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

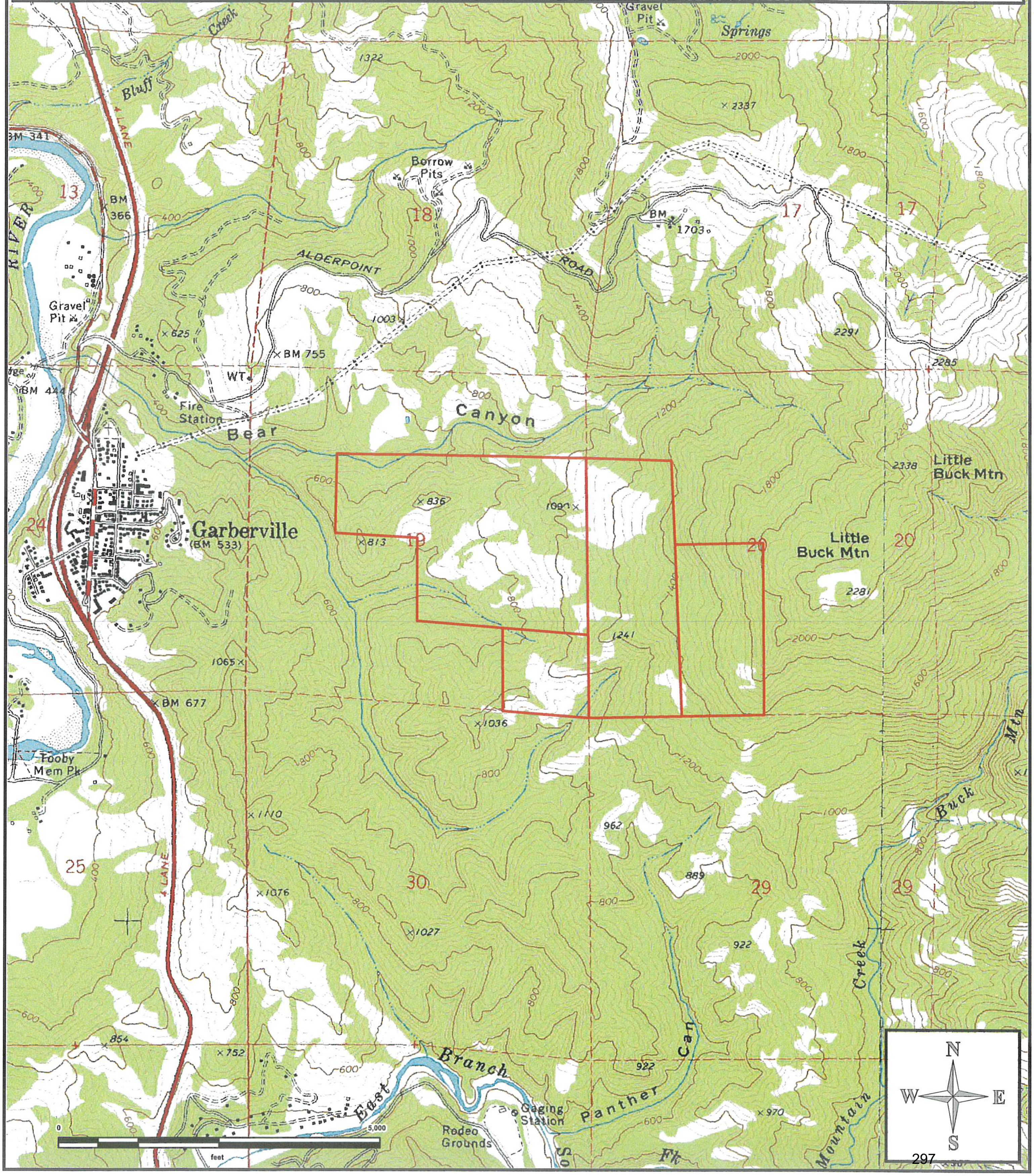
General Location Map [WDID - 1_12CC415333]

Property Boundary

Timberland Resource Consultants

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.

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

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

<u>Stream Crossing Installation and Maintenance:</u>
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 [ft^2]
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

Forrest Hansen

Timberland Resource Consultants

Site Management Plan

Site Map (WDID - 1_12CC415333)

- Property Boundary
- Cultivation Area
- Disturbed Area
- Past Cultivation
- Pond
- Unstable Area
- Proposed Relocation Area
- Riparian Setback
- Cultivation Area & Disturbed Area within Riparian Setbacks
- Seasonal Wet Area

Roads

- Permanent
- Seasonal
- Access
- Trail
- Legacy
- Proposed Access Road/Trail

Watercourses

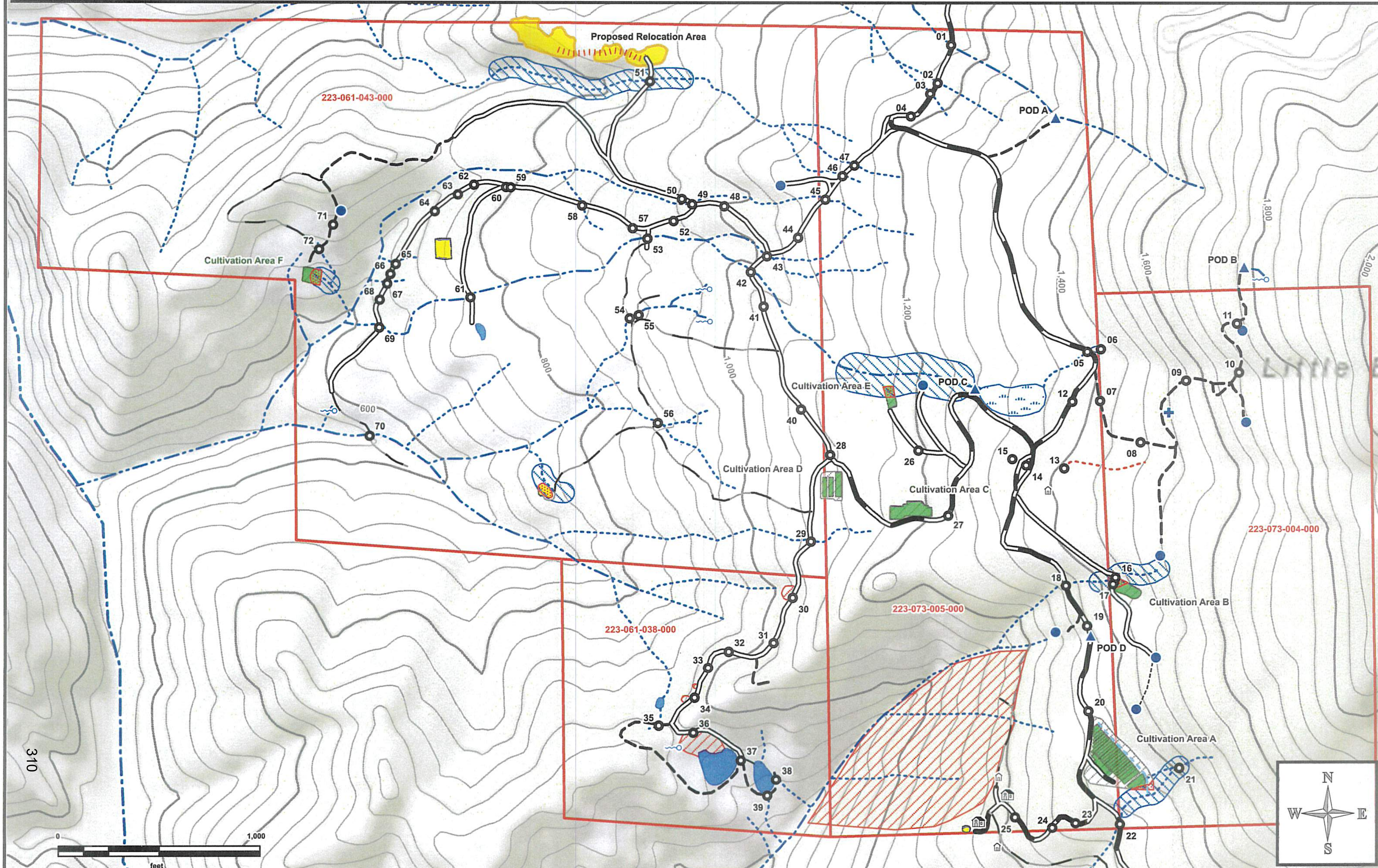
- Class I
- Class II
- Class III
- Class IV
- Undefined

- Site
- POD
- Tank
- Well
- House
- Structure
- Spring/Seep

Timberland Resource Consultants

40' contour intervals
8/20/2019

TRC - 440



Site Management Plan

Site Map (WDID - 1_12CC415333)

Property Boundary
Cultivation Area
Disturbed Area
Past Cultivation
Pond
Unstable Area
Proposed Relocation Area
Riparian Setback
Cultivation Area & Disturbed Area within Riparian Setbacks
Seasonal Wet Area

Roads
Permanent
Seasonal
Access
Trail
Legacy
Proposed Access Road/Trail

Watercourses
Class I
Class II
Class III
Class IV
Undefined

Site
POD
Tank
Well
House
Structure
Spring/Seep

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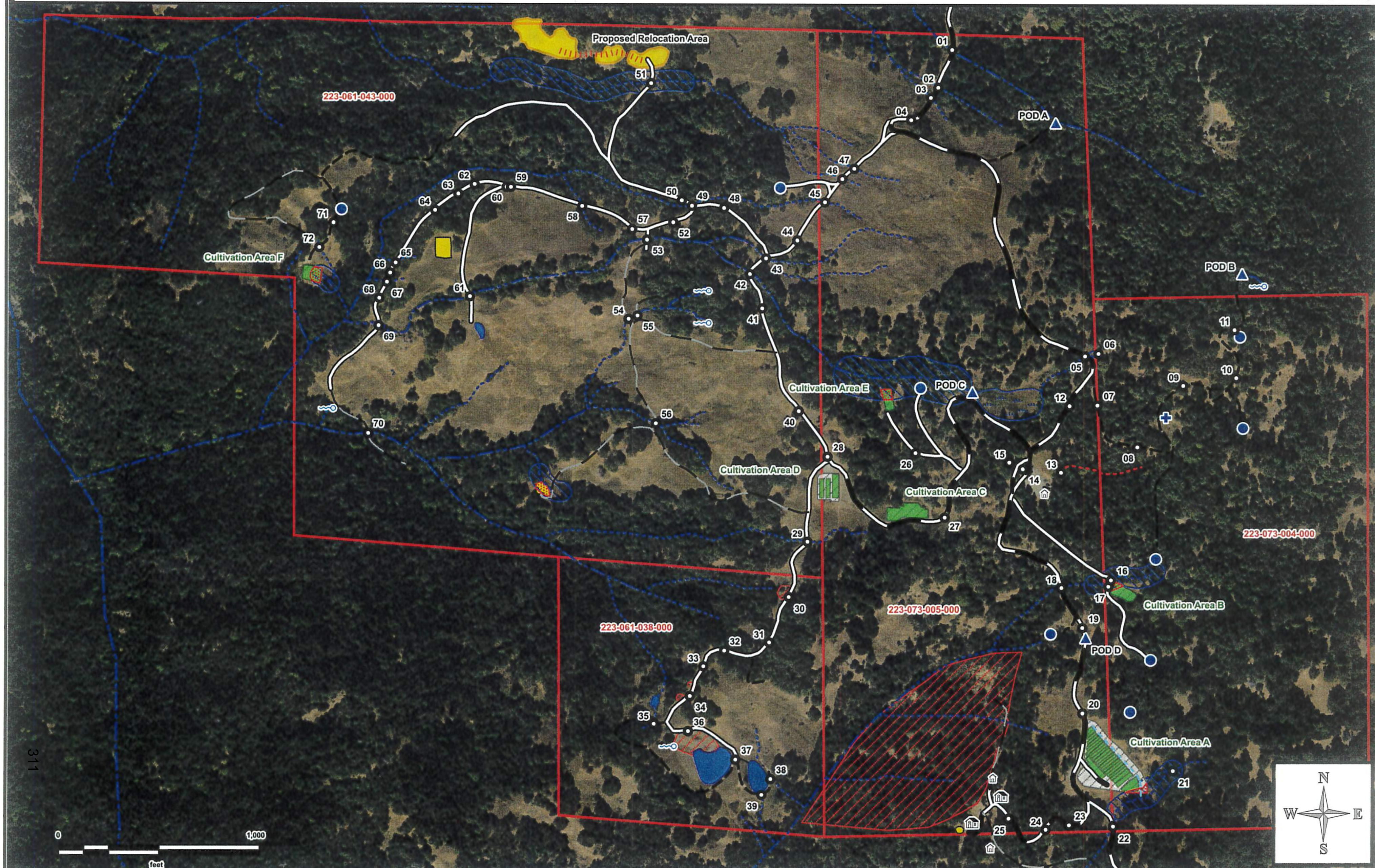
2018 NAIP DOQ
8/20/2019

TRC - 440



Site Management Plan

Overview Map Cultivation Area A (WDID - 1_12CC415333)

Property Boundary
Riparian Setback
Cultivation Area
Disturbed Area

Roads
Permanent
Seasonal
Access
Trail

Watercourses
Class III
Class IV

Site
Tank

Timberland Resource Consultants

40' contour intervals
8/20/2019

TRC - 440

Site Management Plan

Overview Map Cultivation Area A (WDID - 1_12CC415333)

Property Boundary
Riparian Setback
Cultivation Area
Disturbed Area

Roads
Permanent
Seasonal
Access
Trail

Watercourses
Class III
Class IV

Site
Tank

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2018 NAIP DOQ
8/20/2019

TRC - 440

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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

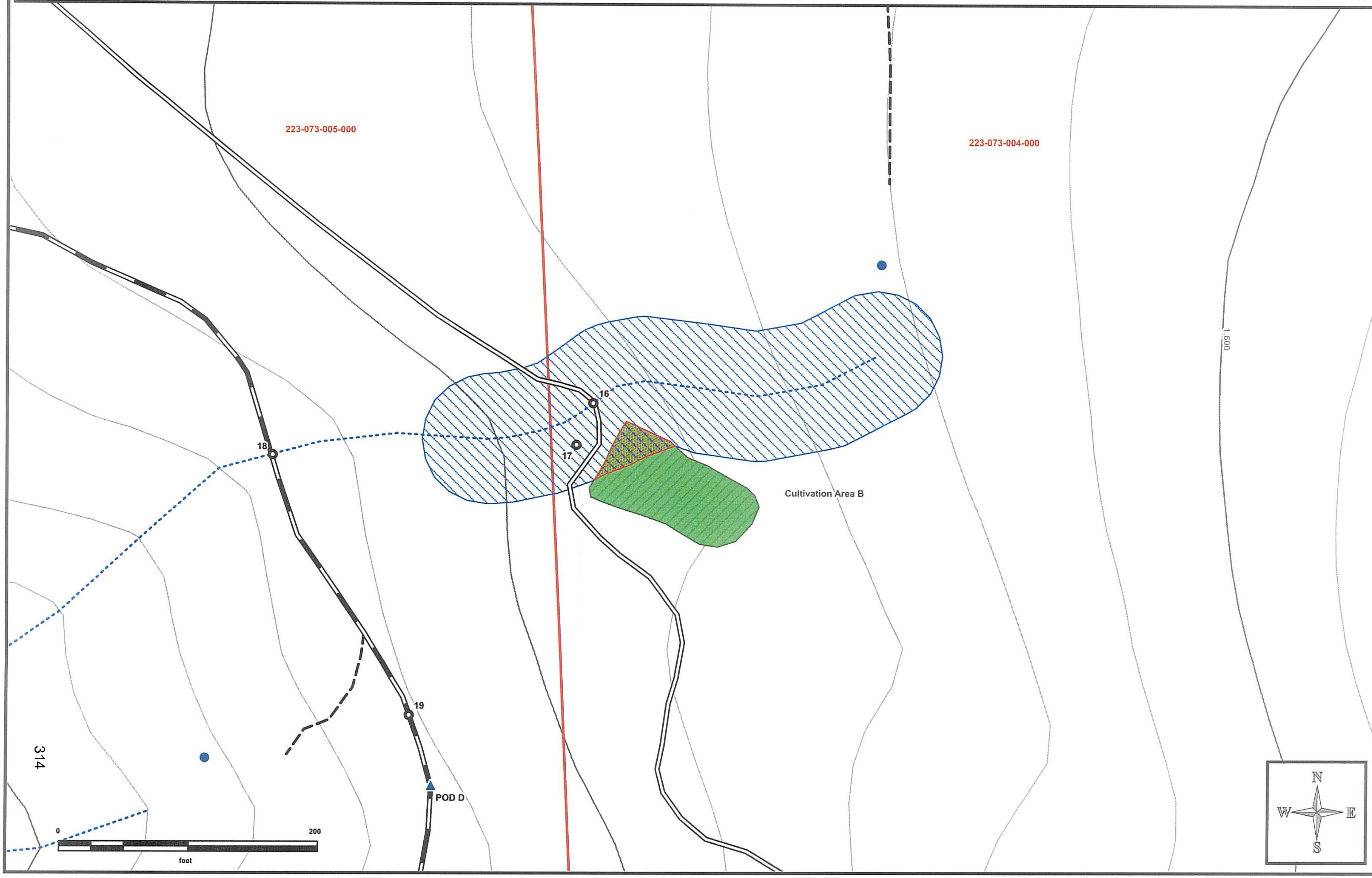
Site

POD

Tank

40' contour intervals
8/20/2019

TRC - 440



Site Management Plan

Overview Map Cultivation Area B (WDID - 1_12CC415333)

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

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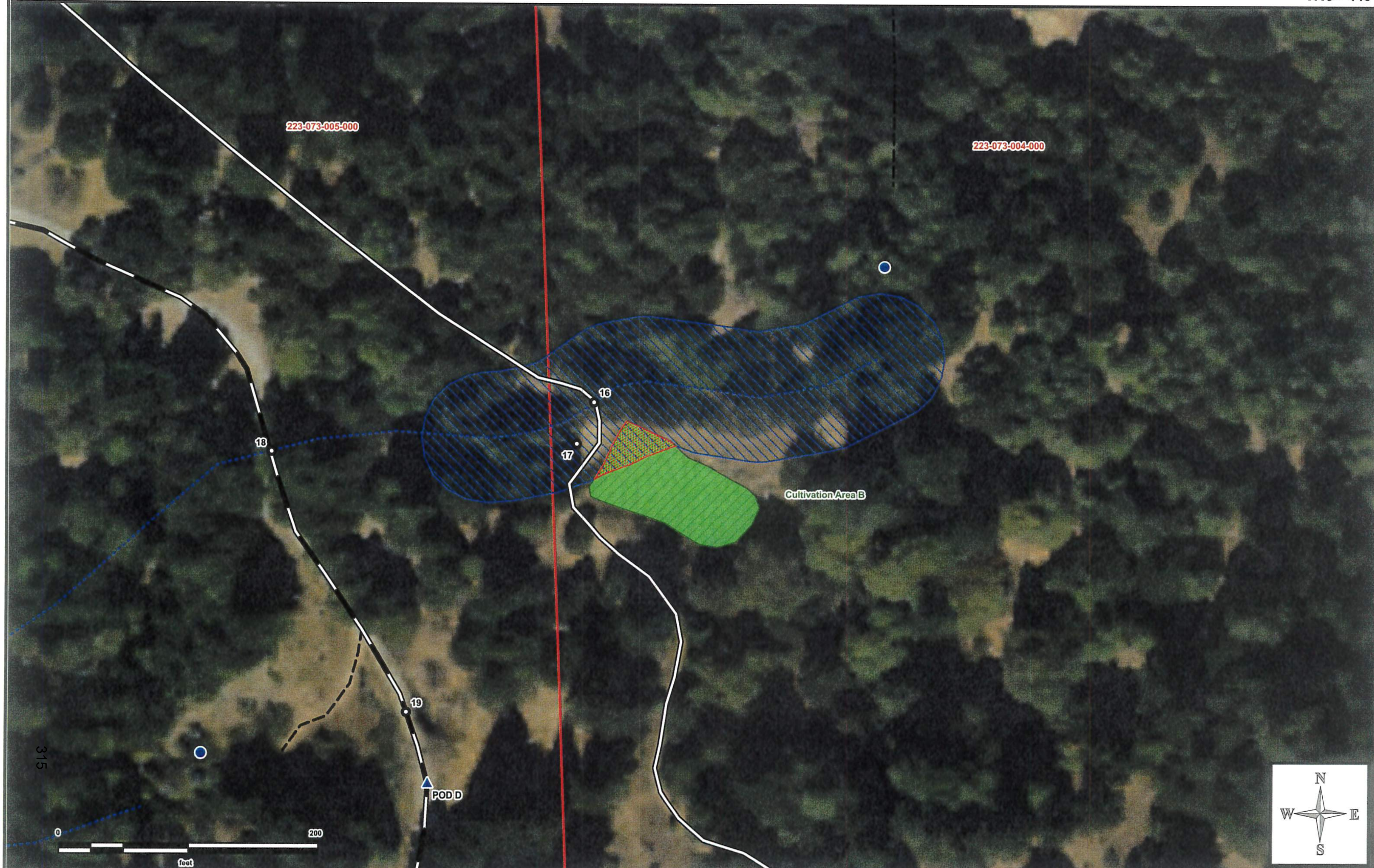
2018 NAIP DOQ
8/20/2019

TRC - 440



315

Site Management Plan

Overview Map Cultivation Area E (WDID - 1_12CC415333)

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

Roads
Permanent
Seasonal
Access

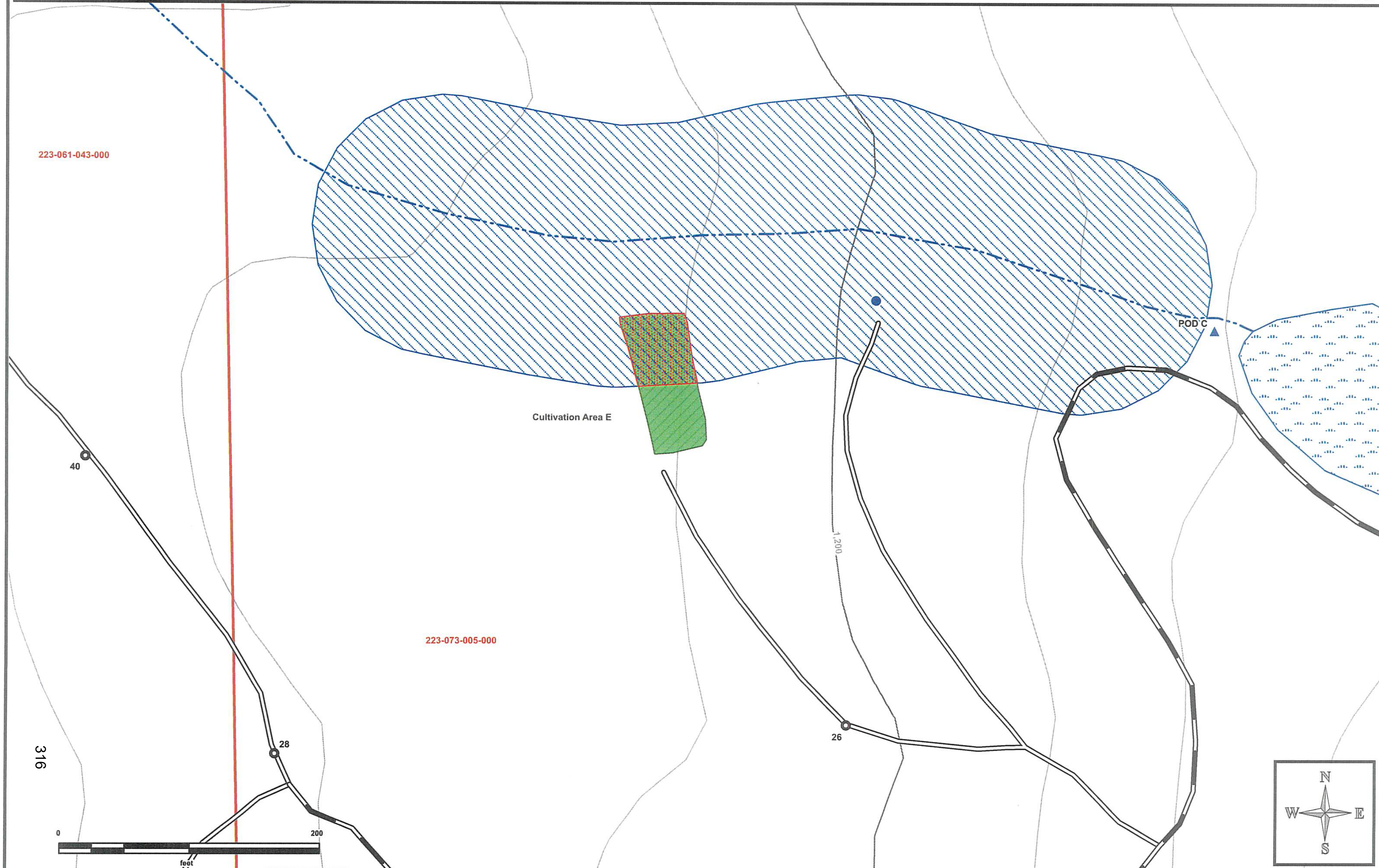
Watercourses
Class II
Class III

Site
Tank

Timberland Resource Consultants

40' contour intervals
8/20/2019

TRC - 440



Site Management Plan

Overview Map Cultivation Area E (WDID - 1_12CC415333)

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

Timberland Resource Consultants

2018 NAIP DOQ
8/20/2019

TRC - 440

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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

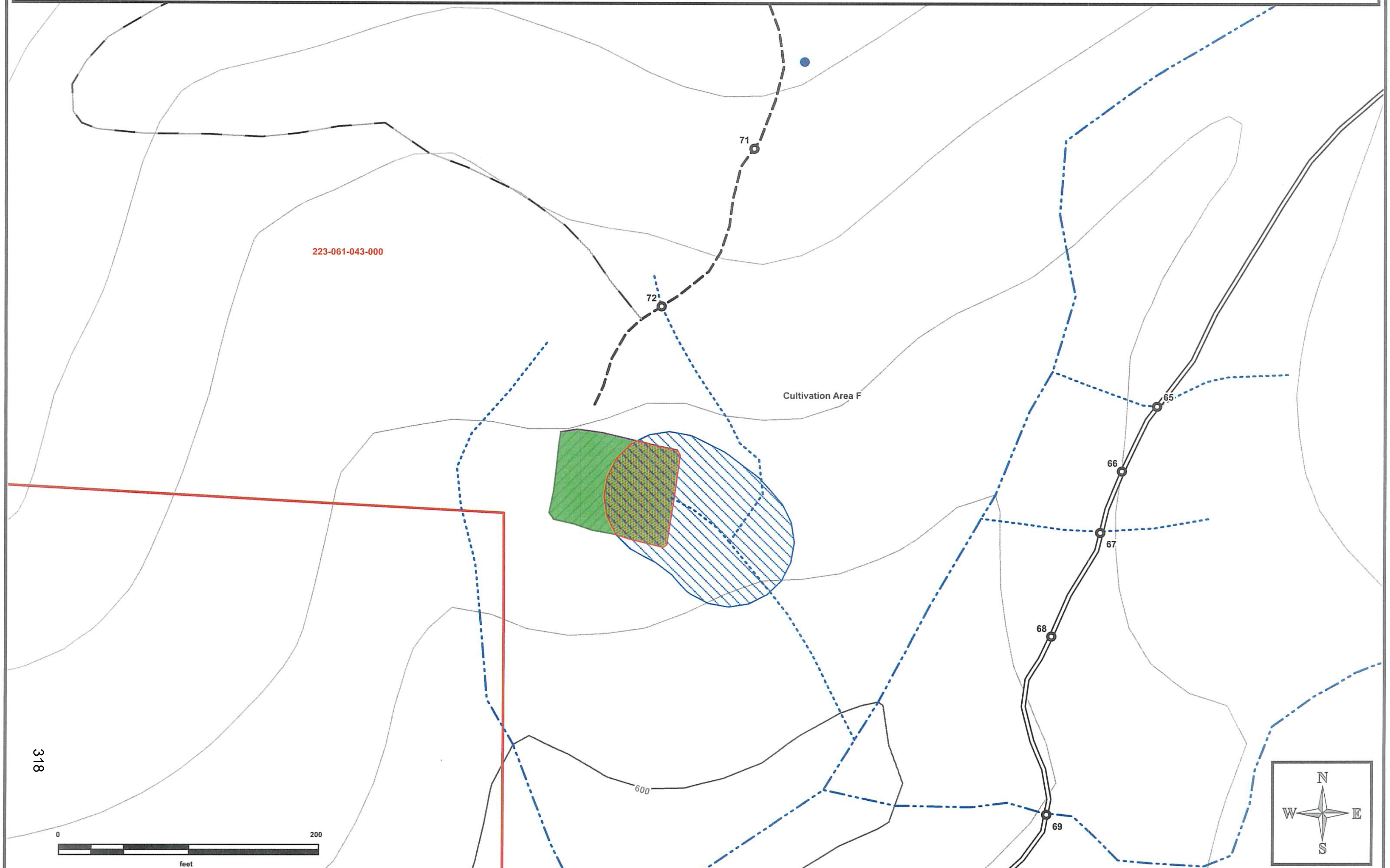
Roads
Seasonal Access
Trail
Legacy

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)

Legend			
Property Boundary	Riparian Setback	Roads: Seasonal Access, Trail, Legacy	Watercourses: Class II, Class III
Cultivation Area	Cultivation Area & Distrubed Area within Riparian Setbacks		Site, Tank
Disturbed Area			

Timberland Resource Consultants

2018 NAIP DOQ
8/20/2019

TRC - 440

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.

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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 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.

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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 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.

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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	Prescribed Action
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	Prescribed Action
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	Prescribed Action
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.

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
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 Consultants
165 South Fortuna Boulevard, Fortuna, CA 95540
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 Consultants
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

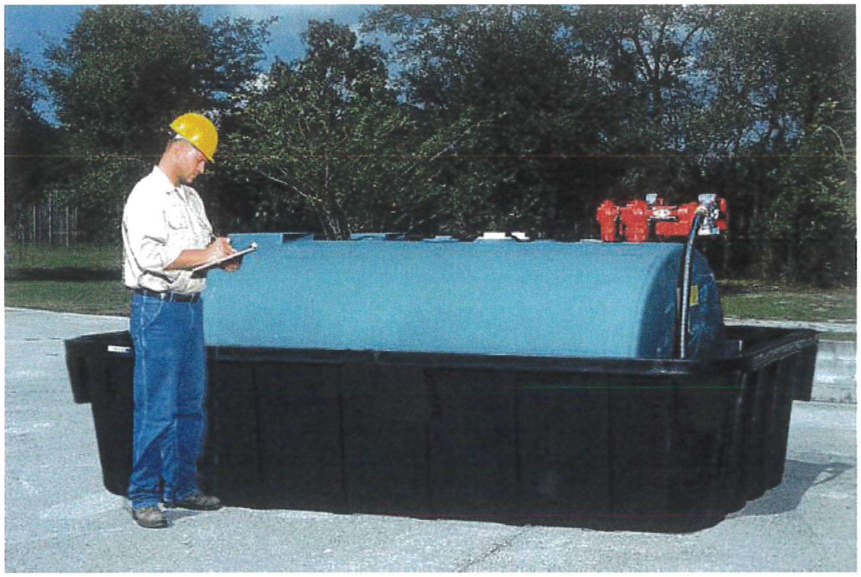
- https://www.newpig.com/collapsible-berms/c/5142?show=All

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.

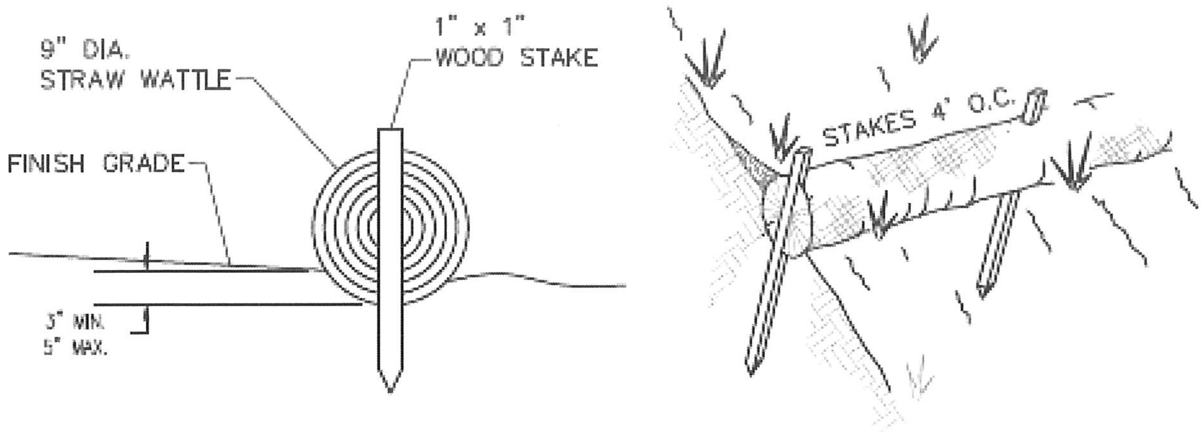
- Side cast or fill material extending more than 20 feet in slope distance from the outside edge of a landing which has access to a watercourse or lake shall be treated with slope stabilization measures described in #3 above. Timing shall occur per #1 above unless outside 100 feet of a watercourse or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

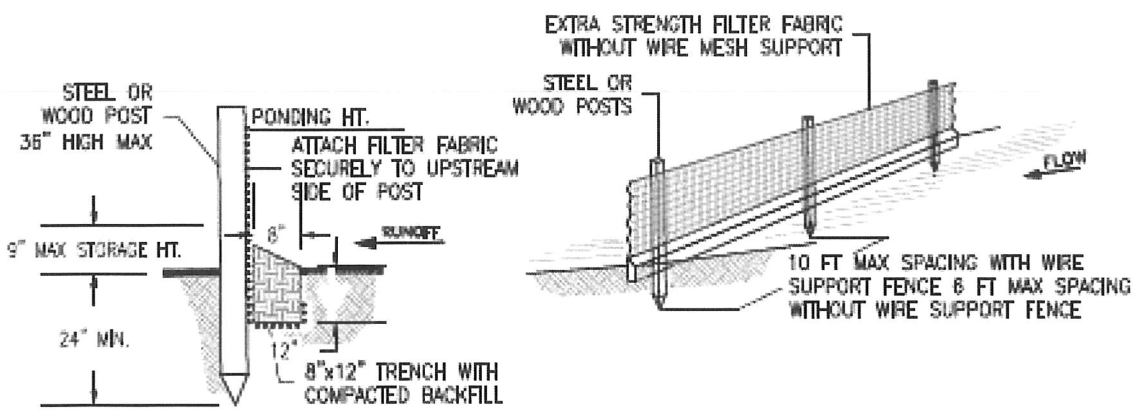


STRAW WATTLE NOTES:

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:

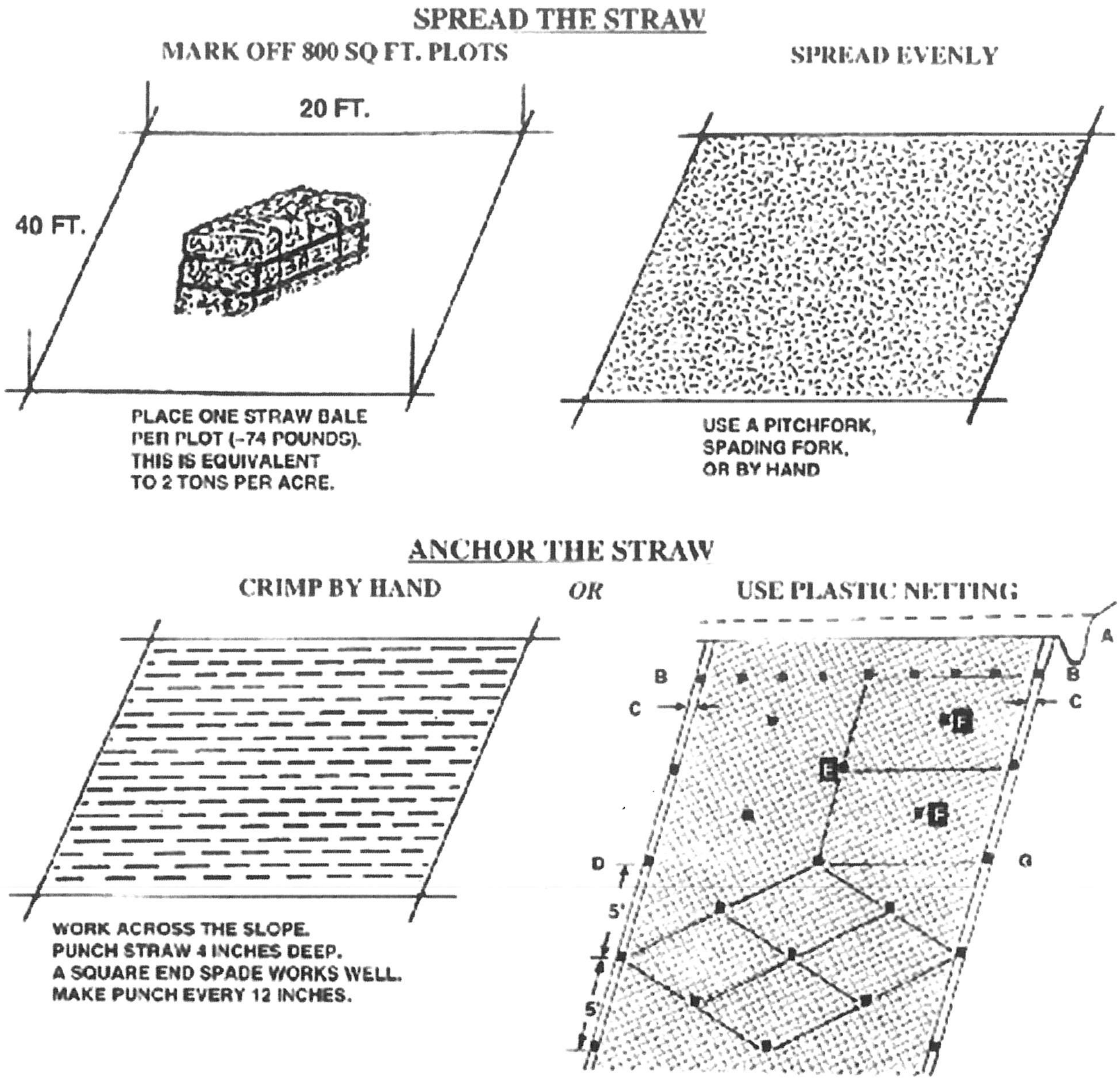
1. THE CONTRACTOR SHALL INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT.
2. CONTRACTOR SHALL REMOVE SEDIMENT AS NECESSARY. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND IN AN AREA THAT CAN BE PERMANENTLY STABILIZED.
3. SILT FENCE SHALL BE PLACED ON SLOPE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

SILT FENCE DETAILS

NTS

BMP: General Erosion Control (Cont.)

BMP: General Erosion Control (Cont.)



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.

