onset of the project. The earthwork described herein cannot be achieved with water in the pond. Earthwork inside the existing pond will require adequate moisture conditioning (drying) to obtain suitable subgrade conditions.
- Strip and remove all existing vegetation and root systems from the embankment face and any additional footprint areas that may receive fills, plus an additional 5 feet outward.
- Remove the abandoned spillway pipes if the existing crest position is to be maintained.

A) ADD FILL TO THE EXISTING OUTBOARD SLOPE FACE TO CREATE 2:1 SLOPE



B) LAY EXISTING OUTBOARD SLOPE FACE BACK TO CREATE 2:1 SLOPE; ADD FILL TO INBOARD FACE



NOTE: DRAWINGS NOT TO SCALE

	SHN	Shadow Light Ranch, LLC. Embankment Details Garberville, California	Embankment Repair Options - Lower Pond SHN 018064
		July 2019	Figure1_EmbankmentDetails

- All embankment fill should be free from woody debris, roots, organics, and rocks retained on the 4-inch sieve. A rock sorter and/or crusher may be required to remove/modify the oversized particles (rocks retained on a 4-inch sieve). Embankment fill should be comprised of greater than 50 percent fine-grained material (silts and clays), to prevent water seepage through the embankment. To the extent possible, blend the stockpiled material into a uniform mixture. The geotechnical engineer or qualified representative should be present during excavating and stockpiling, to ensure the adequacy of the excavated material. If the excavated material is deemed inadequate, then an alternate source must be determined (from either a borrow area elsewhere onsite, or soil imported from offsite).
- Regardless of the approach to the reconstruction of the embankment (adding to the existing outer embankment face versus laying it back), the geometry of the schematic drawing shown in the attached Figure 1 should be used as a guide. The schematic shows keyway- and bench-based construction, and defines the placement of compacted soil lifts. The ultimate design may vary depending on the approach chosen (fill soils may be placed on the outboard embankment face, the inboard embankment face, or both), but it will inevitably include some areas where new fills soils will contact existing fill or native soils. These areas should be adequately prepared and benched.
- For any subgrade area to receive fill, scarify the upper 12 inches of exposed subgrade soils, moisture-condition to a uniform moisture content of at least 2 percent above optimum, and compact to at least 90 percent relative compaction.
- Place embankment fill materials in horizontal layers no greater than 8 inches in loose thickness, moisture-condition to a uniform moisture content at least 2 percent above optimum, and compact to at least 90 percent relative compaction.
- Immediately following completion of pond earthwork, exterior slopes should be seeded/planted with suitable erosion-control vegetation (native grass, for example). Trees and large shrubs should not be planted on the embankment.
- Sufficient construction inspection and materials testing should be performed, as determined by the geotechnical engineer or qualified representative, to confirm that the ponds are constructed in accordance with our design and recommendations. At a minimum, the following should be tested for adequate compaction:
    - Scarified and compacted subgrade soils
    - Initial lift of embankment fill material
    - Middle lift of embankment fill material (that is, the lift that is halfway up the total design height of the embankment)
    - Final lift of embankment fill material
    - Further compaction testing may be required, depending on certain construction-phase items (such as the frequency of failing compaction tests).

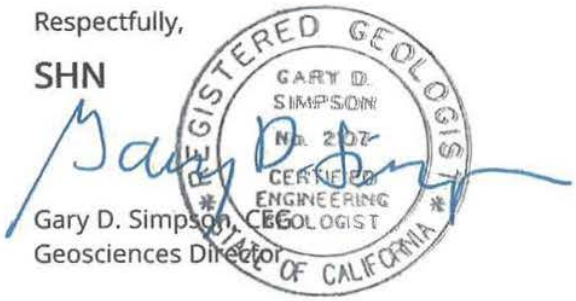
Limitations

This report provides a focused discussion regarding a specific water retention pond on the Shadow Light Ranch. The discussion herein applies to the subject pond at the current time. If a significant lapse in time (>1 year) occurs before the work outlined herein is completed, we should review the site conditions to ensure that no modifications to the plan outlined herein are necessary. The recommendations included herein are not applicable elsewhere (on this property or any other property). The recommendations provided herein are based on an investigation of inherently limited scope, given that the subject pond was built previously, and the work done here is all retroactive.

We hope that this report provides the information that you need at this time. If you need additional information, or clarification of the information included herein, please do not hesitate to call our office at (707) 441-8855.

Respectfully,

SHN



Gary D. Simpson, CEG
Geosciences Director

GDS:lms

wra
ENVIRONMENTAL CONSULTANTS

Confidential Settlement Communication

January 31, 2019

Nicole Granquist
Downey Brand LLP
621 Capitol Mall, 18th Floor
Sacramento, CA 95814

At your request, WRA, Inc. (WRA) conducted technical analysis to evaluate issues recently raised by the State of California in a proposed enforcement action. We reviewed various documents that were provided to WRA, conducted an on-site assessment, and reviewed additional documents including maps, historic and recent aerial photographs, and databases specifically concerning two reservoirs on property located east of Garberville, CA owned by Shadow Light Ranch, LLC. The following documents were reviewed and/or referenced:

1. California Department of Fish and Wildlife (CDFW) Draft Lake or Streambed Alteration Agreement dated February 22, 2016
2. North Coast Regional Water Quality Control Board (NCRWQCB) Inspection Report dated November 2, 2017
3. NCRWQCB Notice of Violation dated May 10, 2018a
4. NCRWQCB Notice of Violation dated June 27, 2018b
5. SWRCB Enforcement Action Related to Cannabis Cultivation Violations dated November 5, 2018
6. Google Earth Aerial Photographs (various dates 1993-2014)
7. National Agriculture Imagery Program (NAIP) Aerial Photographs (various dates 2004-2018)
8. National Hydrography Dataset (NHD)
9. 1987 Corps of Engineers Wetlands Delineation Manual
10. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Corps. 2010)
11. A Guide to Ordinary High Water Mark Delineation for Non-Perennial Streams in the Western Mountains, Valleys, and Coast Region of the United States (Corps. 2014)
12. Regulatory Guidance Letter (RGL) 05-05 (Corps. 2005)
13. SHN Geologic Report September 21, 2018
14. 1602 Application by Timberland December 31, 2018

Assessment of Reservoir 1

Findings Summary

Based on an on-site assessment of current conditions on the Shadow Light Ranch property east of Garberville, CA (Figure 1), review of documents listed above, and interviews with Joshua Sweet (Shadow Light Ranch, LLC), WRA finds no evidence that Reservoir 1 (Figure 2) on the property was constructed on or in a natural drainage course or stream. However, a wetland

delineation conducted by WRA during a site visit on January 10, 2019 determined that a small area of seepage northwest of Reservoir 1 currently meets the three parameters required for being a wetland (but again, no drainage courses or traditional streams are present). As a result of interpretation of aerial photographic signatures, potential isolated wetlands areas likely once existed in the location where Reservoir 1 was created. The estimated area of wetlands impacted by the reservoir construction was 6,828 square feet (Figure 3). The potential wetlands were isolated in the landscape in the relatively level, mid-section of the existing landslide area and did not progress downslope to the unnamed stream.

Assessment Methods

The methods of analysis of the survey area included on-site sampling and observation, aerial photograph review, review of maps available from various sources, inspection reports prepared by NCRWQCB (2018a, 2018b), and information provided by the landowner.

On-site Wetland Delineation

Wetland delineation sample point data was collected during the January 10, 2019 site visit at ten locations following the *1987 Corps of Engineers Wetlands Delineation Manual* and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Corps. 2010) around Reservoir 1 to determine if wetlands were present and their location and extent if present (Figure 2).

In addition, *A Guide to Ordinary High Water Mark Delineation for Non-Perennial Streams in the Western Mountains, Valleys, and Coast Region of the United States* (Corps. 2014) and Regulatory Guidance Letter (RGL) 05-05 (Corps. 2005) was used to assess presence or absence of steam features. The area around Reservoir 1 was visually surveyed during the site visit for evidence of features that may have met the definition of streams having an ordinary high water mark, bed, and bank.

Aerial Photographs

Aerial photographs from various sources were obtained and reviewed to assess historic conditions based on interpretation of photographic signatures and to corroborate observations and data determined during the site visit and accounts in reports and from the landowner.

Aerial photographs were accessed from websites Google Earth and Humboldt County (http://webgis.co.humboldt.ca.us/HCEGIS2.0/) which included photographs of various dates from as early as 2004 (Google Earth) and National Agriculture Imagery Program (NAIP) to as recent at November 2018 (NAIP). However, the resolution and other qualities of some photographs precluded their use for photographic signature interpretation, so not all photographs accessed were useful. Additional photographs were reviewed for incidental information, such as Natural Resource Conservation Service photographs used for soil mapping. Photographic signatures evident on the aerial photographs were matched to the same areas observed during the site visit. Determinations from these comparisons allowed analysis of features between various photographs.

Other Available Information

Other available information that was reviewed consisted of database information from government agency websites, such as:

- U.S. Fish and Wildlife Service National Wetland Inventory (https://www.fws.gov/wetlands/data/mapper.html)
- Natural Resources Conservation Service Soils (https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx)
- U.S. Geological Survey Water Information System (https://maps.waterdata.usgs.gov/mapper/index.html)
- U.S. Geological Survey, The National Map (https://viewer.nationalmap.gov/advanced-viewer/).

Results

The general landform in which Reservoir 1 was created is concave shaped and likely created by areas of "disrupted ground" as described by Spittler 1983 (in SHN 2018) which may have resulted in historic landsliding and/or soil slumping. Noticeable in all aerial photographs is the absence of tree cover in this specific area which suggests soil movement frequent enough to preclude trees from becoming established as compared to adjacent areas with trees which are likely more stable. The NAIP 2005 and NAIP 2014 (Photos 1 and 2) aerial photographs illustrate the slumping nature of the landform area.

In the time since Reservoir 1 was created in 2016, a landslide reactivated in an area north of the reservoir, along with a separate area of hillside seepage northwest of reservoir, resulting in vertical soil surface drop (as much as 8 feet north of the reservoir and up to 2 feet in the hillside seep area) and general soil slumping movement downslope (Photo 3). Erosion rills on the soil surface have developed on both slump areas and also the cut slope west of the reservoir (Photo 4), however these erosion features, which commonly develop on disturbed soils, are not considered to be streams. The seepage area northwest of Reservoir 1 has formed a long narrow depression approximately 15-20 feet wide and 100 feet long with uneven surface. Rain water falling directly in this depression or entering from adjacent side areas makes its way downslope in small puddles and an erosion rill. There was no evidence that a drainage channel with a bed and bank feature existed prior to the slump activity and no such feature was observed during the site visit. Therefore, it was concluded that no stream feature exists and Reservoir 1 was not created as an in-stream impoundment. This conclusion is supported by SHN Consulting Engineers and Geologists (SHN 2018) and Timberland Resource Consultants (Timberland 2018).

Sampling results of the January 10, 2018 wetlands delineation indicate that wetlands conditions are present in a specific area around Reservoir 1 and that a small amount of wetlands conditions may have extended into the area now occupied by Reservoir 1 prior to construction, but not to the extent speculated by the NCRWQCB Inspection Report, which suggested wetlands area of up to 87,000 sq. ft. was disturbed by creation of Reservoir 1. Results of the wetland delineation are provided in Table 1 and wetland delineation data forms with recorded sample data are provided in Appendix A. The location where each wetland delineation sample was taken is shown in Figure 2.

Soils had characteristics meeting hydric soils at only two sample locations, and the soil type in the general area, Coolyork-Northyork Complex 30 to 50 percent slopes, is not listed as a hydric soil type. Wetland vegetation in the two locations that also had hydric soil and wetland hydrology characteristics included wetland classified plants, such as pennyroyal mint (*Menthe pulegium*) and common rush (*Juncus patens*), while non-wetland sample locations had upland plants, such as Harding's grass (*Phalaris aquatica*) and Dogtail grass (*Cynosurus echinatus*). Three sample locations technically met the parameter for wetland classified plants but did not meet hydric soils and/or wetland hydrology. In these locations a non-wetland determination was made.

Table 1. Results of wetland delineation at Shadow Light Ranch on January 10, 2019. A "+" symbol indicates the wetland parameter was met and a "0" symbol indicates the parameter was not met. All three parameters must be met to meet the definition for wetlands.

Sample Point	Wetland Vegetation	Wetland Hydrology	Hydric Soil	Sample Location in Wetland, yes or no
SP-01	0	0	0	no
SP-02*	+	0	0	no
SP-03	+	+	+	yes
SP-04*	0	0	0	no
SP-05	+	0	0	no
SP-06	0	0	0	no
SP-07	0	0	0	no
SP-08	+	0	0	no
SP-09	+	+	+	yes
SP-10	0	0	0	no

* - represents upland control sample location

The results of the delineation included two areas of potential wetlands, one associated with SO-03 and one with SP-09. Both were on sloping ground and were supported by seasonal groundwater seepage, and the wetland vegetation and hydric soil parameters were met as well. While surface water may accumulate and flow on the surface within these wetlands during periods of rainfall, there were no bed and bank features that would constitute a watercourse.

The seep wetland currently associated with SP-03 likely continued downslope and into the area now occupied by Reservoir 1 (Figure 3). The location and area that may have met wetlands conditions was estimated through interpretation of graphic signatures on historic aerial photographs, and comparison with areas meeting wetlands parameters, such as at SP-03 and SP-09. This comparison methodology was conducted using NAIP 2014 aerial photography because photographic signatures appeared to best represent potential wetlands areas on this photograph over other photographs. Based on this analysis, the location and extent of potential wetlands is shown in Figure 3, with an estimated wetlands impact of 6,828 square feet (0.17 ac). The topography that existed in the area of Reservoir 1 prior to its creation had a reduced slope as compared to the seep wetland that still exists upslope of the reservoir to the northwest. Because the slope gradient became more gradual in the area where the reservoir was created it is likely the water seeping downslope slowed and saturated soil creating a wetlands meadow feature, and did not continue farther toward the south. Therefore, there would have been no connection of the wetlands to the unnamed creek to the south.