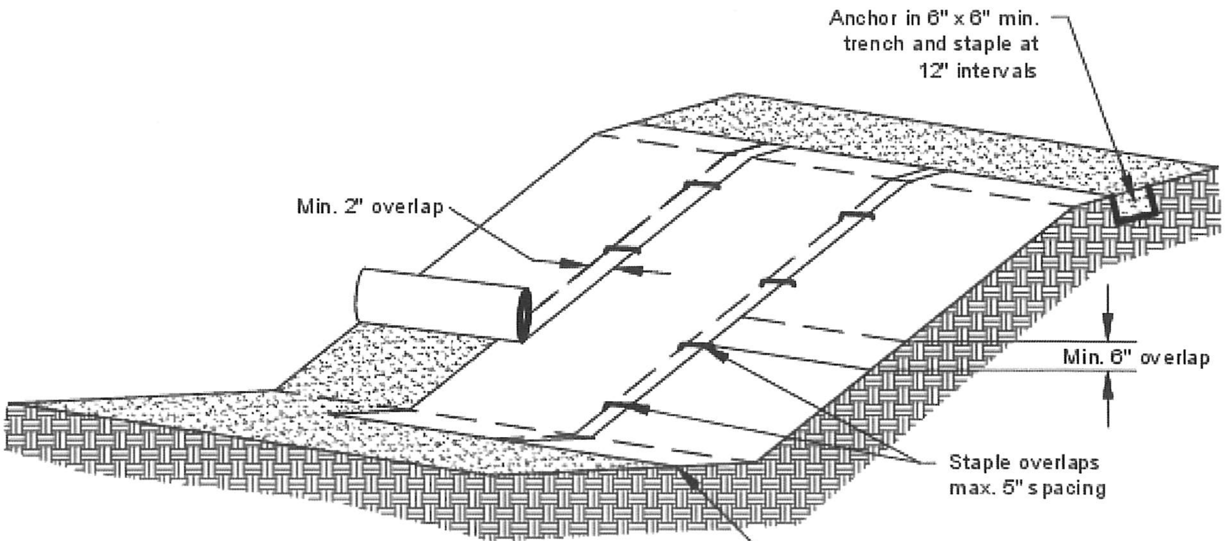
E. STAKE DOWN THE CENTER EVERY 5 FEET.

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

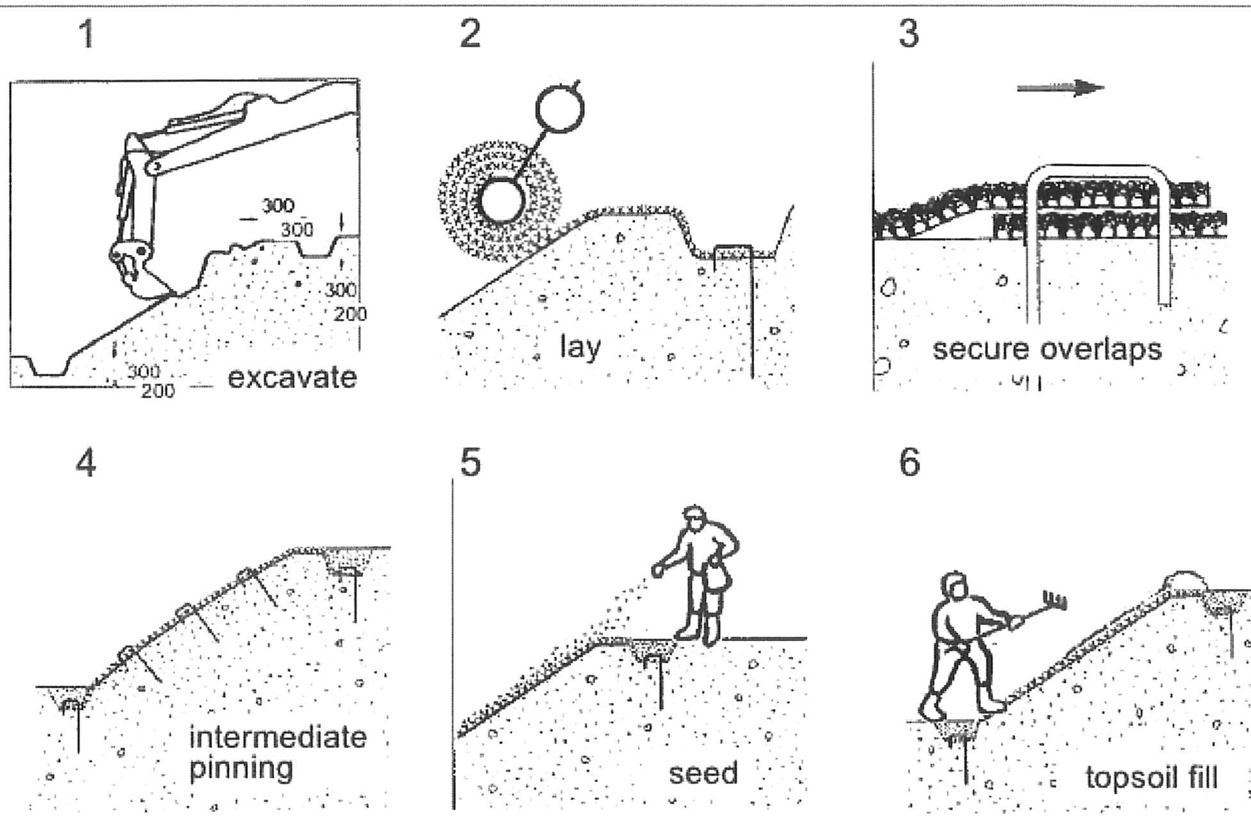
DEPARTMENT OF ECOLOGY State of Washington

Slope Installation

Revised June 2016

BMP: General Erosion Control (Cont.)

Installation of a geosynthetics mat - Enkamat



www.geosyntheticsworld.com

Page 10 of 11 Landscaping and Erosion Control

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
Sediment control during construction	Minimize disturbance (soil and vegetation)	All areas peripheral to 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.

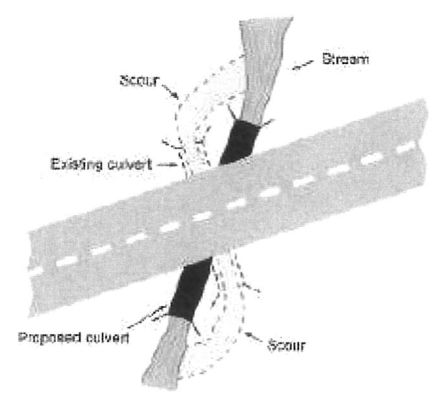
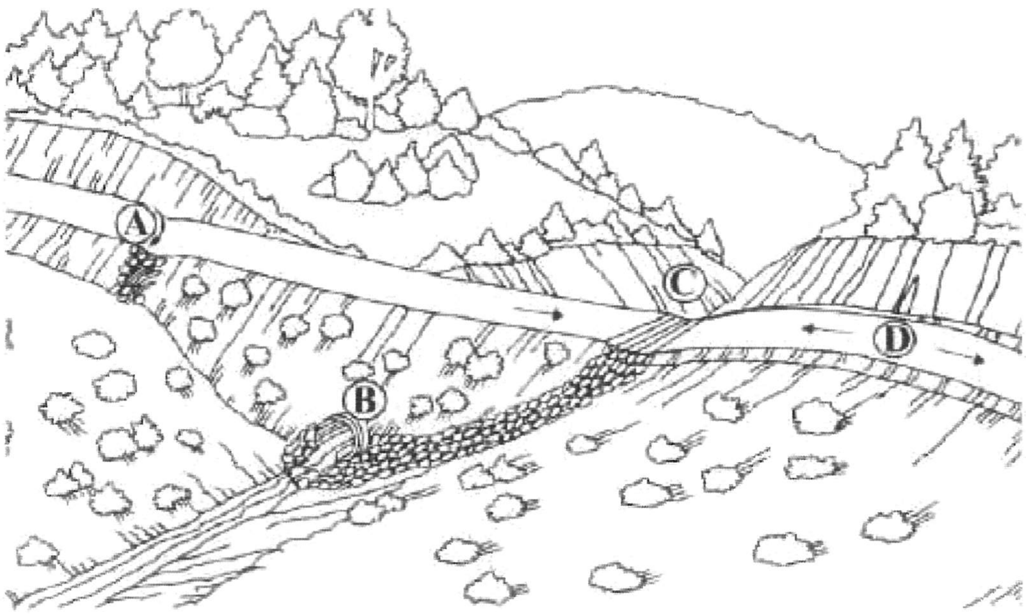


FIGURE 97. *Culvert alignment should be in relation to the stream and not the road. It is important that the stream enters and leaves the culvert in a relatively straight horizontal alignment so streamflow does not have to turn to enter the inlet or discharge into a bank as it exits. This figure shows 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)



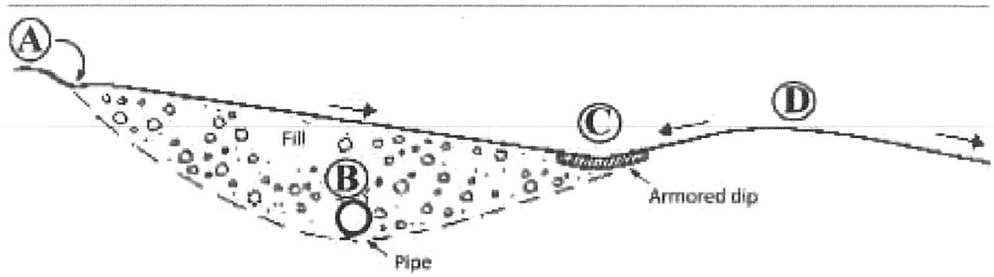
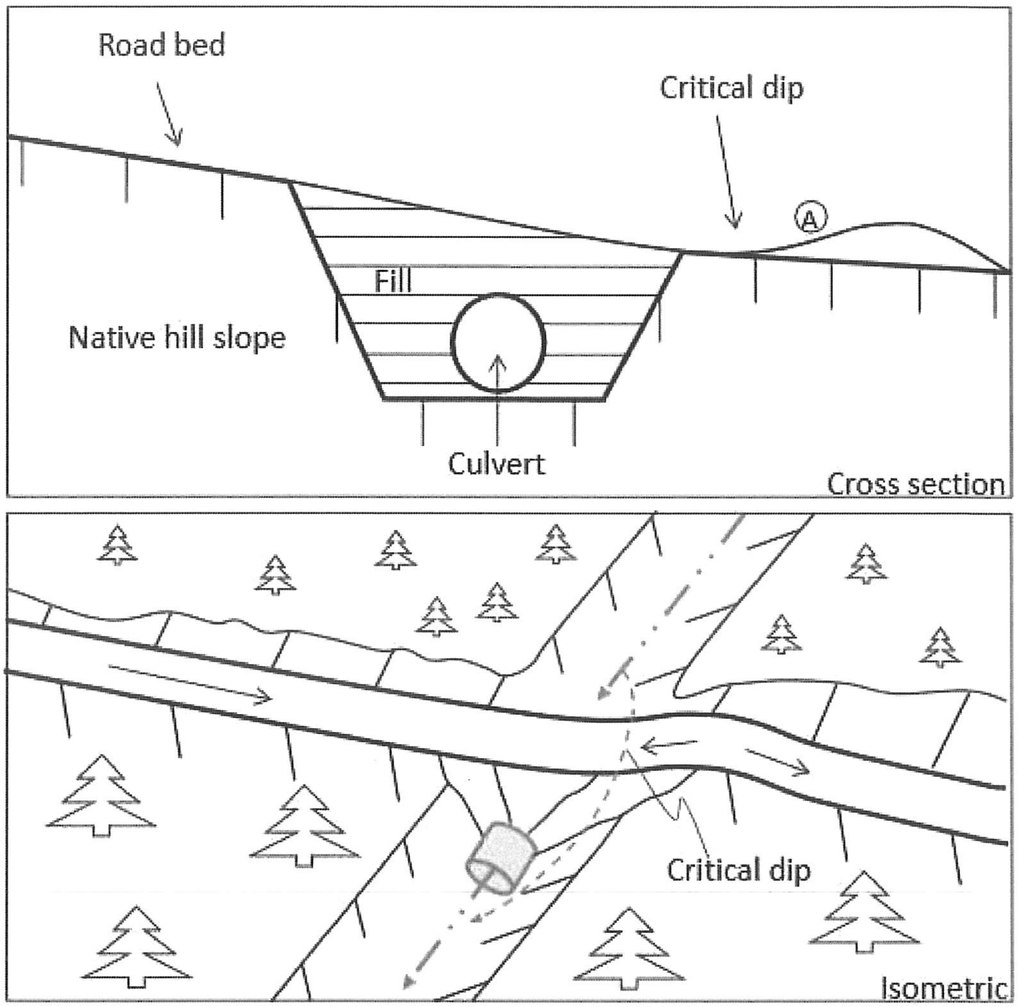


FIGURE 84. *Critical dips or dipped crossing fills should be centered near a stream crossing's down-road hingeline, not over the centerline of the crossing where overtopping could cause washout or severe erosion of the fill. If the stream crossing culvert (B) plugs, water will pond behind the fill until 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

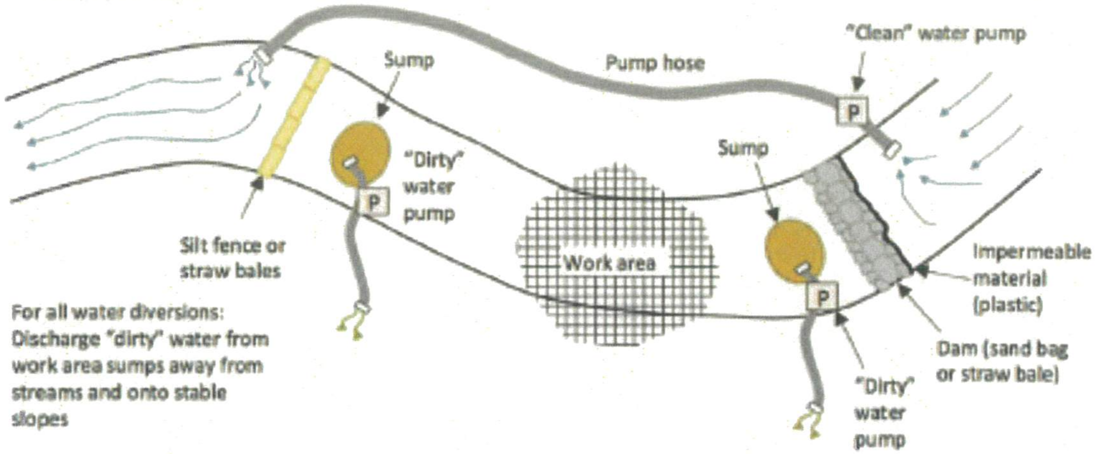


Critical Dip Construction:

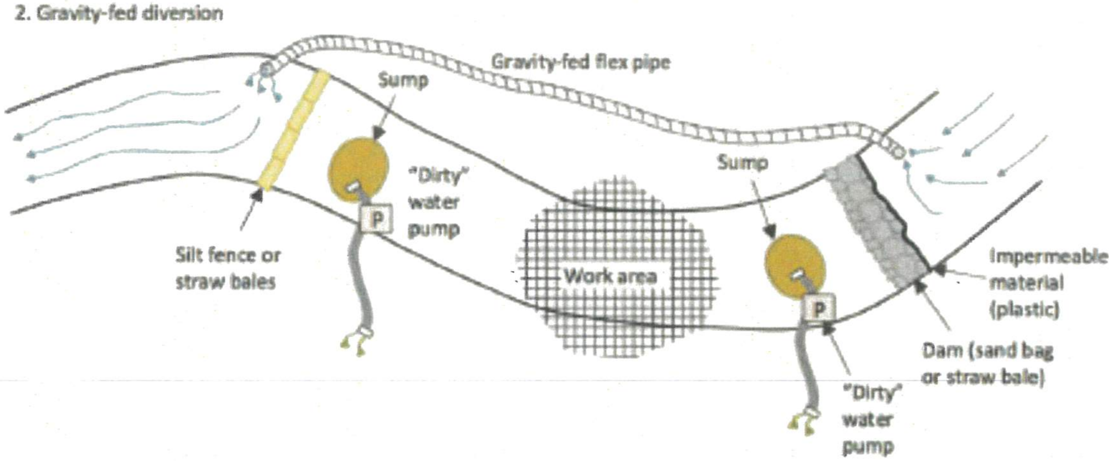
1. Critical dip will be constructed on the lower side of crossing.
2. Critical dip will extend from the cutbank to the outside edge of the road surface. Be sure to fill inboard ditch, if present.
3. Critical dip will have a reverse grade A from cutbank to outside edge of road to ensure flow will not 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)

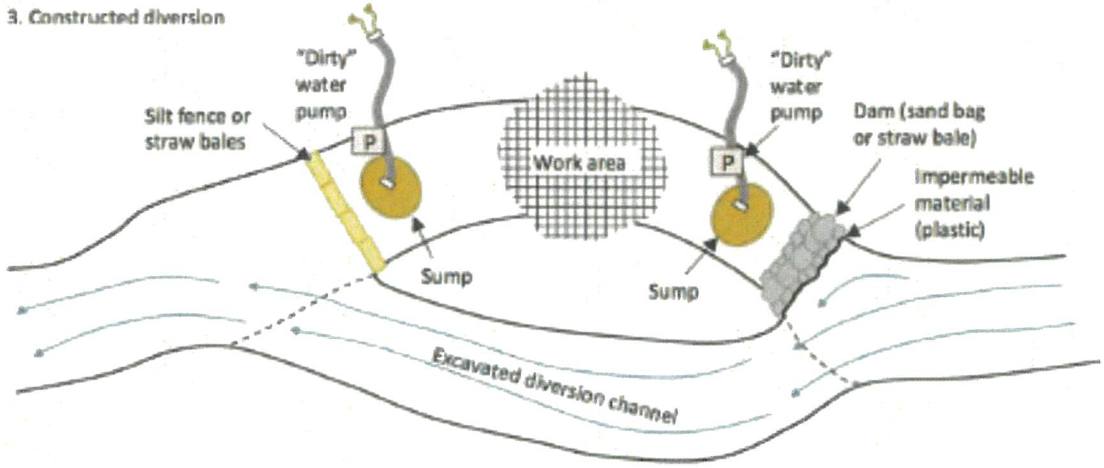
1. Pumped diversion



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)

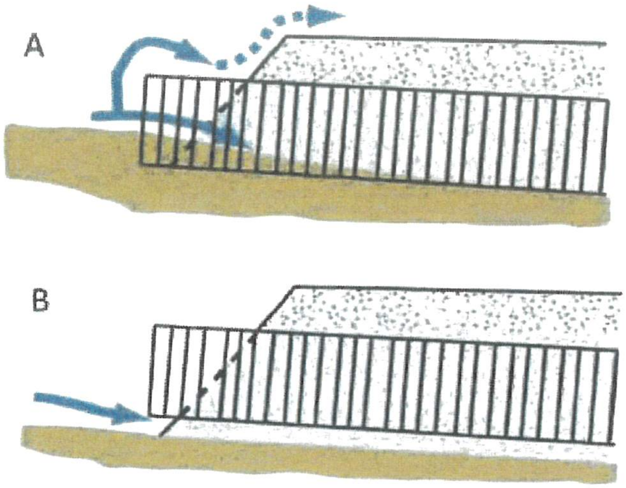
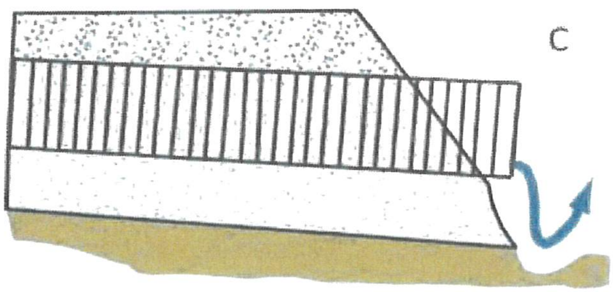
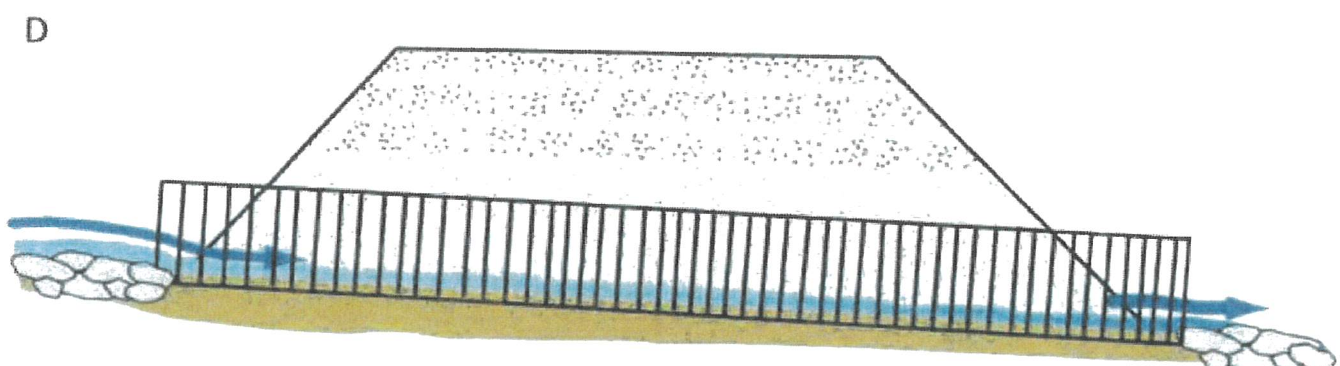


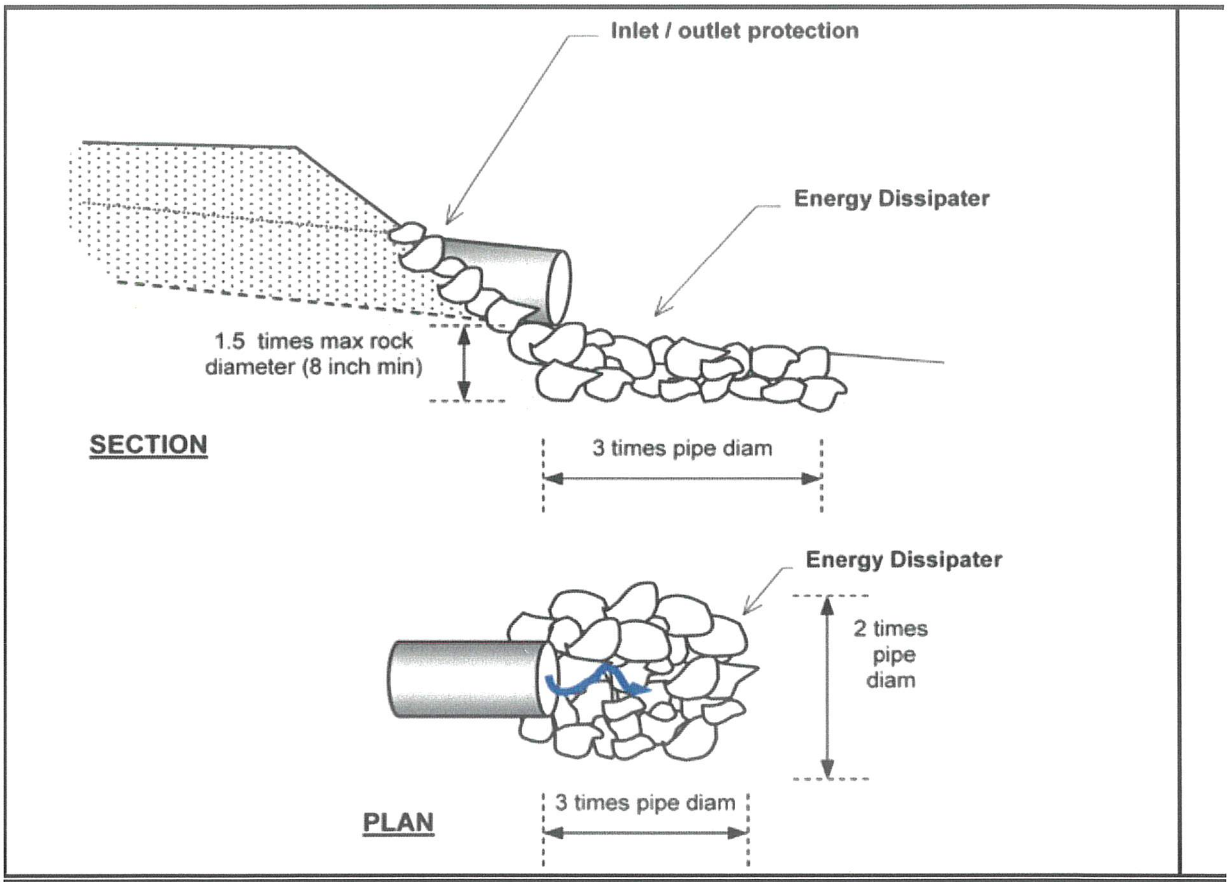
FIGURE 155. *Proper culvert installation involves correct culvert orientation, setting the pipe slightly below the bed of the original stream, and backfilling and compacting the fill as it is placed over the culvert. Installing the inlet too low in the stream (A) can lead to culvert plugging, yet if 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).*

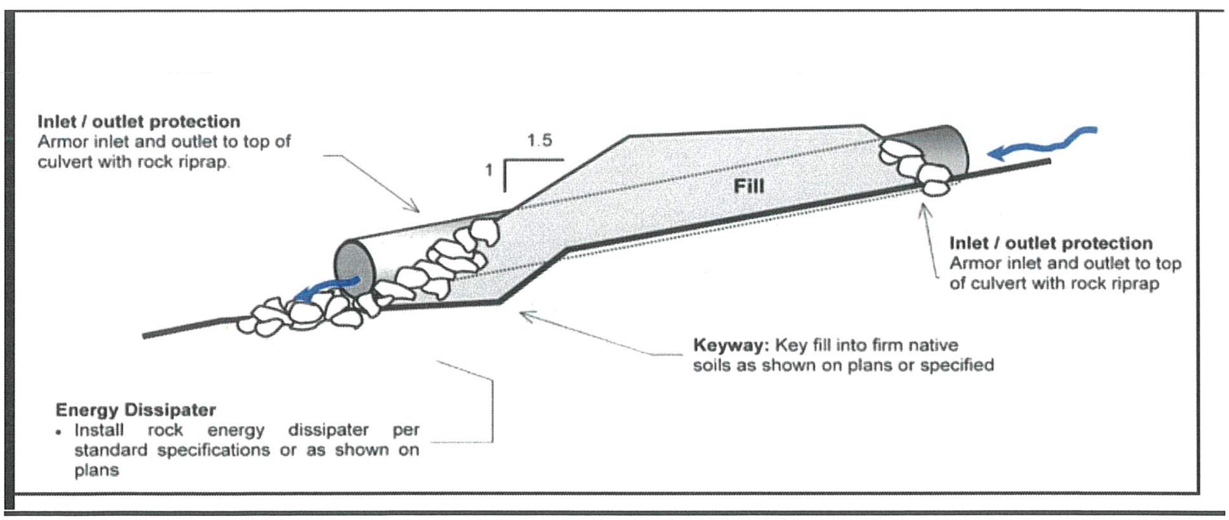




HANDBOOK FOR FOREST, RANCH AND RURAL ROADS

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 i 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 t 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.

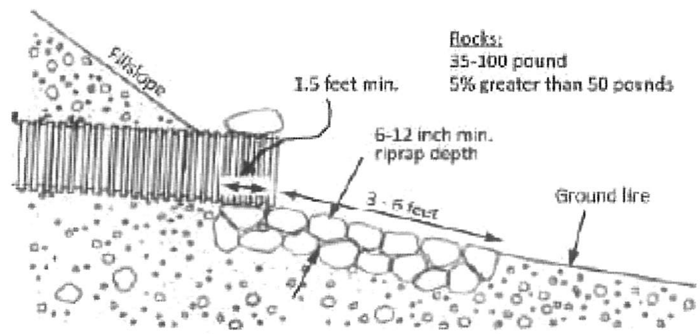


FIGURE 107A. *Riprap armor at culvert outlet (Modified from: Keller et al., 2011).*

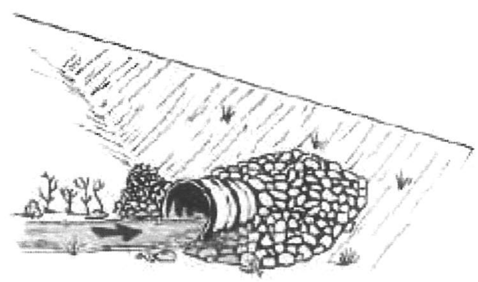


FIGURE 107B. *Riprap armor at culvert inlet (Keller and Sherar, 2003).*

HANDBOOK FOR FOREST, RANCH AND RURAL ROADS

BMP: Stream Bank Armoring (Riprap)

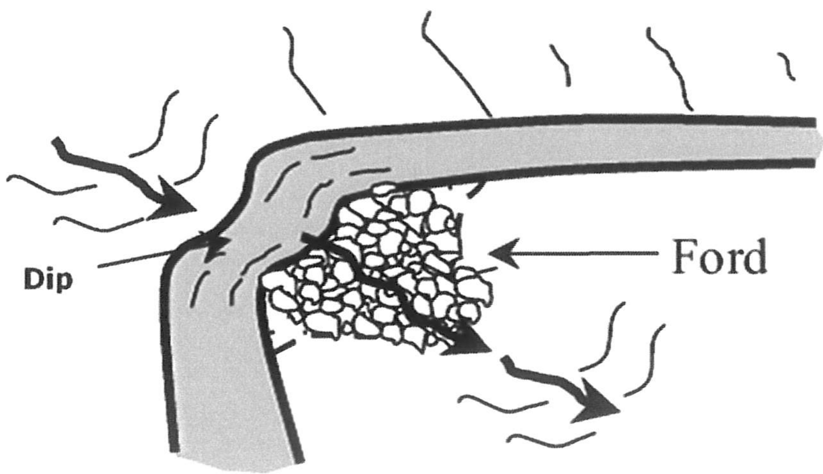
- Riprap should be installed on top of geotextile fabric or a clean mixture of coarse gravel and sand.
- The riprap should be keyed into the streambed and extend below the maximum expected scour depth with an adequately sized key base width at a thickness of a minimum of 2x the median (D50) rock diameter 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.

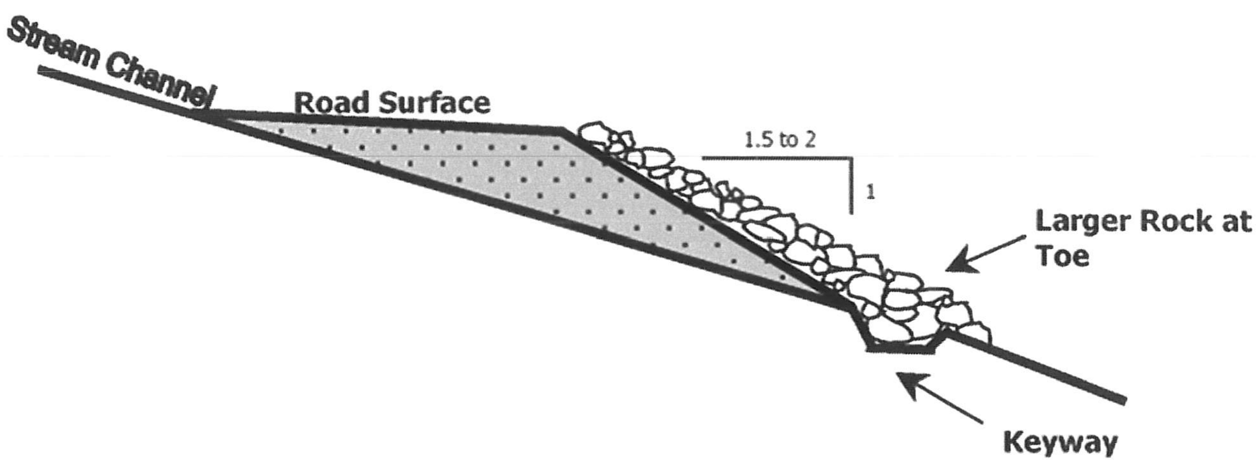
BMP: Rocked Ford

- 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.

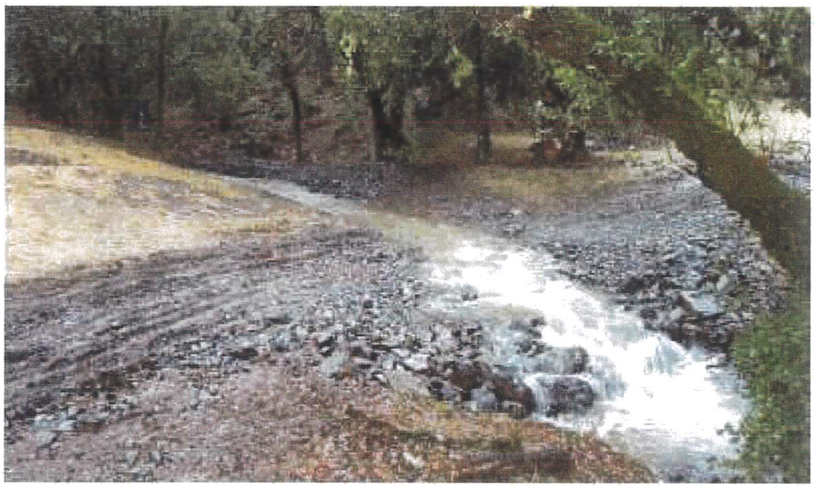
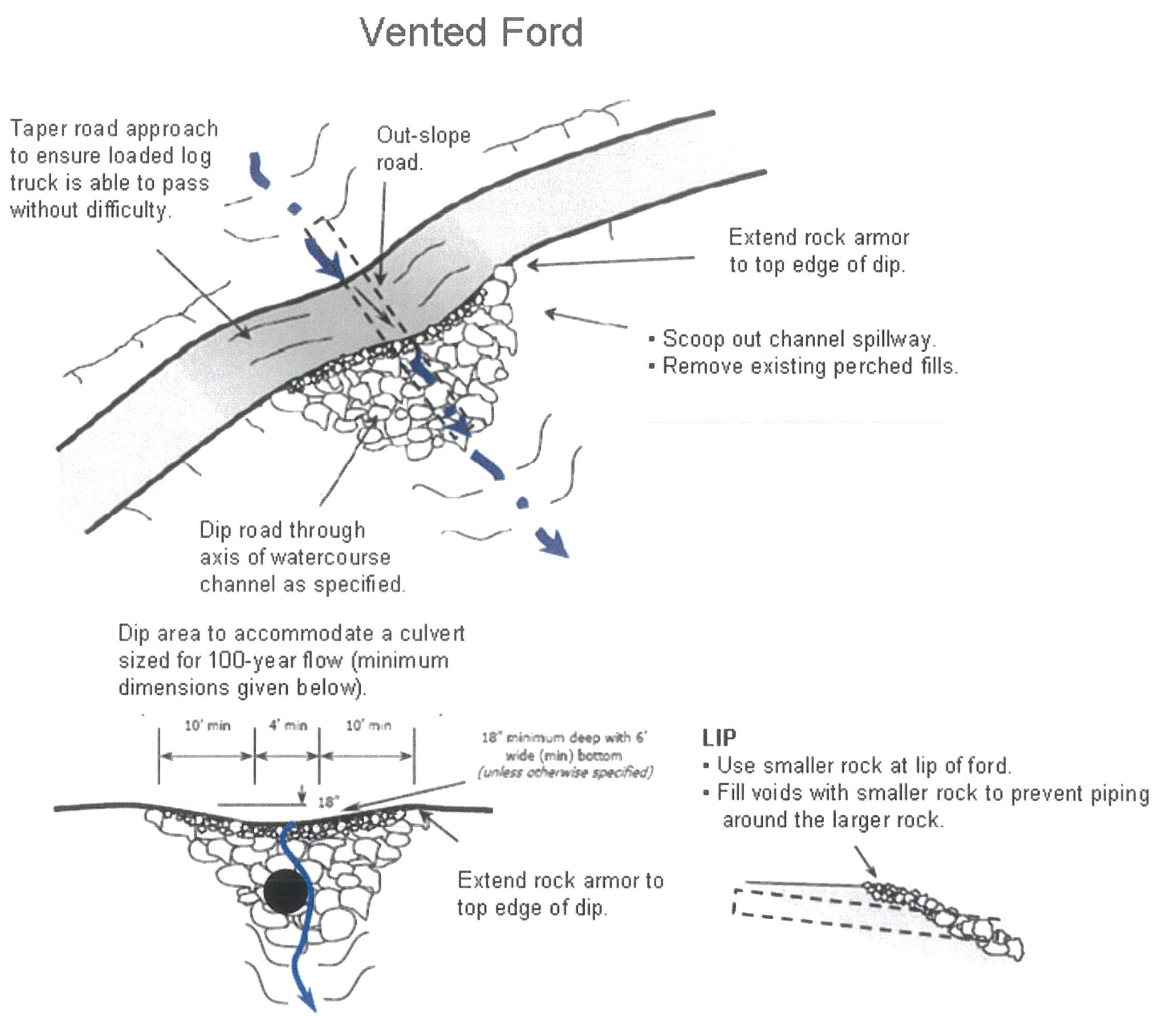


FIGURE 121E. Two weeks after this armored fill was constructed, a storm flow event occurred and the structure maintained its function and integrity. The road approaches had not yet been compacted or surfaced with road rock.

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



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.

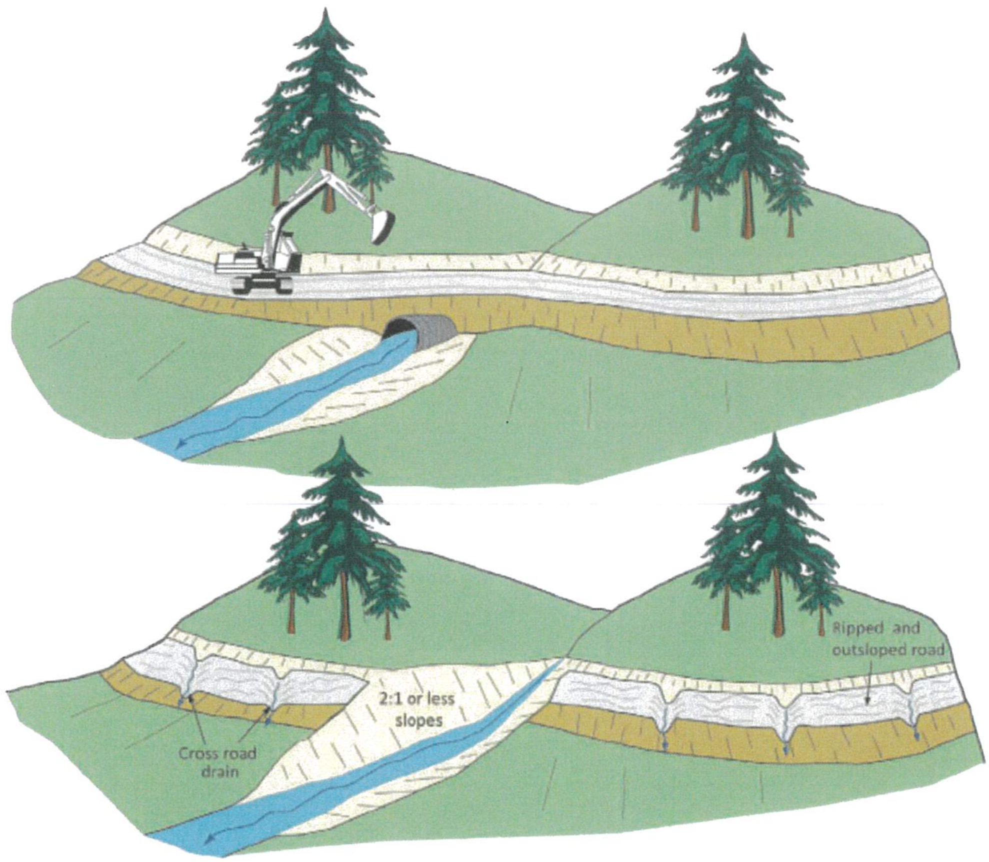


FIGURE 263. *On roads that are to be closed (decommissioned), all stream crossing culverts and fills should be removed. Stream crossing excavations are best performed using an excavator. The original channel should be excavated and exhumed down to the former streambed, with a channel width equal or greater 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.

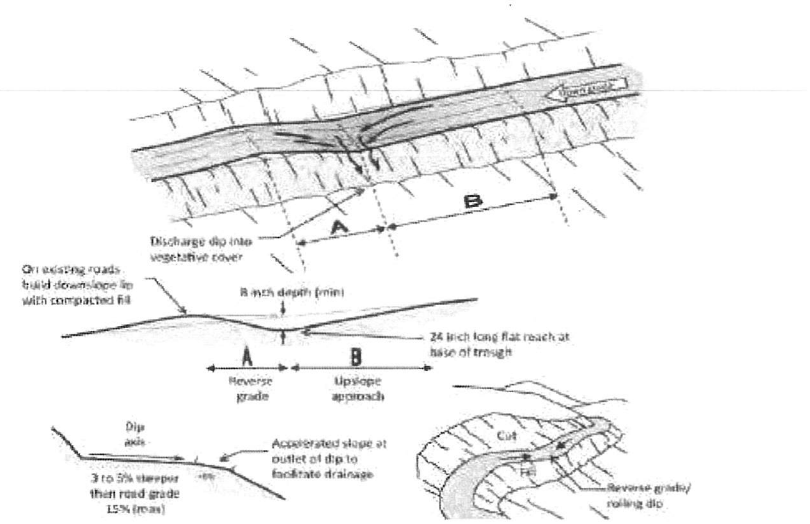


FIGURE 34. *A classic Type I rolling dip, where the excavated up-road approach (B) to the rolling dip is several percent steeper than the approaching road and extends for 60 to 80 feet to the dip axis. The lower side of the structure reverses grade (A) over approximately 15 feet or more, and then falls 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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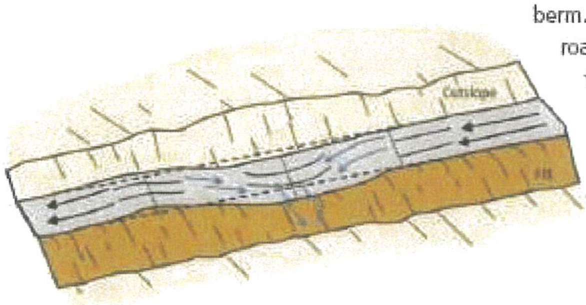
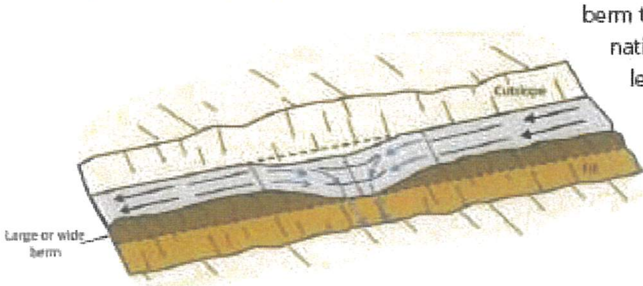
BMP: Rolling Dip Design and Placement (Types)

Type 1 Rolling Dip
(Standard)



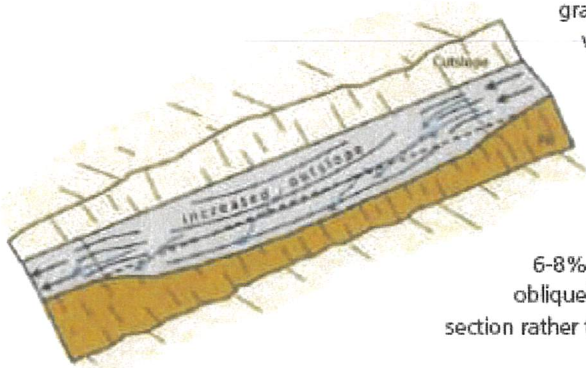
Type 1 rolling dips are used where road grades are less than about 12-14% and road runoff is not confined by a large through cut or berm. The axis of the dip should be perpendicular to the road alignment and sloped at 3-4% across the road tread. Steep roads will have longer and more abrupt dip dimensions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

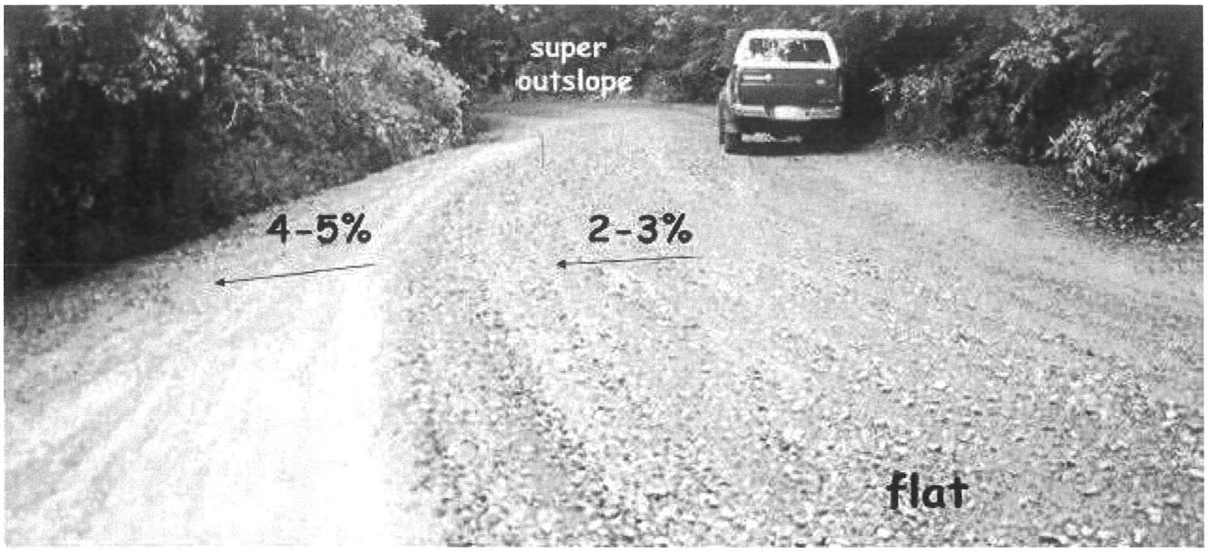

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FIGURE 29. *Road shape changes as the road travels through the landscape. For example, an outsloped road will have a steep or "banked" outslope through inside curves, a consistent outslope through straight reaches and a flat or slightly insloped shape 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.

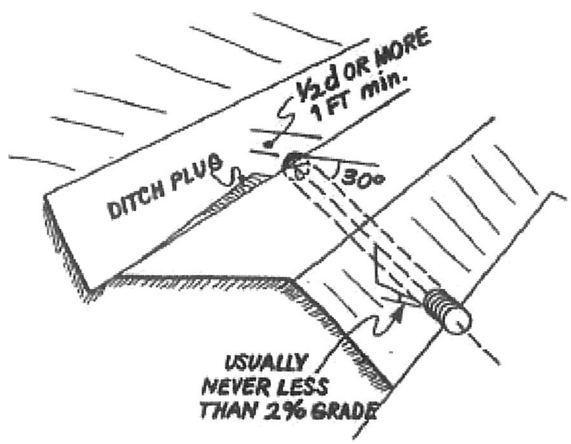
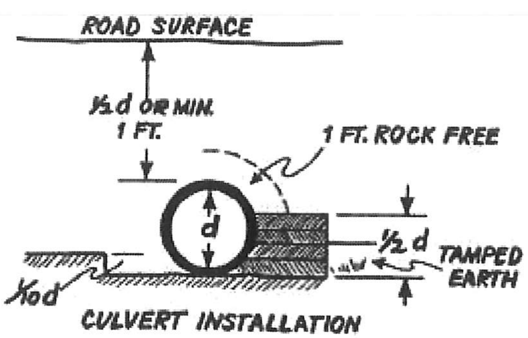


FIGURE 48. The elements of a properly installed ditch relief culvert. The culvert is angled at about 30 degrees to the road alignment to help capture flow and prevent culvert plugging or erosion of the inlet area. It is set at the base of the fill (ideally) or with a grade slightly steeper than the grade 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).



HANDBOOK FOR FOREST, RANCH AND RURAL ROADS

BMP: Waterbar Construction

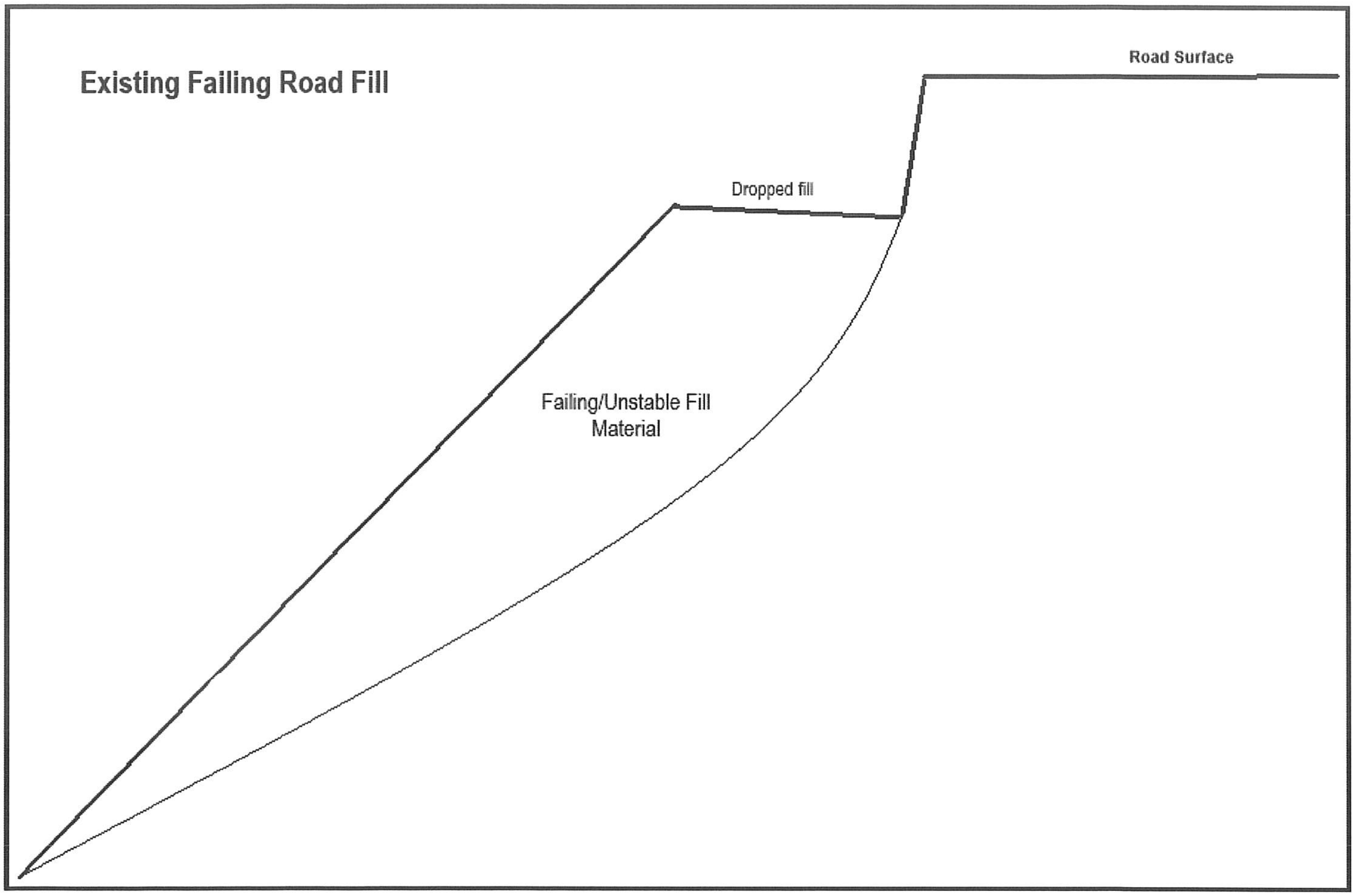
FIGURE 40. *Waterbars are constructed on unsurfaced forest and ranch roads that will have little or no traffic during the wet season. The waterbar should be extended to the cutbank to intercept all ditch flow (1) and extend beyond the shoulder of the road. A berm (2) must block and prevent ditch flow 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).*

HANDBOOK FOR FOREST, RANCH, AND RURAL ROADS

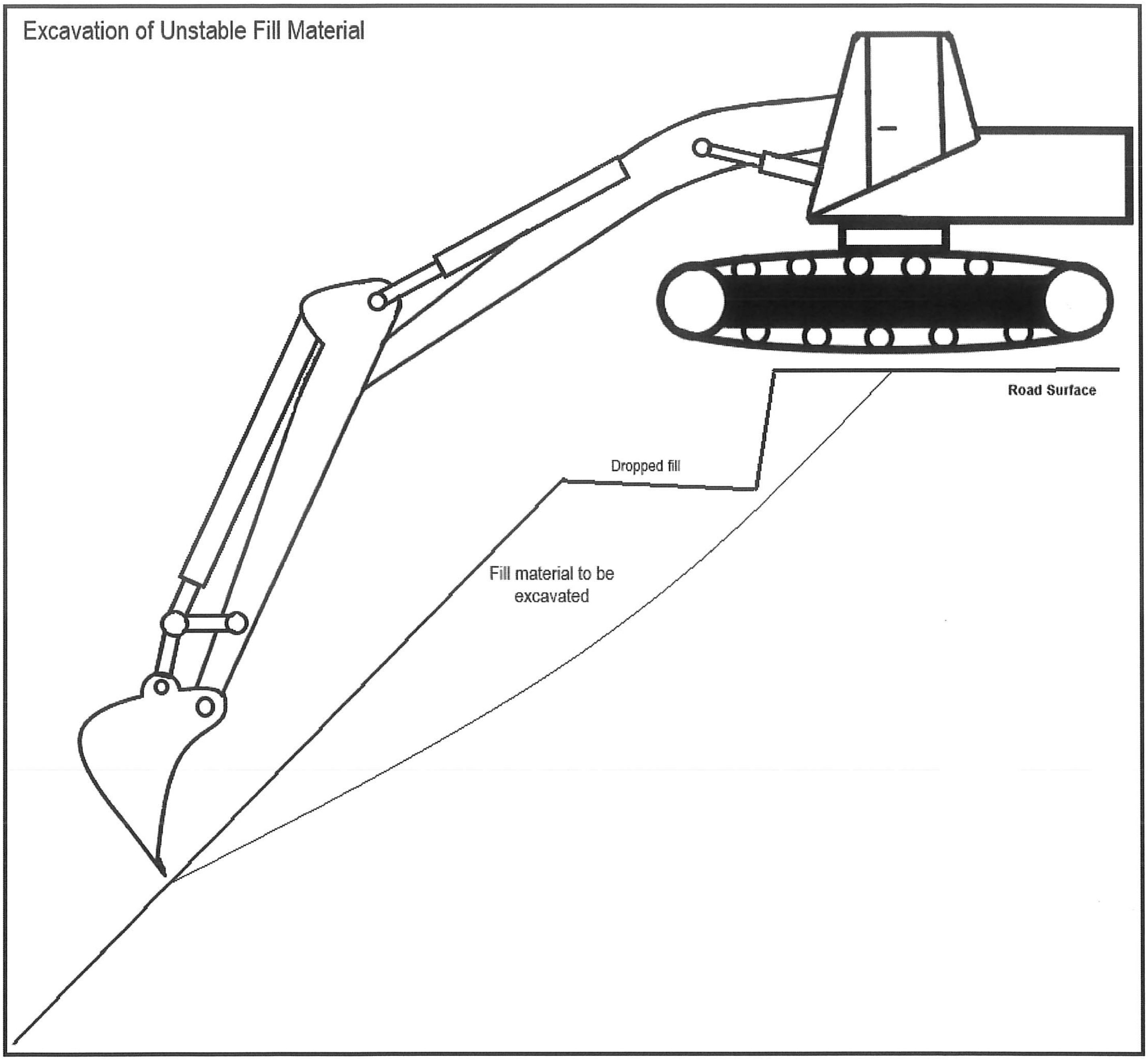
BMP: Unstable Fill Removal and Treatment

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.*

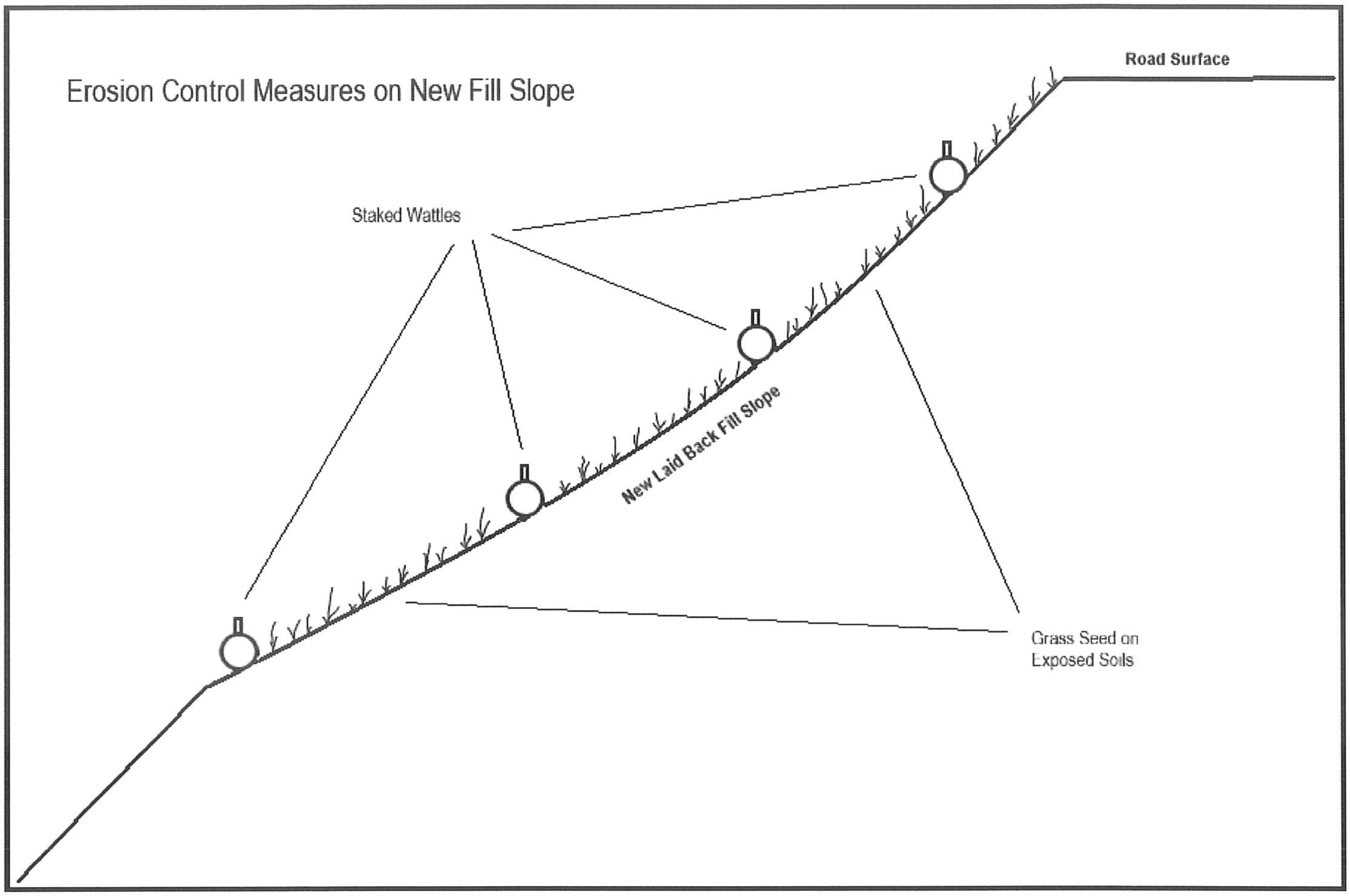
BMP: Unstable Fill Removal and Treatment



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.*

HANDBOOK FOR FOREST, RANCH AND RURAL ROADS

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.
Surface Water Runoff	Report any conditions of surface water runoff, including location, duration, source of runoff (irrigation water, storm water, etc.)
Soil Erosion Control	Report any indications of soil erosion (e.g. gullying, turbid water discharge, landslide, etc.)
Sediment Capture	Report the status of sediment capture measures (e.g. silt fence, fiber rolls, settling basin, etc.)
Erosion/Sediment Capture Maintenance	Report maintenance activities to maintain the effectiveness of erosion control and sediment capture measures (e.g. reinstallation of straw mulch,

	hydroseeding, tarp placement, removal or stabilization of sediment captured, removal of settled sediment in a basin, etc.)
Stabilization of Disturbed Areas	Report maintenance activities to maintain the effectiveness of erosion control and sediment capture measures (e.g. reinstallation of straw mulch, hydroseeding, tarp placement, removal or dischargers characterized as high risk (with any portion of the disturbed area within the riparian setbacks), shall provide a status report describing activities performed to stabilize the disturbed area within the setback
Material(s) Storage Erosion/Spills Prevention	Report materials delivered or stored at the site that could degrade water quality if discharged off-site (e.g. potting soil, manure, chemical fertilizer, gasoline, herbicides, pesticides, etc.)
Holding Tank, Septic Tank, or Chemical Toilet Servicing	Septic tank, or chemical toilet servicing report the dates, activity, and name of the servicing company for servicing holding tanks or chemical toilets

Please note the following information for the table below:

1. Constituents shall be monitored with a calibrated instrument.
2. Samples shall be representative of storm water discharging from the disturbed area.
3. Monitoring sha ll be performed during all months in which activity is occurring at the site until winterization is complete. Monitoring is not required after winterization is complete for unoccupied sites during the winter months.

The following monitoring and reporting activities are required on a monthly basis for **ALL MONTHS** until winterization procedures are completed:

Constituent	Frequency
Turbidity	Once per calendar month when precipitation exceeds 0.25 in/day or when storm water runoff from the site is generated
pH	Once per calendar month when precipitation amount is forecast to exceed 0.25 in/day

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.

NITROGEN MANAGEMENT PLAN

Tier 2 Dischargers with a cannabis cultivation area, or aggregate of cultivation areas, greater than one acre are required to submit a *Nitrogen Management Plan* (NMP). The NMP shall describe how nitrogen is stored, used, and applied to crops in a way that is protective of water quality. At a minimum, an NMP shall address the following:

1. Facility Description

   1.1. Location and Configuration

   1.1.1. Provide a description of the site, the method of growing cannabis (e.g., in ground, raised beds, grow bags, etc.).

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

   Cultivation occurs in above ground beds and smart pots.

   1.1.2. Describe the canopy area acreage (at plant maturity).

   Currently 57,300 ft^2 (2019),

   Max with full Proposed Cultivation area buildout ~65,940 ft^2

   1.1.3. Site Location Map (Provide a United States Geological Survey topographic map or similar map that shows the location, nearby water bodies, public and access roads, etc.).

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

   1.1.4. Facility Plan (Provide a scaled drawing that shows the facility, disturbed areas, cultivation areas, buildings, access roads, greenhouses, material storage areas, source of irrigation water, water storage, etc.).

   See the Site Maps, and Overview Maps (if included), in the above pages.

2. Sources of Nitrogen

2.1. Bulk Materials (Materials either used as growing medium or as amendments to the growing medium (e.g., potting soil, manure, biosolids, etc.)).

Pre-amended potting soil from Humboldt Ag Supply.

2.2. Dry Fertilizers (Materials added to a growing medium or mixed with irrigation water that provide nitrogen to the crop (e.g., bone meal, feather meal, pelletized manure or biosolids, pelletized chemical fertilizer, etc.)).

YaraLiva CALCINIT, JR Peters Inc. Jack's Professional Water-Soluble Fertilizers, Grow More High Nitrogen Fertilizer, Giles Magriculture Epsom Salt, BioSafe TerraGrow, KALIX Grow

2.3. Liquid Fertilizers (Materials added to irrigation water, or that are applied directly to the crop (e.g., fish emulsion, chemical fertilizers, etc.)).

None.

3. Nitrogen Storage, Use, and Disposal Practices

3.1. Describe when nitrogen containing materials will be delivered to the site (e.g., as needed or at the beginning of growing season).

Brought to property as needed.

3.2. Describe how bulk, dry, and liquid fertilizers will be stored.

Stored within the shipping containers with all other fertilizers and amendments.

3.3. Describe any mixing or processing area(s) of nitrogen containing materials.

Fertilizers are mixed into mixing tanks, as needed, located at each Cultivation Area.

3.4. If applicable, describe how "spent" growing medium is either removed from the site or incorporated into site soils.

The cultivator, in the spring of 2019, replaced all the growing medium being used. In the future, all growing medium soils will be amended after each cultivation season. The spent soils were given to another cultivator.

3.5. If "spent" growing medium is not removed from the site, describe how amendments are added to the existing medium to improve the nitrogen content. Describe when that process occurs.

Amendments will be tilled into the soil via a rototiller as needed. Currently the soils used have been pre-amended off-site and do not require amending.

4. Nitrogen Application Rate

4.1. Monthly Applied Nitrogen - Provide a nitrogen management worksheet that calculates the nitrogen applied per canopy acre (see attached). Note that monthly nitrogen uptake rates generally are consistent with the evapotranspiration rate.

See attached nitrogen management worksheet.

4.2. Limited Nitrogen Availability - Due to natural processes, some crops may be nitrogen limited despite applying 1.4 times the crop uptake rate. (See the *Fertilizers, Pesticides, Petroleum Products and Other Chemicals* section of the Cannabis Policy Staff Report.) Additional nitrogen may be applied if the need is demonstrated based on a plant tissue sample analysis as described in the General Order. Provide the name of the analytical or agricultural laboratory that will provide plant tissue analysis.

N/A

Table D1: Nitrogen Reporting Example, Pounds per Canopy Acre

Month	Bulk	Dry	Liquid	Rate Applied
January	0	0	0	0
February	0	0	0	0
March	0	0	0	0
April	0	5.12	0	5.12
May	0	38.9	0	36.9
June	0	63.93	0	63.93
July	0	158.62	0	158.62
August	0	0	0	0
September	0	0	0	0
October	0	0	0	0
November	0	0	0	0
December	0	0	0	0

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".

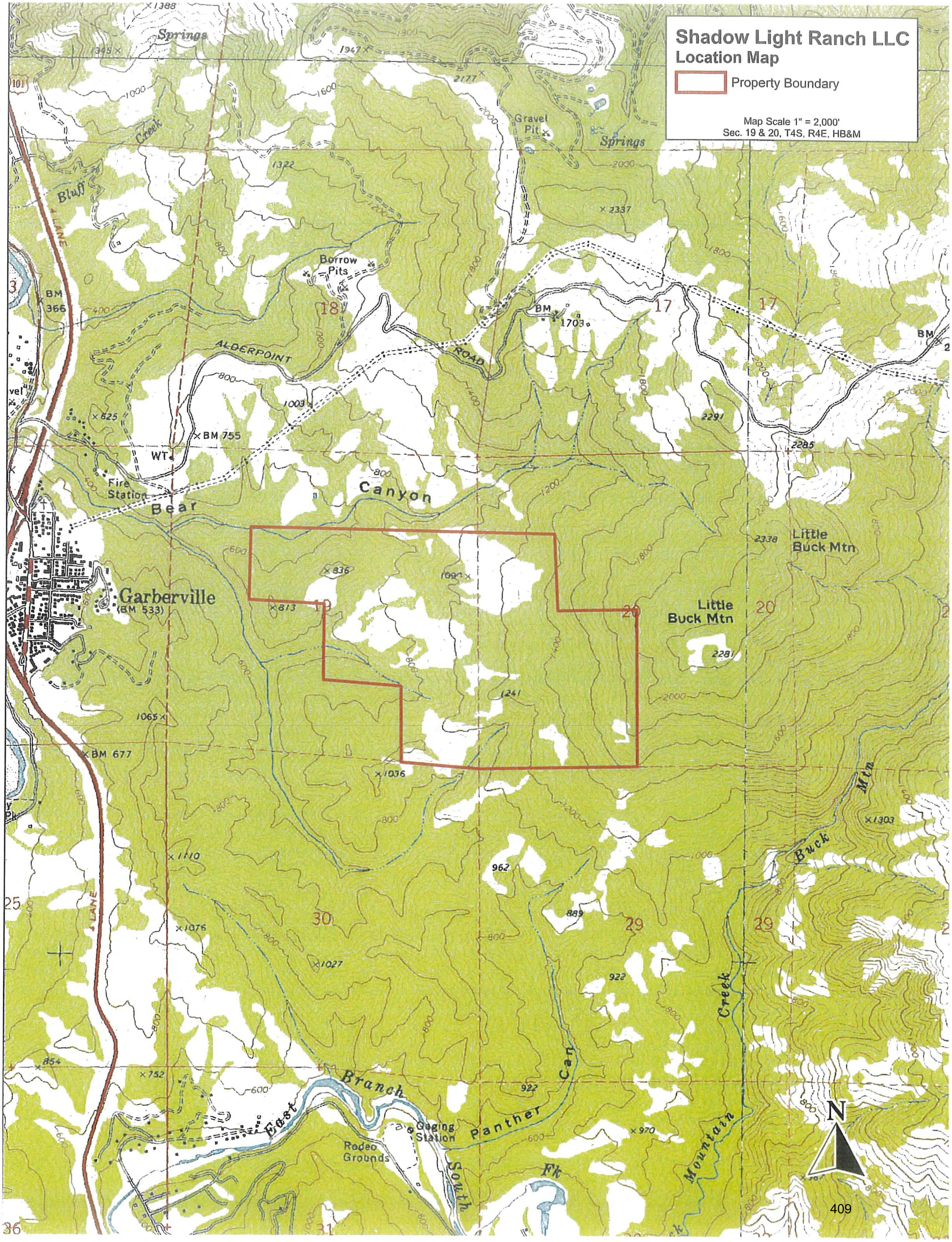
Summary

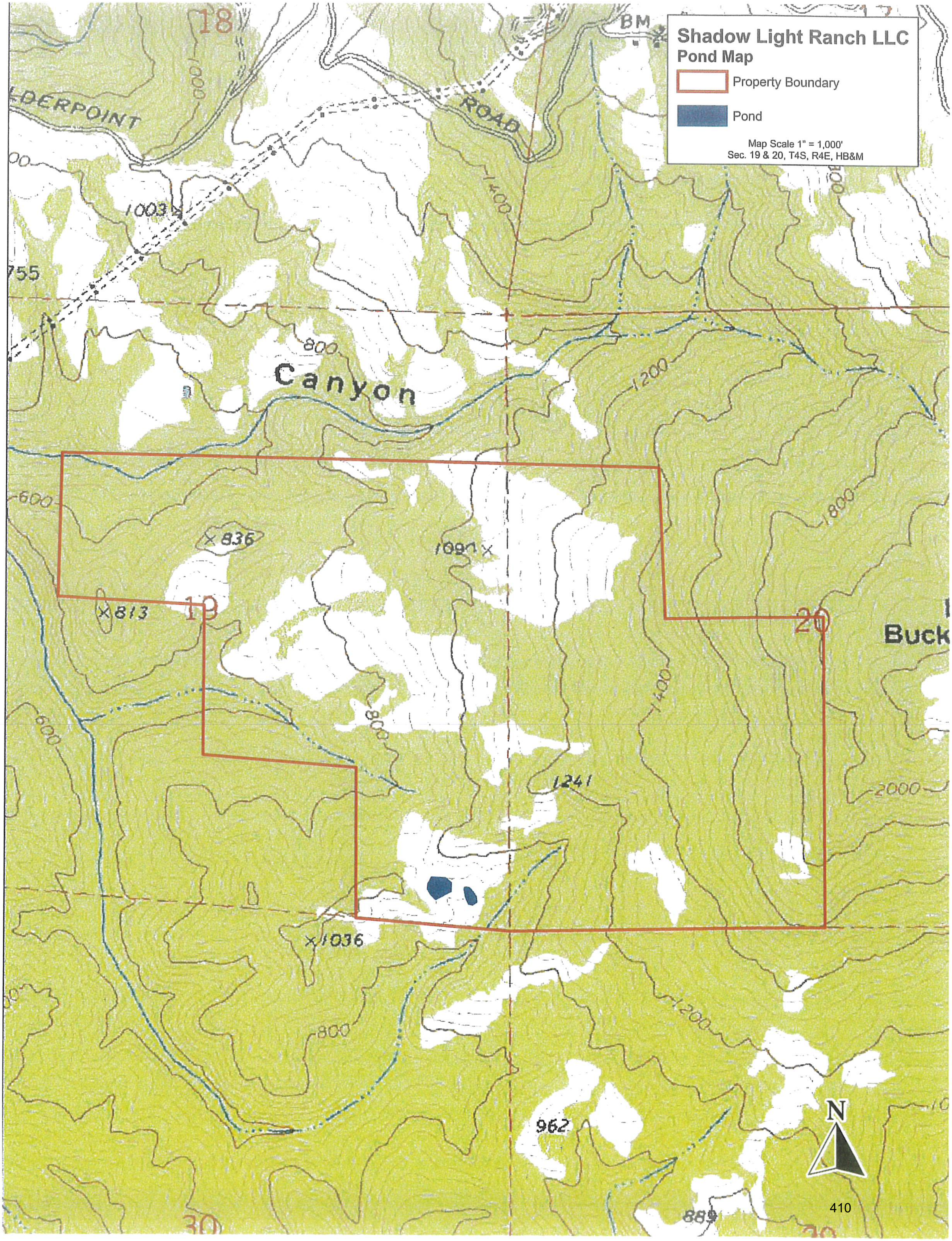
Based upon the use of historical aerial imagery, on-site physical evidence, and professional experience; the Upper Pond does not appear to have been constructed in a watercourse and is therefore not "on-stream". The Lower Pond however contains evidence to suggest it was constructed in a watercourse and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

Sincerely,

PROFESSIONAL FORESTER
Chris Carroll
Chris Carroll
No. 2628
STATE OF CALIFORNIA

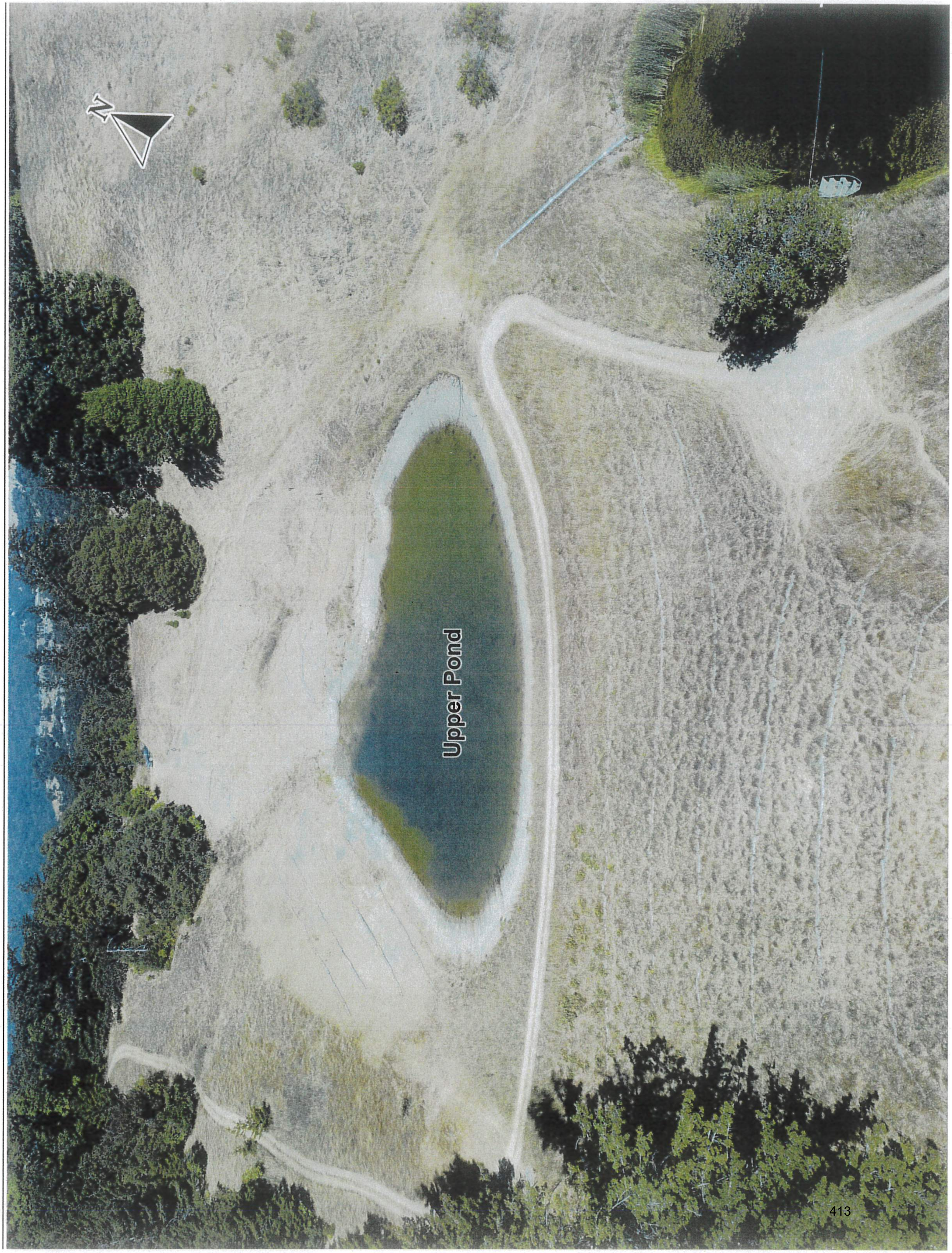
Chris Carroll, RPF #2628
Timberland Resource Consultants


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


Shadow Light Ranch LLC
Pond Map
Property Boundary
Pond
Map Scale 1" = 1,000'
Sec. 19 & 20, T4S, R4E, HB&M
N
Canyon
ROAD
BM
18
19
20
30
1003
755
800
600
1200
1400
1800
2000
836
813
1090
1241
1036
962
889
Buck


Lower Pond
Upper Pond
N


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


Upper Pond


Lower Pond
N

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

REGISTERED GEOLOGIST * GARY D. SIMPSON No. 2107 CERTIFIED ENGINEERING GEOLOGIST * STATE OF CALIFORNIA

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)	SHN Consulting Engineers & Geologists, Inc.	Shadow Light Ranch Garberville, California	Aerial With Geology SHN 018064
		September 2018 / Figure1_LocationAndGeology	Figure 1

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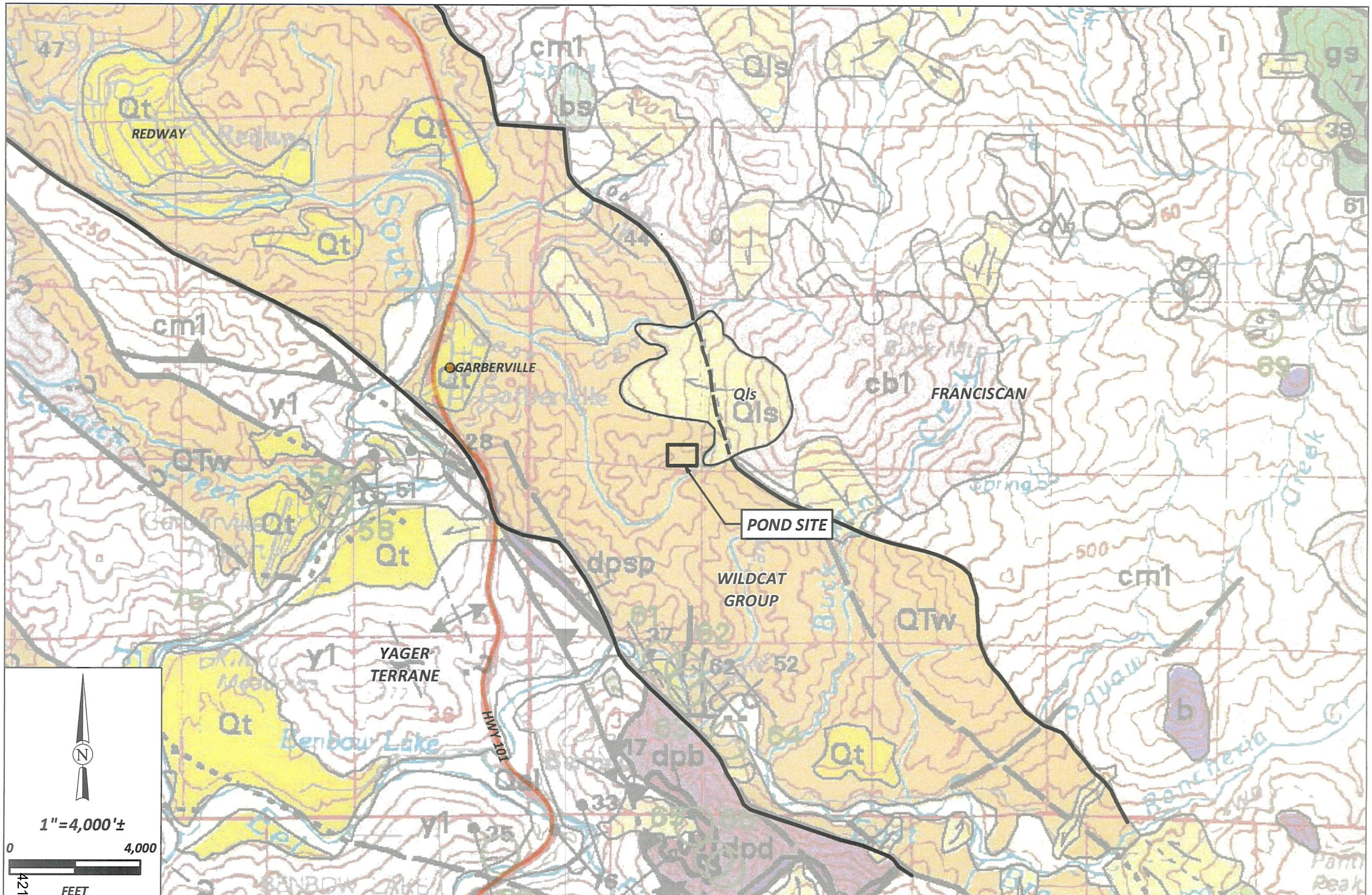

SHN Consulting Engineers & Geologists, Inc.	Shadow Light Ranch Garberville, California	Geology (McLaughlin, 2000) SHN 018064
September 2018	Figure2_Geology	Figure 2

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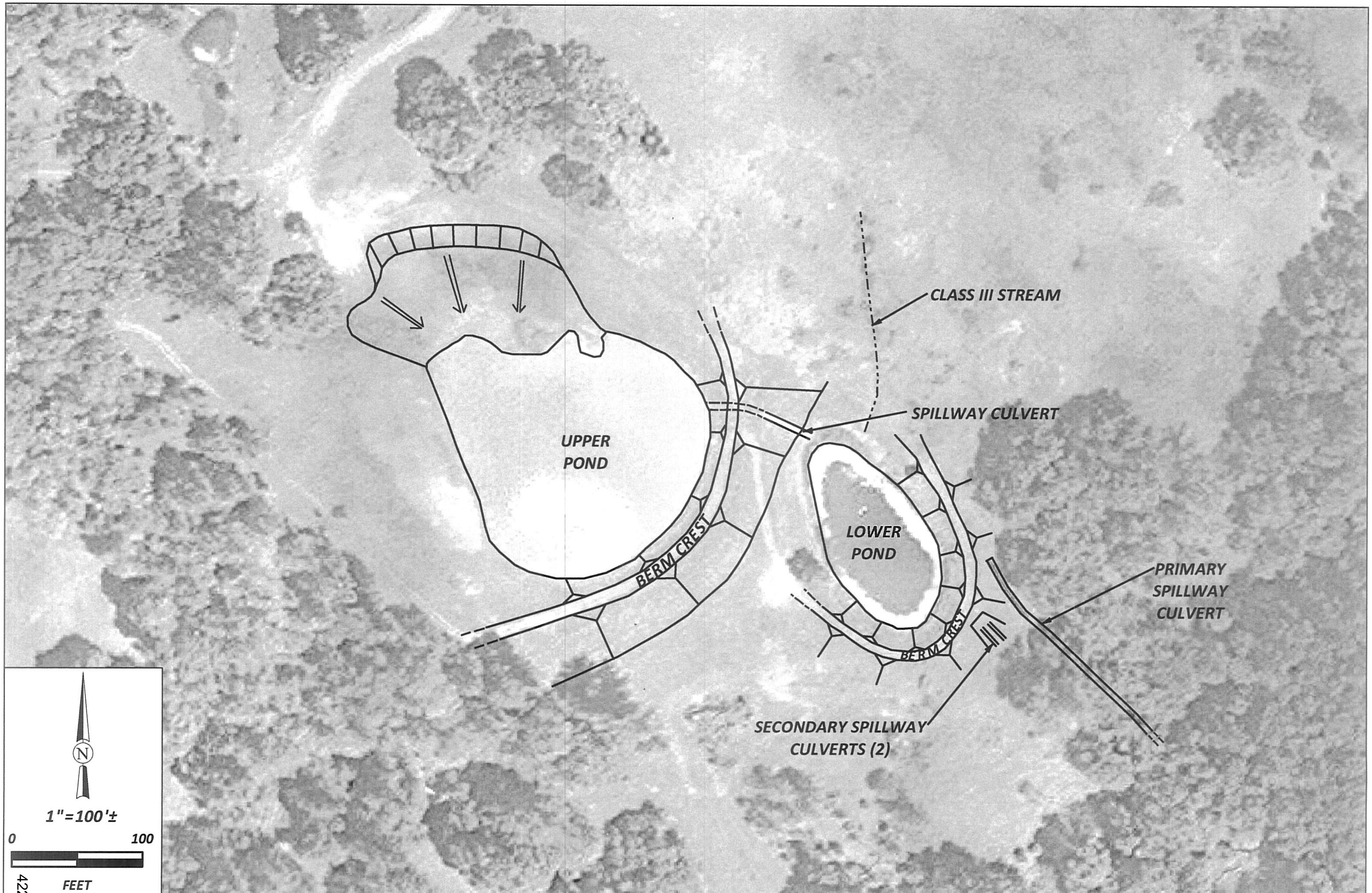


IMAGE SOURCE FROM TERRA SERVER, DATED 5/23/2018	SHN Consulting Engineers & Geologists, Inc.	Shadow Light Ranch Garberville, California	Aerial Photo Dated, 5/23/2018 SHN 018064
		September 2018 / Figure3_AerialPhoto	Figure 3

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.