The NCRWQCB estimate of up to 87,000 square feet of potential wetland impacts by creation of Reservoir 1 (11/02/2017 Inspection Report) was apparently based on using photographic signature coloration ("well-vegetated with denser, darker vegetation") of the NAIP 2016 aerial

photograph (Photo 5). However, this estimate was not based on comparison with direct wetland delineation evidence. The darker green coloration that appears in the area of the created reservoir on that photograph also appears generally in other areas of the photograph and cannot be uniformly assumed to determine wetlands. Moreover, in order to reach 87,000 square feet of wetlands impacts, the entire concave landform from ridge top to below where the reservoir was created would have needed to meet wetlands conditions; as shown in Figure 4, the entire area meeting wetlands conditions is an impossibility. As further evidence that not all green areas in the NAIP 2016 aerial photograph should be considered as representing wetlands, the farm road in the photograph that makes a wide "S" curve through the eastern side of the area would not, from a practical purpose, be placed by a landowner to pass through a wetland because access to areas would be blocked.

Mr. Sweet has indicated that, in discussions with agency staff invited to the ranch on inspection site visits in anticipation of siting Reservoir 1, he was persuaded to create Reservoir 1 in this area, which was a second choice location. The first choice site (Figure 5) was determined to meet wetlands criteria with an area estimated to be 18,600 square feet (0.43 ac), and so Mr. Sweet was told by agency staff that the second choice location was a superior location.

Channel Features Below Reservoir 1

NCRWQCB staff observed headwaters of a stream below Reservoir 1 (NCRWQCB 2018a). This feature appears just below the ranch road that passes the bottom of Reservoir 1 dam near SP-09 and SP-10 (Figure 2). The channel begins as a bifurcated channel at the edge of the ranch road, eventually converging approximately 50 feet downstream into one channel. The bifurcated channel appears to be a gully formed by erosion which may have developed when the ranch road was graded in the historic past and formed a head cut. The channel below the ranch road is obscured by trees/shrubs in aerial photography, however there is no evidence in historic aerial photography that the channel, bifurcated or not, advances upslope of the ranch road (which is not obscured in aerial photography). There is no indication of a watercourse in this location on USGS topographic (Figure 6) or National Wetlands Inventory (Figure 7) maps. Therefore, evidence shows that the potential wetlands that may have existed as a wetlands meadow upslope in the area now occupied by created Reservoir 1 had no hydrologic connection with the unnamed stream to the south.

Assessment of Reservoir 2

Findings Summary

Reservoir 2 is well documented in aerial photography and by landowner declaration to have been created in 2006, apparently by a neighbor who mistakenly thought the reservoir was built on his own adjacent property. The reservoir receives water from direct rainfall and local runoff from an erosional gully directly to the north (Figure 2). Recently, as of 2016, a drain pipe from Reservoir 1 was installed to convey overflow from that reservoir into Reservoir 2. NCRWQCB has indicated that Reservoir 2 is an in-stream impoundment feature because the watershed above the reservoir, a landslide area, is claimed to have stream. However, the gully formation present is the result of ephemeral erosion on a steep escarpment, has no bed and bank, and should not be considered a stream under existing regulation (Section 404 Clean Water Act, 2015 Clean Water Rule). Therefore, Reservoir 2 is not considered an in-stream impoundment. The reservoir drains overflow water through a 24-inch corrugated plastic pipe to the east into an unnamed creek. This drain pipe was recently installed because the original drain pipe that had been installed on the

south face of the dam separated; this outlet was abandoned and the new drain pipe was installed. Seepage from the base of the dam, which likely results from lateral transmissivity through the dam from the reservoir, is beginning to support perennial vegetation growth (Photo 6).

Assessment Methods

Conditions and features of Reservoir 2 were assessed by on-site observation, review of aerial photographs, review of maps available from various sources, inspection reports prepared by NCRWQCB, and information provided by the landowner.

On-site Observation

A site visit to the property was conducted on January 10, 2019 by WRA staff. Observations of site conditions around Reservoir 2 were made, including inspection of inlet and outlet pipes and walking into the areas upslope and downslope of the reservoir. Conditions were noted and photographs were taken.

Aerial Photographs

Aerial photographs from various sources were obtained and reviewed to assess historic conditions based on interpretation of photographic signatures and to corroborate observations and data determined during the site visit and accounts in reports and from the landowner.

Aerial photographs were accessed from websites Google Earth and Humboldt County (http://webgis.co.humboldt.ca.us/HCEGIS2.0/) which included photographs of various dates from as early as 1993 (Google Earth) and National Agriculture Imagery Program (NAIP) to as recent at November 2018 (NAIP). However, the resolution and other qualities of some photographs precluded their use for photographic signature interpretation, so not all photographs accessed were useful. Additional photographs were reviewed for incidental information, such as Natural Resource Conservation Service photographs used for soil mapping. Photographic signatures evident on the aerial photographs were matched to the same areas observed during the site visit; determinations from these comparisons allowed analysis of features between the various photographs.

Other Available Information

Other available information that was reviewed consisted of database information from government agency websites, such as:

- U.S. Fish and Wildlife Service National Wetland Inventory (https://www.fws.gov/wetlands/data/mapper.html)
- Natural Resources Conservation Service Soils (https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx)
- U.S. Geological Survey Water Information System (https://maps.waterdata.usgs.gov/mapper/index.html)
- U.S. Geological Survey The National Map (https://viewer.nationalmap.gov/advanced-viewer/).

Results

Photograph 1 taken in 2005 shows that the landform that has existed above the reservoir before it was built was a steep escarpment to the top of the ridge line with erosion gullies extending downslope with no bed and bank (Photo 7). Observations also made during the January 10, 2019 site visit indicate that the soil slumping still occurs (Photo 8) and the landslide is still active. Therefore, soil erosion and gully formation is continuing. The lack of tree cover in the area above the reservoir is further indication that landslide activity is frequent enough to preclude establishment of trees that are present in adjacent, more stable areas. Shrub vegetation observed leading up the central erosion gully is coyote brush (*Baccharis pilularis*), an upland species and an indication that the flow in the gully is ephemeral with conditions too dry to support riparian species, such as willow. All of these conditions are indicative that the drainage is an erosion feature does not meet requirements to be a recognized watercourse. Therefore, Reservoir 2 is not an in-stream impoundment.

Jurisdictional Opinion

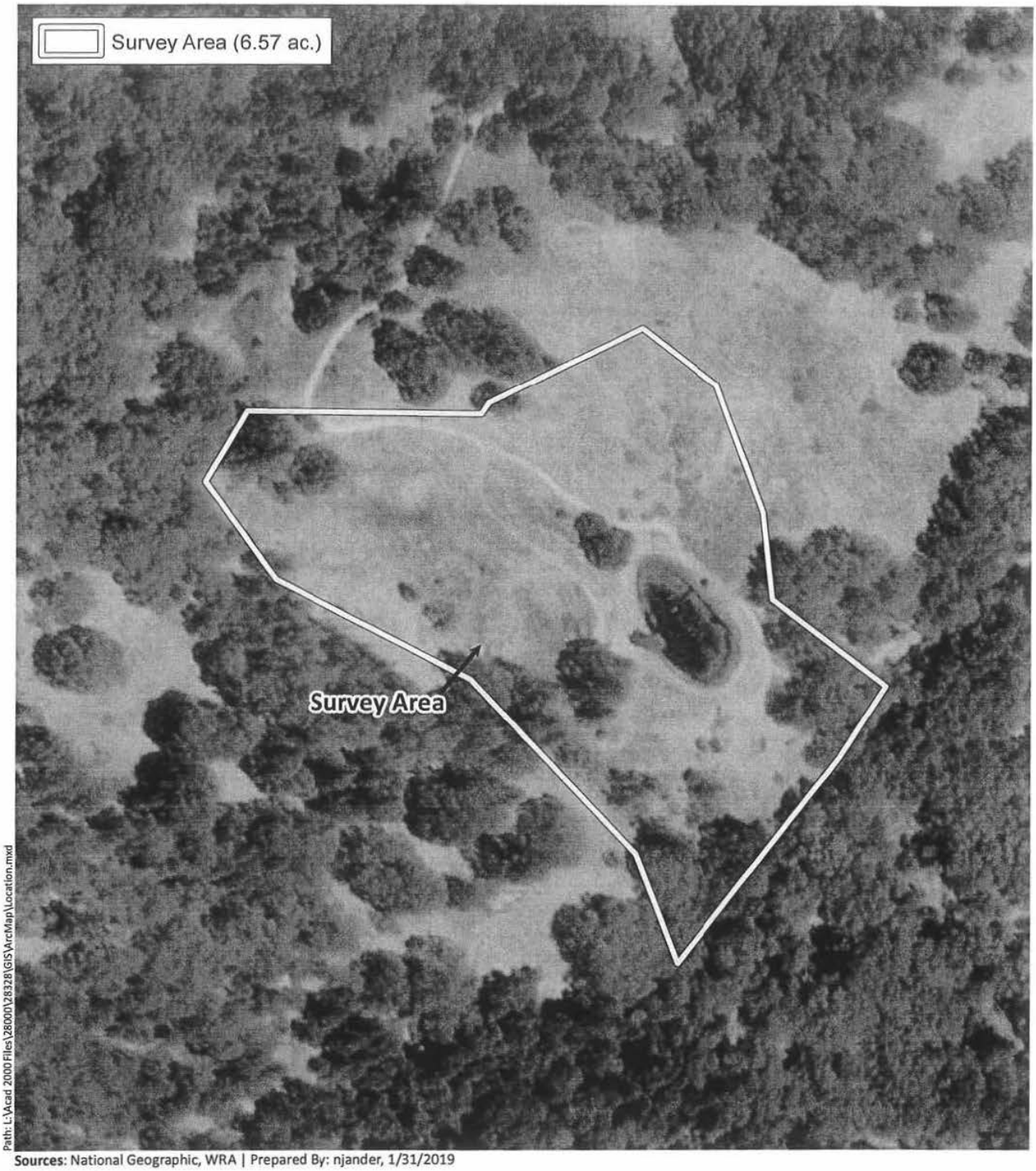
Reservoir 1

Reservoir 1 is not an in-stream impoundment on the basis that: (1) there are no maps or other third party sources indicating that a stream existed at this point historically, (2) a review of historical aerial photographs demonstrate that no bed and bank features were present prior to construction, and (3) no extant observations outside of the construction area indicate that any stream is or was present. Based on field evidence and examination of aerial photographs, wetland characteristics were likely present in a small area now occupied by the reservoir. The assumed wetlands were isolated (not connected hydrologically) from the creek downslope of the reservoir because evidence indicates they did not extend continuously to the unnamed creek. Therefore, the assumed wetlands at the time of Reservoir 1 was constructed were not jurisdictional features. Currently, the wetlands upslope of Reservoir 1 may be jurisdictional under the 2015 Clean Water Rule.

Reservoir 2

Reservoir 2 is not an in-stream impoundment on the basis that no bed and bank features were present that meet the definition of a stream based on a careful review of historical aerial photographs and ground observations.

Currently Reservoir 2 has become jurisdictional under the Clean Water Act (Section 404 Clean Water Act, 2015 Clean Water Rule) and Porter-Cologne because it now has developed wetlands vegetation, existence of hydric soils, and satisfies the significant nexus test because of the connection via an artificial conveyance to a class II watercourse.



Path: L:\Acad 2000 Files\28000\28328\GIS\ArcMap\Location.mxd

Sources: National Geographic, WRA | Prepared By: njander, 1/31/2019

Figure 1. Survey Area

Shadow Light Ranch
Humbolt County, California

0 50 100 Feet

N

wra
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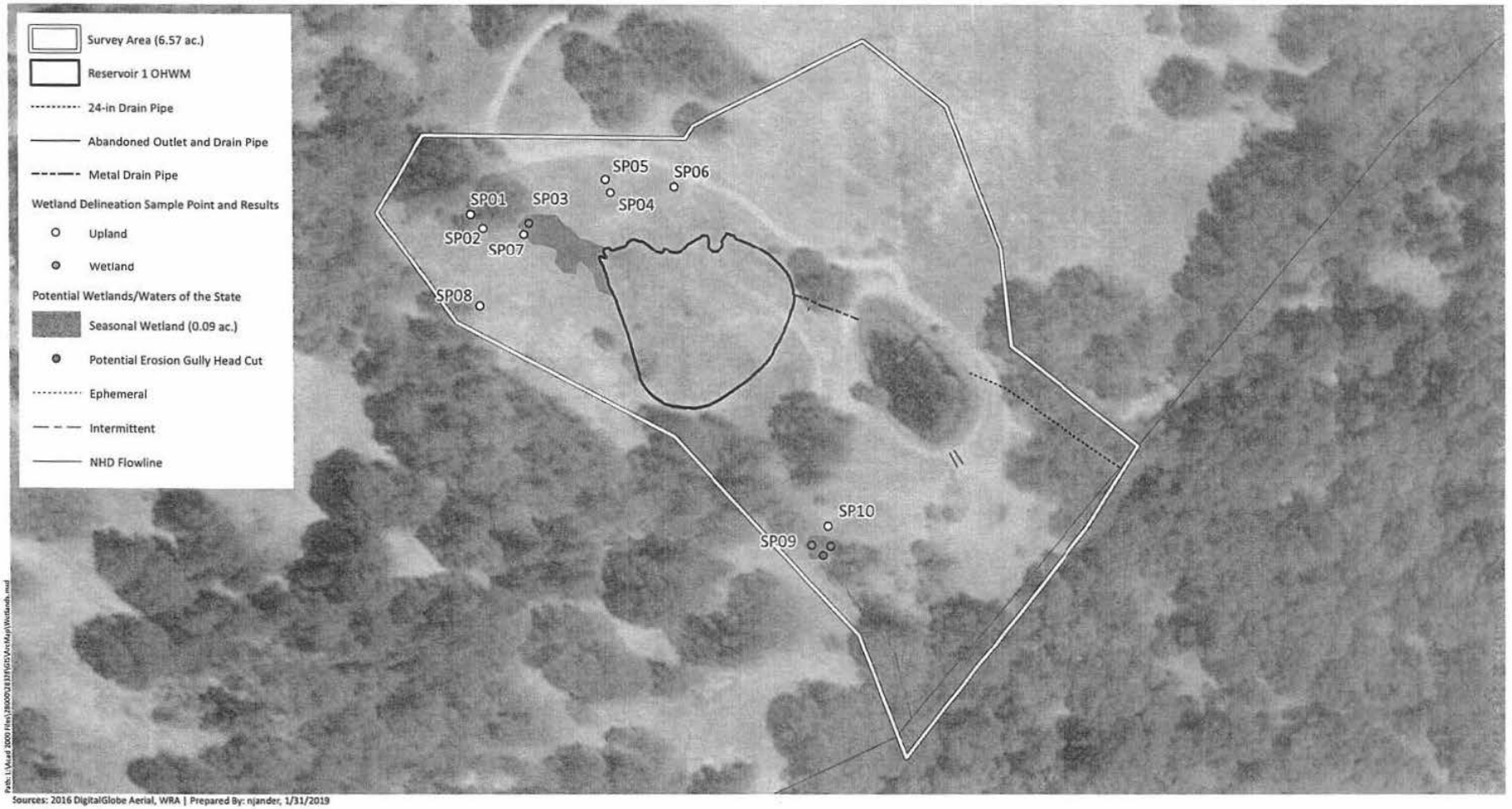

Figure 2. Map showing potential wetlands and waters of the state based on wetland delineation sampling results and observations during a site visit on January 10, 2019

Shadow Light Ranch
Humbolt County, California

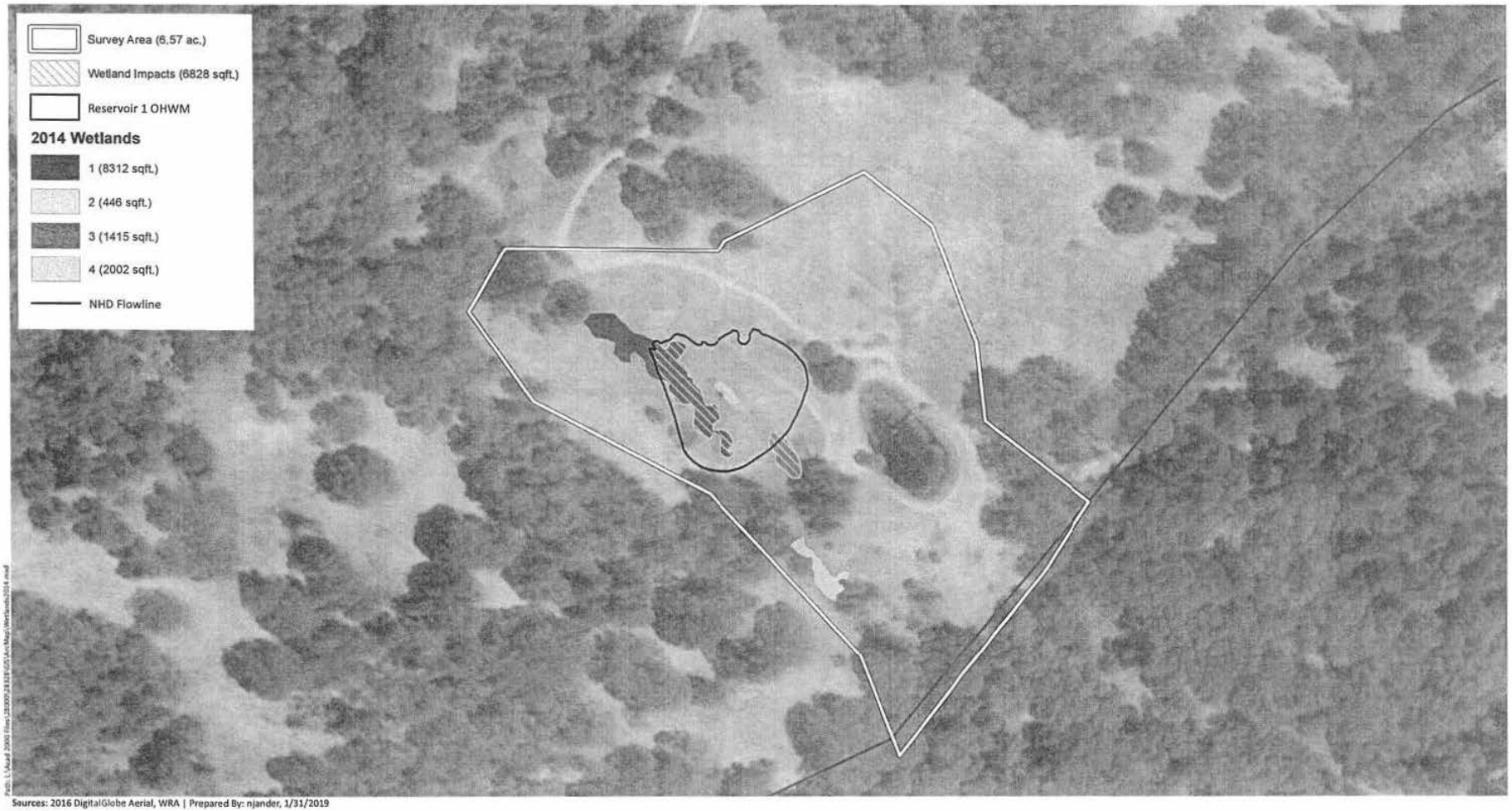

Figure 3. Wetlands Delineation

Shadow Light Ranch
Humbolt County, California

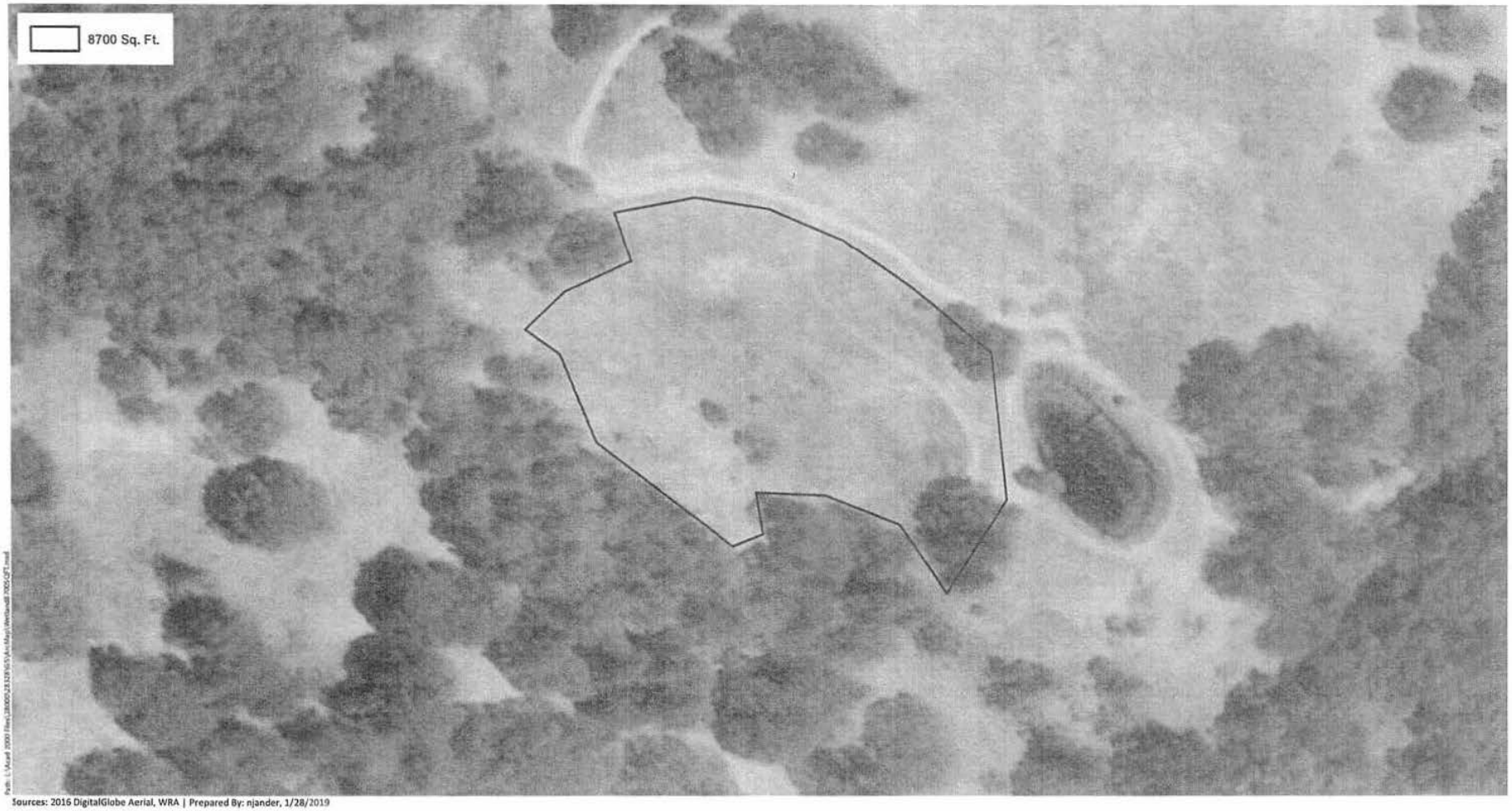

Figure 4. Area that would need to meet wetlands conditions to cause 87,000 sq. ft. of wetlands impacts

Shadow Light Ranch
Humbolt County, California

0 50 100 Feet

N

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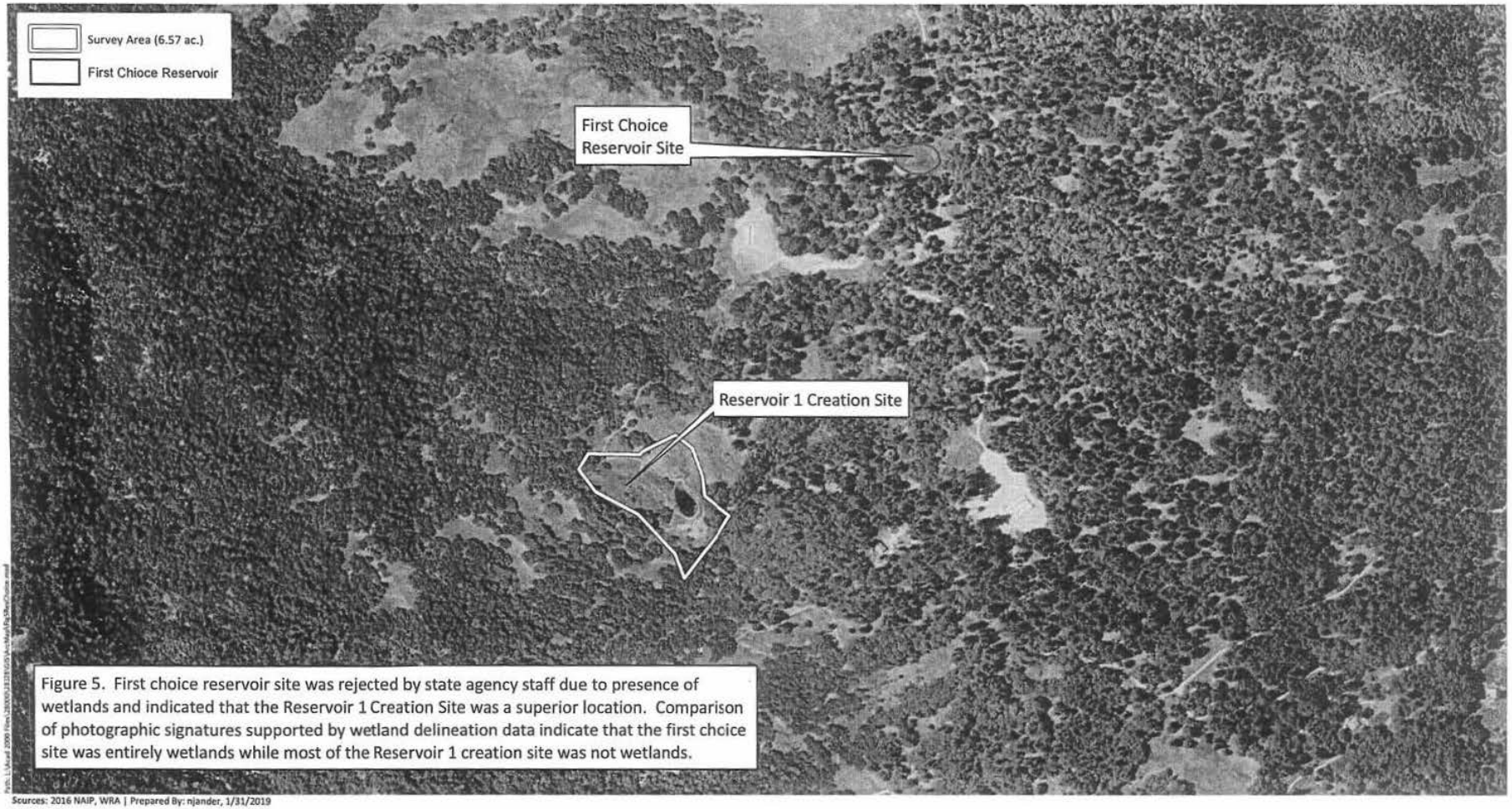

Figure 5. First choice reservoir site was rejected by state agency staff due to presence of wetlands and indicated that the Reservoir 1 Creation Site was a superior location. Comparison of photographic signatures supported by wetland delineation data indicate that the first choice site was entirely wetlands while most of the Reservoir 1 creation site was not wetlands.