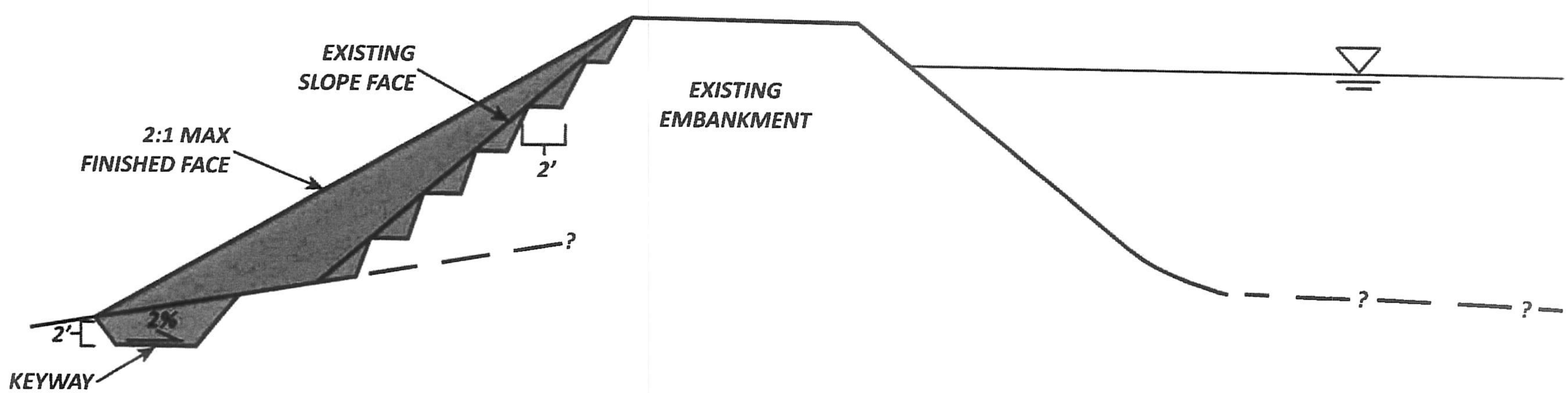
Either of these approaches will result in the removal of the erosion scar described above and mitigation of any hazard associated with it.

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

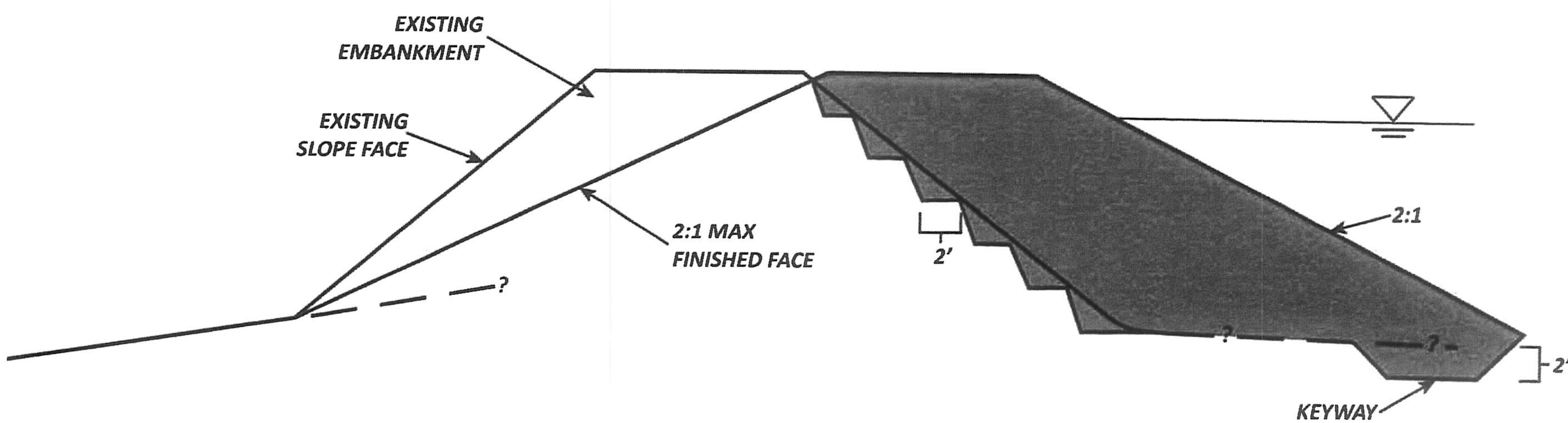
- Drain the pond prior to the onset of the project. The earthwork described herein cannot be achieved with water in the pond. Earthwork inside the existing pond will require adequate moisture conditioning (drying) to obtain suitable subgrade conditions.
- Strip and remove all existing vegetation and 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.

Path: \\eureka\projects\2018\018064-SweetGrbville\GIS\FIGURES\Figure1_EmbankmentDetails.ai User Name: psundberg DATE: 7/8/19, 3:50PM

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

Shadow Light Ranch, LLC. Embankment Details Garberville, California	Embankment Repair Options - Lower Pond SHN 018064	
July 2019	Figure1_EmbankmentDetails	Figure 1

- 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

REGISTERED GEOLOGIST
GARY D. SIMPSON
No. 2107
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Gary D. Simpson, CEG
Geosciences Director

GDS:lms

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

<u>Findings Summary</u>

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

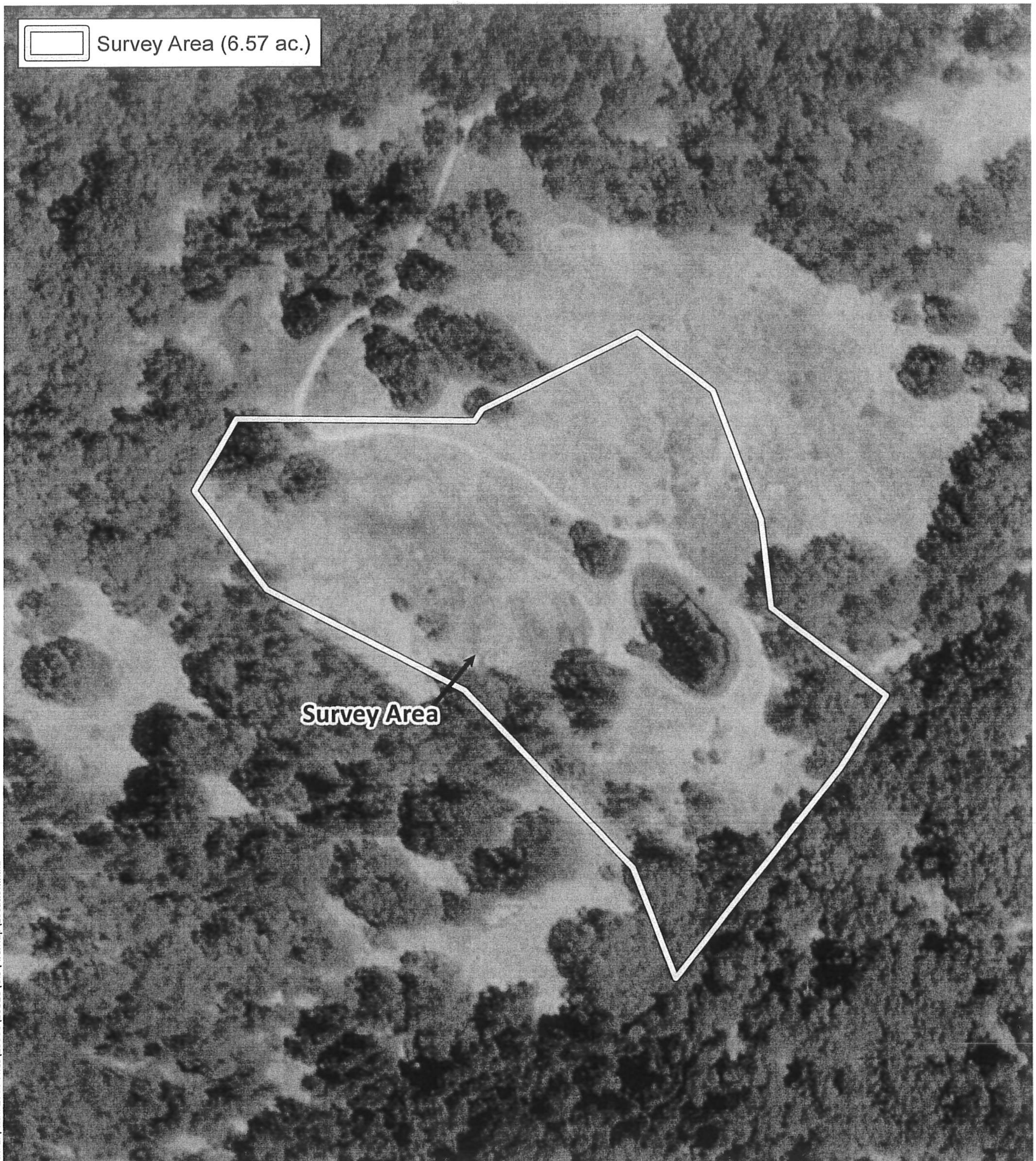
Reservoir 1

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.



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

Figure 1. Survey Area

Shadow Light Ranch
Humbolt County, California

0 50 100 Feet

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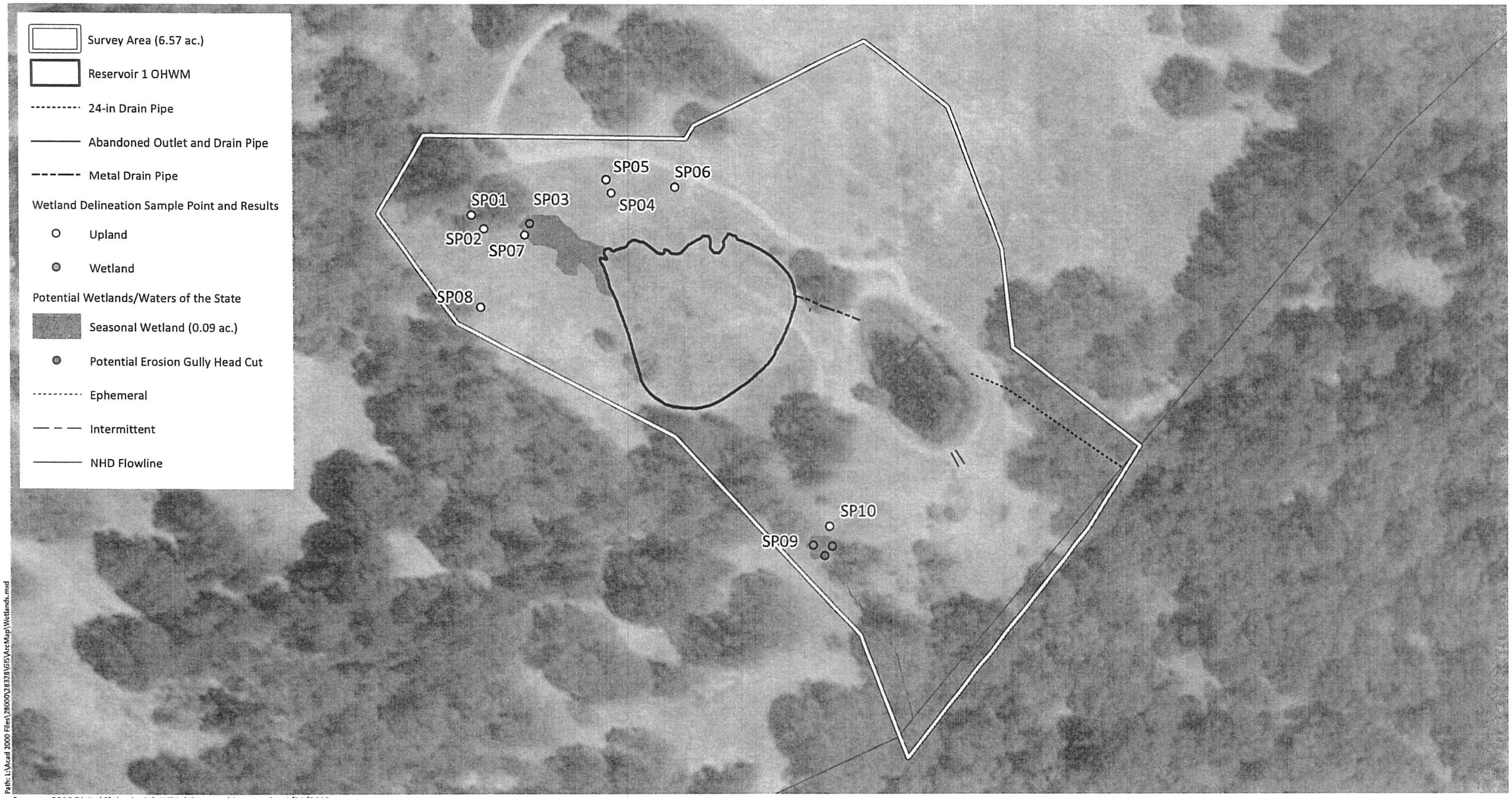

Sources: 2016 DigitalGlobe Aerial, WRA | Prepared By: njander, 1/31/2019

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

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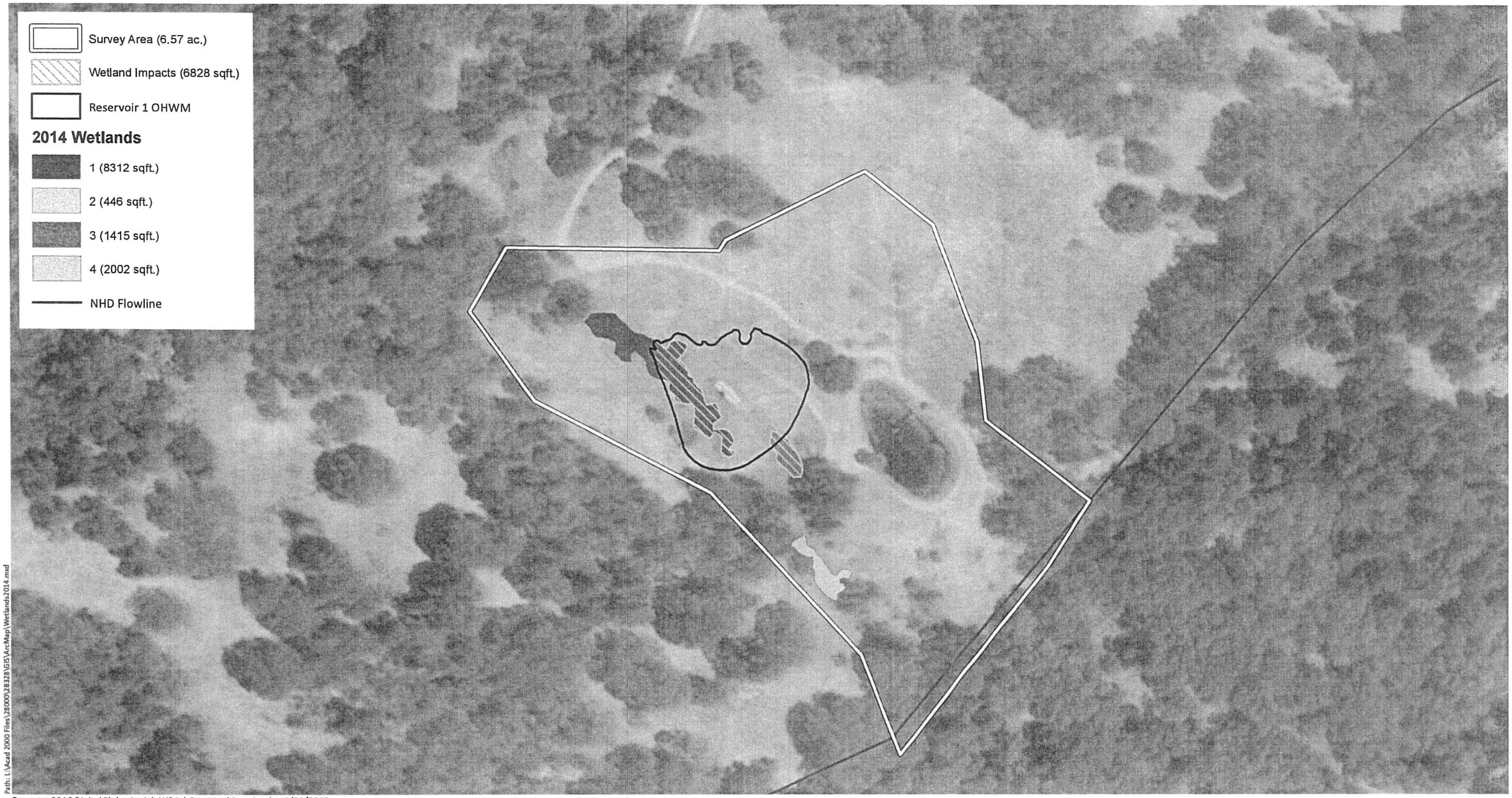
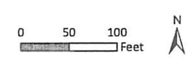


Sources: 2016 DigitalGlobe Aerial, WRA | Prepared By: njander, 1/31/2019

Figure 3. Wetlands Delineation

Shadow Light Ranch
Humbolt County, California



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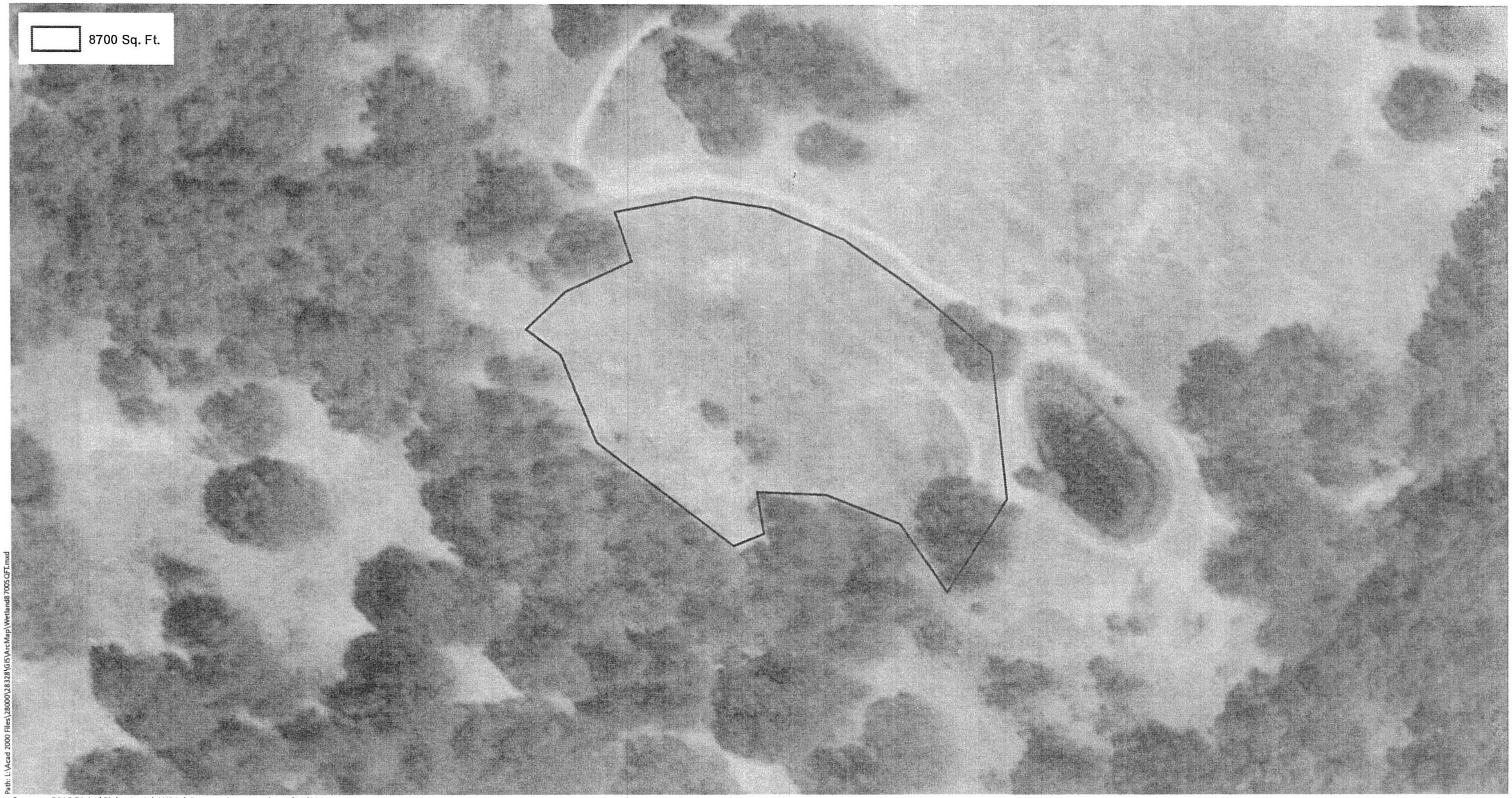

Sources: 2016 DigitalGlobe Aerial, WRA | Prepared By: njander, 1/28/2019

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
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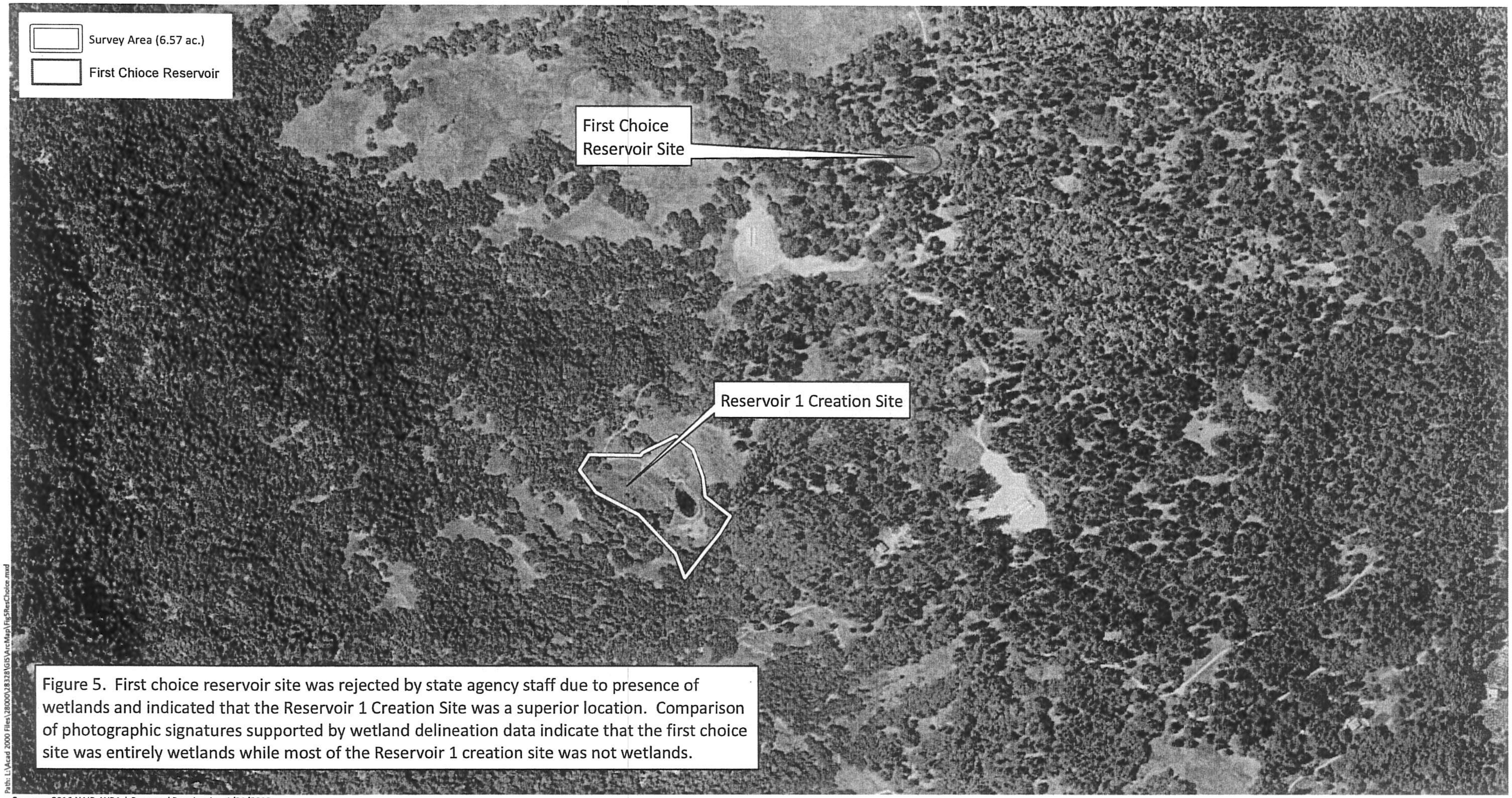

Figure 5. First choice reservoir site was rejected by state agency staff due to presence of wetlands and indicated that the Reservoir 1 Creation Site was a superior location. Comparison of photographic signatures supported by wetland delineation data indicate that the first choice site was entirely wetlands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

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

Shadow Light Ranch
Humbolt County, California

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ENVIRONMENTAL CONSULTANTS

Sources:ESRI, USGS, WRA | Prepared By: njander, 1/31/2019

Figure 6 USGS Map and Survey Area

Shadow Light Ranch
Humbolt County, California

0 50 100 Feet

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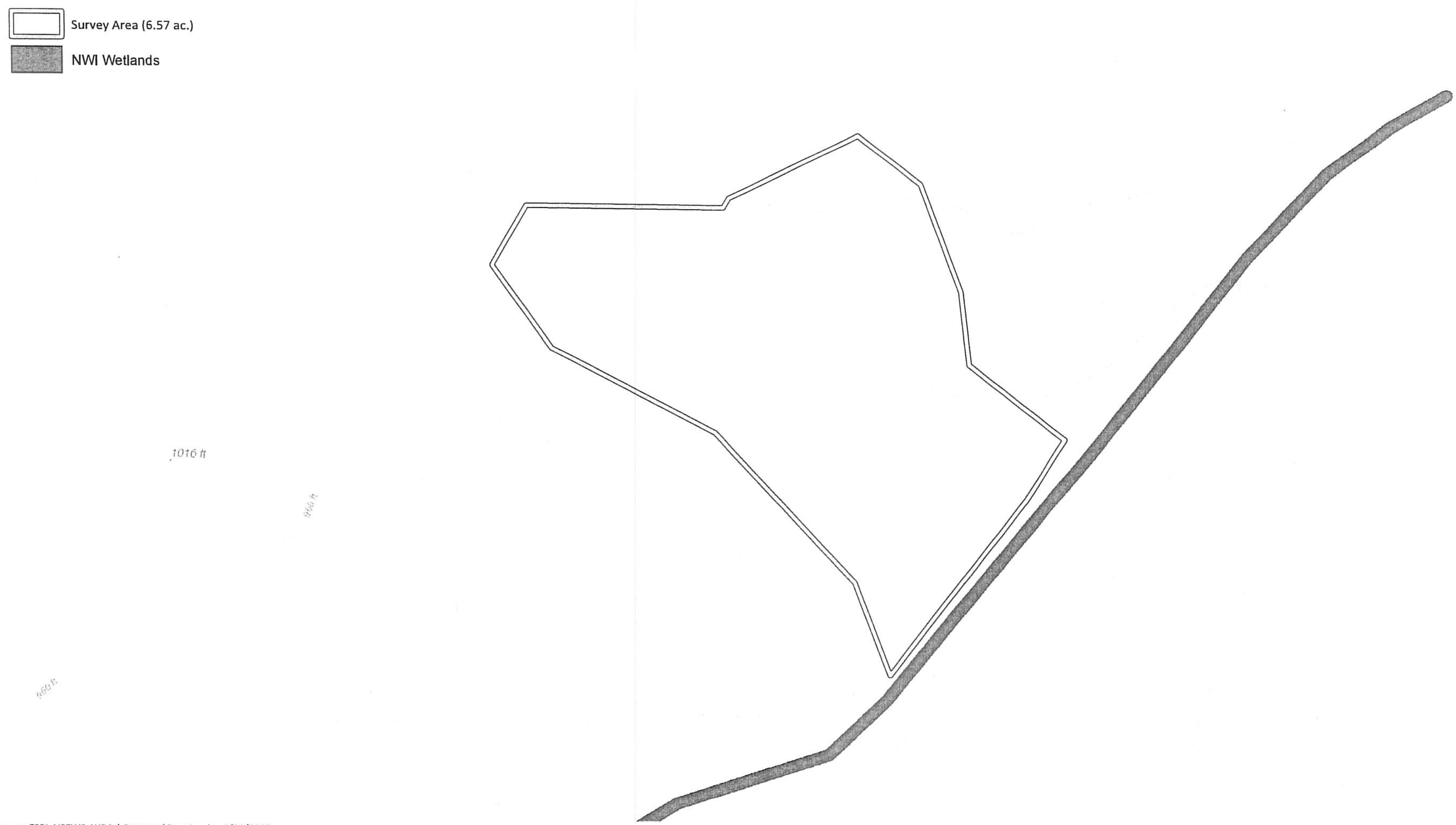

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Sources:ESRI, USFWS, WRA | Prepared By: njander, 1/31/2019

Figure 7. National Wetlands Inventory and Survey Area

Shadow Light Ranch
Humbolt County, California

0 50 100
Feet

N

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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 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 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)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM Plot Size: 10'x10'			
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 (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	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 (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	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
Hydric Soil Present?	☐ Yes	☒ No
Wetland Hydrology Present?	☐ Yes	☒ No

Is the Sampled Area within a Wetland? ☐ **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)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM Plot Size: N/A			
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 (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	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
Hydric Soil Present?	☐ Yes	☒ No
Wetland Hydrology Present?	☐ Yes	☒ No

Is the Sampled Area within a Wetland? ☐ 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 %	Type[1]	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 (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	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 (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	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
Hydric Soil Present?	☒ Yes	☐ No
Wetland Hydrology Present?	☒ Yes	☐ No

Is the Sampled Area within a Wetland? ☒ **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)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM Plot Size: N/A			
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 (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	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)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM Plot Size: N/A			
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[2]	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

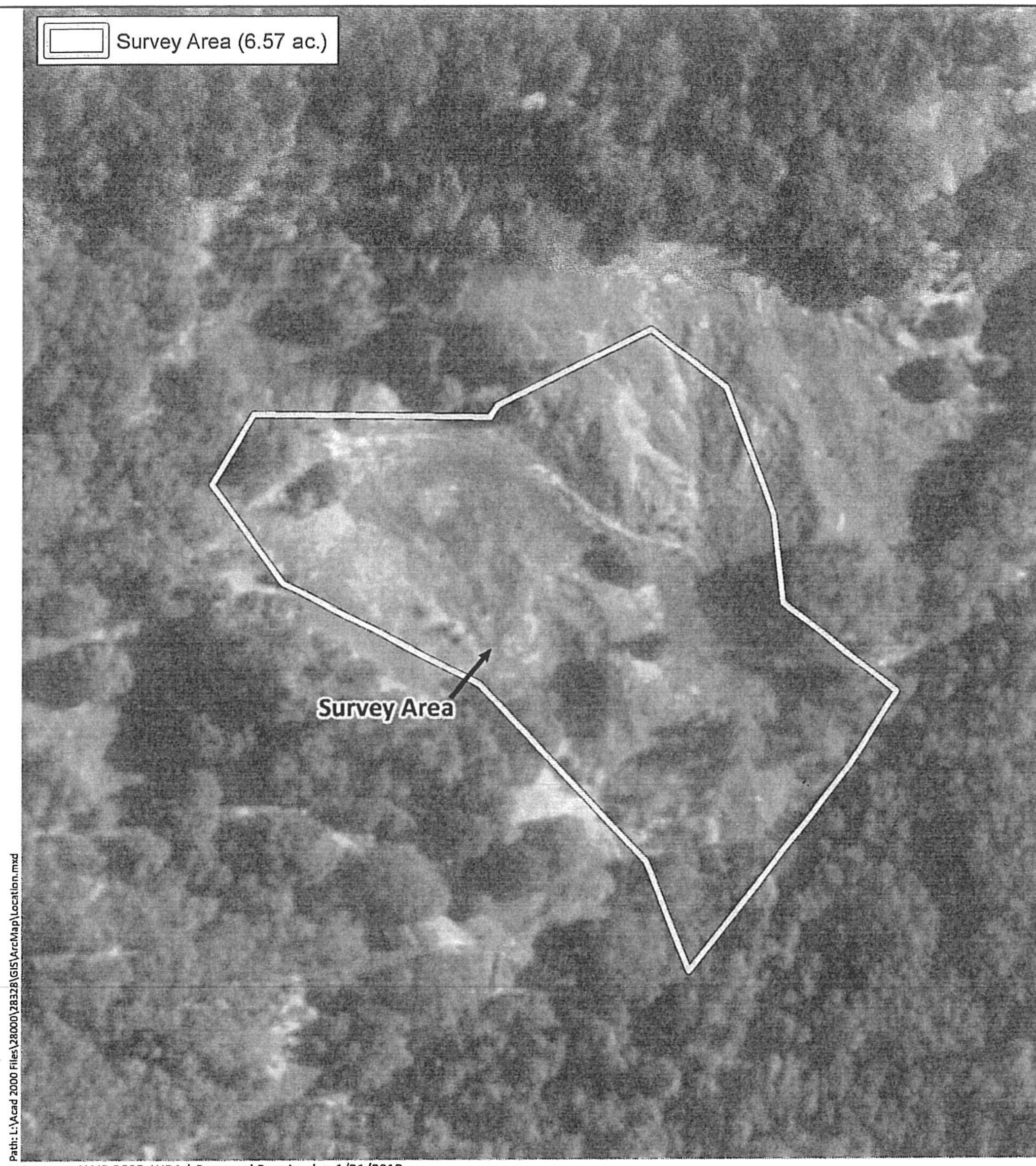
Wetland Hydrology Present ? ☐ Yes ☒ No

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



Sources: NAIP 2005, WRA | Prepared By: njander, 1/31/2019

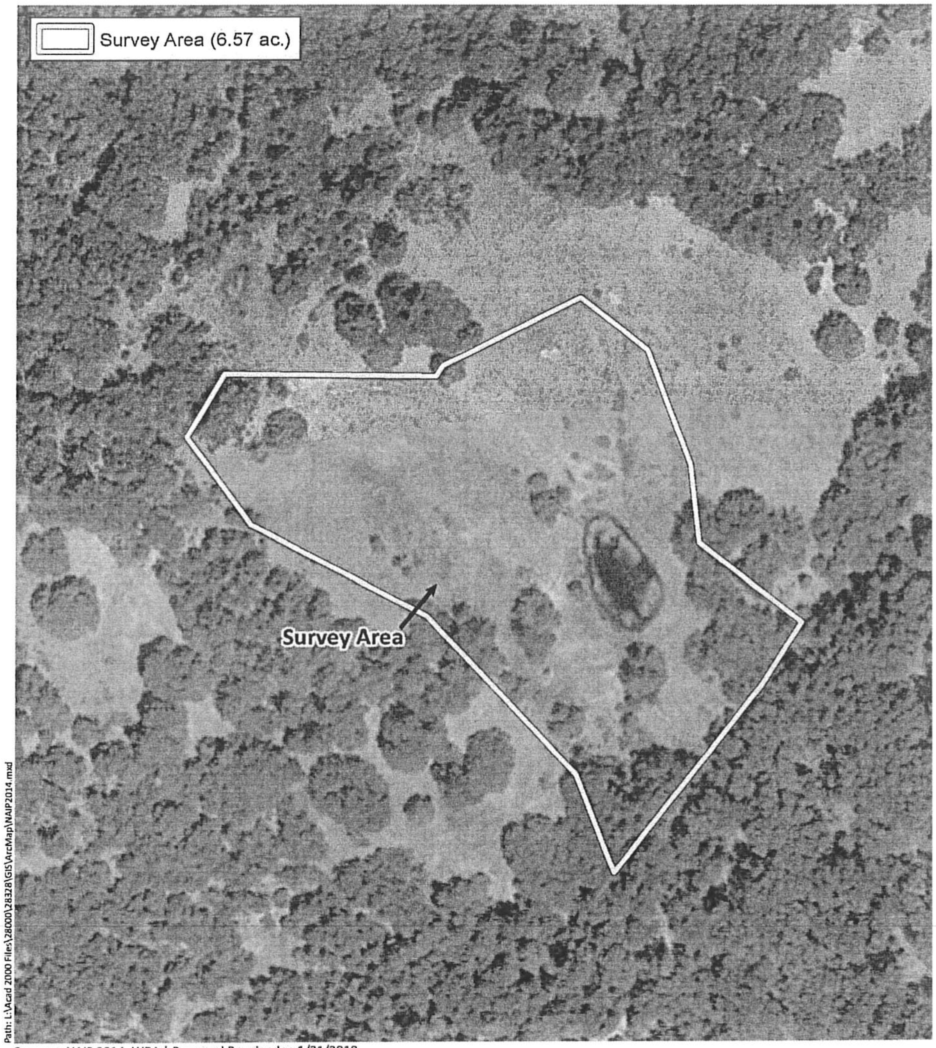
Photograph 1. 2005 NAIP Imagery

Shadow Light Ranch
Humbolt County, California

0 50 100 Feet

N

wra



Sources: NAIP 2014, WRA | Prepared By: njander, 1/31/2019

Photograph 2. 2014 NAIP Imagery

Shadow Light Ranch
Humbolt County, California

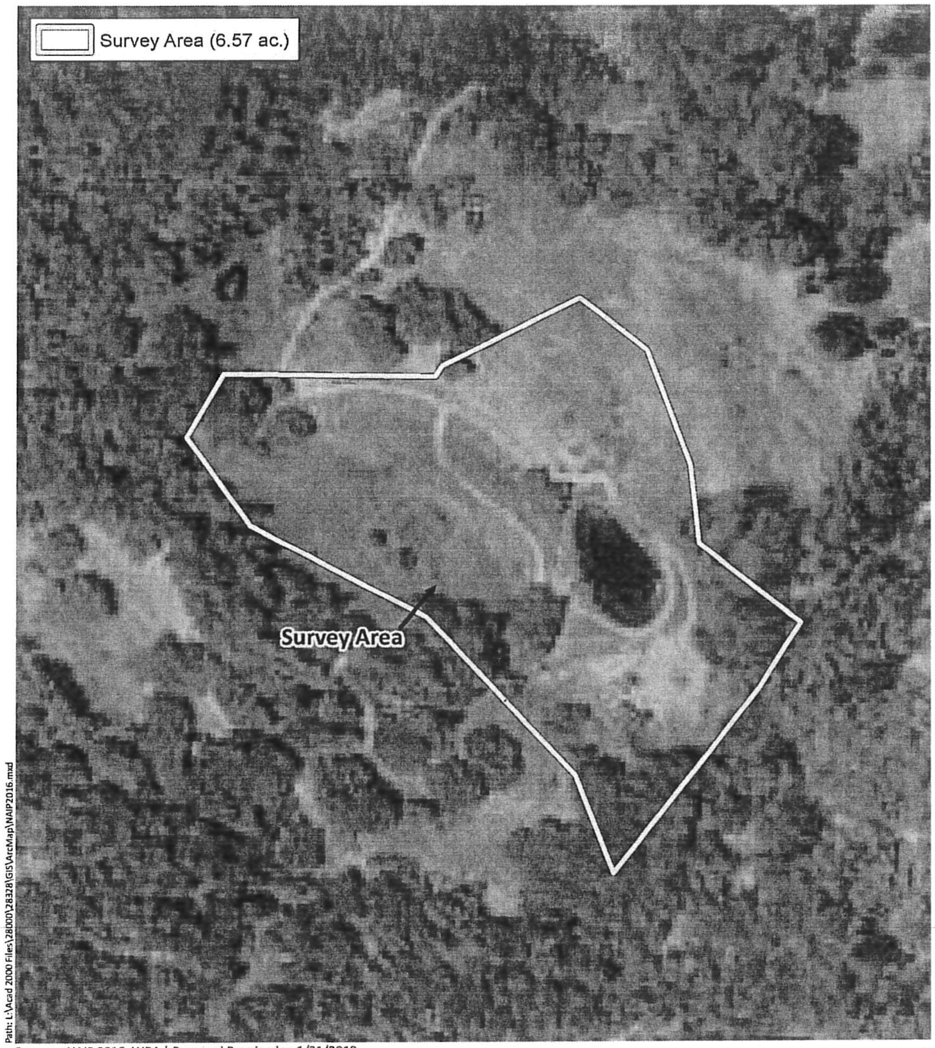
0 50 100 Feet

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.



Path: L:\Acad 2000 Files\28000\28328\GIS\ArcMap\NAIP2016.mxd

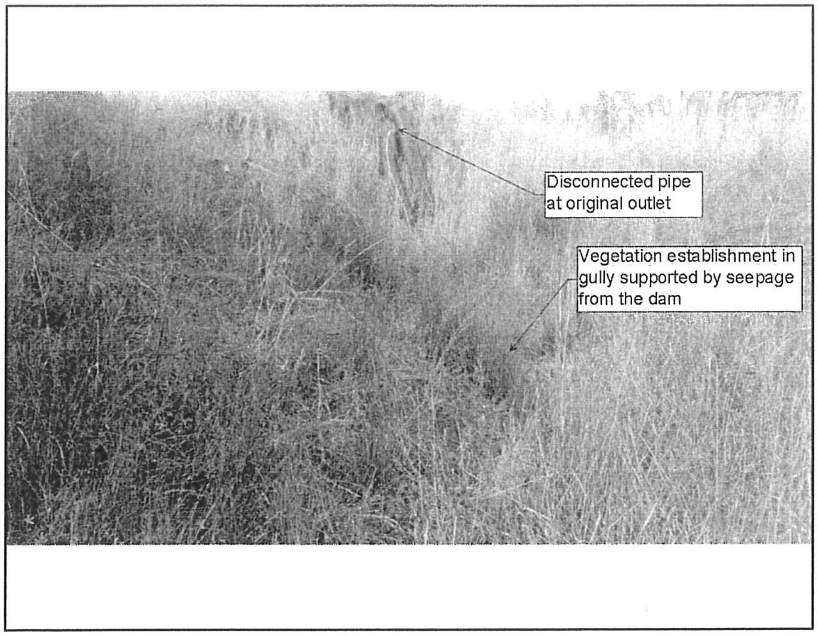
Sources: NAIP 2016, WRA | **Prepared By:** njander, 1/31/2019

Photograph 5. 2016 NAIP Imagery

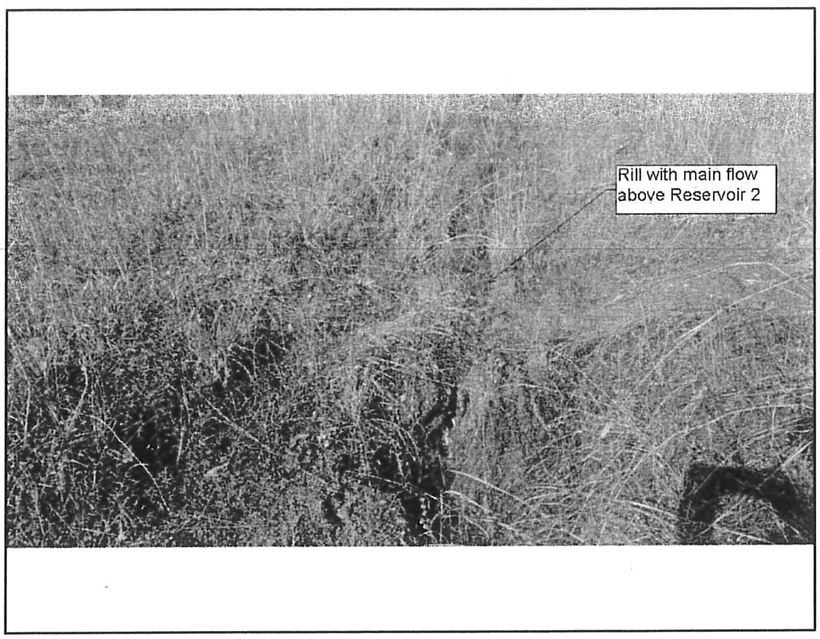
Shadow Light Ranch
Humbolt County, California

0 50 100 Feet N

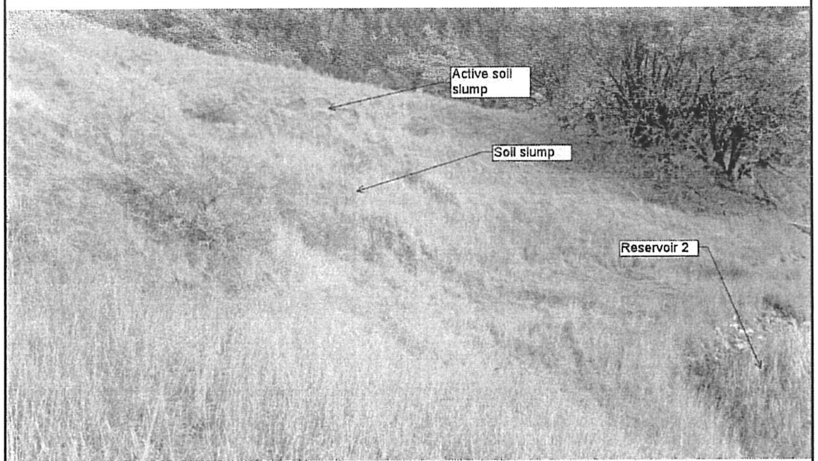
wra ENVIRONMENTAL CONSULTANTS



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.

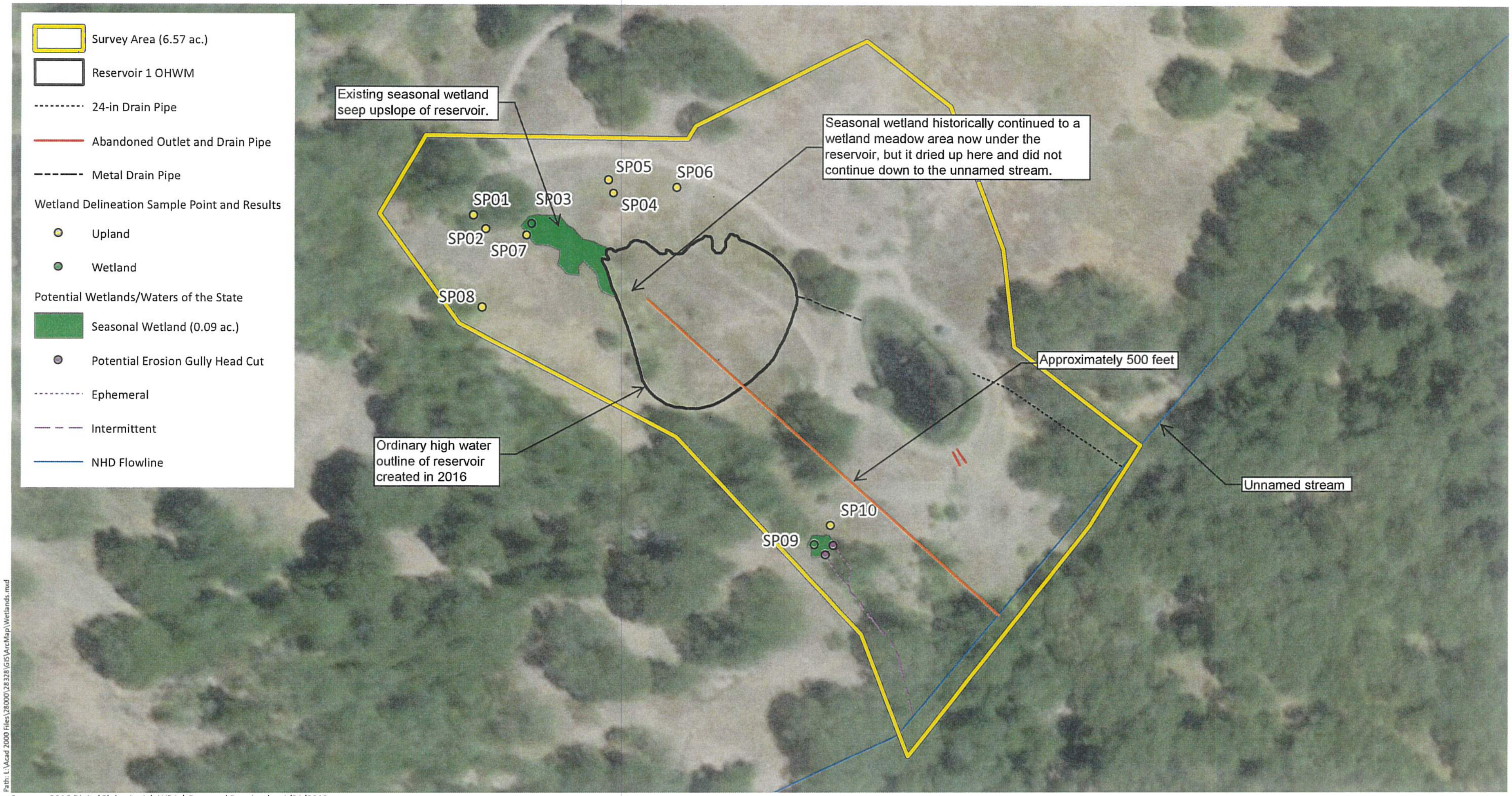
Sources: 2016 DigitalGlobe Aerial, WRA | Prepared By: njander, 1/9/2019

Figure X. Study Area

Shadow Light Ranch
Humbolt County, California

0 200 400 Feet
N

wra ENVIRONMENTAL CONSULTANTS

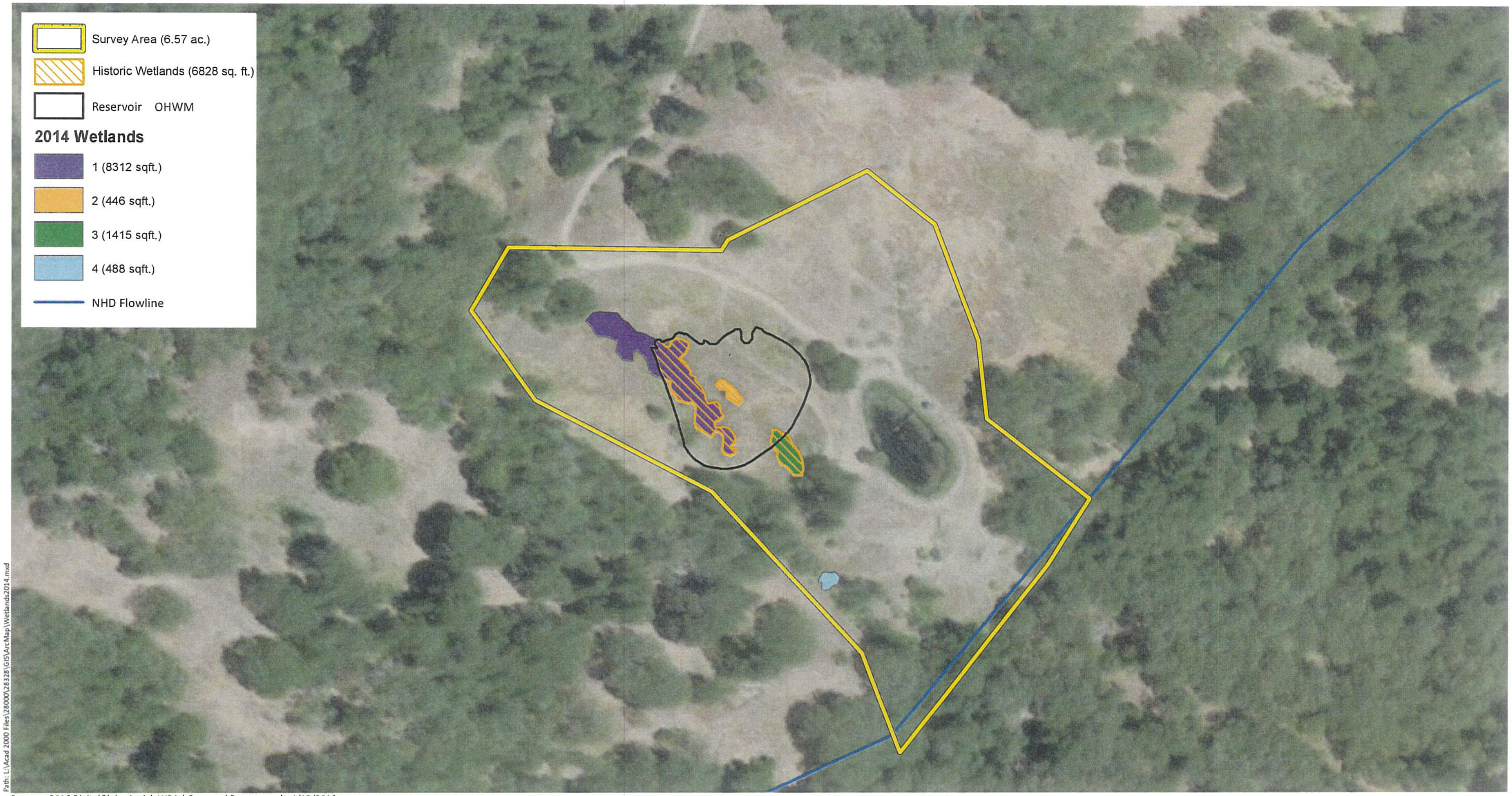


Sources: 2016 DigitalGlobe Aerial, WRA | Prepared By: njander, 1/31/2019

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



Sources: 2016 DigitalGlobe Aerial, WRA | Prepared By: czumwalt, 4/12/2019

Figure 3. Wetlands Delineation

Shadow Light Ranch
Humbolt County, California

0 50 100 Feet N

wra ENVIRONMENTAL CONSULTANTS

Photographs

Photo Dates: July 18th, 2019 and July 30th, 2019

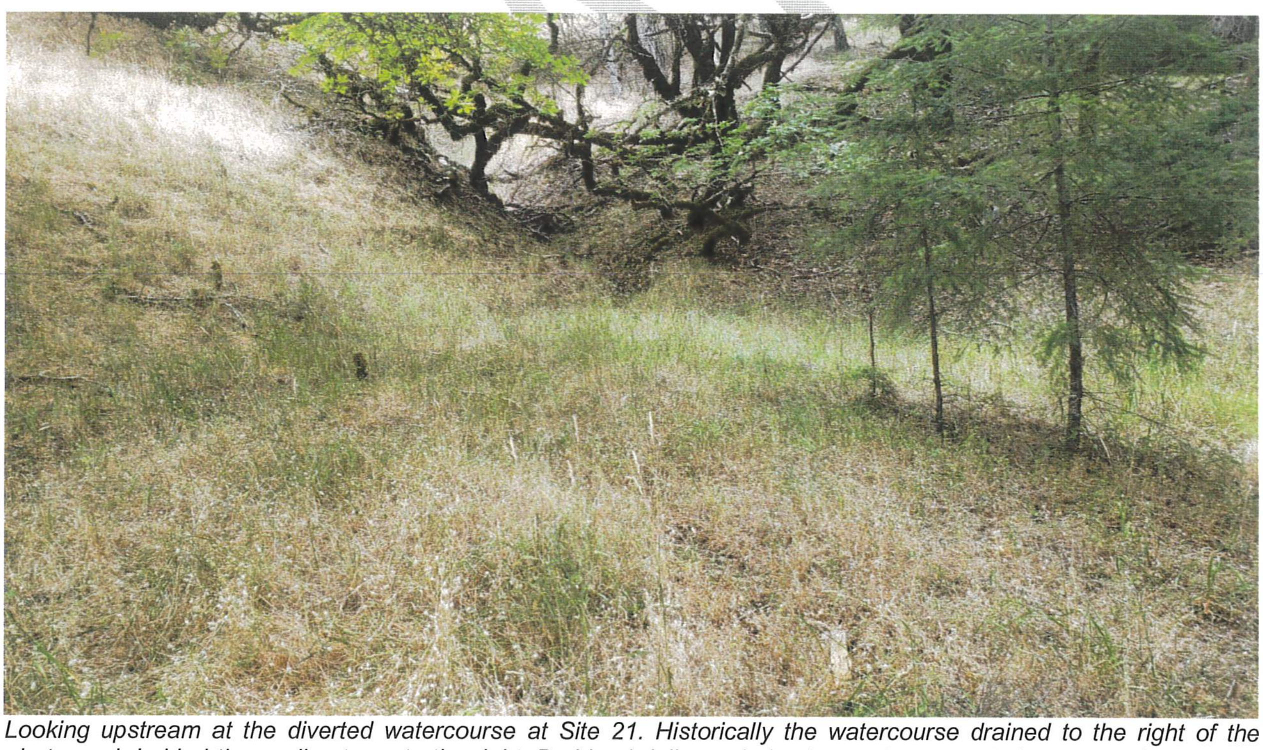
Undefined watercourse at Site 13 looking up stream.

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.

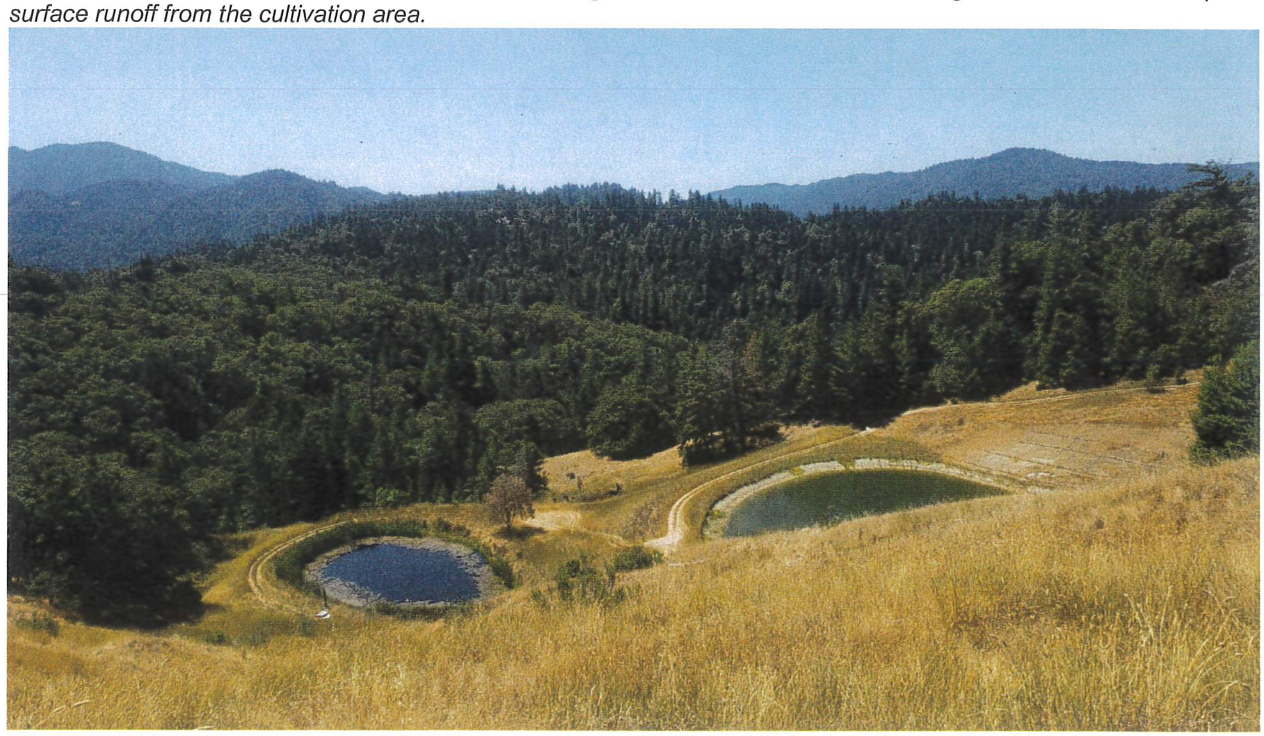
Looking down stream of the diverted watercourse at Site 21.

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).

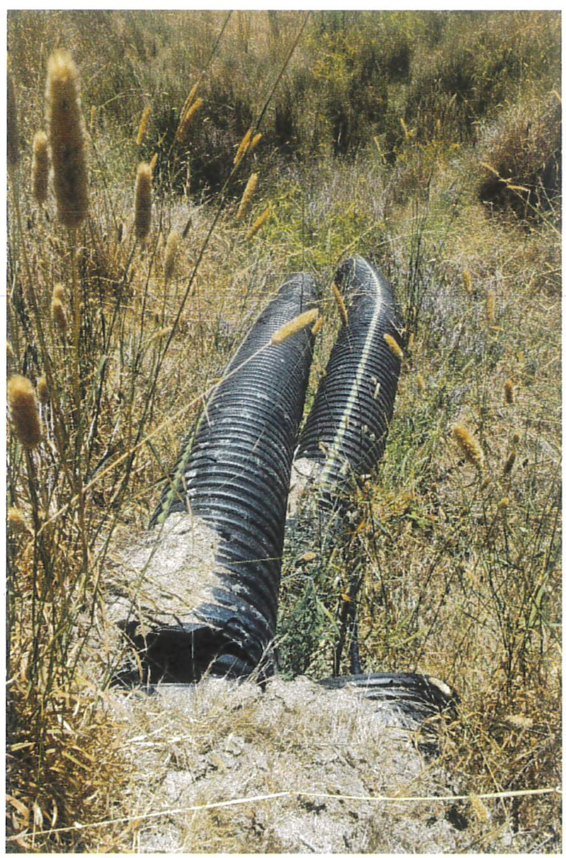
Photograph of the Upper Pond (Off-stream rain catchment) looking down slope at Site 36 and 37.

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.



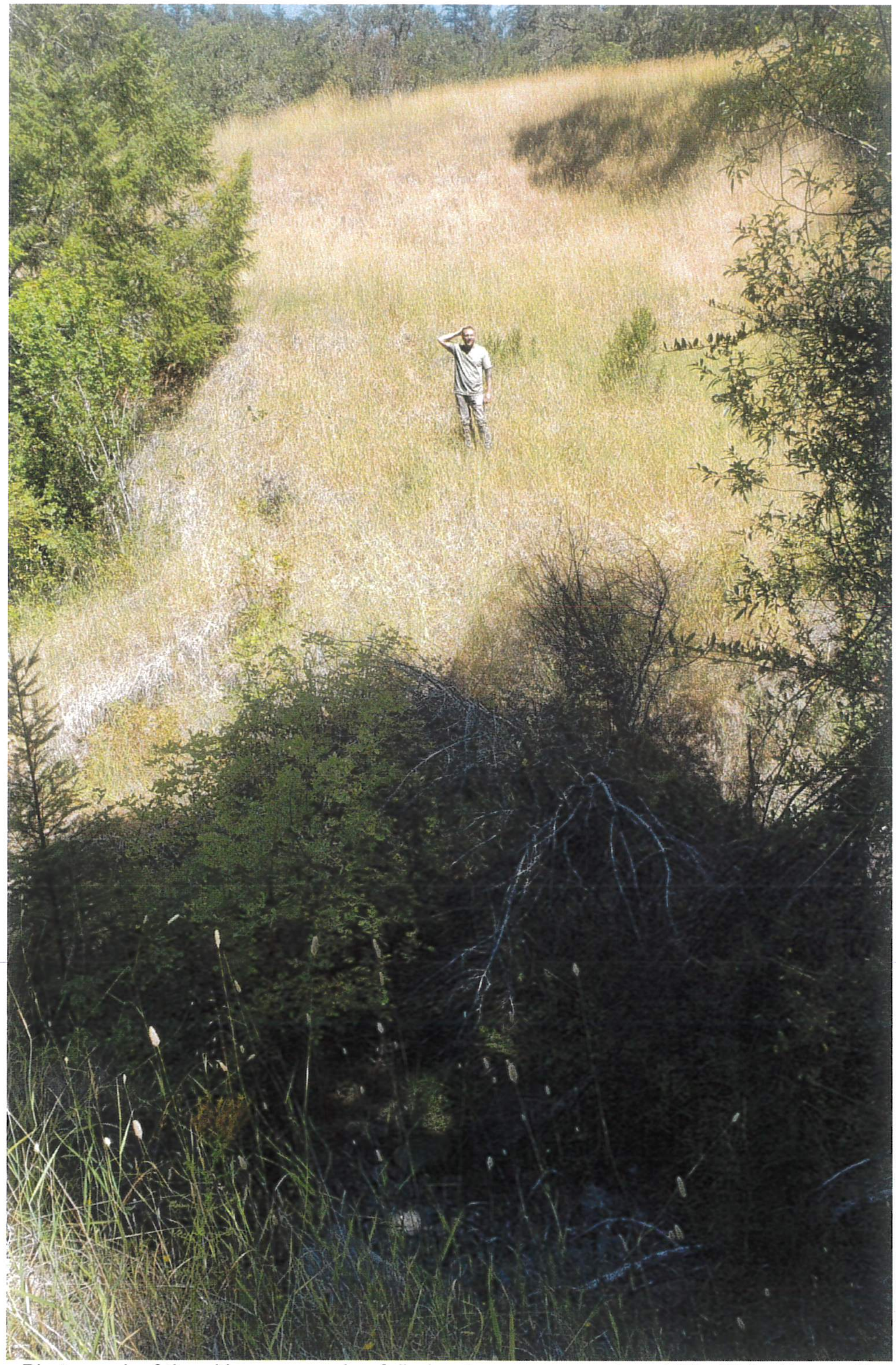
Photograph of the failing secondary spillway at Site 39. This spillway is to become the primary spillway after reconstructing of the pond embankment and installation of an anchored 24" culvert spillway.


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.

Power and Generators Plan
The Hills LLC
Apps#11638
October 4, 2021

Power Plan

Power is currently provided by generators. See siteplans for locations. Power is proposed to be provided by PGE using its renewable energy rate to power Zone 1, Zone 2, Roadside, and the processing facility campus. Rockpit will be served by solar to power direct-drive fans with small battery backup to power security system (camera, motion sensors, etc).

The proposed cultivation operation will utilize generators to power string lights in the mixed light greenhouse structures, nursery operations and structures until PGE power is available. PGE. PGE application has been submitted and engineered plans have been submitted to the building department.

Applicant believes he is on the delivery list as soon as the project is approved based on the executed contract he holds however barring an unforseen issues, PGE is in process of upgrading the Garberville substation and should be able to provide power by the end of 2024.

The well pump, Building A and the residence as well as greenhouse string lights and fans in Zone 1 are currently powered by the generators as outlined below. Interim generator usage is proposed for Building B and Building C during drying operations. Operator will install solar panels for day to day use but will be utilizing generators during peak power demand during the drying season. Operator will work to minimize the need for new generators as power usage for the mixed light is only needed.

A solar array will be developed for the proposed Rock Pit area. PGE power will be trenched to Zone 2 and Roadside to power fans and eventually automated greenhouse light deprivation systems.

It is anticipated that generators will only be utilized for back-up purposes if PGE power is down once grid service is installed. An outline of the generators currently utilized is provided below along with an analysis of the noise generation and mitigation.

Generators Utilized
Whisperwatt DCA-25SSIU4F (Stored at the existing Building A and transported used at Zone 1 as needed in the early season for string lights)
65 decibels at 23' = 52.2 at 100'*

Whisperwatt DCA-45SSIU4F (Stored at the existing Building A and transported used at Zone 1 as needed in the early season for string lights)
58 decibels at 23' = 45 at 100'*

Honda 6500is (Located at and powers Residence)
60 decibels at 23' = 47.2 at 100'*

Honda 5000SX (Located at and powers the existing Building A)
66 decibels at 23' = 53.2 at 100'*

Honda eu2000i (Portable, moved as needed to power mixers at mixing tanks or in Zone 1 greenhouses)
59 decibels at 23' = 46 at 100'*

Kubota GL11000 (Located at and powers Well)
68 decibels at 23' = 52.2 at 100'*

*(see appended inverse square law calculation and generator specifications, estimate at full load)

Mitigation in the form of an enclosure or a load analysis will be provided for all generators that exceed the 50 decibel limit to ensure the decibels generator or reduced or that the generator will never run at full load to bring the noise generation down to meet the limit of 50 decibels at 100 feet.

Back Up Generators in Final Phase
Once PGE service has been provided, it is anticipated that back up generators will be located at Zone 1 and at the processing facility campus (Julian Berg plans, buildings A,B,C,D). The sizing of these back up generators has not been finalized but they will be mitigated using appropriate containment structures for noise and secondary containment in the case of any leaks.

Power Usage by Month
See below for an outline of where power is used. This serves as an overview of the anticipated interim usage of generators until PGE service is delivered to the site (~12-24 months from date of approval) as well as emergency usage if grid power goes off-line once power is delivered to the site.

January
12-18 hours – Nursery activities
8-10 hours (Daytime) – Processing
Pumping well water (Daytime) – 1 hour
Powering lights 12-18 hours

February
Pumping well water to fill tanks. 3 hours a day 3-4 times a week until storage tanks are full.
Emergency generator activity is never expected to be utilized this month as there is sufficient time before season begins to "wait out" any power outage.
12-18 hours – Nursery activities
8-10 hours (Daytime) – Processing
Pumping well water (Daytime) – 1 hour
Powering lights 12-18 hours

March
Pumping well water to fill tanks. 3 hours a day 3-4 times a week until storage tanks are full.
Emergency generator activity is never expected to be utilized this month as there is sufficient time before season begins to "wait out" any power outage.
12-18 hours – Nursery activities
8-10 hours (Daytime) – Processing
Pumping well water (Daytime) – 1-2 hours
Powering lights 12-18 hours

April
Pump water from well. Water starts. 2 hours a day 3-4 times a week during daytime hours.
Supplemental string lights 4.5 to 5 hours per day (can be powered off solar if PGE is down)
12-18 hours – Nursery activities
8-10 hours (Daytime) – Processing
Pumping well water (Daytime) – 1-2 hours
Powering lights ~12 hours

May
Pump water from well. Water plants. 2 hours a day 3-4 times a week during daytime hours.
Supplemental string lights 4.5 to 3.5 hours per day, decreasing as month goes on (can be powered off solar if PGE is down)
12-18 hours – Nursery activities

24 hours – Processing and drying
Pumping well water (Daytime) – 1-2 hours
Powering lights 8 hours

June
Pump water from well. Water plants. 3 hours a day 5-7 times a week during daytime hours.
12-18 hours – Nursery activities
24 hours – Processing and drying
Pumping well water (Daytime) – 1-2 hours
Powering lights ~6 hours

July
Pump water from well. Water plants. 3 hours a day 5-7 times a week during daytime hours.
12-18 hours – Nursery activities
24 hours – Processing and drying
Pumping well water (Daytime) – 1-2 hours
Powering lights ~6 hours

August
Pump water from well. Water plants. 3 hours a day 5-7 times a week during daytime hours.
12-18 hours – Nursery activities
24 hours – Processing and drying
Pumping well water (Daytime) – 1-2 hours
Powering lights ~6 hours

September
Pump water from well. Water plants. 3 hours a day 3-4 times a week during daytime hours.
12-18 hours – Nursery activities
24 hours – Processing and drying
Pumping well water (Daytime) – 1-2 hours
Powering lights ~8 hours

October
12-18 hours – Nursery activities
24 hours – Processing and drying
Pumping well water (Daytime) – 1-2 hours
Powering lights ~12 hours

November
12-18 hours – Nursery activities
8-10 hours (Daytime) – Processing
Pumping well water (Daytime) – 1-2 hours
Powering lights 12-18 hours

December
12-18 hours – Nursery activities
8-10 hours (Daytime) – Processing
Pumping well water (Daytime) – 1-2 hours
Powering lights 12-18 hours

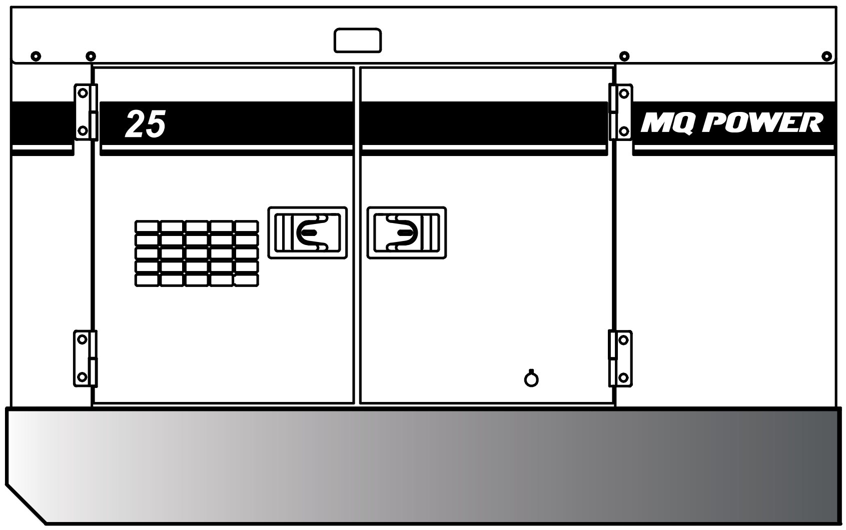
DCA25SSIU4F
Generator

WhisperWatt™

Prime Rating — 20 kW (25 kVA)

Standby Rating — 22 kW (27.5 kVA)

Three-Phase, 60 Hertz, 0.8 PF



STANDARD FEATURES

- Heavy duty, 4-cycle, direct injection, heated crankcase vent, turbocharged diesel engine provides maximum reliability.
- EPA emissions certified - Tier 4 final emissions compliant.
- Microprocessor engine control system maintains frequency to ±0.25%.
- Full load acceptance of standby nameplate rating in a single step.
- Fuel/water separator removes condensation from fuel for extended engine life. Panel mounted alarm light included.
- Sound attenuated, weather resistant, steel housing provides operation at 65 dB(A) at 23 feet. Fully lockable enclosure allows safe unattended operation.
- E-coat and powder coat paint provides durability and weather protection.
- Internal fuel tank with direct reading of fuel gauge.
- Spill containment — Bunded design protects environment by capturing up to 124% of engine fluids.
- Brushless alternator reduces service and maintenance requirements and meets temperature rise standards for Class F insulation systems.
  - Open delta excitation design provides virtually unlimited excitation for maximum motor starting capability.
  - Automatic voltage regulator (AVR) provides precise regulation.
- Fully covered power panel. Three-phase terminals and single phase receptacles allow fast and convenient hookup for most applications including temporary power boxes, tools and lighting equipment. All are NEMA standard.
- ECU754 microprocessor-based digital generator controller.
  - Remote 2-wire start/stop control.
  - Operational temperature range of -40° to 85° C.
- Digital engine gauges including oil pressure, water temperature, battery volts, engine speed and fuel level.
- Analog generator instrumentation including AC ammeter, AC voltmeter, frequency meter, ammeter phase selector switch, voltmeter phase selector switch, and voltage regulator adjustment potentiometer.
- Automatic safety shutdown system monitors the water temperature, engine oil pressure, overspeed and overcrank. Warning lights indicate abnormal conditions.
- Voltage selector switch allows easy to change voltages as your applications require.