Sources: 2016 NAIP, WRA | Prepared By: njander, 1/31/2019

Shadow Light Ranch
Humbolt County, California

0 500 1,000 Feet

N

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Figure 6 USGS Map and Survey Area

Shadow Light Ranch
Humbolt County, California

0 50 100 Feet

N

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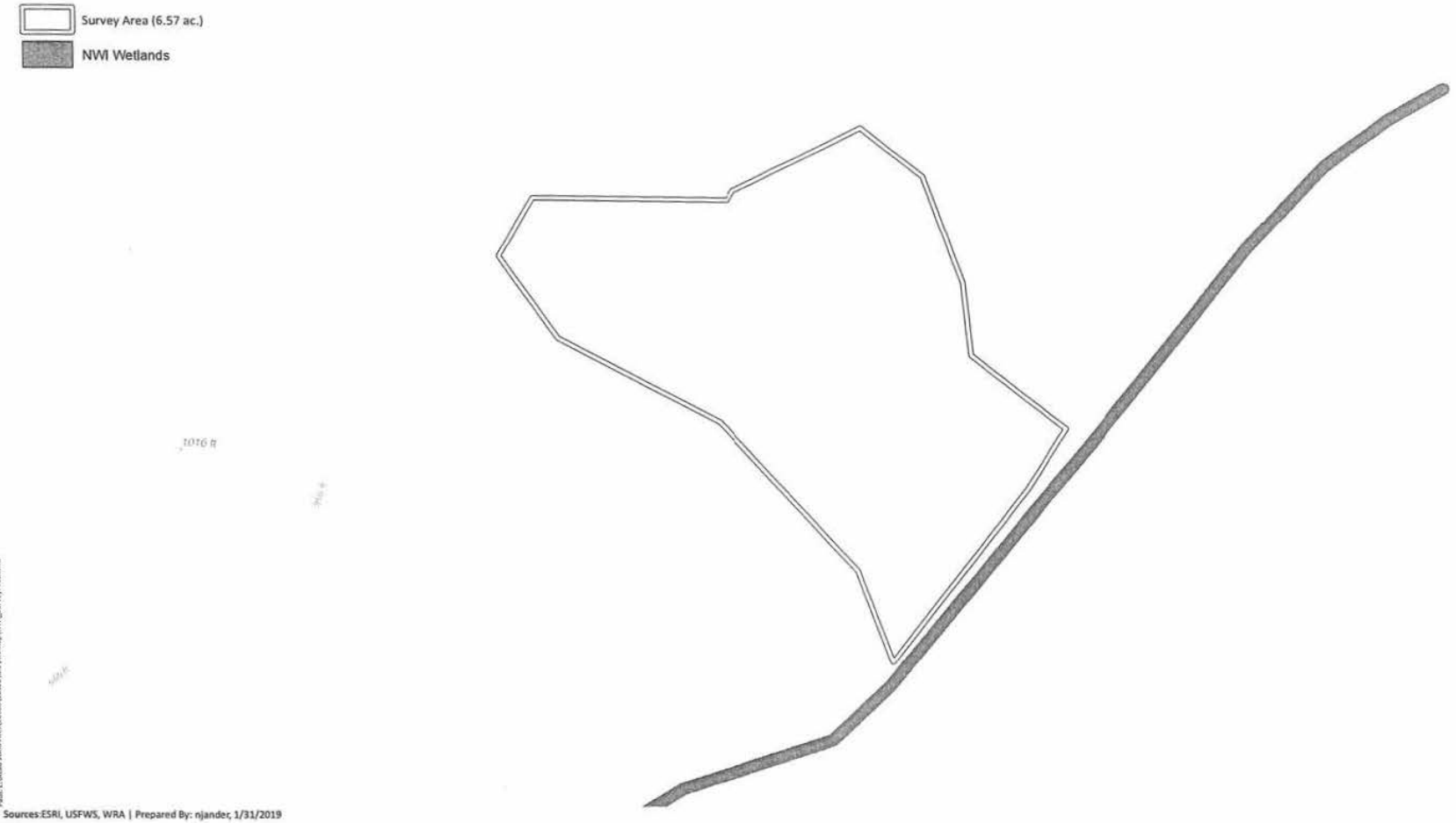

Figure 7. National Wetlands Inventory and Survey Area

Shadow Light Ranch
Humbolt County, California

wra
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Attachment 1

Western Mountains Valleys and Coast Region Delineation Data Forms

Wetland Determination Data Form - Western Mountains, Valleys and Coast Region

Project/Site Shadow Light Ranch City Unincorporated County Humboldt Sampling Date 1/10/2019

Applicant/Owner Joshua Sweet State CA Sampling Point SP-01

Investigator(s) D. Spicher, R. Korhummel (WRA, Inc.) Section,Township,Range

Landform (hillslope, terrace, etc.) hillslope Local Relief (concave, convex, none) concave Slope(%) 54

Subregion(LRR) LRR C (Medit. CA) Lat: 40.09328223 Long: -123.7703408 Datum: WGS 84

Soil Map Unit Name Coolyork-Yorknorth ccmplex, 30 to 50 percent slopes NWI classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☒ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☐ Yes ☒ No	**Is the Sampled Area within a Wetland?** ☐ Yes ☒ No
Hydric Soil Present?	☐ Yes ☒ No	
Wetland Hydrology Present?	☐ Yes ☒ No	

Remarks: Hydrology is considered naturally problematic as site visit was conducted less than 24 hours after a significant rain event. Sample point located in a small swale near the ridge line, above active slumping area.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: 10'x10'	Absolute % cover	Dominant Species?	Indicator Status
1. *Quercus wislizeni var. wislizeni*	4	Y	NL
2. *Pseudotsuga menziesii var. menziesii*	2	Y	FACU
3. *Quercus chrysolepis*	2	Y	NL
4. *Arbutus menzesii*	2	Y	NL
Tree Stratum Total Cover:	**10**		
SAPLING/SHRUB STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM Plot Size: 5'x5'			
1. *Phalaris aquatica*	70	Y	FACU
2. *Mentha pulegium*	5		OBL
3. *Fragaria vesca*	t		FACU
4. *Ranunculus sp.*	t		?
5. *Sanicula crassicaulis*	t		NL
6. *Briza maxima*	t		NL
7. *Elymus glaucus ssp. glaucus*	t		FACU
8. *Hypericum perforatum ssp. perforatum*	t		FACU
Herb Stratum Total Cover:	**75**		
WOODY VINES Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum % cover of biotic crust

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	0	(A)
Total number of dominant species across all strata?	5	(B)
% of dominant species that are OBL, FACW, or FAC?	0	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is </= 3.0[1]
- ☐ 4 - Morphological adaptations[1] (provide supporting data in remarks)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: Moss 5%; thatch 20%; Vegetation cover does not pass Dominance Test.

SOIL

Sampling Point SP-01

Profile description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-16	10YR 4/2	90					clay	
	2.5Y 5/4	10						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except MLRA1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present ? ☐ Yes ☒ No

Remarks: No indicators of hydric soils observed at sample point.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except NW coast)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1)(LRR AA)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9)(NW coast)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6)(LRR A)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface water present? ☐ Yes ☒ No Depth (inches): _____

Water table present? ☒ Yes ☐ No Depth (inches): 4

Saturation Present? (includes capillary fringe) ☒ Yes ☐ No Depth (inches): 3

Wetland Hydrology Present ? ☐ Yes ☒ No

Describe recorded data (stream guage, monitoring well, aerial photos, etc.) if available.

Remarks: Water table and saturation problematic as site visit was conducted less than 24 hours after a significant rain event.

Wetland Determination Data Form - Western Mountains, Valleys and Coast Region

Project/Site Shadow Light Ranch City Unincorporated County Humboldt Sampling Date 1/10/2019

Applicant/Owner Joshua Sweet State CA Sampling Point SP-02

Investigator(s) D. Spicher, R. Korhummel (WRA, Inc.) Section,Township,Range

Landform (hillslope, terrace, etc.) hillslope Local Relief (concave, convex, none) concave Slope(%) 54

Subregion(LRR) LRR C (Medit. CA) Lat: 40.09324192 Long: -123.7702933 Datum: WGS 84

Soil Map Unit Name Coolyork-Yorknorth complex, 30 to 50 percent slopes NWI classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☒ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☐ Yes ☒ No
Hydric Soil Present?	☐ Yes ☒ No	
Wetland Hydrology Present?	☐ Yes ☒ No	

Remarks: Hydrology is naturally problematic as site visit was conducted less than 24 hours following a significant rainfall event. Sample point located in a rush patch located in swale above an active slumping area.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: N/A	Absolute % cover	Dominant Species?	Indicator Status
1. *Quercus wislizenii var. wislizenii*	30	Y	NL
2.			
3.			
4.			
Tree Stratum Total Cover:	30		
SAPLING/SHRUB STRATUM Plot Size: 10x10			
1. *Toxicodendron diversilobum*	5	Y	FAC
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:	5		
HERB STRATUM Plot Size: 5'x5'			
1. *Juncus patens*	50	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	50		
WOODY VINES Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum 0 % cover of biotic crust 0

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC? 2 (A)

Total number of dominant species across all strata? 3 (B)

% of dominant species that are OBL, FACW, or FAC? 67 (A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species	50	x2	100
FAC species	5	x3	15
FACU species		x4	
UPL species	30	x5	150
Column Totals	85 (A)		265 (B)

Prevalence Index = B/A = 3.1

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is </= 3.0[1]
- ☐ 4 - Morphological adaptations[1] (provide supporting data in remarks)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: Thatch 50%; Vegetation cover meets Dominance Test criteria for wetland vegetation.

SOIL

Sampling Point SP-02

Profile description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-2.5	10YR 3/2	100					loam	
2.5-7.5	10YR 4/4	70					clay loam	
	10YR 4/2	30						
7.5-11.5	10YR 4/4	95					sandy clay loam	
	10YR 4/2	5						
11.5-16	2.5Y 4/1	100					sandy clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except MLRA1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present ? ☐ Yes ☒ No

Remarks: No indicators of hydric soil observed at sample point.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except NW coast)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1)(LRR AA)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9)(NW coast)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6)(LRR A)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface water present?	☐ Yes	☐ No	Depth (inches): _____
Water table present?	☒ Yes	☐ No	Depth (inches): 8
Saturation Present? (includes capillary fringe)	☒ Yes	☐ No	Depth (inches): 0-4

Wetland Hydrology Present ? ☐ Yes ☒ No

Describe recorded data (stream guage, monitoring well, aerial photos, etc.) if available.

Remarks: Water table and saturation problematic as site visit was conducted less than 24 hours after a significant rain event.

Wetland Determination Data Form - Western Mountains, Valleys and Coast Region

Project/Site Shadow Light Ranch City Unincorporated County Humboldt Sampling Date 1/10/2019

Applicant/Owner Joshua Sweet State CA Sampling Point SP-03

Investigator(s) D. Spicher, R. Korhummel (WRA, Inc.) Section,Township,Range

Landform (hillslope, terrace, etc.) hillslope Local Relief (concave, convex, none) concave Slope(%) 54

Subregion(LRR) LRR C (Medit. CA) Lat: 40.0932607 Long: -123.7701166 Datum: WGS 84

Soil Map Unit Name Coolyork-Yorknorth complex, 30 to 50 percent slopes NWI classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☒ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ Yes ☐ No
Hydric Soil Present?	☒ Yes ☐ No	
Wetland Hydrology Present?	☒ Yes ☐ No	

Remarks: Hydrology is naturally problematic as the site visit was conducted less than 24 hours following a significant rainfall event; however hydrology is assumed as both hydrophytic vegetation and hydric soils are present. Sample point located within a slumping swale dominated by rush. While redox was observed within the upper 6-inches of the soil, no hydric soil indicators were observed.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: N/A	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM Plot Size: 5'x5'			
1. *Juncus patens*	60	Y	FACW
2. *Mentha pulegium*	20	Y	OBL
3. *Phalaris aquatica*	2		FACU
4. *Zeltnera sp.*	1		?
5. *Carduus pycnocephalus ssp. pycnocephalus*	1		NL
6. *Vicia sp.*	1		?
7. *Agrostis stolonifera*	t		FAC
8.			
Herb Stratum Total Cover:	85		
WOODY VINES Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum 10 % cover of biotic crust

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC? 2 (A)

Total number of dominant species across all strata? 2 (B)

% of dominant species that are OBL, FACW, or FAC? 100 (A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is </= 3.0[1]
- ☐ 4 - Morphological adaptations[1] (provide supporting data in remarks)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: Thatch 5%; Vegetation meets Dominance Test value for hydrophytic vegetation.

SOIL

Sampling Point SP-03

Profile description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[1]	Texture	Remarks
0-6	10YR 4/2	85	10YR 3/6	15	C	M	clay	redox is prominent
6-16	10YR 4/1	80					clay	
	10YR 4/6	20					sandy clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except MLRA1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present ? ☒ Yes ☐ No

Remarks: Depleted Matrix (F3) hydric soil indicator was observed at the sample point.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except NW coast)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1)(LRR AA)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9)(NW coast)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6)(LRR A)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface water present? ☐ Yes ☐ No Depth (inches): _____

Water table present? ☒ Yes ☐ No Depth (inches): 20

Saturation Present? (includes capillary fringe) ☒ Yes ☐ No Depth (inches): 19

Wetland Hydrology Present ? ☒ Yes ☐ No

Describe recorded data (stream guage, monitoring well, aerial photos, etc.) if available.

Remarks: Hydrology is naturally problematic as the site visit was conducted less than 24 hours following a significnat rainfall event. Surface water was observed in depressed pockets within the slumping swale. However, as hydrophytic vegetation and hydric soils were observed, hydrology is assumed to be present.

Wetland Determination Data Form - Western Mountains, Valleys and Coast Region

Project/Site Shadow Light Ranch City Unincorporated County Humboldt Sampling Date 1/10/2019

Applicant/Owner Joshua Sweet State CA Sampling Point SP-04

Investigator(s) D. Spicher, R. Korhummel (WRA, Inc.) Section,Township,Range

Landform (hillslope, terrace, etc.) hillslope Local Relief (concave, convex, none) concave Slope(%) 30-50

Subregion(LRR) LRR C (Medit. CA) Lat: 40.09335565 Long: -123.7698058 Datum: WGS 84

Soil Map Unit Name Coolyork-Yorknorth complex, 30 to 50 percent slopes NWI classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☐ Yes ☒ No	**Is the Sampled Area within a Wetland?** ☐ Yes ☒ No
Hydric Soil Present?	☐ Yes ☒ No	
Wetland Hydrology Present?	☐ Yes ☒ No	

Remarks: Sample point located in actively slumping area on obvious upland, believed to have been the top of the slumping area prior to slumping.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: N/A	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM Plot Size: 5'x5'			
1. *Phalaris aquatica*	75	Y	FACU
2. *Bromus hordeacus*	3		FACU
3. *Zeltnera sp.*	2		?
4. *Hypericum perforatum ssp. perforatum*	t		FACU
5. *Cirsium vulgare*	t		FACU
6. *Plantago lanceloata*	t		FACU
7. *Mentha pulegium*	t		OBL
8.			
Herb Stratum Total Cover: 80			
WOODY VINES Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum % cover of biotic crust

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC? 0 (A)

Total number of dominant species across all strata? 1 (B)

% of dominant species that are OBL, FACW, or FAC? 0 (A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is </= 3.0[1]
- ☐ 4 - Morphological adaptations[1] (provide supporting data in remarks)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: thatch 20%; Vegetation cover does not pass Dominance Test.