DCA45USI

MQ POWER Series Generator

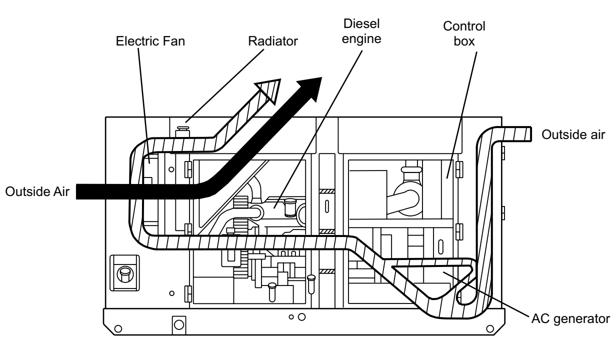
MQ POWER DECIBEL LEVELS

Our soundproof housing allows substantially lower operating noise levels than competitive designs. WhisperWatts are at home on construction sites, in residential neighborhoods, and at hospitals — just about anywhere.

- 90 — Subway / truck traffic
- 80 — Average city traffic
- 70 — Inside car at 60 mph
- 60 — Air conditioner at 20 feet
- — Ultra-Silent at 23 feet
- 50 — Normal conversation

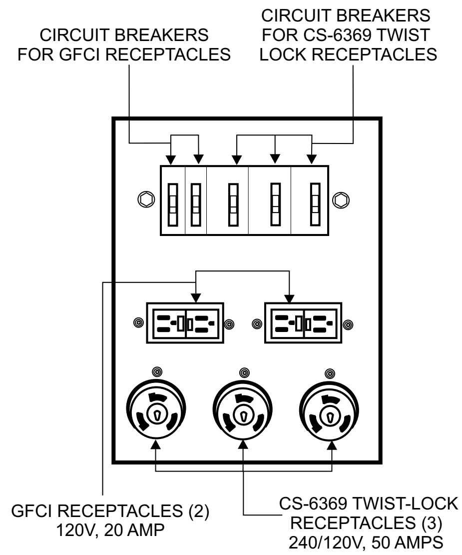
ULTRA-SILENT FEATURES

- **Low Noise Muffler** — Large capacity low noise muffler minimizes exhaust sound.
- **Soundproof Casing** — The new design divides the cabinet into three sections, separating the engine, muffler and radiator for more efficient cooling and reduces noise from the engine and fans.
- **New Cooling System** — An advanced design uses two separate air intake systems to cool the generator. The engine fan draws air in to cool the engine and generator housing while a second electric fan directly cools the radiator. With less air being drawn into the generator through each fan, considerably less noise is produced through the top of the generator.
- **Environmental Design** — Constructed using an integrated environmental skid and fuel tank. This design fully contains fuel leakage and any liquid that might leak from the engine such as lube oil or radiator coolant. All potentially hazardous liquids are contained without contaminating the surrounding area.



Flow of Cooling Air

GENERATOR OUTPUT PANEL



OPTIONAL GENERATOR FEATURES

- **Battery Charger** — provides fully automatic and self-adjusting charging to the generator's battery system.
- **Jacket Water Heater** — for easy starting in cold weather climates.
- **Special Batteries** — long life batteries provide extra engine cranking power.
- **Low Coolant Level Shutdown —** provides protection from critically low coolant levels. Includes control panel warning light**.**
- **Spring Isolaters** — provides extra vibration protection for standby applications.
- **Trailer Mounted Package** — meets National Highway Traffic Safety Administration (NHTSA) regulations. Trailer is equipped with electric or surge-hydraulic brakes with double or triple axle configuration.

OPTIONAL CONTROL FEATURES

- **Emergency Stop Switch** — when manually activated shuts down generator in the event of an emergency.
- **Audible alarm** — alerts operator of abnormal conditions.

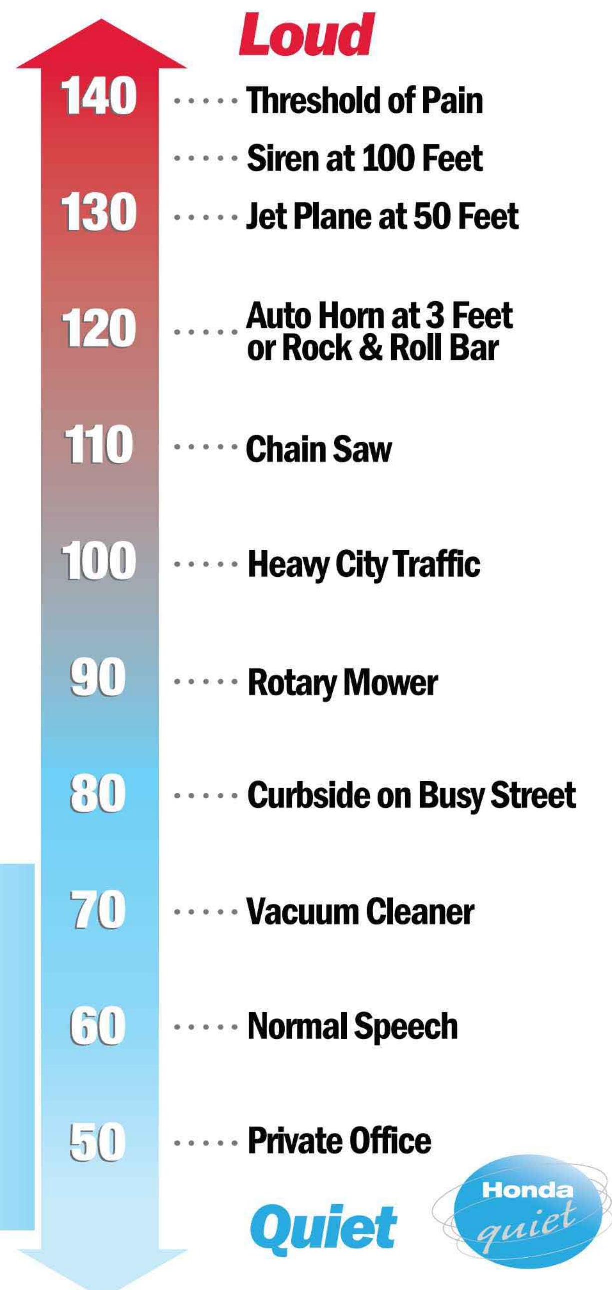
OPTIONAL OUTPUT CONNECTIONS

- **Cam-Lok Connectors** — provides quick disconnect alternative to bolt-on connectors.
- **Pin and Sleeve Connectors** — provides industry standard connectors for all voltage requirements.
- **Output Cable** — available in any custom length and size configuration.

Model Number	Noise Level* (in decibels)
EB10000	71-73 dB(A)†
EG5000CL	70-73 dB(A)†
EG6500CL	70-72 dB(A)†
EG4000CL	66-67 dB(A)†
EB3000c	65-65 dB(A)†
EB6500X	64-67 dB(A)†
EM6500SX	64-66 dB(A)†
EM5000SX	63-66 dB(A)†
EB5000X	63-65 dB(A)†
EB2800*i*	62-67 dB(A)‡
EG2800*i*	62-67 dB(A)‡
EB4000X	61-63 dB(A)†
EM4000SX	61-63 dB(A)†
EU7000*is*	52-58 dB(A)‡
EU3000*i Handi*®	52-58 dB(A)‡
EU3000*is*	50-57 dB(A)‡
EB2200*i*	48-57 dB(A)‡
EU2200*i*	48-57 dB(A)‡
EU1000*i*	42-50 dB(A)‡

3rd Party Tested**

Noise Level Comparisons (in decibels)



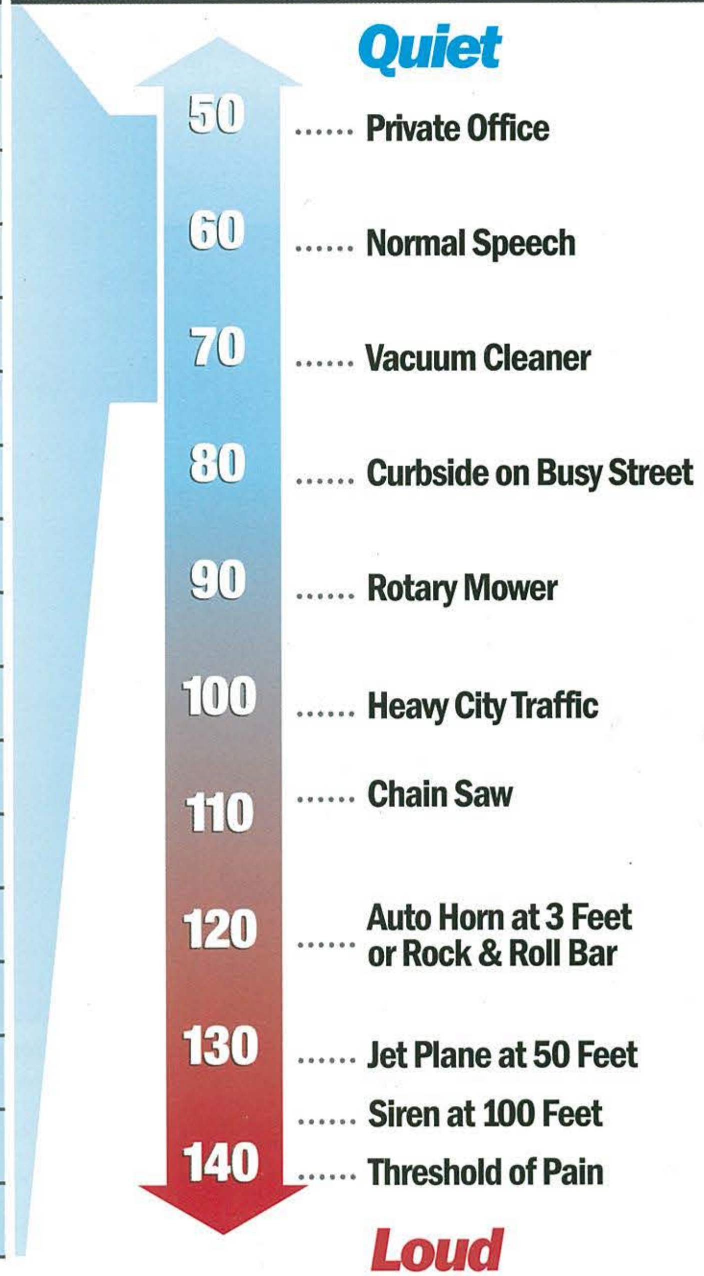
*Tested in accordance with ISO 9614-2, sound pressure level calculated at 23 Feet (7 meters) using the front plane of the generator (control panel side) per ASHRAE Handbook 2017.
**3rd Party Testing by Leading Independent Laboratory. †50% Rated Load-100% Rated Load. ‡25% Rated Load-100% Rated Load.

When quiet counts, count on Honda.

Many of today's applications for generators require quiet operation. Whether you're using your generator for home backup power or taking along one of our lightweight models for a camping trip, you can count on Honda to provide one of the quietest sources of portable power around. Thanks to the use of inherently quiet OHV engines and quality construction, Honda EU generators boast incredibly low sound levels. The chart below compares the noise level of Honda generators to a variety of common sounds we're exposed to every day.

Model Number	Noise Level* (in decibels)
EU3000*is*	49-58 dBA 90 LwA**
EU1000*i*	53-59 dBA 86 LwA**
EU2000*i*	53-59 dBA 89 LwA**
EU6500*is*	53-60 dBA 91 LwA**
EU3000*i Handi*	57-65 dBA 91 LwA**
EM5000*is*	62-68 dBA 98 LwA**
EB3000c	68 dBA 97 LwA**
EP2500X	69 dBA 96 LwA**
EM4000SX	71 dBA 97 LwA**
EB4000X	71 dBA 97 LwA**
EG4000CL	72 dBA 97 LwA**
EM5000SX	72 dBA 99 LwA**
EB5000X	72 dBA 99 LwA**
EM6500SX	73 dBA 100 LwA**
EB6500X	73 dBA 100 LwA**
EG5000CL	73 dBA 100 LwA**
EG6500CL	74 dBA 101 LwA**

Noise Level Comparisons (in decibels)



** Noise levels at rated load to reflect maximum noise level possible, measured at 9 Feet (3 Meters) from the control panel side of the generator.*

*** LwA is an international noise level measurement that uses a weighting factor to reflect noise "tonality" in addition to the sound power (dBA) level.*

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Sale!

Kubota 11 kW Portable Generator, Electric Start, Quiet Operation, Tier 4 Final- GL11000 USA 11,000

Watt Lowboy II Series Industrial Diesel Generator (CARB)

Kubota GL Series generators are made to deliver reliable power with a durable, convenient design – plus a wealth of features that maximize usability and enhance your peace of mind.

Operator Friendly Design- The one-point lifting eye makes GL Series generators easy to transport, as well as the option to lift the generator from the bottom.

Low Noise Level- Slower-speed fan, built-in muffler & reduced air intake sound produce an operating noise level of 66 dB

Compact Design- Designed to have the lowest-possible height while using vertical diesel engines to deliver impressive power output.

Low Emissions- Fully compliant with EPA Tier 4 final emission regulations.

Easy One-Side Maintenance- All maintenance can be performed from a single, large access panel on the generator.

SKU: **GL11000 USA** Categories: **Brands**, **Kubota**, **Portable Generators**

GENERATOR MART'S
LOWEST PRICE

~~$7,961.00~~ **$6,600.00**

Available for pre-ordering

1

PRE-ORDER NOW

Description

Additional information

Description

- Electric Starter
- 7.4 gallon fuel tank
- 7 hours of run time at full load
- Water temperature and oil pressure gauges
- Double circuit breakers
- Built in muffler
- Operating sound output of 66 dB

Estimating Sound Levels With the Inverse Square Law

In the real world, the inverse square law is always an idealization because it assumes exactly equal sound propagation in all directions. If there are reflective surfaces in the sound field, then reflected sounds will add to the directed sound and you will get more sound at a field location than the inverse square law predicts. If there are barriers between the source and the point of measurement, you may get less than the inverse square law predicts. Nevertheless, the inverse square law is the logical first estimate of the sound you would get at a distant point in a reasonably open area.

WHISPERWATT DCA25

$$\frac{I_2}{I_1} = \left[\frac{d_1}{d_2}\right]^2$$

If you measure a sound level I_1 = 65 dB

at distance

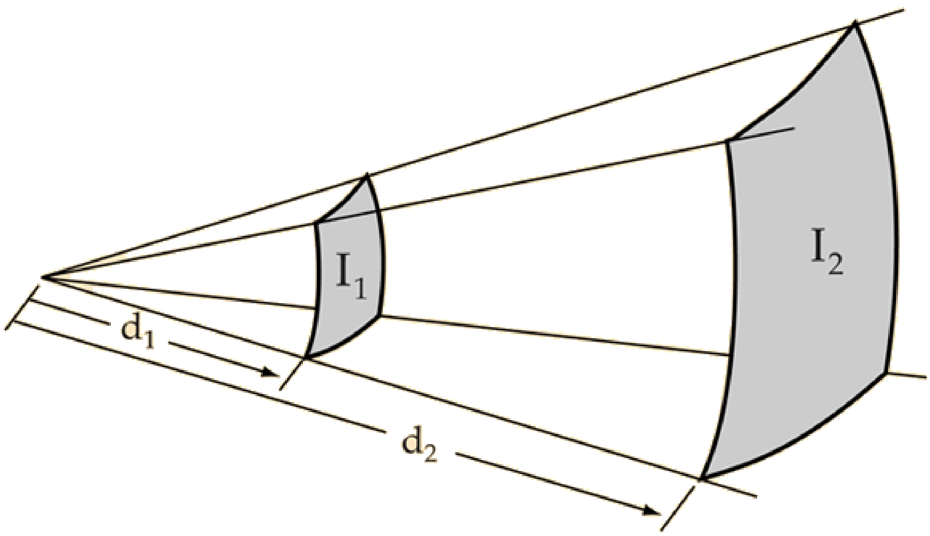
d_1 = 7.01040000 m = 23 ft

then at distance

d_2 = 30.48 m = 100 ft

the inverse square law predicts a sound level

I_2 = 52.2345567: dB



You can explore numerically to confirm that doubling the distance drops the intensity by about 6 dB and that 10 times the distance drops the intensity by 20 dB.

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Auditorium acoustics

In the real world, the inverse square law is always an idealization because it assumes exactly equal sound propagation in all directions. If there are reflective surfaces in the sound field, then reflected sounds will add to the directed sound and you will get more sound at a field location than the inverse square law predicts. If there are barriers between the source and the point of measurement, you may get less than the inverse square law predicts. Nevertheless, the inverse square law is the logical first estimate of the sound you would get at a distant point in a reasonably open area.

WHISPERWATT DCA45

If you measure a sound level $I_1 =$ 58 dB

at distance

$d_1 =$ 7.01040000 m = 23 ft

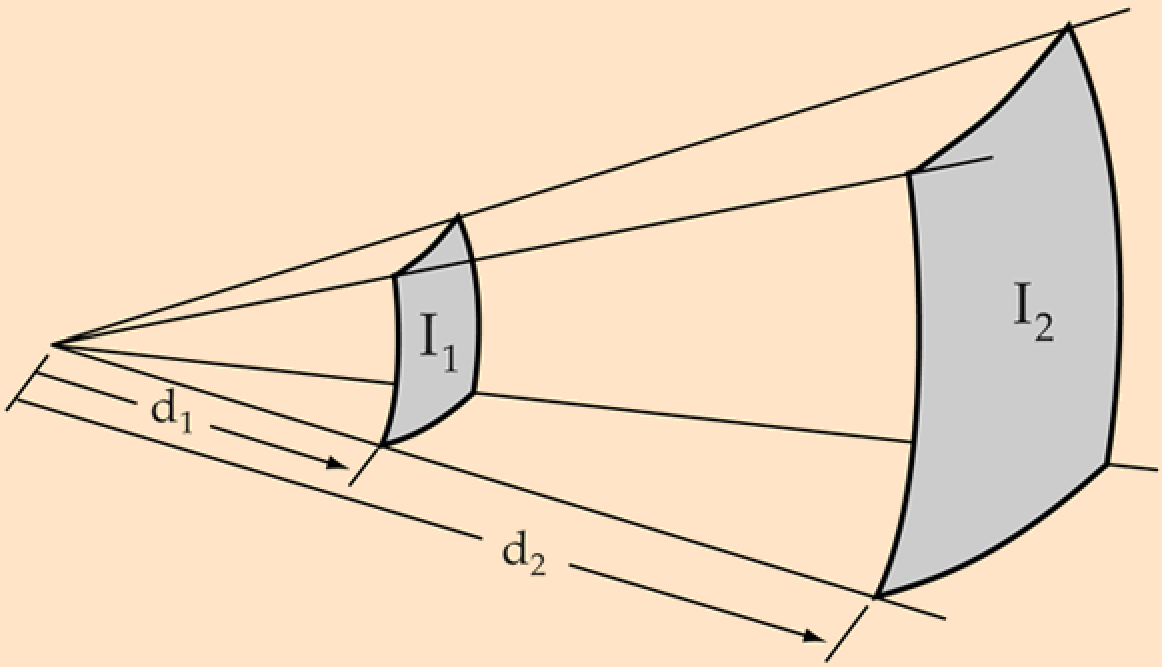
$$\frac{I_2}{I_1} = \left[\frac{d_1}{d_2}\right]^2$$

then at distance

$d_2 =$ 30.48 m = 100 ft

the inverse square law predicts a sound level

$I_2 =$ 45.2345567 dB



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HONDA 6500 IS

$$\frac{I_2}{I_1} = \left[\frac{d_1}{d_2}\right]^2$$

If you measure a sound level I_1 = 60 dB

at distance

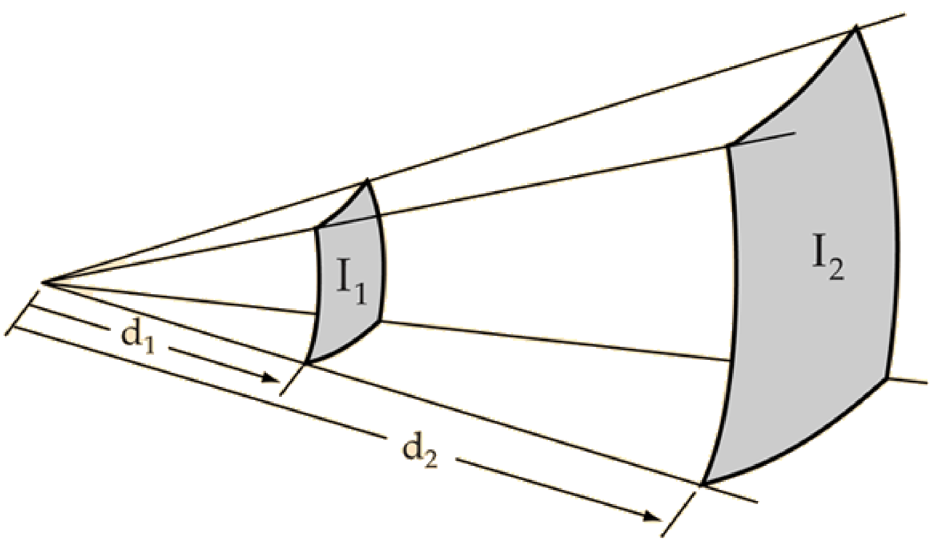
d_1 = 7.01040000 m = 23 ft

then at distance

d_2 = 30.48 m = 100 ft

the inverse square law predicts a sound level

I_2 = 47.2345567 dB



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HONDA 5000 IS

$$\frac{I_2}{I_1} = \left[\frac{d_1}{d_2}\right]^2$$

If you measure a sound level I_1 = 66 dB

at distance

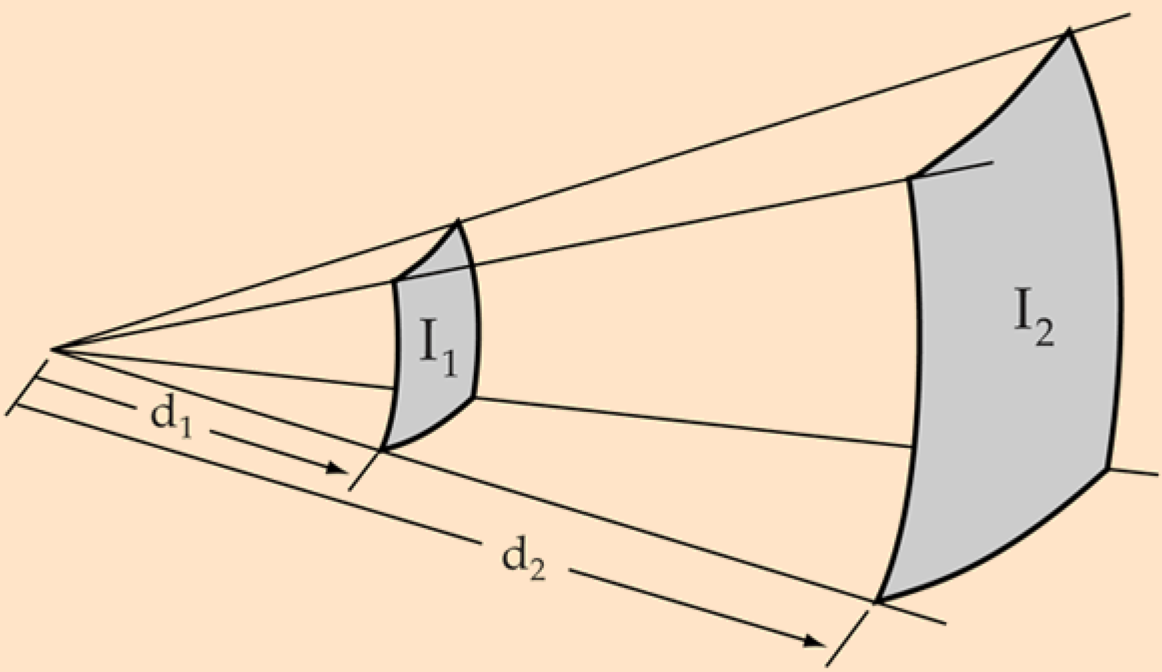
d_1 = 7.01040000 m = 23 ft

then at distance

d_2 = 30.48 m = 100 ft

the inverse square law predicts a sound level

I_2 = 53.2345567 dB



You can explore numerically to confirm that doubling the distance drops the intensity by about 6 dB and that 10 times the distance drops the intensity by 20 dB.

Decibel definition | Decibel calculation

Calculating dB for distance ratios

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HONDA 2000

$$\frac{I_2}{I_1} = \left[\frac{d_1}{d_2}\right]^2$$

If you measure a sound level I_1 = 59 dB

at distance

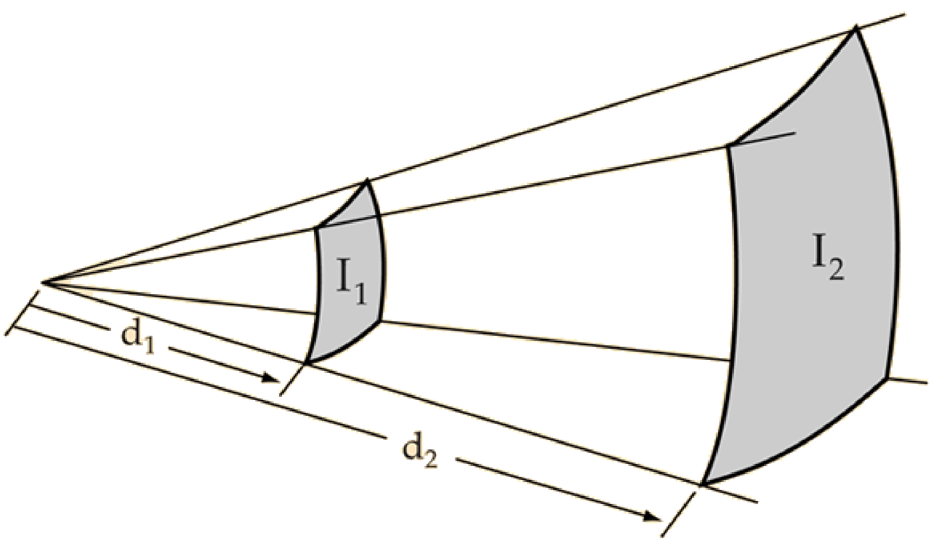
d_1 = 7.01040000 m = 23 ft

then at distance

d_2 = 30.48 m = 100 ft

the inverse square law predicts a sound level

I_2 = 46.2345567 dB



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KUBOTA

If you measure a sound level I_1 = 68 dB

at distance

d_1 = 7.01040000 m = 23 ft

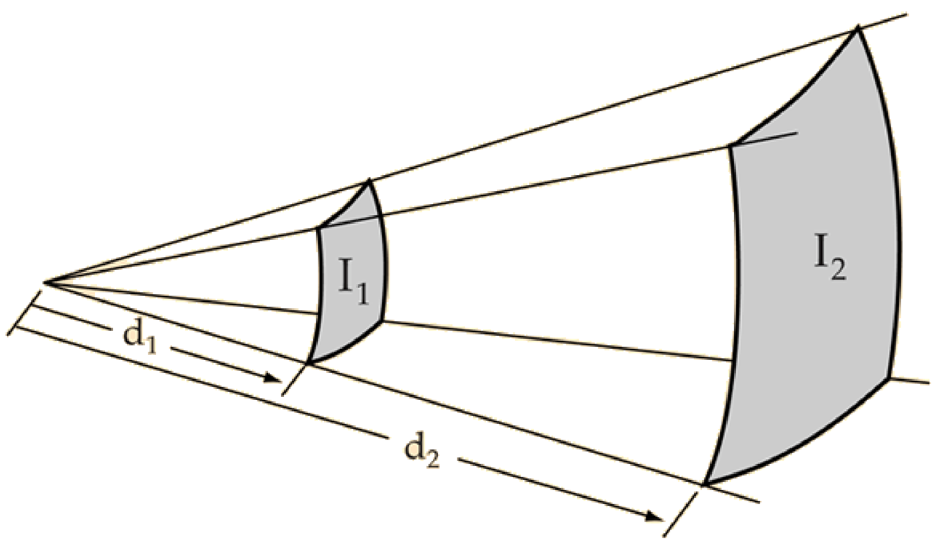
$$\frac{I_2}{I_1} = \left[\frac{d_1}{d_2}\right]^2$$

then at distance

d_2 = 30.48 m = 100 ft

the inverse square law predicts a sound level

I_2 = 55.2345567: dB



You can explore numerically to confirm that doubling the distance drops the intensity by about 6 dB and that 10 times the distance drops the intensity by 20 dB.

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Calculating dB from source power

Biological Report

Shadow Light Ranch

Garberville, Humboldt County, California

APNs 223-061-038, 223-061-043, 223-073-004, 223-073-005

Prepared for:
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Eureka, CA 95501

Revised
May 2020

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I. Summary of Findings and Conclusions

The project includes existing cannabis cultivation on three parcels, APNs 223-061-038, 223-061-043, 223-073-004, 223-073-005, concentrated in the southern portions of the APNs. The parcels are located east of the town of Garberville in Humboldt County, California (Figure 1).

This biological report reviewed the projects at the above APNs to determine to what extent species currently listed or proposed for listing (Table 1) would be impacted (Table 2). No special status species were detected during the site visit (Table 3). It has been determined that the projects and operations on the parcels are likely to have no impacts on these species given all measures are taken to prevent any light or noise pollution.

Summary of Further Surveys Needed and Mitigation Recommendations

- No use of plastic support netting. This plastic netting is a hazard to all forms of wildlife and is not to be used. CDFW recommends using netting of natural materials such as jute or hemp, with no welded seams. For example (not endorsement), see this product made in southern Humboldt: https://consciousgardeners.com/

- No rodenticides shall be used.

- Surveys for foothill yellow-legged frogs should occur in the vicinity of any earth moving activities near Class II water courses. If it is determined earth moving activities will need to occur at or near the Lower Pond, surveys should be conducted on the adjacent Class II stream prior to determine presence/absence.

- Any structure requiring lighting (mixed light greenhouses) MUST be covered from one hour before sunrise to one hour after sunset to avoid any adverse effects on nocturnal wildlife. Further, all attempts to keep noise levels at a minimum during year-round operations will help maintain the quality of habitat for all wildlife species.

- Strict adherence to Humboldt County Commercial Medical Marijuana Land Use Order (CMMLUO 1.0) regarding performance standard for noise at cultivation sites for generator use, if being implemented in operations. Generator will need to be housed in a ventilated and sound-insulated box to reduce noise pollution.

II. Introduction

The purpose of this Biological Report is to review the project (described below) in sufficient detail to determine existing or potential impacts to wildlife species currently listed or formally proposed for listing as endangered or threatened under the federal Endangered Species Act (ESA) or the California Endangered Species Act (CESA), or designated as sensitive by the California Department of Fish and Wildlife (CDFW); these species are hereinafter referred to as special status species (Table 1).

Species with potential habitat present, or whose presence was not confirmed but may potentially occur, are considered in further detail and include fisher (*Pekania pennanti)*.

The project parcels APNs 223-061-038, 223-061-043, 223-073-004, 223-073-005 are located east of the town of Garberville in Humboldt County, California (Figure 1), approximately one mile from the nearest parcel boundary. Projects on these parcels include cannabis cultivation in the pre-existing cultivation areas of Zones I and II, with a nursery site to be located in Zone II (Figure 2), and the Roadside cultivation site, located just above Zone II. There are two existing ponds that will remain, an upper pond constructed in 2016 (Upper Pond), and a Lower Pond constructed around 2006; the Upper Pond is to be utilized for irrigation water (Figure 2). Within this report, these areas are collectively referred to as the Study Area.

There are three additional established cultivation areas that are dispersed on the parcels, Lower 40, Corral, and South 80, which the landowner is abandoning along with the proposed new zones associated with these areas, including the Nursery, Zones III and Zone IV (Figure 2).

The current cannabis sites are ‘grandfathered’ by the Humboldt County Commercial Medical Marijuana Land Use Order (CMMLUO 1.0), which requires they remain at their current location unless there are associated environmental concerns. A biological assessment was conducted to evaluate any environmental issues. In addition, these areas were surveyed in order to describe any terrestrial and aquatic animals occurring in the Study Area, as well as determine whether habitat exists for any special status species. At the time of the site visit, the proposed project included the development of cannabis related infrastructure (Figure 2) that was required to comply with the General Waiver of Waste Discharge Requirements and General Water Quality Certification for Discharges of Waste Resulting from Cannabis Cultivation and Associated Activities or Operations with Similar Environmental Effects in the North Coast Region, Order No. R1-2015-0023 (NCRWQCB 2015). The Order outlines protections for wetlands and watercourses. For this reason, the presence of wetland indicator and riparian vegetation was also surveyed for within and around the current and previously proposed projects.

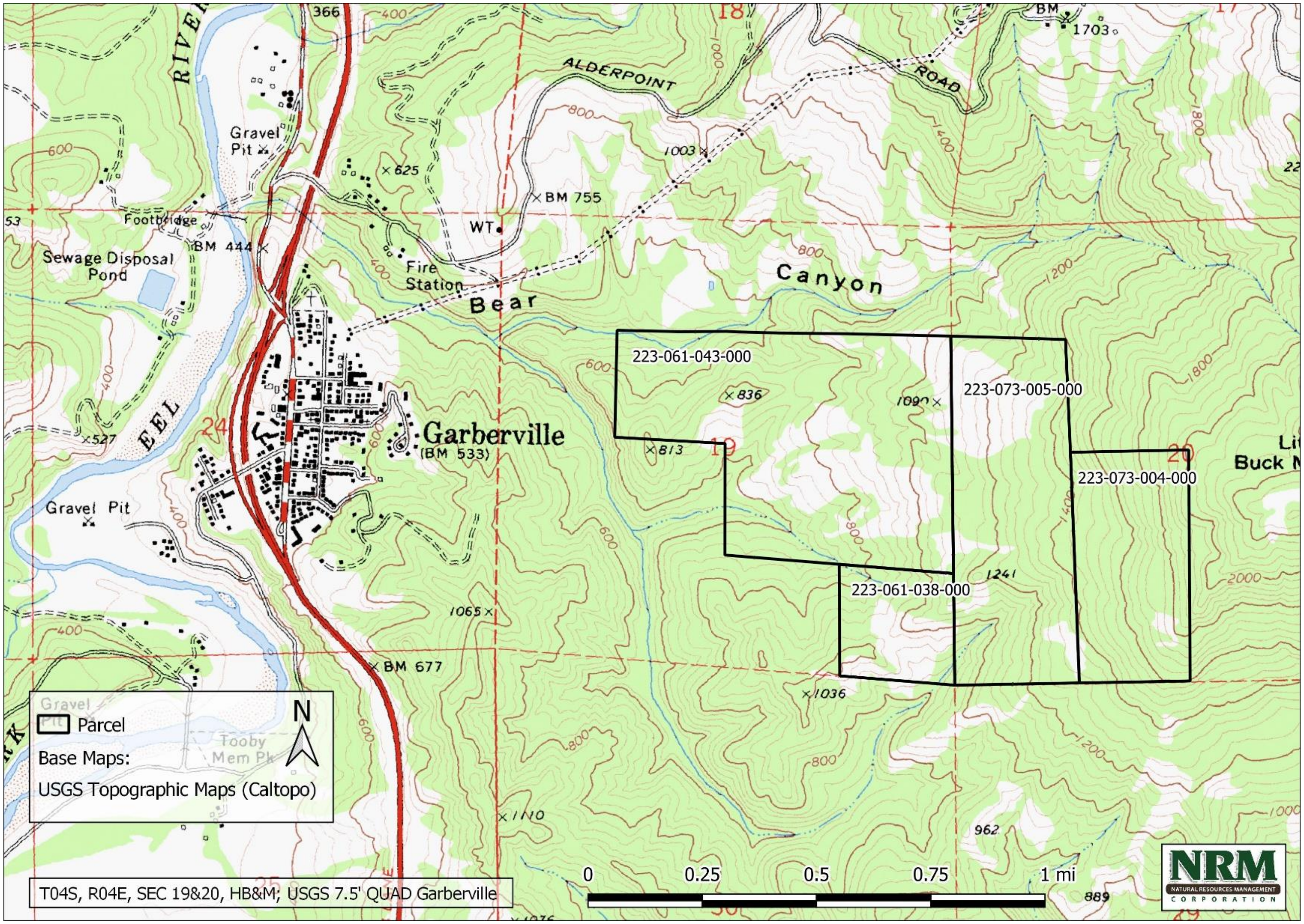

Figure 1. Vicinity map for APNs 223-061-038, 223-061-043, 223-073-004, 223-073-005

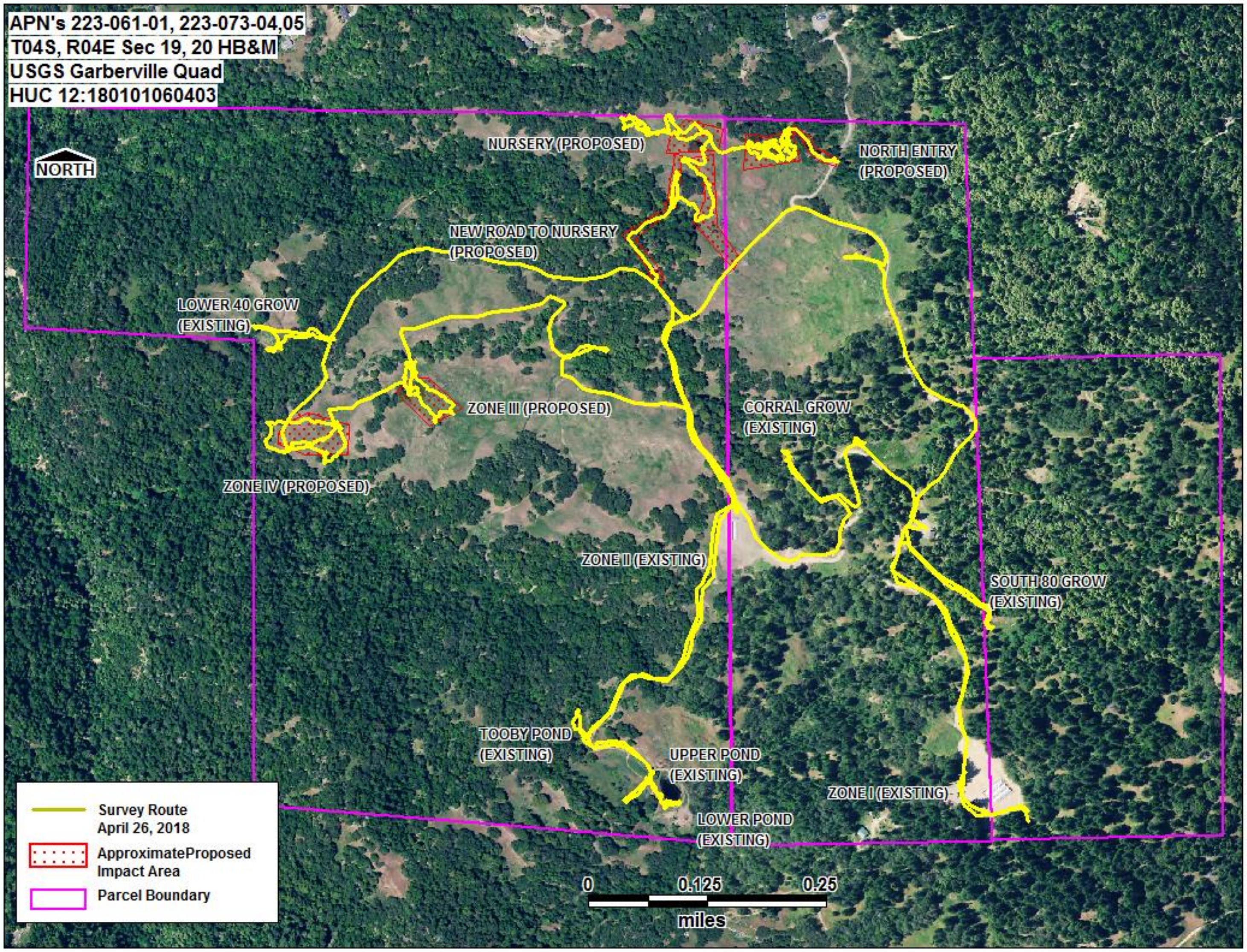

Figure 2. Project map with current and formerly proposed project areas

III. Background and Project Understanding

Project Site

The project areas on parcel APNs 223-061-038, 223-061-043, 223-073-004, 223-073-005 are located approximately 2.5 air miles east of US Highway 101 and the town of Garberville, in Humboldt County, California. The legal description is T04S, R04E, Sections 19 and 20, HB&M, within the USGS 7.5' Garberville quadrangle topographic map. These four contiguous parcels total approximately 443 acres: 223-061-038 is 39 acres; 223-061-043 is 196 acres; 223-073-004 is 81 acres; and 223-073-005 is 127 acres.

Overall, this area can be described as a mid-mature forest dominated by Douglas fir interspersed with large open grassland areas within the rolling hills of the coastal range. When viewing the general area in Google Earth imagery (1993-2019, Google Earth Pro 2020), it appears the open areas previously utilized for cannabis cultivation are natural. Some open areas appear larger in earlier imagery, suggesting forest encroachment into the natural grassland openings.

Topography and Hydrology

The parcels have a general western aspect towards the South Fork (SF) Eel River watershed, with elevations ranging from approximately 500 feet at the northwest corner to approximately 2,000 feet at the northeast parcel boundary, with several promontories across the open grassland areas. They are bound to the west by Garberville and the South Fork Eel River, to the east by Little Buck Mountain, to the north by Bear Canyon and Alderpoint Road, and to the south by the East Branch of the South Fork Eel River (Figure 1).

At the northwest corner of the project parcels, a tributary to the SF Eel River in Bear Canyon flows into and back out of the northern parcel boundary, approximately 2 miles east of the SF Eel River. Just west of the parcel boundary this tributary joins another tributary with forks originating in the south central portion of APN 223-061-038, approximately 0.2 miles (1,055 feet) west of Zone II, and in the southwest corner of APN 223-073-005, approximately 0.2 miles west of Zone I. This meets the required watercourse setbacks (buffers) for the State Waterboard and Humboldt County.

The mainstem Eel River, a Class I fish bearing watercourse, flows northwest from Garberville to the confluence with South Fork Eel River at Dyerville, continuing another 20 air miles to the confluence with the Van Duzen River, then flows approximately 12 additional air miles to the Pacific Ocean.

Project Description

Within the Study Area, the proposed cultivation sites include Zone I (Photo 1), Zone II, and Roadside, located just above Zone II. These are existing cultivation areas with established greenhouses. The current location of three other established cannabis cultivation areas that are dispersed across the parcels are Lower 40, Corral, and South 80 will be abandoned and the sites remediated (Figure 2).

As part of the permitting process the landowner has been instructed to either remove or improve stability of the Upper Pond, constructed in 2016 (Photo 2) prior to record-setting winter precipitation when some minor bank failure occurred. The landowner is planning to improve the stability of land around this pond and utilize the water for cannabis irrigation.

The Lower Pond, constructed around 2006, is connected to the upper pond via a culvert (Photo 3). The earthen dam (Photo 4) at the end opposite where the culvert enters from the Upper Pond has had some issues, apparent by the erosion around the two outlet culverts (Photo 5) which deposit into a Class II drainage. The landowner, who has been instructed to either mitigate or remove this pond, is planning to improve the stability of land around this pond.

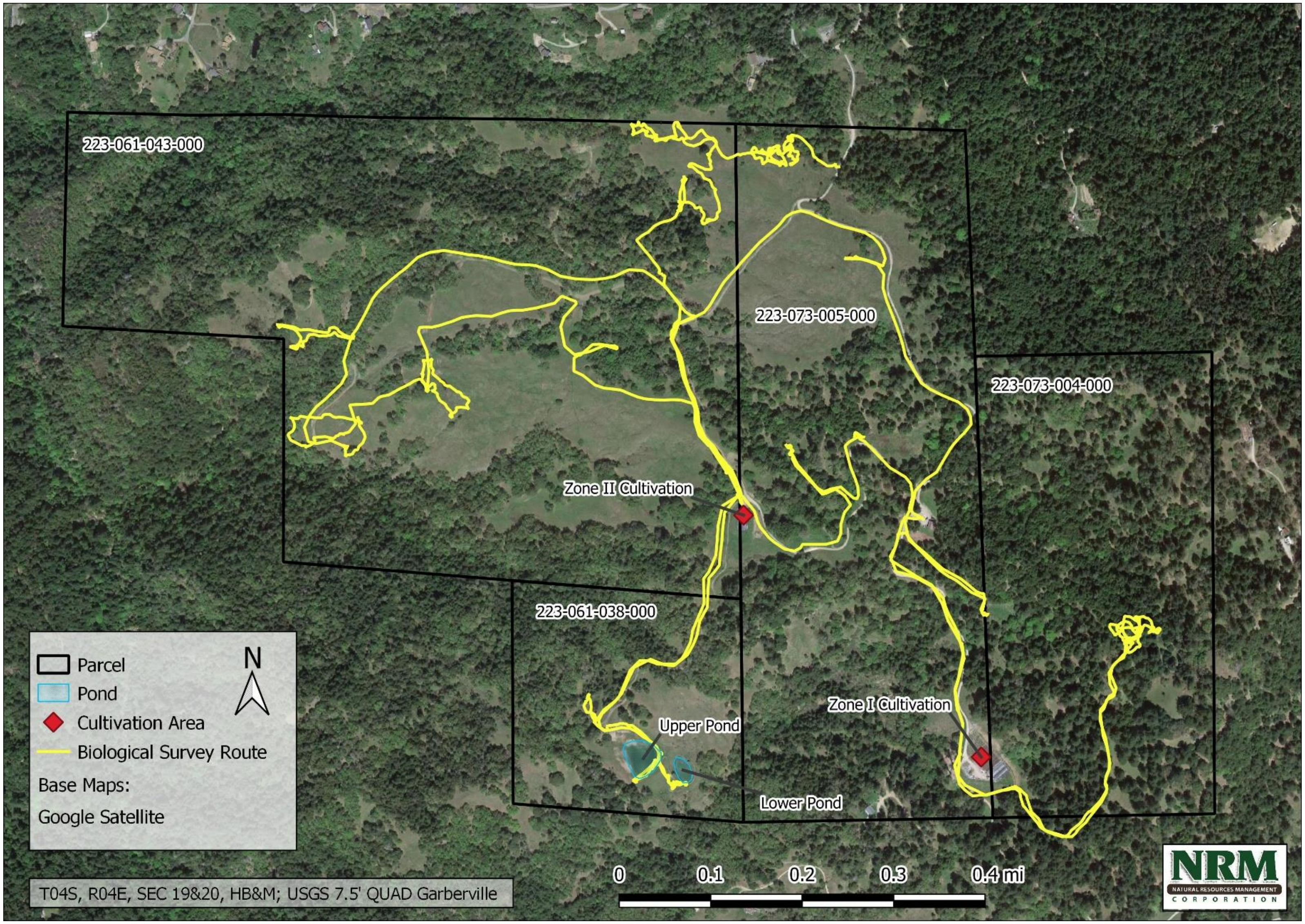

Figure 3. Revised project map for APNs 223-061-038, 223-061-043, 223-073-004 and 223-073-005

IV. Methods

Pre-Field Review

Prior to the survey, the CDFW California Natural Diversity Data Base (CNDDB, CDFW 2018) records of wildlife species occurrences for Humboldt County was queried for a nine-quad area surrounding the project parcels to determine if there were any known locations for special status species in the general area (Table 1). A recent query was done for this revision to ensure no additional records were added to the database since the site visit in 2018.

Table 1. CNDDB list of potential special status species in the Garberville nine-quad area

Common Name	Scientific Name	Fed/State Listing
Cooper's hawk	*Accipiter cooperii*	Watch List
golden eagle	*Aquila chrysaetos*	Fully Protected
osprey	*Pandion haliaetus*	Watch List
American peregrine falcon	*Falco peregrinus anatum*	Delisted, Fully Protected
little willow flycatcher	*Empidonax traillii brewstersi*	State Endangered
Sonoma tree vole	*Arborimus pomo*	SSC
Pacific fisher- West Coast DPS	*Pekania pennanti*	Proposed & Candidate Threatened
pallid bat	*Antrozous pallidus*	SSC
western pond turtle	*Emys marmota*	SSC
Pacific tailed frog	*Ascaphus truei*	SSC
foothill yellow-legged frog	*Rana boylii*	Candidate Threatened
southern torrent salamander	*Rhyacotriton variegatus*	SSC
red-bellied newt	*Taricha rivularis*	SSC

Field Survey

On April 26th, 2018 NRM wildlife biologist Michelle McKenzie and botanist Claire Brown conducted a site visit to survey the existing and proposed projects and surrounding area for all terrestrial and aquatic species present. The survey was conducted for approximately 7 hours on a mild (60ºF/15ºC), partly sunny afternoon (Figure 2, survey track in yellow).

While walking between project areas all audial detections of bird and mammal (particularly squirrel) species were noted, as well as any sign, such as tracks and scat. In addition, large trees and snags were inspected for activity or sign of use by wildlife (cavities, nests or accumulated vegetation), and all cover objects were inspected for potential amphibian species at all proposed and existing project areas. The two pond areas were surveyed by traversing the perimeter, scanning ahead with binoculars prior to approaching to detect all potential species, particularly escaping amphibians, and stopping every 50 meters for several minutes of observation.

In addition, all previously proposed and existing project areas were surveyed for the presence of wetland-indicator and riparian vegetation.

V. Results and Discussion

For all species, direct impacts are those which are caused by the action (project) and occur at the same time and place. Indirect impacts are defined as those effects that are caused by the proposed action and are later in time, but still reasonably certain to occur. Special status and additional species of interest, and the potential for project impacts, are presented in Table 2, below. None of these species are expected to experience significant impacts from the proposed projects, either directly or indirectly. The proposed project areas (Zone I, Zone II, Roadside) are existing cultivation flats with greenhouses, and the ponds have been established for several years.

The CNDDB database search for all special status species within a 1-mile radius of the project revealed records for foothill yellow-legged frog (presumed extant) and pallid bat (based on coordinates provided). The Study Area at Shadow Light Ranch did not reveal any optimal habitat for foothill yellow-legged frogs though some habitat may exist in the forested portions of watercourses elsewhere on the parcels. The presence of pallid bats is likely due to the interior location and open grassland habitat, although only during the summer months. Favored roosting include rock crevices, which exist on property, as well as buildings and bridges.

There are no northern spotted owl (NSO) activity centers (ACs) in the general vicinity of Shadow Light Ranch and no nesting or roosting habitat; the nearest is HUM0012 at over 3.7 miles to the southwest.

A recent CNDDB query for this revision was conducted and included no new records for the general area.

No listed wildlife species or species of concern were detected during the survey; see Table 2 for species-specific information. In addition, no sensitive species or natural communities of plants were detected during the survey and no wetland indicator vegetation was identified in the proposed cultivation areas.

The Upper pond, which has been determined needs removed or mitigated to improve stability, contained hundreds of tadpoles on the margins that appeared to be Northern Pacific tree frogs. According to the landowner this pond, as well as the Tooby pond across the road, is shallow and tends to be dry by June which likely contributes to keeping the non-native bullfrog from establishing. This pond appears stable; what slumping has occurred appears contained and was perhaps due to unseasonably saturating rains the winter following construction. Should CDFW determine this pond needs removed it should be done once it has dried up and juvenile frogs have had time to disperse into the surrounding landscape.

A culvert connecting the Upper Pond and Lower Pond showed some signs of slumping but did not appear to be delivering sediment to the Lower Pond. It has been determined that the Lower Pond may need mitigation or removal as well. This more established pond currently contains Pacific tree frog tadpoles and some nesting red-winged blackbirds in the cattails. The habitat at this site is similar to that of the Upper Pond, but with an established emergent wetland along the margins. The area between the Lower Pond and the adjacent Class II below has some significant erosion issues that need addressed to avoid delivering sediment to the watercourse downslope. The Class II stream course was not surveyed during this visit; it is assumed if habitat for foothill yellow-legged frog existed in the stream course that adults would be present year-round. Should CDFW determine this pond needs removed it should be done once it dries, if indeed it does, and juvenile frogs or fledgling red-winged blackbirds from the last nesting attempt have had the opportunity to disperse. In addition, surveys for foothill yellow-legged frogs should occur if earth moving activities are required in the vicinity of the stream course at any time of year.

The general area is dominated by open grassland prairie habitat, optimal for foraging golden eagles that utilize these areas for hunting rabbits, ground squirrels and other prey items. Nesting structures, such as broken tops of large diameter trees, are required and are often associated with steep-walled canyons that locally are typically associated with larger river systems, such as the mainstem and SF Eel Rivers. The nearest CNDDB record for this species is greater than 5 miles north, in the Bear Buttes area.

There does not appear to be sufficient extensive habitat in the immediate project area to support listed or candidate species (fisher, little willow flycatcher, foothill yellow-legged frog), although foraging by fisher on the parcels is presumed, utilizing forested patches for cover. There is no willow of any extent on the parcels to support willow flycatchers, and the watercourses surveyed during the course of the biological assessment did not provide optimal habitat for foothill yellow-legged frog although habitat may exist elsewhere on the ranch; presence was not confirmed for either species. In addition to the red-winged blackbirds, migratory birds are presumed to nest in the area.

Table 2. Special status species, species potentially present in the project areas, and potential impacts

Common Name	Listing Status	General Habitat Description	Presence of Suitable Habitat w/in Site?	Potentially Impacted by Project?	Comments
BIRDS					
Cooper's hawk	WL	Dense stands of live oak, riparian deciduous or other forest habitats near water used most frequently. Woodland, chiefly of open, interrupted or marginal type for hunting; nests usually in second growth conifer stands or deciduous riparian areas near streams	Yes	No	No impacts; nesting/foraging habitat present in wider general area; more likely utilizing watercourse areas
golden eagle	FP	Rolling foothills, mountain areas, sage-juniper flats, and desert. Cliff-walled canyons provide nesting habitat in most parts of range; also, large trees in open areas	Yes	No	No impacts; parcel in vicinity of habitat but unlikely to have any impacts due to extensive options and no nearby historic records
osprey	WL	Ocean shore, bays, freshwater lakes, and larger streams. Large nests built in tree-tops within 15 miles of a good fish-producing body of water	No	No	No impacts; likely present in SF Eel river watershed
American peregrine falcon	FP	Breeds near water in woodland, forest, and coastal habitats. Riparian areas important year-round. Requires cliffs, ledges for cover and breeding	No	No	No impacts; some large cliff areas typically of this species (locally) in the vicinity
northern spotted owl	T	Old-growth forests or mixed stands of old-growth and mature trees; occasionally in younger forests with patches of big trees	No	No	No impacts; nearest known AC is greater than 3 miles from project areas
little willow flycatcher	SE	Breeds in moist brushy thickets, open second-growth, and riparian woodland, especially with willow	No	No	No impacts; no concentrated areas of willow or other riparian brushy areas observed on parcels

MAMMALS					
Sonoma tree vole	SSC	North coast fog belt from Oregon border to Sonoma County; in Douglas-fir, redwood & montane hardwood-conifer forests	Yes	No	No impacts; if habitat on parcel it occurs in areas with no disturbance; no habitat being removed
fisher	CT	Intermediate to large-tree stages of coniferous forests and deciduous-riparian areas with high percent canopy closure; denning structures include hollow trees, logs and snags	Yes	No	No impacts; this wide ranging species expected to be in general area foraging; may be denning structures present on ranch; no habitat being removed
Pallid bat	SSC	Frequents open habitats for foraging, often taking prey on the ground, such as crickets and grasshoppers; day roosts in caves, crevices and occasionally hollow trees and buildings; night roosts more open sites such as bridges and open buildings; prefers rocky outcrops, cliffs to access open habitats	Yes	No	No impacts; foraging habitat present, assume roosting in general vicinity
HERPETOFAUNA					
western pond turtle	SSC	A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation, below 6000 ft elevation	Yes	No	No impacts; not present/detected at pond sites, which dry up by July
Pacific tailed frog	SSC	Occurs in montane hardwood-conifer, redwood, Douglas-fir & ponderosa pine habitats	No	No	No impacts; Class III creek surveyed is not considered consistent or cool enough for this species
Red-bellied newt	SSC	Prefers clean rocky streams and rivers with moderate to fast flows	No	No	No impacts; no habitat; may be out of range for this species
foothill yellow-legged frog	CT	Partly-shaded, shallow streams and riffles with a rocky substrate in a variety of habitats. Need at least some cobble-sized substrate for egg-laying. Need at least 15 weeks to attain metamorphosis	No	No	No impacts; rarely encountered far from rocky streams with permanent water; no habitat in surveyed areas
southern torrent salamander	SSC	Coastal redwood, Douglas-fir, mixed conifer, montane riparian, and montane hardwood-conifer habitats; Old growth forests	No	No	No impacts; requires cold, well shaded permanent water; stays within splash zone; class III not permanent

Species Accounts

Fisher

Regulatory Status: The west coast population of fisher is a Federal and State Proposed Candidate Threatened species, and a State Species of Special Concern.

Habitat Requirements and Natural History: This species occurs in intermediate to large-tree stages of coniferous forests and deciduous-riparian habitats with a high canopy closure. Breeds February through May with a litter size of 1-4 young, that stay with female until late autumn.

Potential for Occurrence within the Project Area: Assume nighttime foraging can/will occur in the project vicinity; potential breeding habitat in the vicinity.

Direct Effects: If fisher denning in the area equipment noise could disturb adults and young.

Indirect Effects: No indirect effects are expected.

Determination: It is determined that the project will have no effect on the fisher, particularly due to no construction.

Survey Results

Species, or their sign, observed during the survey are summarized in Table 3, below. An additional pond (Figure 2, Tooby pond) located across the road from the previously mentioned Upper and Lower Ponds was surveyed due to the landowner concerns of American bullfrogs (*Lithobates catesbeianus*) presence. Inspection of the Tooby pond revealed several adult rough-skinned newts coming to the surface for air then swimming back down to the bottom out of view; it is assumed this is a breeding pond for newts and that no bullfrog are present in any of the existing ponds. There were no direct sightings of mammal species, all were inferred from sign.

Table 3. Species detected at the Shadow Light Ranch, April 26, 2018

Common Name	Scientific Name	Fed/ State Listing	Detection Method
red-tailed hawk	*Buteo jamaicensis*	No	Visual
sharp-shinned hawk	*Accipiter striatus*	No	Visual
northern flicker	*Colaptes auratus*	No	Visual, Auditory
red-breasted sapsucker	*Sphyrapicus ruber*	No	Foraging holes, Visual
sooty grouse	*Dendragaphus fuliginosus*	No	Auditory
wild turkey	*Melegris gallopavo*	No	Feathers (predated), Visual
turkey vulture	*Cathartes aura*	No	Visual
common raven	*Corvus corax*	No	Auditory
chimney swift	*Chaetura pelagica*	No	Visual
American robin	*Turdus migratorius*	No	Visual
spotted towhee	*Pipilo maculatus*	No	Visual
dark-eyed junco	*Junco hyemalis*	No	Visual
black-throated gray warbler	*Setophaga nigrescens*	No	Auditory
hermit warbler	*Setophaga occidentalis*	No	Auditory
Wilson's warbler	*Cardellina pusilla*	No	Auditory
orange-crowned warbler	*Vermivora celata*	No	Auditory
Cassin's vireo	*Vireo cassinii*	No	Auditory
warbling vireo	*Vireo gilvus*	No	Visual
American goldfinch	*Spinus tristis*	No	Visual
red-winged blackbird	*Agelaius phoeniceus*	No	Visual
black phoebe	*Sayornis nigricans*	No	Visual, Auditory
Steller's jay	*Cyanocitta stelleri*	No	Visual, Auditory
winter wren	*Troglodytes hiemalis*	No	Visual
varied thrush	*Ixoreus naevius*	No	Visual, Auditory
song sparrow	*Melospiza melodia*	No	Visual
Pacific slope flycatcher	*Empidonax diffcilis*	No	Auditory
California vole	*Microtus californicus*	No	Burrows
black-tailed deer	*Odocoileus hemionus columbianus*	No	Scat, Tracks
gray fox	*Urocyon cinereoargenteus*	No	Scat
coyote	*Canis latrans*	No	Scat
western fence lizard	*Sceloporus occidentalis*	No	Visual
coast garter snake	*Thamnophis elegans terrestris*	No	Visual
northern Pacific treefrog	*Pseudacris regilla*	No	Visual
rough skinned newt	*Taricha granulosa*	No	Visual

Cumulative Effects

No cumulative effects from the proposed projects on regulated species is expected.

Management Recommendations

- No use of plastic support netting. This plastic netting is a hazard to all forms of wildlife and is not to be used. CDFW recommends using netting of natural materials such as jute or hemp, with no welded seams. For example (not endorsement), see this product made in southern Humboldt: https://consciousgardeners.com/

- No rodenticides shall be used.

- Surveys for foothill yellow-legged frogs should occur in the vicinity of any earth moving activities near Class II water courses. If it is determined earth moving activities will need to occur at or near the Lower Pond, surveys should be conducted on the adjacent Class II stream prior to determine presence/absence.

- Any structure requiring lighting (mixed light greenhouses) before sunrise or after sunset MUST be covered to avoid any effects on nocturnal wildlife. Further, all attempts to keep noise levels at a minimum during year-round operations will help maintain the quality of habitat for all wildlife species.

- Strict adherence to Humboldt County Commercial Medical Marijuana Land Use Order (CMMLUO 1.0) regarding performance standard for noise at cultivation sites for generator use, if being implemented in operations. Generator will need to be housed in a ventilated and sound-insulated box to reduce noise pollution.

Appendix Site Visit Photos taken April 26, 2018

Photo 1. Current cultivation at Zone I

Photo 2. Upper Pond needing removed or improved

Photo 3. Culvert connected Upper Pond with Lower Pond

Photo 4. View of Lower Pond looking toward Class II and cattails with nesting red-winged blackbirds; person to right standing above culverts in the following picture.

Photo 5. View of culverts behind earth dam of Lower Pond and erosion, with Class II drainage below

Botanical Survey Results

Shadowlight Ranch
Rock Pit Cultivation Site

HUMBOLDT COUNTY, CA

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Date:

May 2020

1. INTRODUCTION

This report includes the results of a botanical survey conducted on a portion of the Shadowlight Ranch near Garberville. The purpose of the survey was to identify special status plants and natural communities at the "Rock Pit" proposed new cultivation area to fulfill the recommendation in the November 12, 2018 letter for a seasonally appropriate botanical survey of the site. The Rock Pit site was not included in the 2018 botanical survey conducted by Natural Resources Management Corporation (NRM). The primary purpose of this survey was to survey the Rock Pit, but additional surveys were conducted at three other existing cultivation areas and one new proposed building site; this additional survey coverage is partially redundant with the 2018 NRM survey.

2. DEFINITIONS

2.1. Special Status Plants

Special status plants include those listed as rare, threatened, or endangered under the federal Endangered Species Act and/or the California Endangered Species Act. Additionally, impacts to taxa with California Rare Plant Ranks (CRPR) of 1A, 1B, 2A, and 2B must be analyzed in environmental documents related to the California Environmental Quality Act (CEQA), or those considered functionally equivalent to CEQA. Impacts to plants with CRPRs of 3 and 4 should also addressed. Protection measures for populations of these taxa may warranted if they are determined to have local or biological significance.

2.2. Special Status Plant Communities

Special status plant communities are communities with limited distribution that may be vulnerable to environmental impacts. Natural communities recognized as sensitive are provided on the CDFW Sensitive *Natural Communities List* (CDFW 2018). The list is based on the vegetation classification in *A Manual of California Vegetation, 2nd Edition* (Sawyer et al. 2009). Natural communities with G or S ranks of 3 or lower are considered sensitive. However, they may not warrant protected under CEQA unless they are considered high quality. Human disturbance, invasive species, logging, and grazing are common factors considered when judging whether the stand is high quality and warrants protection.

3. ENVIRONMENTAL SETTING

3.1. Project Location

The ranch is located of Wallan Road approximately 1.2 miles east of Garberville on the Garberville USGS quadrangle in Humboldt County.

3.2. Soil, Topography, and Hydrology

The soil type mapped at the Rock Pit is Yorknorth-Witherell complex, 15 to 30 percent slopes (USDA, NRCS 2020). The soil type is derived from sandstone and schist parent material. The project area is on a relatively flat ridgeline on an otherwise approximately 15% west-facing slope. The elevation is approximately 900 feet above sea level. There area drains into Bear Canyon, a tributary of the South Fork Eel River.

4. METHODS

4.1. Scoping

A list of special status plants that could potentially occur in the project area was generated by consulting the *California Natural Diversity Database* (CDFW 2020) and the CNPS *Inventory of Rare and Endangered Plants* (CNPS 2020). The scoping list includes special status plants with documented occurrences on the Garberville USGS quadrangle or adjacent quadrangles; the list may include other taxa know to occur in habitat similar to the project area in Humboldt County (Table 1).

4.2. Survey

The botanical survey was conducted by Kyle Wear, M.A. Mr. Wear has over 25 years of experience conducting floristic surveys and other botanical work in northern California.

The survey was floristic and followed methods outlined in *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW 2018). The Rock Pit and additional areas were surveyed on May 20, 2020. Approximately 3 hours were spent on the survey. The timing of the survey was seasonally appropriate for the site; all plants with potential to occur on the site would have been recognizable and identifiable at the time of the survey. A survey coverage map is provided in Figure 1. Plant taxonomy generally follows *The Jepson Manual Vascular Plants of California, Second Edition* (Baldwin et. al. 2012), however the plant list may include more recent name changes. Plant communities were classified according to *A Manual of California Vegetation, 2nd Edition* (Sawyer et al. 2009).

5. RESULTS AND DISCUSSION

5.1. Special Status Plants

No special status plants were encountered on the survey. A list of all plants encountered is provided in Table 2.

5.2. Special Status Plant Communities

There are no special status plant communities in the project area. There are stands of Oregon white oak (*Quercus garryana*), but the stands are relatively small or mixed with Douglas-fir and other hardwoods and were determined not to meet the criteria for Oregon white oak woodland (*Quercus garryana* Woodland Alliance). The grasslands include stands California oatgrass (*Danthonia californica*) and purple needlegrass (*Stipa pulchra*). However, the stands are small and mixed with non-native grasses and other non-native herbaceous species and were determined not to be special status native grassland communities.

The Rock Pit site is a disturbed area used for rock quarrying. The areas adjacent to the Rock Pit and in the other survey areas include a mosaic of mixed conifer and hardwood stands and grasslands. The mixed conifer and hardwood stands include Douglas-fir (*Pseudotsuga menziesii*), Oregon white oak (*Quercus garryana*), California bay (*Umbellularia californica*), madrone (*Arbutus menziesii*), buckeye (*Aesculus californica*), and tanoak (*Notholithocarpus densiflorus* var. *densiflorus*). Common understory plants include sword fern (*Polystichum munitum*), Pacific snakeroot (*Sanicula crassicaulis*), hair honeysuckle (*Lonicera hispidula*), sweet cicily (*Osmorhiza berteroi*), and white hawkweed (*Hieracium albiflorum*). The grasslands are dominated by non-native grasses including rattlesnake grass (*Briza maxima*), ripgut (*Bromus diandrus*), orchard grass (*Dactylis glomerata*), harding grass (*Phalaris aquatica*), soft chess (*Bromus hordeaceus*), and dogtail grass (*Cynosurus echinatus*).

6. REFERENCES

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Table 1. Special Status Plant Scoping List.

Scientific Name	Common Name	Listing Status	Blooming Period	Habitat- Micro Habitat	Potential to Occur in Survey Area
Arabis mcdonaldiana	McDonald's rockcress	1B.1, CE, FE	May-Jul	Lower montane coniferous forest, Upper montane coniferous forest- serpentinite	None. Occurs on serpentine soil.
Arctostaphylos stanfordiana ssp. raichei	Raiche's manzanita	1B.1	Feb-Apr	Chaparral, Lower montane coniferous forest (openings)- rocky, often serpentinite	Unlikely. Area lacks chaparral, lower montane coniferous forest, and serpentine
Astragalus agnicidus	Humboldt County milk-vetch	1B.1	Apr-Sep	Broadleafed upland forest, North Coast coniferous forest- openings, disturbed areas, sometimes roadsides	High. Potential is disturbed areas and along roads.
Castilleja litoralis	Oregon coast paintbrush	2B.2	Jun-Jul	Coastal bluff scrub, Coastal dunes, Coastal scrub- sandy	None. Occur in immediate coastal habitat.
Castilleja mendocinensis	Mendocino Coast paintbrush	1B.2	Apr-Aug	Coastal bluff scrub, Closed-cone coniferous forest, Coastal dunes, Coastal prairie, Coastal scrub	None. Occur in immediate coastal habitat.
Ceanothus foliosus var. vineatus	Vine Hill ceanothus	1B.1	Mar-May	Chaparral	Unlikely. Area lacks chaparral
Eriogonum kelloggii	Kellogg's buckwheat	1B.2, CE	(May)Jun-Aug	Lower montane coniferous forest (rocky, serpentinite)	None. Occurs on serpentine soil.
Erythronium oregonum	giant fawn lily	2B.2	Mar-Jun(Jul)	Cismontane woodland, Meadows and seeps- sometimes serpentinite, rocky, openings	Unlikely. Area lacks typical mesic rock habitat. High potential along streams elsewhere on parcel.
Erythronium revolutum	coast fawn lily	2B.2	Mar-Jul(Aug)	Bogs and fens, Broadleafed upland forest, North Coast coniferous forest- Mesic, streambanks	Unlikely. Area lacks typical mesic rock habitat. High potential along streams elsewhere on parcel.

Scientific Name	Common Name	Listing Status	Blooming Period	Habitat- Micro Habitat	Potential to Occur in Survey Area
Gentiana setigera	Mendocino gentian	1B.2	(Apr-Jul)Aug-Sep	Lower montane coniferous forest, Meadows and seeps-mesic	Unlikely. Area is not lower montane coniferous forest.
Gilia capitata ssp. pacifica	Pacific gilia	1B.2	Apr-Aug	Coastal bluff scrub, Chaparral (openings), Coastal prairie, Valley and foothill grassland	High. Often occurs in rocky areas in grasslands.
Howellia aquatilis	water howellia	2B.2, FT	Jun	Marshes and swamps (freshwater)	None. Area lacks suitable open water. Higher potential in ponds elsewhere on property.
Kopsiopsis hookeri	small groundcone	2B.3	Apr-Aug	North Coast coniferous forest	Moderate. Potential in conifer stands.
Montia howellii	Howell's montia	2B.2	(Jan-Feb)Mar-May	Meadows and seeps, North Coast coniferous forest, Vernal pools-vernally mesic, sometimes roadsides	Moderate. Potential along roads.
Piperia candida	white-flowered rein orchid	1B.2	(Mar)May-Sep	Broadleafed upland forest, Lower montane coniferous forest, North Coast coniferous forest-sometimes serpentinite	Moderate -High. Potential on roadcuts and forest/woodland understory.
Pleuropogon hooverianus	North Coast semaphore grass	1B.1, CT	Apr-June	Broadleafed upland forest, Meadows and seeps, North Coast coniferous forest-open areas, mesic.	Moderate. Potential in grasslands.
Sedum laxum ssp. eastwoodiae	Red Mountain stonecrop	1B.2	May-Jul	Lower montane coniferous forest (serpentinite)	None. Occurs on serpentine soil.
Tracyina rostrata	beaked tracyina	1B.2	May-Jun	Chaparral, Cismontane woodland, Valley and foothill grassland	High. Potential in grasslands.
Viburnum ellipticum	oval-leaved viburnum	2B.3	May-Jun	Chaparral, Cismontane woodland, Lower montane coniferous forest	Moderate-Unlikely. Some potential in mixed woodlands.

SPECIAL STATUS PLANT LISTING STATUS

Endangered Species Act (ESA)
FE: Federally Endangered
FT: Federally Threatened
FR: Federally Rare

California Endangered Species Act (CESA)
CE: California Endangered
CT: California Threated
CR: California Rare

California Rare Plant Ranks
1A: Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere
1B: Plants Rare, Threatened, or Endangered in California and Elsewhere
2A: Plants Presumed Extirpated in California, But Common Elsewhere
2B: California Rare Plant Rank 2B: Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere

Threat Ranks
0.1-Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
0.2-Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
0.3-Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

Figure 1. Survey Coverage Map.

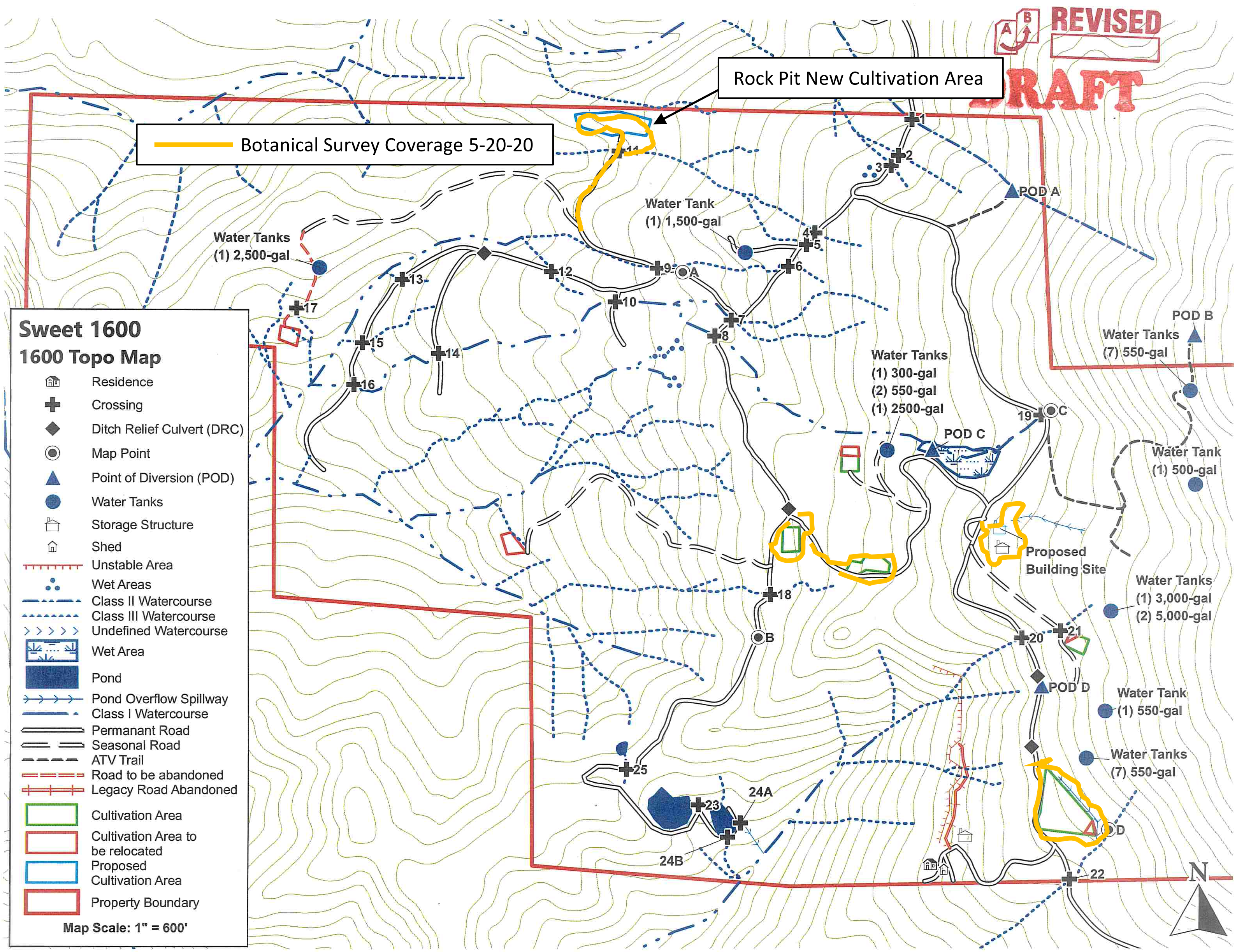

Table 2. List of Plants Encountered in the Project Area.

Scientific Name	Common Name
Acer macrophyllum	bigleaf maple
Achillea millefolium	common yarrow
Acmispon americanus var. americanus	lotus
Acmispon parviflorus	lotus
Adiantum jordanii	California maidenhair fern
Aesculus californica	California buckeye
Agrostis sp.	bent grass
Aira caryophyllea	European hairgrass
Anisocarpus madioides	woodland madia
Anthoxanthum odoratum	sweet vernal grass
Arbutus menziesii	Pacific madrone
Arctostaphylos manzanita ssp. *manzanita*	common manzanita
Arrhenatherum elatius	tall oatgrass
Avena barbata	slender wild oat
Baccharis pilularis	coyote brush
Briza maxima	rattlesnake grass
Bromus carinatus	California brome
Bromus diandrus	ripgut grass
Bromus hordeaceus	soft chess
Bromus laevipes	woodland brome
Cardamine californica	milk maids
Carduus pycnocephalus	Italian thistle
Cerastium glomeratum	mouse ear chickweed
Chamomilla suaveolens	pineapple weed
Chloroglaum pomeridianum	soaproot
Cichorium intybus	chicory
Claytonia perfoliata	miner's lettuce
Clinopodium douglasii	yerba buena
Cryptantha sp.	cryptantha
Cynoglossum grande	hound's-tongue
Cynosurus echinatus	dogtail grass
Cyperus eragrostis	nut-grass
Dactylis glomerata	orchard grass
Danthonia californica	California oatgrass
Dichelostemma capitatum	blue dicks
Elymus glaucus ssp. *glaucus*	blue wildrye
Epilobium minutum	minute willow-herb
Erodium botrys	long-beaked storksbill
Festuca arundinacea	tall fescue

Table 2 (Cont.). List of Plants Encountered in the Project Area.

Scientific Name	Common Name
Festuca myuros	rattail sixweeks grass
Festuca perennis	rye grass
Galium aparine	goose grass
Galium californicum	California bedstraw
Heteromeles arbutifolia	toyon
Hieracium albiflorum	white hawkweed
Holcus lanatus	common velvet grass
Hordeum jubatum	foxtail barley
Hordeum marinum	Mediteranean barley
Hypericum perforatum	St. John's-wort
Hypochaeris radicata	hairy cat's-ear
Iris purdyi	Purdy's iris
Juncus effusus	common rush
Juncus patens	spreading rush
Lasthenia californica ssp. californica	California Goldfields
Lathyrus vestitus	wood pea
Leontodon saxatilis	hawkbit
Lepidium campestre	cow cress
Linum bienne	western blue flax
Logfia gallica	narrow-leaved filago
Lonicera hispidula	hairy honeysuckle
Lupinus bicolor	miniature lupine
Melica sp.	oniongrass
Mentha pulegium	pennyroyal
Notholithocarpus densiflorus var. *densiflorus*	tanoak
Osmorhiza berteroi	sweet-cicely
Pentagramma triangularis ssp. *triangularis*	goldback fern
Phalaris aquatica	harding grass
Pharodendron serotinum ssp. tomentosum	mistletoe
Plantago lanceolata	English plantain
Polypodium glycyrrhiza	licorice fern
Polystichum munitum	sword fern
Prunella vulgaris	self-heal
Pseudognaphalium luteoalbum	weedy cudweed
Pseudotsuga menziesii	Douglas-fir
Pteridium aquilinum var. *pubescens*	bracken fern
Quercus chrysolepis	canyon live oak

Table 2 (Cont.). List of Plants Encountered in the Project Area.