SOIL

Sampling Point SP-04

Profile description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[1]	Texture	Remarks
0-6	10YR 4/2	70						
	2.5YR 4/2	30						
6-6.5	10YR 2/1	100						buried organic material
6.5-16	10YR 4/2	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except MLRA1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present ? ☐ Yes ☒ No

Remarks: No indicators of hydric soil were observed at the sample point.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except NW coast)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1)(LRR AA)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9)(NW coast)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6)(LRR A)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface water present? ☐ Yes ☒ No Depth (inches): _____

Water table present? ☐ Yes ☒ No Depth (inches): _____

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (inches): _____

Wetland Hydrology Present ? ☐ Yes ☒ No

Describe recorded data (stream guage, monitoring well, aerial photos, etc.) if available.

Remarks: No indicators of hydrology were observed.

Wetland Determination Data Form - Western Mountains, Valleys and Coast Region

Project/Site Shadow Light Ranch City Unincorporated County Humboldt Sampling Date 1/10/2019

Applicant/Owner Joshua Sweet State CA Sampling Point SP-05

Investigator(s) D. Spicher, R. Korhummel (WRA, Inc.) Section,Township,Range

Landform (hillslope, terrace, etc.) hillslope Local Relief (concave, convex, none) concave Slope(%) 30-50

Subregion(LRR) LRR C (Medit. CA) Lat: 40.09339439 Long: -123.7698254 Datum: WGS 84

Soil Map Unit Name Coolyork-Yorknorth complex, 30 to 50 percent slopes NWI classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☒ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☐ Yes ☒ No
Hydric Soil Present?	☐ Yes ☒ No	
Wetland Hydrology Present?	☐ Yes ☒ No	

Remarks: Hydrology is naturally problematic as the site visit was conducted less than 24 hours following a significant rainfall event. Sample point located in active slump area where known hydrophytic plant species appeared to be domiant and water was flowing.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: N/A	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM Plot Size: 5'x5'			
1. *Juncus patens*	27	Y	FACW
2. *Mentha pulegium*	15	Y	OBL
3. *Phalaris aquatica*	5		FACU
4. *Zeltnera sp.*	1		?
5. *Festuca arundinaceae*	1		FAC
6. *Agrostis sp.*	t		?
7.			
8.			
Herb Stratum Total Cover:	50		
WOODY VINES Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum 50 % cover of biotic crust

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC? 2 (A)

Total number of dominant species across all strata? 2 (B)

% of dominant species that are OBL, FACW, or FAC? 100 (A/B)

Prevalence Index Worksheet

Total % cover of:	Multiply by:
OBL species	x1
FACW species	x2
FAC species	x3
FACU species	x4
UPL species	x5
Column Totals (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is </= 3.0[1]
- ☐ 4 - Morphological adaptations[1] (provide supporting data in remarks)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: Vegetation cover meets Dominance Test for hydrophytic vegetation.

SOIL

Sampling Point SP-05

Profile description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[1]	Texture	Remarks
0-14	10YR 4/2	100					clay	
14-16	10YR 4/2	98						
	2.5Y 4/1	2						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except MLRA1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present ? ☐ Yes ☒ No

Remarks: No indicators of hydric soils were observed at the sample point.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except NW coast)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1)(LRR AA)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9)(NW coast)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6)(LRR A)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface water present? ☒ Yes ☐ No Depth (inches): 1

Water table present? ☐ Yes ☐ No Depth (inches): _____

Saturation Present? (includes capillary fringe) ☒ Yes ☐ No Depth (inches): 0

Wetland Hydrology Present ? ☐ Yes ☒ No

Describe recorded data (stream guage, monitoring well, aerial photos, etc.) if available.

Remarks: Surface water was flowing down the slope, filling sample pit to 3 inches from the top. Soils were saturated to the top of the pit. However, hydrology is naturally problematic as site visit was conducted less than 24 hours following significant rainfall event.

Wetland Determination Data Form - Western Mountains, Valleys and Coast Region

Project/Site Shadow Light Ranch City Unincorporated County Humboldt Sampling Date 1/10/2019

Applicant/Owner Joshua Sweet State CA Sampling Point SP-06

Investigator(s) D. Spicher, R. Korhummel (WRA, Inc.) Section,Township,Range

Landform (hillslope, terrace, etc.) hillslope Local Relief (concave, convex, none) concave Slope(%) 30-50

Subregion(LRR) LRR C (Medit. CA) Lat: 40.09337713 Long: -123.7695629 Datum: WGS 84

Soil Map Unit Name Coolyork-Yorknorth complex, 30 to 50 percent slopes NWI classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☒ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☐ Yes ☒ No	**Is the Sampled Area within a Wetland?** ☐ Yes ☒ No
Hydric Soil Present?	☐ Yes ☒ No	
Wetland Hydrology Present?	☐ Yes ☒ No	

Remarks: Hydrology is naturally problematic as the site visit was conducted less than 24 hours following a significant rainfall event. Sample point located in active and recent slumping area where water was observed seeping and collecting. Vegetation present suggests this area was not graded during construction of the detention basin.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: N/A	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM Plot Size: 5'x5'			
1. *Phalaris aquatica*	40	Y	FACU
2. *Mentha pulegium*	5		OBL
3. *Zeltnera sp.*	2		?
4. *Juncus patens*	2		FACW
5. *Festuca perennis*	1		FAC
6. *Briza maxima*	t		NL
7.			
8.			
Herb Stratum Total Cover:	50		
WOODY VINES Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum % cover of biotic crust

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC? 0 (A)

Total number of dominant species across all strata? 1 (B)

% of dominant species that are OBL, FACW, or FAC? 0 (A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is </= 3.0[1]
- ☐ 4 - Morphological adaptations[1] (provide supporting data in remarks)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: Moss 20%, thatch 30%; Vegetation cover does not pass Dominance Test.

SOIL

Sampling Point SP-06

Profile description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[1]	Texture	Remarks
0-16	2.5Y 4/2	65					clay	
	N 4/0	30					clay	Blocky chunks
	2.5Y 4/1	5					clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except MLRA1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present ? ☐ Yes ☒ No

Remarks: No indicators of hydric soils were observed in the sample point.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except NW coast)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1)(LRR AA)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9)(NW coast)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6)(LRR A)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface water present?	☒ Yes	☐ No	Depth (inches): 1
Water table present?	☐ Yes	☒ No	Depth (inches):
Saturation Present? (includes capillary fringe)	☒ Yes	☐ No	Depth (inches): 0

Wetland Hydrology Present ? ☐ Yes ☒ No

Describe recorded data (stream guage, monitoring well, aerial photos, etc.) if available.

Remarks: Surface water seeping from exposed slopes and collecting in pockets. Sample pit filled to surface from surface water. Hydrology is naturally problematic due to site visit conducted less than 24 hours following significant rainfall event.

Wetland Determination Data Form - Western Mountains, Valleys and Coast Region

Project/Site Shadow Light Ranch City Unincorporated County Humboldt Sampling Date 1/10/2019

Applicant/Owner Joshua Sweet State CA Sampling Point SP-07

Investigator(s) D. Spicher, R. Korhummel (WRA, Inc.) Section,Township,Range

Landform (hillslope, terrace, etc.) hillslope Local Relief (concave, convex, none) convex Slope(%) 30-50

Subregion(LRR) LRR C (Medit. CA) Lat: 40.0932274 Long: -123.7701351 Datum: WGS 84

Soil Map Unit Name Coolyork-Yorknorth complex, 30 to 50 percent slopes NWI classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☐ Yes ☒ No	**Is the Sampled Area within a Wetland?** ☐ Yes ☒ No
Hydric Soil Present?	☐ Yes ☒ No	
Wetland Hydrology Present?	☐ Yes ☒ No	

Remarks: Sample point located on hillslope above slumping swale. Paired point with SP-03.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: N/A	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM Plot Size: 5'x5'			
1. *Phalaris aquatica*	25	Y	FACU
2. *Cynosurus echinatus*	10		NL
3. *Juncus patens*	10		FACW
4. *Briza maxima*	10		NL
5. *Mentha pulegium*	5		OBL
6. *Hypericum perforatum ssp. perforatum*	t		FACU
7. *Cirsium vulgare*	t		FACU
8. *Zeltnera sp.*	t		?
Herb Stratum Total Cover:	60		
WOODY VINES Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum % cover of biotic crust

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC? 0 (A)

Total number of dominant species across all strata? 1 (B)

% of dominant species that are OBL, FACW, or FAC? 0 (A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is </= 3.0[1]
- ☐ 4 - Morphological adaptations[1] (provide supporting data in remarks)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: Thatch 30%; moss 10%; Vegetation cover does not pass Dominance Test.

SOIL

Sampling Point SP-07

Profile description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[1]	Texture	Remarks
0-16	10YR 4/2	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except MLRA1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present ? ☐ Yes ☒ No

Remarks: No indicators of hydric soils were observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except NW coast)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1)(LRR AA)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9)(NW coast)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6)(LRR A)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface water present? ☐ Yes ☒ No Depth (inches): _____

Water table present? ☐ Yes ☒ No Depth (inches): _____

Saturation Present? (includes capillary fringe) ☐ Yes ☒ No Depth (inches): _____

Wetland Hydrology Present ? ☐ Yes ☒ No

Describe recorded data (stream guage, monitoring well, aerial photos, etc.) if available.

Remarks: No indicators of hydrology were observed at the sample point.

Wetland Determination Data Form - Western Mountains, Valleys and Coast Region

Project/Site Shadow Light Ranch City Unincorporated County Humboldt Sampling Date 1/10/2019

Applicant/Owner Joshua Sweet State CA Sampling Point SP-08

Investigator(s) D. Spicher, R. Korhummel (WRA, Inc.) Section,Township,Range

Landform (hillslope, terrace, etc.) hillslope Local Relief (concave, convex, none) convex Slope(%) 30-50

Subregion(LRR) LRR C (Medit. CA) Lat: 40.09301268 Long: -123.7703004 Datum: WGS 84

Soil Map Unit Name Coolyork-Yorknorth complex, 30 to 50 percent slopes NWI classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☒ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☐ Yes ☒ No
Hydric Soil Present?	☐ Yes ☒ No	
Wetland Hydrology Present?	☐ Yes ☒ No	

Remarks: Hydrology is naturally problematic as the site visit was conducted less than 24 hours following a significant rainfall event. Sample point was located within a rush patch to use as a possible correlation point for vegetation which was present prior to construction of detention basin.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: N/A	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM Plot Size: 5'x5'			
1. *Juncus patens*	90	Y	FACW
2. *Agrostis sp.*	3		?
3. *Mentha pulegium*	2		OBL
4. *Hypericum perforatum ssp. perforatum*	t		FACU
5.			
6.			
7.			
8.			
Herb Stratum Total Cover: 95			
WOODY VINES Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum % cover of biotic crust

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC? 1 (A)

Total number of dominant species across all strata? 1 (B)

% of dominant species that are OBL, FACW, or FAC? 100 (A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is </= 3.0[1]
- ☐ 4 - Morphological adaptations[1] (provide supporting data in remarks)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: Thatch 5%; Vegetation cover meets Dominance Test value for hydrophytic vegetation.

SOIL

Sampling Point SP-08

Profile description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[1]	Texture	Remarks
0-11	10YR 2/1	100					loamy clay	
11-16	2.5Y 4/2	100					clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except MLRA1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present ? ☐ Yes ☒ No

Remarks: No hydric soil indicators observed at the sample point.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except NW coast)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1)(LRR AA)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9)(NW coast)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6)(LRR A)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface water present? ☐ Yes ☒ No Depth (inches): _____

Water table present? ☒ Yes ☐ No Depth (inches): 10

Saturation Present? (includes capillary fringe) ☒ Yes ☐ No Depth (inches): 0

Wetland Hydrology Present ? ☐ Yes ☒ No

Describe recorded data (stream guage, monitoring well, aerial photos, etc.) if available.

Remarks: Hydrology is naturally problematic due to site visit occurring less than 24 hours following a significant rainfall event.

Wetland Determination Data Form - Western Mountains, Valleys and Coast Region

Project/Site Shadow Light Ranch | City Unincorporated | County Humboldt | Sampling Date 1/10/2019

Applicant/Owner Joshua Sweet | State CA | Sampling Point SP-09

Investigator(s) D. Spicher, R. Korhummel (WRA, Inc.) | Section,Township,Range

Landform (hillslope, terrace, etc.) hillslope | Local Relief (concave, convex, none) concave | Slope(%) 30-50

Subregion(LRR) LRR C (Medit. CA) | Lat: 40.0923359 | Long: -123.769005 | Datum: WGS 84

Soil Map Unit Name Coolyork-Yorknorth complex, 30 to 50 percent slopes | NWI classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☒ Hydrology | (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☒ Yes ☐ No	**Is the Sampled Area within a Wetland?** ☒ Yes ☐ No
Hydric Soil Present?	☒ Yes ☐ No	
Wetland Hydrology Present?	☒ Yes ☐ No	

Remarks: Hydrology is naturally problematic as site visit was conducted less than 24 hours following a significant rainfall event; however hydrology is assumed as both hydrophytic vegetation and hydric soils were observed. Sample point located in a rush patch in a wide swale below the detention basin. While prominent redox was observed, no hydric soil indicators were observed.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: N/A	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: 10'x10'			
1. *Toxicodendron diversilobum*	5	Y	FAC
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:	5		
HERB STRATUM Plot Size: 5'x5'			
1. *Junucs patens*	40	Y	FACW
2. *Phalaris aquatica*	40	Y	FACU
3. *Mentha pulegium*	10		OBL
4. *Agrostis sp.*	3		?
5. *Holcus lanatus*	2		FAC
6.			
7.			
8.			
Herb Stratum Total Cover:	95		
WOODY VINES Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum | % cover of biotic crust

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	2	(A)
Total number of dominant species across all strata?	3	(B)
% of dominant species that are OBL, FACW, or FAC?	67	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is </= 3.0[1]
- ☐ 4 - Morphological adaptations[1] (provide supporting data in remarks)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: Thatch 5%; Vegetation cover meets Dominanct Test value for hydrophytic vegetation.

SOIL

Sampling Point SP-09

Profile description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[1]	Texture	Remarks
0-16	2.5Y 4/2	90	10YR 4/6	10	C	M	clay	redox prominent

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except MLRA1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present ? ☒ Yes ☐ No

Remarks: Depleted Matrix (F3) hydric soil indicator was observed at the sample point.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except NW coast)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1)(LRR AA)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9)(NW coast)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6)(LRR A)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface water present? ☐ Yes ☒ No Depth (inches): _____

Water table present? ☒ Yes ☐ No Depth (inches): 10

Saturation Present? (includes capillary fringe) ☒ Yes ☐ No Depth (inches): 0

Wetland Hydrology Present ? ☒ Yes ☐ No

Describe recorded data (stream guage, monitoring well, aerial photos, etc.) if available.

Remarks: Hydrology is naturally problematic as the site visit was conducted less than 24 hours following a significant rainfall event. However, as hydrophytic vegetation and hydric soils were observed, hydrology is assumed to be present.

Wetland Determination Data Form - Western Mountains, Valleys and Coast Region

Project/Site Shadow Light Ranch City Unincorporated County Humboldt Sampling Date 1/10/2019

Applicant/Owner Joshua Sweet State CA Sampling Point SP-10

Investigator(s) D. Spicher, R. Korhummel (WRA, Inc.) Section,Township,Range

Landform (hillslope, terrace, etc.) hillslope Local Relief (concave, convex, none) concave Slope(%) 30-50

Subregion(LRR) LRR C (Medit. CA) Lat: 40.092392 Long: -123.7689451 Datum: WGS 84

Soil Map Unit Name Coolyork-Yorknorth complex, 30 to 50 percent slopes NWI classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☒ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☐ Yes ☒ No	**Is the Sampled Area within a Wetland?** ☐ Yes ☒ No
Hydric Soil Present?	☐ Yes ☒ No	
Wetland Hydrology Present?	☐ Yes ☒ No	

Remarks: Hydrology is naturally problematic due to site visit being conducted less than 24 hours following significant rainfall event. Sample point located in a wide swale on a hillslope below the detention basin.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: N/A	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM Plot Size: 5'x5'			
1. *Phalaris aquatica*	50	Y	FACU
2. *Zeltnera sp.*	1		?
3. *Agrostis sp.*	t		?
4. *Mentha pulegium*	t		OBL
5.			
6.			
7.			
8.			
Herb Stratum Total Cover: 51			
WOODY VINES Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum % cover of biotic crust

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC? 0 (A)

Total number of dominant species across all strata? 1 (B)

% of dominant species that are OBL, FACW, or FAC? 0 (A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is </= 3.0[1]
- ☐ 4 - Morphological adaptations[1] (provide supporting data in remarks)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: thatch 50%; Vegetation cover does not pass Dominance Test.

SOIL

Sampling Point SP-10

Profile description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-16	2.5Y 4/2	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except MLRA1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present ? ☐ Yes ☒ No

Remarks: No hydric soil indicators were observed at the sample point.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except NW coast)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1)(LRR AA)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9)(NW coast)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6)(LRR A)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface water present? ☐ Yes ☒ No Depth (inches): _____

Water table present? ☒ Yes ☐ No Depth (inches): 12

Saturation Present? (includes capillary fringe) ☒ Yes ☐ No Depth (inches): 6

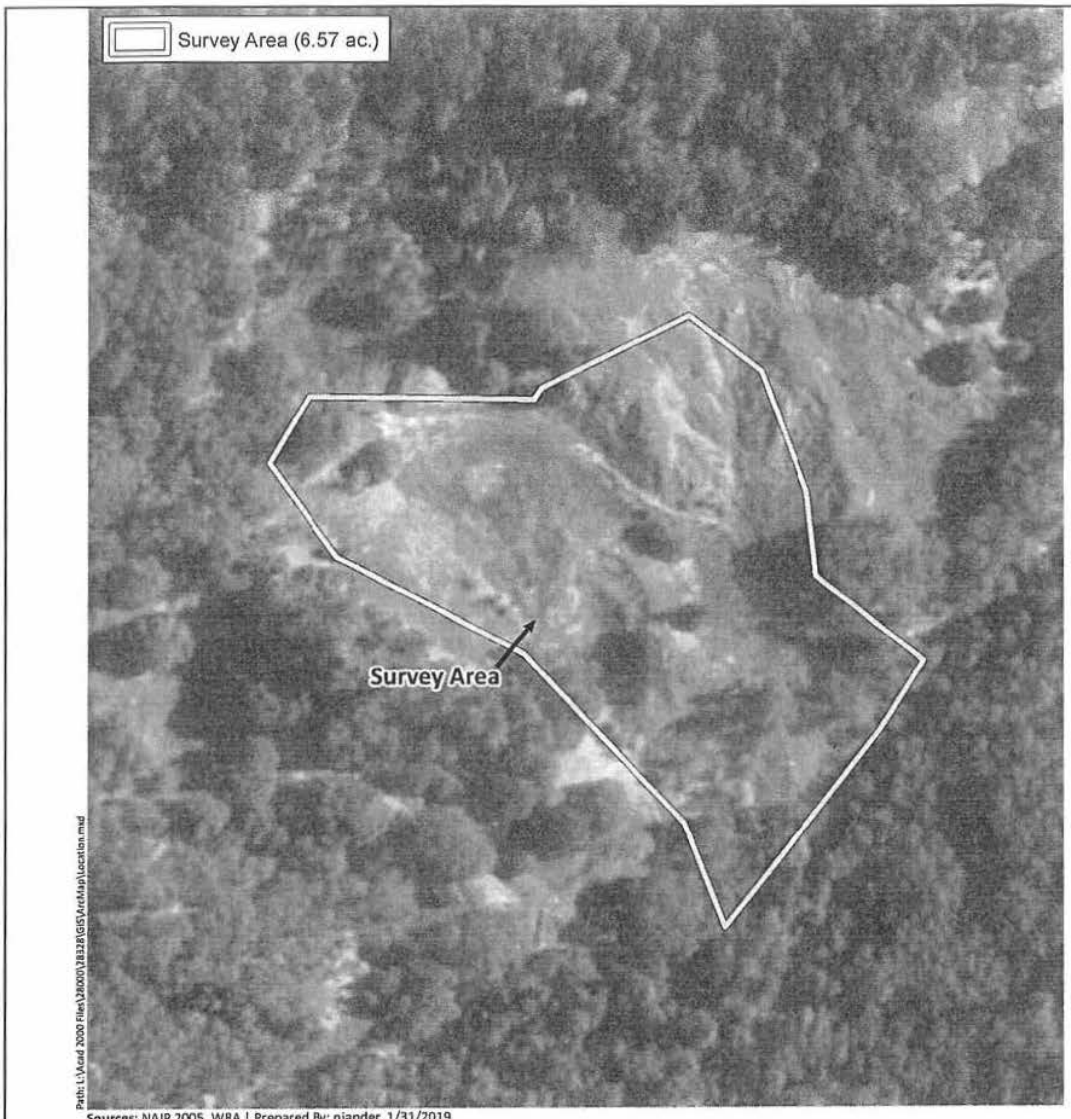
Wetland Hydrology Present ? ☐ Yes ☒ No

Describe recorded data (stream guage, monitoring well, aerial photos, etc.) if available.

Remarks: Hydrology naturally problematic due to site visit being conducted less than 24 hours following a significant rainfall event.

Attachment 2

Photographs

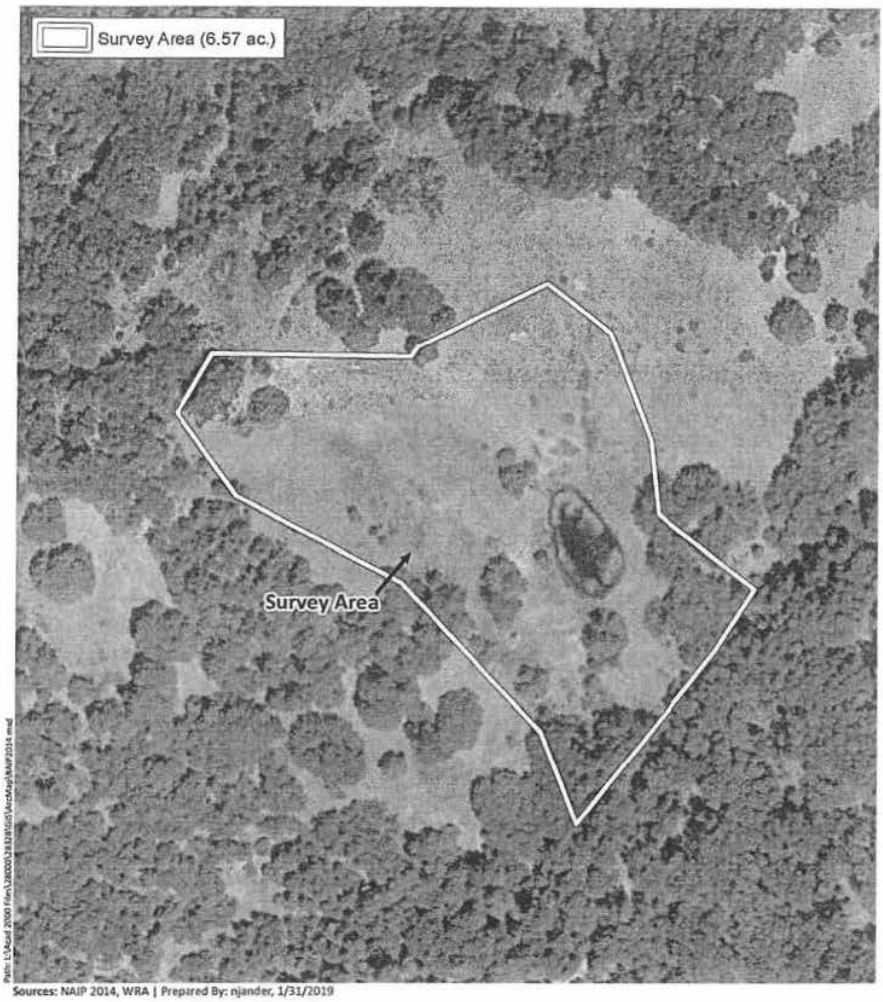


Photograph 1. 2005 NAIP Imagery

Shadow Light Ranch
Humboldt County, California

0 50 100 Feet N

wra



Photograph 2. 2014 NAIP Imagery

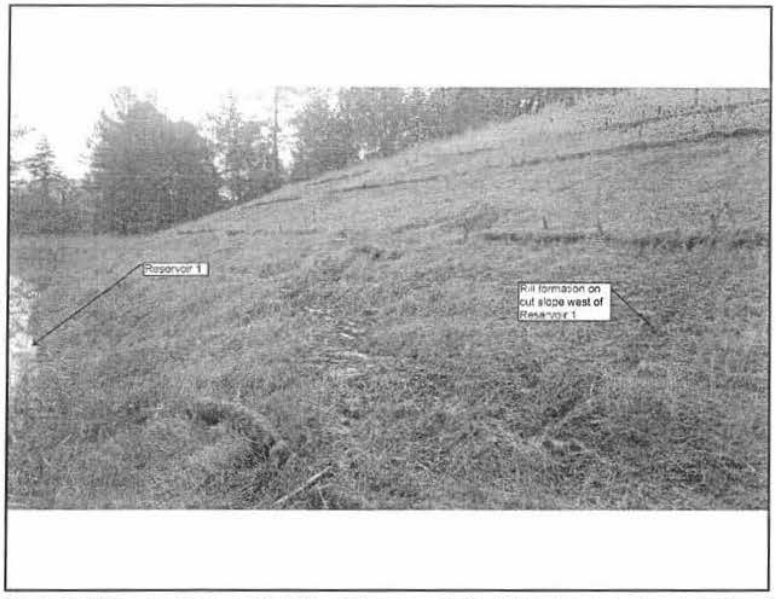
Shadow Light Ranch
Humbolt County, California

0 50 100 Feet

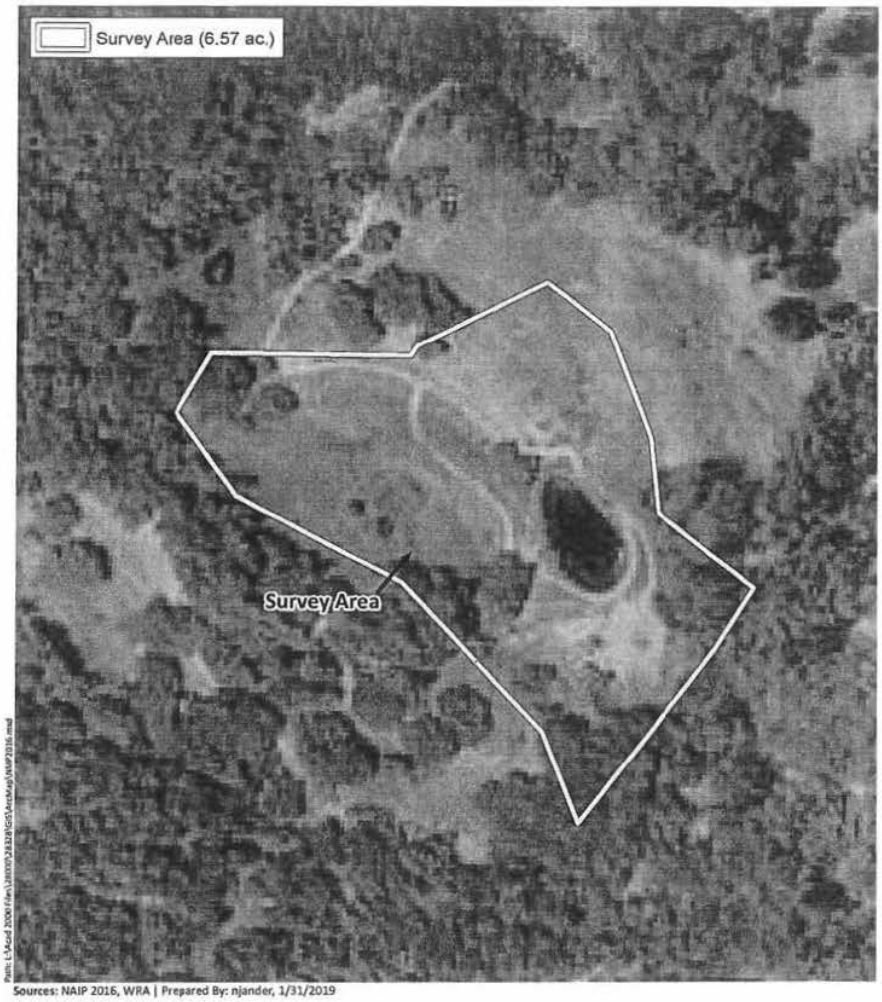
N

wra
ENVIRONMENTAL CONSULTANTS

Photograph 3. Photograph taken January 10, 2019 of the landslide areas above Reservoir 1. No bed and bank features that would constitute streams were present.



Photograph 4. The cut slope on the west side of Reservoir 1. Rills have formed, but nothing meeting the definition of stream was present.



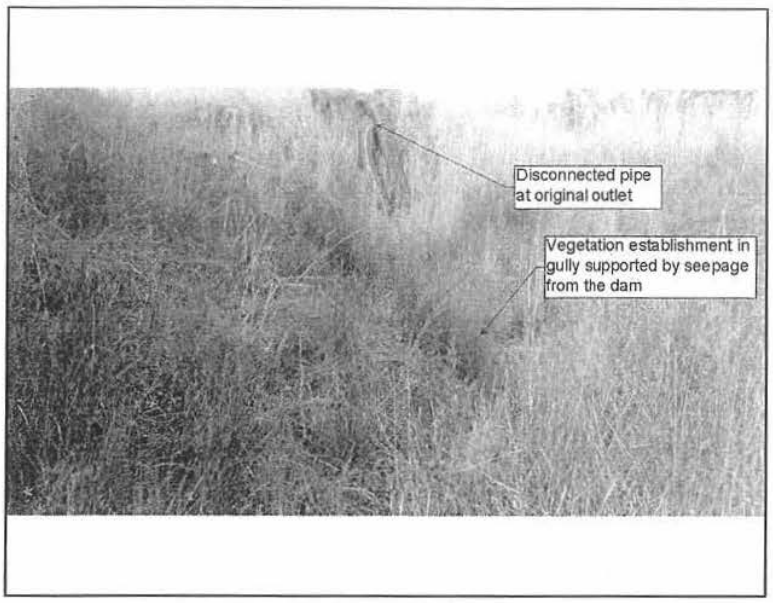
Photograph 5. 2016 NAIP Imagery

Shadow Light Ranch
Humboldt County, California

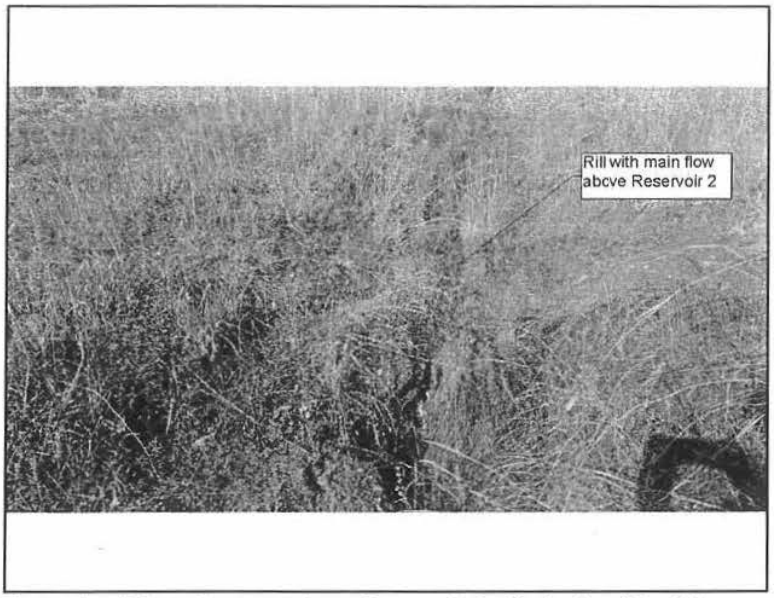
0 50 100 Feet

N

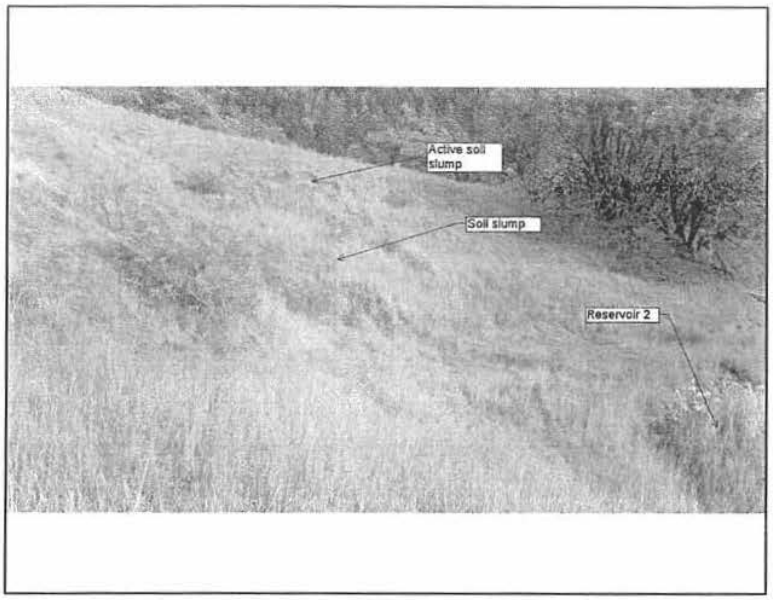
wra
ENVIRONMENTAL CONSULTANTS



Photograph 6. Gully below Reservoir 2 eroded by outfall from the reservoir from the drain pipe separating. A new outlet on the east side of the reservoir was installed. Seepage from the bottomof the reservoir is becoming established



Photograph 7. The main rill from the area above Reservoir 2. No bed and back is present which precludes calling this feature a stream.



Photograph 8. The area above Reservoir 2 is a landslide area that is still somewhat active as indicated by soil slumping and recent active soil slumping.

ENVIRONMENTAL CONSULTANTS

April 11, 2019

Confidential Attorney-Client Privilege

Elan Puno
Shadow Light Ranch
P.O. Box 250
Garberville, CA 95542

Dear Elan:

At your request, regarding an application for a Cannabis Small Irrigation Use Registration (Cannabis SIUR) in Humboldt County, WRA, Inc. (WRA) conducted an on-site assessment and reviewed additional documents including maps, historic and recent aerial photographs, and databases specifically concerning a natural wetland seep or spring located upslope of a reservoir located on property east of Garberville, CA (Figure 1) owned by Shadow Light Ranch, LLC (APN: 223-006-038). According to the State Water Resources Control Board 2019 Cannabis Policy, cannabis cultivators wishing to use water that originates from a natural seep or spring for irrigation purposes may request an exemption from the Policy's Instream Flow Requirements by obtaining a Cannabis SIUR and provide substantial evidence to support that the seep or spring is fully contained on the property and does not have surface or subsurface hydrologic connectivity to a surface water at any time of year during all water year types.

Evidence that was reviewed indicates that the natural seep upslope of the reservoir existed prior to construction of the reservoir in 2016 (Figure 2). Therefore, the following documents were reviewed for historic conditions in conducting the assessment:

1. Google Earth Aerial Photographs (various dates 1993-2014)
2. National Agriculture Imagery Program (NAIP) Aerial Photographs (various dates 2004-2016)
3. National Hydrography Dataset (NHD)

Findings Summary

Based on an on-site assessment of current and historic conditions on the Shadow Light Ranch property east of Garberville, CA and review of documents listed above, evidence indicates that surface water and ground water from the seep above the reservoir (Figure 2) originates on the property but does not flow off of the property either on the surface or by subsurface flow to a surface water.

Assessment Methods

On-site Wetland Delineation

The seep upslope of the reservoir was the subject of a jurisdictional wetlands delineation conducted by WRA during a site visit on January 10, 2019 following the *1987 Corps of*

Engineers Wetlands Delineation Manual and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Corps. 2010).

Aerial Photographs

Aerial photographs from various sources were obtained and reviewed to assess historic conditions based on interpretation of photographic signatures and to corroborate observations and data determined during the site visit and jurisdictional wetlands delineation conducted in January 2019.

Aerial photographs were accessed from websites Google Earth and Humboldt County (http://webgis.co.humboldt.ca.us/HCEGIS2.0/) which included photographs of various dates from as early as 2004 (Google Earth) and National Agriculture Imagery Program (NAIP) to as recent at November 2018 (NAIP). Additional photographs were reviewed for incidental information, such as Natural Resource Conservation Service photographs used for soil mapping. Photographic signatures evident on the aerial photographs were matched to the same areas observed during the site visit. Determinations from these comparisons allowed analysis of features between various photographs.

Other Available Information

Other available information that was reviewed consisted of database information from government agency websites, such as:

- U.S. Fish and Wildlife Service National Wetland Inventory (https://www.fws.gov/wetlands/data/mapper.html)
- Natural Resources Conservation Service Soils (https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx)
- U.S. Geological Survey Water Information System (https://maps.waterdata.usgs.gov/mapper/index.html)
- U.S. Geological Survey, The National Map (https://viewer.nationalmap.gov/advanced-viewer/).

Results

The wetland seep upslope of the reservoir occupies a long narrow depression approximately 15-20 feet wide and 100 feet long with uneven surface. The delineation study conducted by WRA concluded that evidence of all three parameters required for an area to be determined a wetland were present: (1) hydric soil, (2) prevalence of wetland plants, and (3) presence of wetland hydrology.

Water that emanates from the seep saturates the soil profile and inundates depressions in the uneven surface. The water gradually flows downslope mainly as sheet flow to the reservoir that was created in 2016. Historically, before creation of the reservoir, water from the seep, continued into the area now occupied by the reservoir (Figure 2). How far downslope that water would have moved can be determined by the continuous area that would have met seasonal wetlands conditions prior to creation of the reservoir. Determination of the seasonal wetland area was estimated through interpretation of photographic signatures on historic aerial

photographs in comparison with wetlands areas determined by current wetlands delineation parameters. This comparison methodology was conducted using NAIP 2014 aerial photography because photographic signatures appeared to best represent potential wetlands areas on this photograph over other photographs. Based on this analysis, the location and extent of potential seasonal seep wetlands (Figure 3) that existed prior to reservoir creation was estimated to be 6,828 square feet (0.17 ac). Photographic signatures indicate that the seasonal seep wetland did not extend south to the unnamed creek. The topography that existed in the area of the reservoir prior to its creation was a gradual slope as compared to the more steeply sloped seep area upslope of the reservoir. Because the slope gradient became more gradual (in the area where the reservoir was created), the water moving downslope from the seep likely slowed and spread. Water from the seep did not move farther than the immediate area because it either evaporated, was absorbed by soil, and/or was transpired by plants. Therefore, the seep was isolated and had no surface connection with the unnamed creek farther to the south.

The soil series at this location, Coolyork Series, supports a conclusion that water from the seep would not have reached the unnamed stream via subsurface connectivity. The Coolyork series is described as consisting of loam and clay loam with moderately low saturated hydraulic conductivity (NRCS 2019). This trait means that, under saturated conditions, water flow vertically or laterally through the soil is slow, and since the seep area described above in the location now occupied by the reservoir was approximately 500 feet from the unnamed creek, subsurface connectivity would not have been possible due to the distance involved.

In summary, observations of existing conditions, wetlands delineation data, historic aerial photograph review, soils characteristics, and distance provide substantial evidence that the wetland seep above the reservoir did not and does not have connectivity with the unnamed stream by either surface or subsurface flow.

Sincerely,

Douglas Spicher
Senior Wetland Ecologist

References

U.S. Natural Resources Conservation Service (NRCS). 2019. Soil survey of Humboldt County. Information accessed: https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm, April 2019.

Figure X. Study Area

Shadow Light Ranch
Humbolt County, California

0 200 400 Feet

N

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Figure 2. Map showing potential wetlands and waters of the state based on wetland delineation sampling results and observations during a site visit on January 10, 2019

Shadow Light Ranch
Humbolt County, California

0 50 100 Feet

N

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Figure 3. Wetlands Delineation

Shadow Light Ranch
Humbolt County, California

0 50 100 Feet N

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Photographs

Photo Dates: July 18th, 2019 and July 30th, 2019

Undefined watercourse at Site 13 looking up stream.

Undefined watercourse at Site 13 looking downstream. The watercourse terminates at the edge of the tree line.

Photograph of the watercourse crossing at Site 16. This crossing is to be upgraded to a culverted crossing and the road approaches rocked to the garden parking area immediately to the left out of frame of this photograph.

Photograph of the watercourse crossing at Site 16 looking southeast.

Photograph of Cultivation Area B's parking area. This area is to be rocked and staked straw wattles are to be installed to the right of the road along the brush line above the watercourse.

Looking upstream at the diverted watercourse at Site 21. Historically the watercourse drained to the right of the photograph behind the sapling trees to the right. Bed load delivery during large storm events has created an alluvial fan that has diverted the watercourse towards the position of where the photograph was taken.

Looking down stream of the diverted watercourse at Site 21.

Looking at the drainage ditch along the northeastern side of Cultivation Area A. The diverted watercourse from Site 21 is draining over the cut bank and causing the erosion of the cutbank as scene in this photograph.

The drainage ditch then drains into the head of a Class III watercourse. The re-alignment of the watercourse at Site 21 will have the watercourse drain into the channel located at the base of the sapling trees in the upper left of the photo.

Photo looking at the outlet of the drainage ditch previously shown in the photo above. The Class III watercourse is located approximately center left of the photo where the flagging tied to trees is located along the tree line.

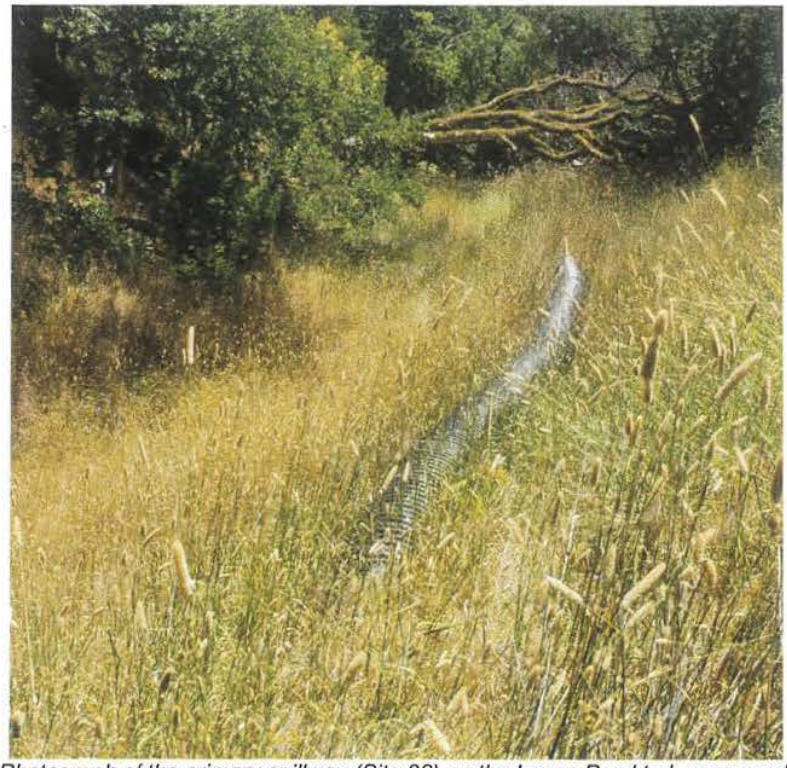
Photograph of the drainage ditch along the northeastern edge of Cultivation Area A. This photograph was taken looking northwest. Note the well vegetated ditch, straw wattles, graveled surface, and weed matting all used to slow and capture surface runoff from the cultivation area.

Photograph of both the Upper Pond (right) and Lower Pond (left).

Photograph of the Upper Pond (Off-stream rain catchment) looking down slope at Site 36 and 37.

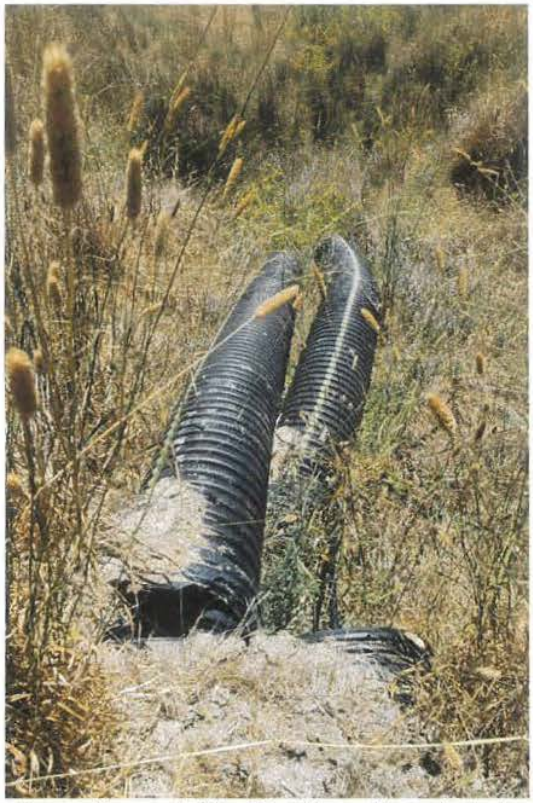
Photograph of the Upper Pond (off-stream rain catchment) look up grade towards the road fillslope failure at Site 36 taken from the pond embankment.

Photograph of the road fillslope failure at Site 36 taken from the west.



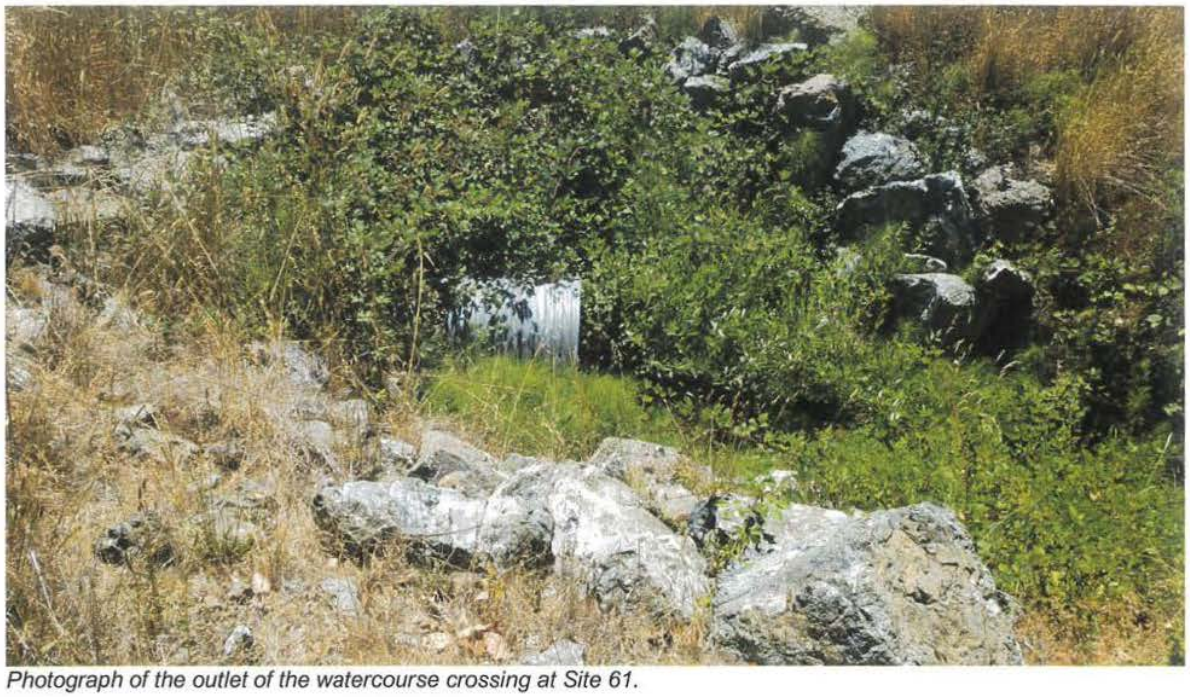
Photograph of the primary spillway (Site 38) on the Lower Pond to be removed.

Photograph of the Lower Pond (on-stream). The primary spillway (Site 38) is located along the left side of the pond in the photograph and the secondary spillway (Site 39, to become the primary spillway) is located to the right. The overflow spillway from the Upper Pond is located in the left-hand corner of the photograph.



Photograph of the failing secondary spillway at Site 39. This spillway is to become the primary spillway after reconstructing of the pond embankment and installation of an anchored 24" culvert spillway.

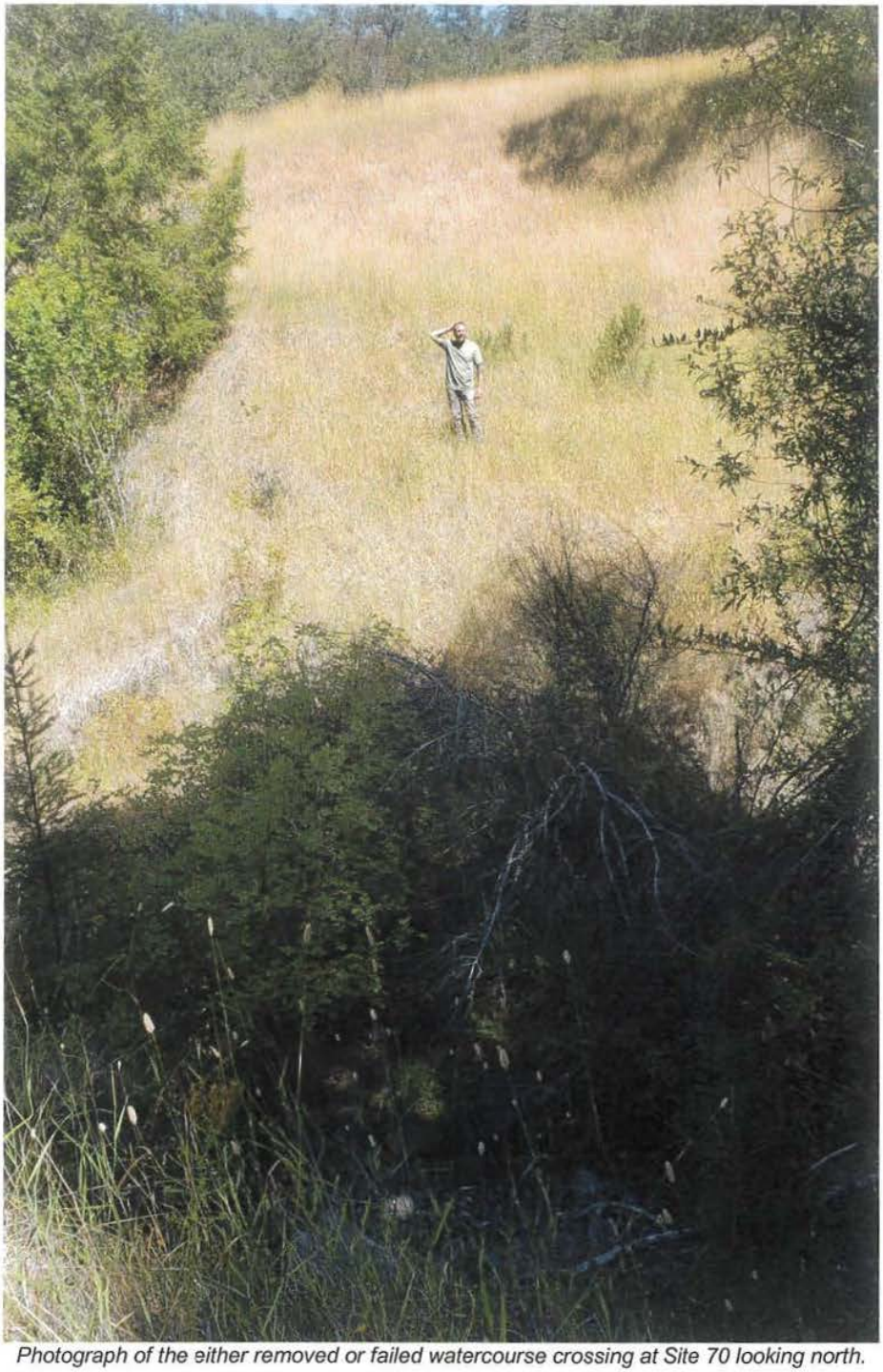
Photograph of the inlet of the watercourse crossing at Site 61.



Photograph of the outlet of the watercourse crossing at Site 61.

Photograph of the watercourse crossing at Site 69.

Photograph of the inlet of the watercourse crossing at Site 69.

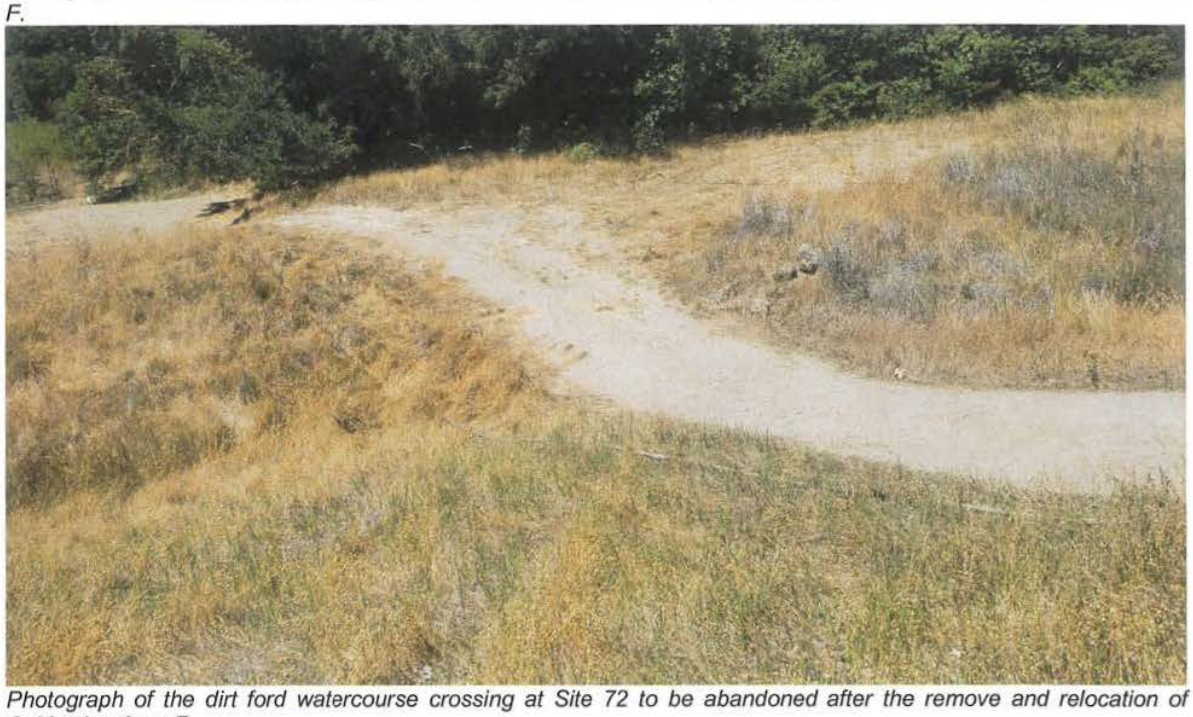


Photograph of the either removed or failed watercourse crossing at Site 70 looking north.

Photograph of the either removed or failed watercourse crossing at Site 70 looking west.

Photograph of the either removed or failed watercourse crossing at Site 70 looking south.

Photograph of the trail at Site 71 to be water barred and abandoned after the removal and relocation of Cultivation Area F.



Photograph of the dirt ford watercourse crossing at Site 72 to be abandoned after the remove and relocation of Cultivation Area F.