Scientific Name	Common Name
Quercus garryana	Oregon white oak
Quercus kelloggii	California black oak
Rosa sp.	rose
Rubus leucodermis	white-stemmed raspberry
Rubus ursinus	California blackberry
Rumex acetosella	sheep sorrel
Rumex crispus	curly dock
Sanicula crassicaulis	Pacific snakeroot
Silybum marianum	milk thistle
Sisyrinchium bellum	blue-eyed-grass
Spergularia rubra	purple sand spurry
Stachys ajugoides	hedge nettle
Stellaria media	common chickweed
Stipa pulchra	purple needlegrass
Torilis arvensis	rattlesnake weed
Trifolium dubium	little hop clover
Trifolium glomeratum	clustered clover
Trifolium pratense	red clover
Trifolium repens	white clover
Trifolium subterraneum	subterranean clover
Trifolium variegatum	variagated clover
Triphysaria pusilla	dwarf orthocarpus
Umbellularia californica	California-bay
Vaccinium ovatum	evergreen huckleberry
Vicia sativa	vetch
Vicia villosa	hairy vetch
Viola ocellata	two-eyed violet
Viola sempervirens	evergreen violet
Whipplea modesta	modesty

Botanical Survey Results

Shadowlight Ranch
(APNs 223-061-043, 223-061-038, 223-073-004, & 223-073-005)

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TABLE OF CONTENTS

1. INTRODUCTION

This report includes the results of a botanical survey conducted on the Shadowlight Ranch near Garberville. The survey included portion of APN 223-061-043 (Parcel 1) and APNs 223-061-038, 223-073-004, and 223-073-005 (Parcel 2). The purpose of the survey was to identify special status plants and natural communities that could be impacted by the proposed commercial cannabis cultivation project. This report also addresses aquatic resources and invasive plants.

This report supersedes the 2020 botanical survey conducted on a portion of the project area. The survey includes all existing and proposed cultivation areas, appurtenant roads, stream crossings, ponds, water storage areas, processing facilities, and extents west of the original 2020 survey of the Rock Pit.

2. PROJECT DESCRIPTION

The project includes two Conditional Use Permits for to allow for continued cultivation of 60,940 square feet of existing outdoor and mixed light cannabis cultivation (Appendix A). There is 22,200 square feet of existing outdoor cultivation on APN 223-061-043 that will be grown in 23 greenhouses. There is 38,740 square feet of cultivation on APNs 223-061-038, 223-073-004 and 223-073-005 that consists of 32,500 square feet of existing outdoor and 6,240 square feet of mixed light cultivation that will be grown in 22 greenhouses. The proposed project includes relocation of five historic cultivation areas to environmentally superior locations on the subject parcels. Processing, including drying, curing and trimming, will occur on APN 223-073-005 in three proposed structures as follows: a one-story, 1,200-square-foot warehouse; a one-story, 5,050-square-foot processing facility; a two-story, 7,592-square-foot processing facility and office uses (footprint = 4,776 square feet); and associated parking facilities. The proposed project also includes a Special Permit for a 10,080-square-foot wholesale nursery on APNs 223-061-038, 223-073-004 and 223-073-005.

3. DEFINITIONS

3.1. Special Status Plants

Special status plants include those listed as rare, threatened, or endangered under the federal Endangered Species Act and/or the California Endangered Species Act. Additionally, impacts to taxa with California Rare Plant Ranks (CRPR) of 1A, 1B, 2A, and 2B must be analyzed in environmental documents related to the California Environmental Quality Act (CEQA), or those considered functionally equivalent to CEQA. Impacts to plants with CRPRs of 3 and 4 should also be addressed. Protection measures for populations of these taxa may be warranted if they are determined to have local or biological significance.

3.2. Special Status Plant Communities

Special status plant communities are communities with limited distribution that may be vulnerable to environmental impacts. Updated information on California natural communities, including rarity rankings, is provided in *A Manual of California Vegetation Online Edition* (CNPS 2021a). Natural communities with G or S ranks of 3 or lower are considered sensitive.

3.3. Wetlands

The Army Corps of Engineers defines wetlands as:

> "…areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

The State Water Resources Control Board defines wetlands as:

> "An area is wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation."

3.4. Invasive Plants

Invasive plants are non-native plants whose introduction causes or is likely to cause environmental or economic damage or harm to human health. Invasive species can cause a decline of endangered species and native diversity through direct competition and by alteration of ecological processes. The California Invasive Plant Council (Cal-IPC) maintains a list of plants considered invasive in California (Cal-IPC 2021). CDFW also maintains a list of invasive animals in California (CDFW 2021a).

4. ENVIRONMENTAL SETTING

4.1. Project Location

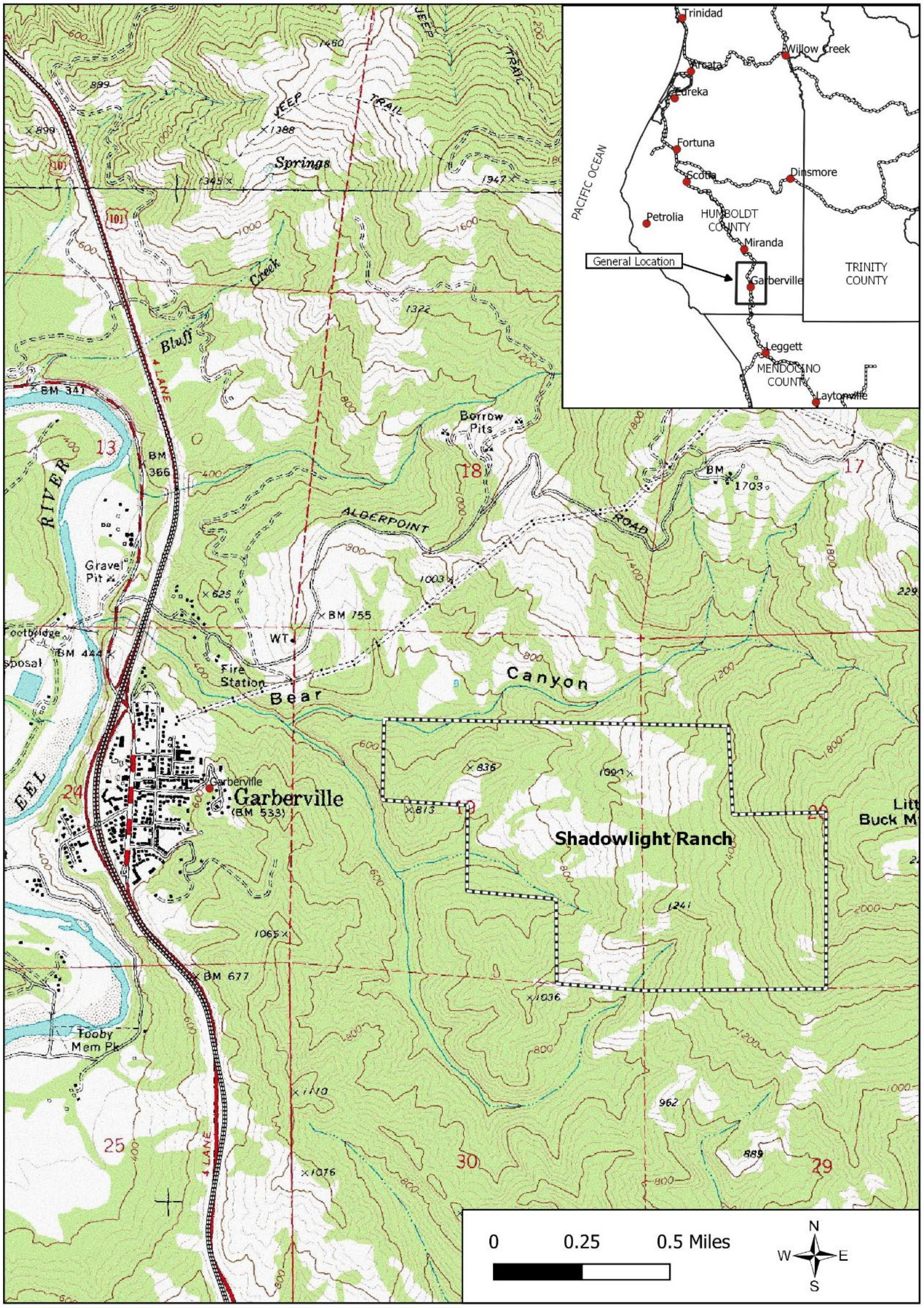
The property is located approximately 1.25 miles east of Garberville on the Garberville USGS quadrangle (Sections 19 & 20, T4S, R4E) in Humboldt County (Figure 1).

4.2. Soil, Topography, Hydrology

There are no serpentine, volcanic, or other unique soil types on the property. Several soil types are mapped on the property (United States Department of Agriculture, Natural Resource Conservation Service 2021) (Appendix B). These soil types are derived from sandstone, mudstone, and schist parent material.

The topography ranges from relatively flat ridges to 15-40% generally west-facing slopes. The elevation ranges from approximately 500 to 2,000 feet above sea level. The property includes several tributaries of Bear Canyon, which drains into the South Fork Eel River. There are also three ponds and emergent wetlands on the property.

Figure 1. Location Map.



4.3. Vegetation

The property includes coniferous forest dominated by Douglas-fir (*Pseudotsuga menziesii*), mixed Douglas-fir and hardwood stands, oak woodlands, grasslands, emergent wetlands, and ponds. A general vegetation map is provided in Figure 2.

Much of the property is a mix of Douglas-fir and hardwoods including tanoak (*Notholithocarpus densiflorus* var*. densiflorus*), canyon live oak (*Quercus chrysolepis*), Oregon white oak (*Quercus garryana*), California black oak (*Quercus kelloggii*), California bay (*Umbellularia californica*), madrone (*Arbutus menziesii*), and buckeye (*Aesculus californica*).

The oak woodlands are generally dominated by Oregon white oak. The understory includes a mix of native and non-native herbaceous plants. The oak woodlands shown in Figure 2 are obvious on the aerial imagery. Additional stands of oaks also occur along the grassland margins or within stands of other trees.

The grasses on the property are predominantly composed of non-native grasses including harding grass (*Phalaris aquatica*), colonial bentgrass (*Agrostis capillaris*), wild oat (*Avena barbata*), soft chess (*Bromus hordeaceus*), dogtail grass (*Cynosurus echinatus*), and rattlesnake grass (*Briza maxima*). Several areas were noted on the property that include stands of native grasses including California oatgrass (*Danthonia californica*) and purple needle grass (*Stipa pulchra*).

There are several wetlands associated with the watercourses or concave topography in the grasslands with rushes (*Juncus patens* & *J. effusus*), feta sedge (*Carex feta*), nut-grass (*Cyperus eragrostis*), and pennyroyal (*Mentha pulegium*).

The ponds include cattail (*Typha latifolia*), pondweed (*Potamogeton* sp.), and duckweed (*Lemna sp*.).

5. METHODS

5.1. Scoping

A list of special status plants that could potentially occur on the property was generated by consulting the *California Natural Diversity Database* (CDFW 2021) and the CNPS *Inventory of Rare and Endangered Plants* (CNPS 2021a). The scoping list includes special status plants with documented occurrences on the Garberville USGS quadrangle or adjacent quadrangles (Table 1).

Special status natural communities that have potential to occur on the property include, but are not limited to, oak woodlands and special status native grassland communities. A full list of special status natural communities that occur in northwestern California queried from *A Manual of California Vegetation Online Edition* (CNPS 2021b) is provided in Appendix C.

Figure 2. General Vegetation Map.

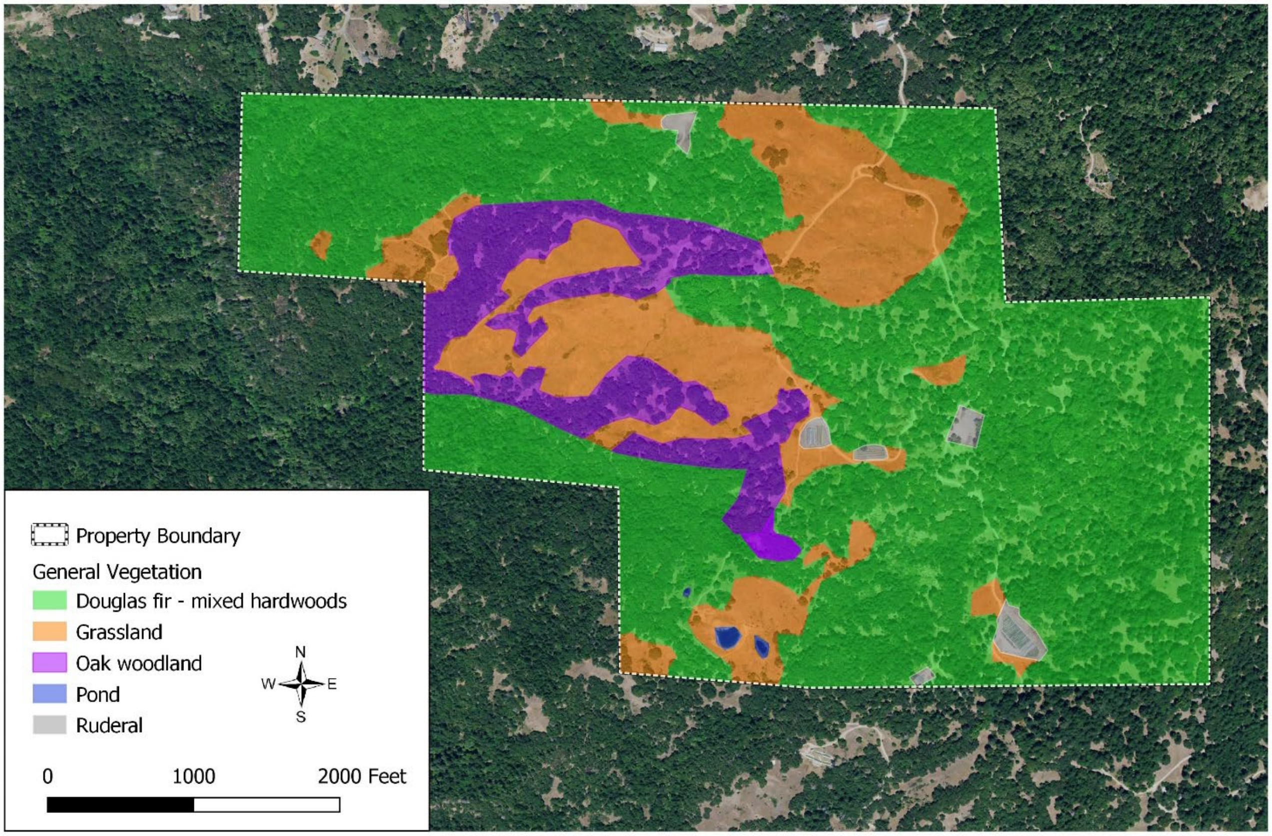


Table 1. Special Status Plant Scoping List.

Scientific Name **Common Name**	**Listing Status**	**Blooming Period**	**Habitat**	**Potential to Occur on Parcel**
Arabis mcdonaldiana McDonald's rockcress	1B.1, CE, FE	May-Jul	Lower montane coniferous forest, Upper montane coniferous forest-Serpentinite-Serpentinite	None. Occurs on serpentine.
Arctostaphylos stanfordiana ssp. raichei Raiche's manzanita	1B.1	Feb-Apr	Chaparral, Lower montane coniferous forest-rocky, often serpentinite	Unlikely. Parcel lacks typical habitat.
Astragalus agnicidus Humboldt County milk-vetch	1B.1, CE	Apr-Sep	Broadleafed upland forest, North Coast coniferous forest-penings, disturbed areas, sometimes roadsides	High. Potential along roads and disturbed areas.
Astragalus rattanii var. rattanii Rattan's milk-vetch	4.3	Apr-Jul	Chaparral, Cismontane woodland, Lower montane coniferous forest-gravelly streambanks	Unlikely. Parcel lacks gravelly streambanks.
Calamagrostis bolanderi Bolander's reed grass	4.2	May-Aug	Bogs and fens, Broadleafed upland forest, Closed-cone coniferous forest, Coastal	Moderate. Some potential along streams.

Scientific Name Common Name	Listing Status	Blooming Period	Habitat	Potential to Occur on Parcel
			scrub, Marshes and swamps, Meadows and seeps, North Coast coniferous forest-mesic	
Calamagrostis foliosa leafy reed grass	4.2, CR	May-Sep	Coastal bluff scrub, North Coast coniferous forest-rocky	Moderate-High. Potential in rocky areas.
Carex arcta northern clustered sedge	2B.2	Jun-Sep	Bogs and fens, North Coast coniferous forest-mesic	High. Potential in ponds and wetlands.
Castilleja litoralis Oregon coast paintbrush	2B.2	Jun	Coastal bluff scrub, Coastal dunes, Coastal scrub-sandy	None. Occurs in immediate coastal habitat.
Castilleja mendocinensis Mendocino Coast paintbrush	1B.2	Apr-Aug	Closed-cone coniferous forest, Coastal bluff scrub, Coastal dunes, Coastal prairie, Coastal scrub	None. Occurs in immediate coastal habitat.
Ceanothus foliosus var. vineatus Vine Hill ceanothus	1B.1	Mar-May	Chaparral	Unlikely. Maybe some potential along roads.
Ceanothus gloriosus var. exaltatus glory brush	4.3	Mar-Jun(Aug)	Chaparral (often occurs along roads/roadcuts in redwood forest)	Moderate. Potential along roads.
Coptis laciniata Oregon goldthread	4.2	(Feb)Mar-May(Sep-Nov)	Meadows and seeps, North Coast coniferous forest-mesic	Moderate. Potential along streams.
Cypripedium californicum California lady's-slipper	4.2	Apr-Aug(Sep)	Bogs and fens, Lower montane coniferous forest	Moderate. Potential along streams.
Epilobium septentrionale Humboldt County fuchsia	4.3	Jul-Sep	Broadleafed upland forest, North Coast coniferous forest-sandy or rocky	High. Potential in rocky areas.
Erigeron biolettii streamside daisy	3	Jun-Oct	Broadleafed upland forest, Cismontane woodland, North Coast coniferous forest-rock mesic	Moderate. Potential in rocky areas along streams.
Erigeron robustior robust daisy	4.3	Jun-Jul	Lower montane coniferous forest, Meadows and seeps-sometimes serpentinite	Unlikely. Maybe some potential along streams or wetlands.
Eriogonum kelloggii Kellogg's buckwheat	1B.2, CE	(May)Jun-Aug	Lower montane coniferous forest (rocky, serpentinite)	None. Occurs on serpentine.
Erythronium citrinum var. citrinum lemon-colored fawn lily	4.3	Mar-May	Chaparral, Lower montane coniferous forest- usually serpentinite	Unlikely. Maybe some potential in forest understory.
Erythronium oregonum giant fawn lily	2B.2	Mar-Jun(Jul)	Cismontane woodland, Meadows and seeps-sometimes serpentinite, rocky, openings	High. Potential in rocky areas and along streams.
Erythronium revolutum coast fawn lily	2B.2	Mar-Jul(Aug)	Bogs and fens, Broadleafed upland forest, North Coast coniferous forest- Mesic, streambanks	High. Potential in rocky areas and along streams.

Scientific Name Common Name	Listing Status	Blooming Period	Habitat	Potential to Occur on Parcel
Gentiana setigera Mendocino gentian	1B.2	(Apr-Jul)Aug-Sep	Lower montane coniferous forest, Meadows and seeps-mesic	Unlikely. Maybe some potential in wetlands.
Gilia capitata ssp. pacifica Pacific gilia	1B.2	Apr-Aug	Chaparral, Coastal bluff scrub, Coastal prairie, Valley and foothill grassland	High. Potential in grasslands and open rocky areas.
Hemizonia congesta ssp. tracyi Tracy's tarplant	4.3	May-Oct	Coastal prairie, Lower montane coniferous forest, North Coast coniferous forest-openings sometimes serpentinite	High. Potential in grasslands.
Hosackia gracilis harlequin lotus	4.2	Mar-Jul	Broadleafed upland forest, Cismontane woodland, Closed-cone coniferous forest, Coastal bluff scrub, Coastal prairie, Coastal scrub, Marshes and swamps, Meadows and seeps, North Coast coniferous forest, Valley and foothill grassland-wetlands, roadsides	High. Potential open areas.
Howellia aquatilis water howellia	2B.2, FT	Jun	Marshes and swamps (freshwater)	Moderate. Potential in ponds.
Kopsiopsis hookeri small groundcone	2B.3	Apr-Aug	North Coast coniferous forest	High. Potential in forest understory.
Leptosiphon acicularis bristly leptosiphon	4.2	Apr-Jul	Chaparral, Cismontane woodland, Coastal prairie, Valley and foothill grassland	High. Potential in grasslands, rocky areas, and along roads/open areas.
Leptosiphon latisectus broad-lobed leptosiphon	4.3	Apr-Jun	Broadleafed upland forest, Cismontane woodland	High. Potential in grasslands, rocky areas, and along roads/open areas.
Leptosiphon rattanii Rattan's leptosiphon	4.3	May-Jul	Cismontane woodland, Lower montane coniferous forest- rocky or gravelly	High. Potential in grasslands, rocky areas, and along roads/open areas.
Lilium rubescens redwood lily	4.2	Apr-Aug(Sep)	Broadleafed upland forest, Chaparral, Lower montane coniferous forest, North Coast coniferous forest, Upper montane coniferous forest- Sometimes serpentinite, sometimes roadsides	High. Potential along roads and forest edges.
Listera cordata heart-leaved twayblade	4.2	Feb-Jul	Bogs and fens, Lower montane coniferous forest, North Coast coniferous forest	High. Potential in forest understory.

Scientific Name Common Name	Listing Status	Blooming Period	Habitat	Potential to Occur on Parcel
Lomatium engelmannii Engelmann's lomatium	4.3	May-Aug	Chaparral, Lower montane coniferous forest, Upper montane coniferous forest- Serpentinite	None. Occurs on serpentine.
Lycopus uniflorus northern bugleweed	4.3	Jul-Sep	Bogs and fens, Marshes and swamps	Moderate. Potential in wetlands and around ponds.
Mitellastra caulescens leafy-stemmed mitrewort	4.2	(Mar)Apr-Oct	Broadleafed upland forest, Lower montane coniferous forest, Meadows and seeps, North Coast coniferous forest- mesic, sometimes roadsides	Moderate. Potential along streams.
Montia howellii Howell's montia	2B.2	(Feb)Mar-May	Meadows and seeps, North Coast coniferous forest, Vernal pools- vernally mesic, sometimes roadsides	High. Potential along roads, open areas.
Piperia candida white-flowered rein orchid	1B.2	(Mar)May-Sep	Broadleafed upland forest, Lower montane coniferous forest, North Coast coniferous forest	High. Potential in forest understory, forest edges, oak woodlands and roadcuts.
Pityopus californicus California pinefoot	4.2	(Mar-Apr)May-Aug	Broadleafed upland forest, Lower montane coniferous forest, North Coast coniferous forest, Upper montane coniferous forest- mesic	High. Potential in forest understory.
Pleuropogon hooverianus North Coast semaphore grass	1B.1, CT	Apr-Jun	Broadleafed upland forest, Meadows and seeps, North Coast coniferous forest- open areas, mesic	High. Potential in wetlands.
Sedum laxum ssp. eastwoodiae Red Mountain stonecrop	1B.2	May-Jul	Lower montane coniferous forest (serpentinite)	None. Occurs on serpentine.
Sidalcea malachroides maple-leaved checkerbloom	4.2	(Mar)Apr-Aug	Broadleafed upland forest, Coastal prairie, Coastal scrub, North Coast coniferous forest, Riparian woodland- Often in disturbed areas	High. Potential along roads, disturbed areas, forest edges.
Sidalcea malviflora ssp. patula Siskiyou checkerbloom	1B.2	May-Aug	Coastal bluff scrub, Coastal prairie, North Coast coniferous forest	High. Potential in grasslands
Silene campanulata ssp. campanulata Red Mountain catchfly	4.2, CE	Apr-Jul	Chaparral, Lower montane coniferous forest- Rocky, Serpentinite (usually)- Rocky Serpentinite (usually)	Unlikely. Usually serpentine habitat.

Scientific Name Common Name	Listing Status	Blooming Period	Habitat	Potential to Occur on Parcel
Tracyina rostrata beaked tracyina	1B.2	May-Jun	Chaparral, Cismontane woodland, Valley and foothill grassland	High. Potential in grasslands and woodlands.
Usnea longissima Methuselah's beard lichen	4.2		Broadleafed upland forest, North Coast coniferous forest- On tree branches; usually on old growth hardwoods and conifers	High. Potential on tree branches.
Viburnum ellipticum oval-leaved viburnum	2B.3	May-Jun	Chaparral, Cismontane woodland, Lower montane coniferous forest	Moderate-Unlikely. Some potential in woodlands.

SPECIAL STATUS PLANT LISTING STATUS

Endangered Species Act (ESA)
FE: Federally Endangered
FT: Federally Threated
FR: Federally Rare

California Endangered Species Act (CESA)
CE: California Endangered
CT: California Threated
CR: California Rare

California Rare Plant Ranks
1A: Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere
1B: Plants Rare, Threatened, or Endangered in California and Elsewhere
2A: Plants Presumed Extirpated in California, But Common Elsewhere
2B: California Rare Plant Rank 2B: Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere
3. Review List: Plants about which more information is needed.
4. Watch List: Plants of limited distribution

Threat Ranks
0.1-Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
0.2-Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
0.3-Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

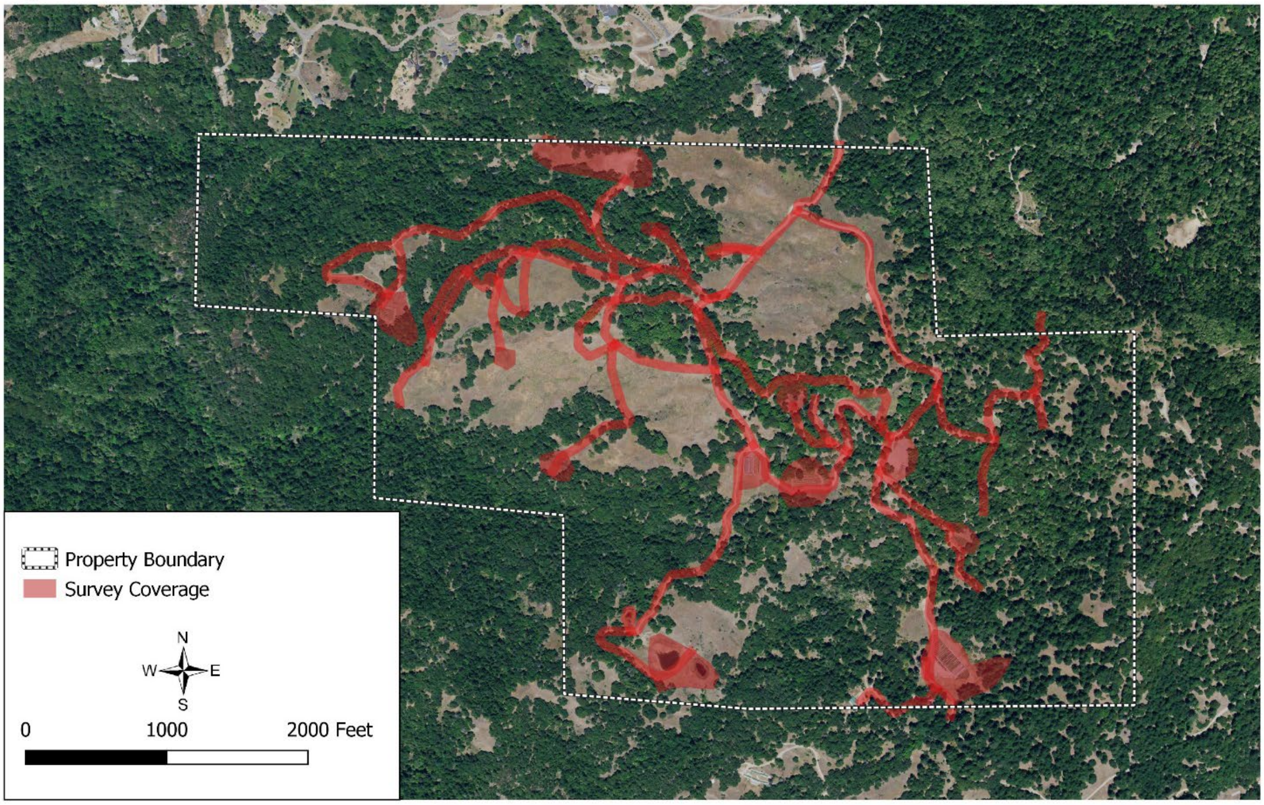
5.2. Survey

The survey was conducted by Kyle Wear, M.A. Mr. Wear has over 25 years of experience conducting floristic surveys and other botanical work in northern California. Mr. Wear is trained in wetland delineation by the Wetland Training Institute.

The survey was floristic and followed methods outlined in *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW 2018). The project area was surveyed on April 8, June 7, and July 26, 2021. A survey coverage map is provided in Figure 3. All plants were identified to the taxonomic level necessary to determine whether they are special status. Plant taxonomy generally follows *The Jepson Manual Vascular Plants of California, Second Edition* (Baldwin et. al. 2012), however the plant list may include more recent name changes. Plant communities were classified according to *A Manual of California Vegetation Online Edition* (CNPS 2021b).

The surveys were conducted at the time of year when plants on the scoping list with potential to occur on the property would be recognizable and identifiable (generally, but not necessarily

Figure 3. Survey Coverage Map.



during the blooming or fruiting period) and when other common plants would be identifiable so that a comprehensive plant list could be compiled.

6. RESULTS

6.1. Special Status Plants

An occurrence of long-beard lichen (*Usnea longissima*), CRPR 4.2, was encountered on the survey (Figure 4). The lichen was on madrone, buckeye, and California bay branches along a watercourse. No other special status plants were recorded on the property. A list of all plants recorded is provided in Table 2.

6.2. Special Status Natural Communities

Most of the grassland on the property is dominated by non-native grasses. However, there is a native grass component that included stands of California oatgrass (*Danthonia californica*) and purple needle grass (*Stipa (Nassella) pulchra*). Recent changes to the membership rules in *A Manual of California Vegetation Online Edition* now indicate that relative cover of California oatgrass can be as low as 10% (previously 50%) to meet the criteria of Idaho Fescue - California oatgrass grassland (*Festuca idahoensis - Danthonia California* Herbaceous Alliance), which has a S Rank of 3, and is a special status natural community. Cover can be as low as 5% of purple needle grass to meet the membership rules for Needle grass - Melic grass grassland

Figure 4. Special Status and Invasive Plant Map.

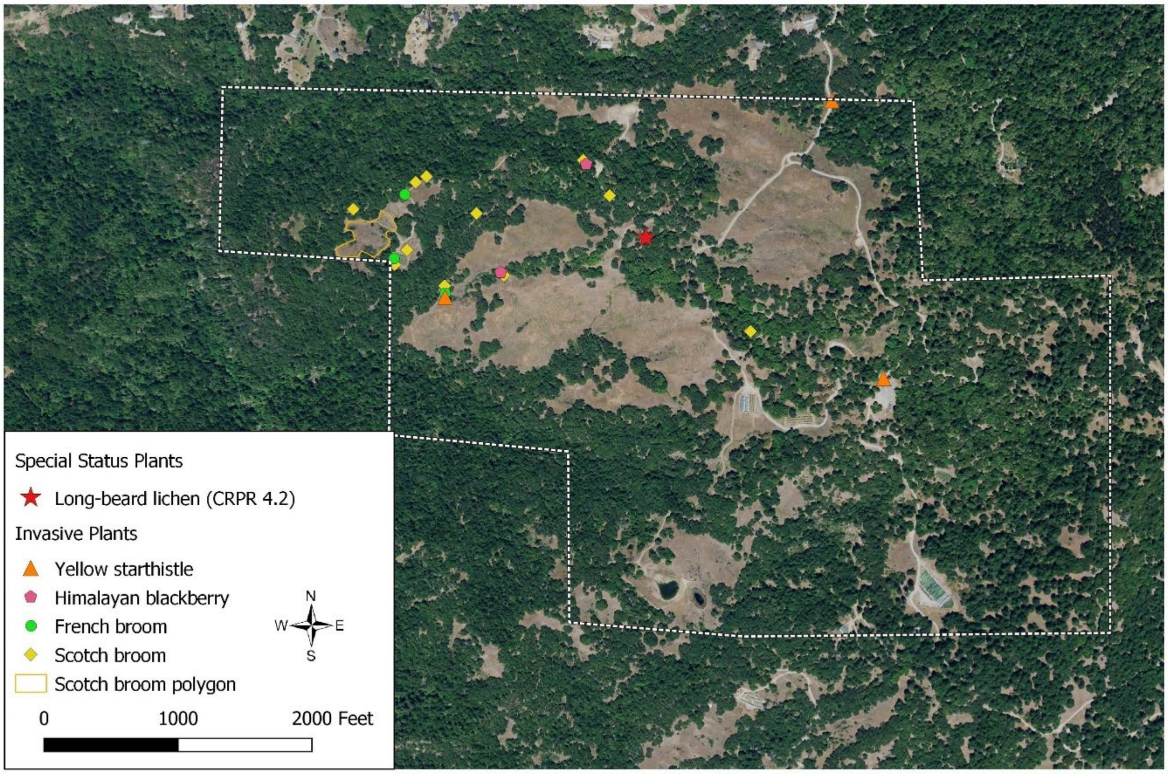


Table 2. Plant List.

Scientific Name	Common Name
Acer macrophyllum	bigleaf maple
Achillea millefolium	common yarrow
Acmispon americanus var. americanus	lotus
Acmispon parviflorus	lotus
Adiantum jordanii	California maidenhair fern
Aesculus californica	California buckeye
Agrostis capillaris	colonial bentgrass
Agrostis sp.	bent grass
Aira caryophyllea	European hairgrass
Anisocarpus madioides	woodland madia
Anthoxanthum odoratum	sweet vernal grass
Arbutus menziesii	Pacific madrone
Arctostaphylos columbiana	hairy manzanita
Arctostaphylos manzanita ssp. *manzanita*	common manzanita
Athyrium filix-femina	lady fern
Avena barbata	slender wild oat
Baccharis glutinosa	marsh baccharis

Scientific Name	Common Name
Baccharis pilularis	coyote brush
Bellis perennis	English daisy
Berberis aquifolium	tall Oregon-grape
Briza maxima	rattlesnake grass
Briza minor	small rattlesnake grass
Brodiaea elegans	harvest brodiaea
Bromus carinatus	California brome
Bromus diandrus	ripgut grass
Bromus hordeaceus	soft chess
Bromus laevipes	woodland brome
Bromus madritensis	foxtail chess
Bromus orrcuttianus	Orcut's brome grass
Calochortus tolmiei	pussy ears
Calypso bulbosa	calypso orchid
Capsella bursa-pastoris	shepherd's purse
Cardamine brewerii	Brewer's bittercress
Cardamine californica	milk maids
Cardamine oligosperma	western bittercress
Carduus pycnocephalus	Italian thistle
Carex feta	feta sedge
Carex tumulicola	foothill sedge
Centaurea solstitialis	yellow starthistle
Cerastium glomeratum	mouse ear chickweed
Chloroglaum pomeridianum	soaproot
Cirsium vulgare	bull thistle
Claytonia perfoliata	miner's lettuce
Clinopodium douglasii	yerba buena
Convolvulus arvensis	field bindweed
Croton setiger	turkey-mullein
Cynoglossum grande	hound's-tongue
Cynosurus echinatus	dogtail grass
Cyperus eragrostis	nut-grass
Cystopteris fragilis	fragile fern
Cytisus scoparius	Scotch broom
Dactylis glomerata	orchard grass
Danthonia californica	California oatgrass
Daucus carota	Queen Anne's lace
Deschampsia elongata	slender hairgrass
Dichelostemma capitatum	blue dicks

Scientific Name	Common Name
Dichelostemma ida-maia	firecracker flower
Drymocallis glandulosa	sticky cinquefoil
Dryopteris arguta	coastal wood fern
Eleocharis macrostachya	creeping spike-rush
Eleocharis sp.	spike-rush
Elymus caput-medusae	Medusa head
Elymus glaucus ssp. *glaucus*	blue wildrye
Equisetum telmateia ssp. *braunii*	giant horsetail
Eriophyllum lanatum	woolly sunflower
Erodium botrys	long-beaked storksbill
Erodium brachycarpum	long-beaked filaree
Eschscholzia californica	California poppy
Festuca arundinacea	tall fescue
Festuca californica	California fescue
Festuca myuros	rattail sixweeks grass
Festuca perennis	rye grass
Fragaria vesca	wood strawberry
Galium sp.	bedstraw
Gamochaeta ustulata	purple cudweed
Gastridium phleoides	nit grass
Genista monspessulana	French broom
Geranium dissectum	cut-leaved geranium
Geranium molle	dovefoot geranium
Heteromeles arbutifolia	toyon
Hieracium albiflorum	white hawkweed
Holcus lanatus	common velvet grass
Holodiscus discolor	oceanspray
Hordeum marinum	Mediteranean barley
Hypericum perforatum	St. John’s-wort
Hypochaeris glabra	smooth cat's-ear
Hypochaeris radicata	hairy cat’s-ear
Iris purdyi	Purdy’s iris
Juncus bufonius	common toad rush
Juncus effusus	common rush
Juncus patens	spreading rush
Juncus tenuis	slender rush
Lactuca sp.	wild lettuce
Lathyrus polyphyllus	Oregon pea
Lathyrus vestitus	wood pea

Scientific Name	Common Name
Lemna sp.	duckweed
Leontodon saxatilis	hawkbit
Lepidium sp.	peppergrass or pepperwort
Leucanthemum vulgare	ox-eye daisy
Linum bienne	western blue flax
Lithophragma affine	woodland star
Logfia gallica	narrow-leaved filago
Lonicera hispidula	hairy honeysuckle
Lotus corniculatus	birdfoot trefoil
Lotus humistratus	hill lotus
Lupinus bicolor	miniature lupine
Luzula comosa	common wood rush
Lysimachia arvensis	scarlet pimpernel
Lythrum hyssopifolium	Hyssop loosestrife
Madia exigua	small tarweed
Madia sativa	coast tarweed
Matricaria discoidea	pineapple weed
Medicago polymorpha	bur clover
Melica aritata	awned melic
Melica sublata	Alaska oniongrass
Mentha pulegium	pennyroyal
Monardella villosa	coyote mint
Myosotis discolor	yellow and blue scorpion grass
Nasturtium officinale	water cress
Navarretia squarrosa	skunkweed
Nemophila parviflora	small-flowered nemophila
Notholithocarpus densiflorus var. *densiflorus*	tanoak
Oenanthe sarmentosa	Pacific water-parsley
Osmorhiza berteroi	sweet-cicely
Oxalis oregana	redwood sorrel
Pedicularis densiflora	Indian warrior
Pentagramma triangularis ssp. *triangularis*	goldback fern
Perideria kelloggii	kellogg's yampah
Periderida sp.	yampah
Persicaria sp.	knotweed
Petasites frigidis var. *palmatus*	western coltsfoot
Phacelia bolanderi	Bolander's phacelia
Phalaris aquatica	harding grass
Phleum pratense	timothy grass

Scientific Name	Common Name
Phoradendron leucarpum	mistletoe
Plantago lanceolata	English plantain
Plectritis congesta ssp. *brachystemon*	shortspur seablush
Poa annua	annual bluegrass
Poa pratensis	Kentucky bluegrass
Poa trivialis	rough bluegrass
Polygala californica	California milkwort
Polygonum aviculare	prostrate knotweed
Polypodium glycyrrhiza	licorice fern
Polypogon monspeliensis	rabbitfoot grass
Polystichum munitum	sword fern
Potamogeton sp.	pondweed
Primula herdersonii	Henderson's shooting star
Prosartes hookeri	Hooker's fairy bells
Prunella vulgaris	self-heal
Pseudotsuga menziesii	Douglas-fir
Psilocarphus tenellus	woolly marbles
Pteridium aquilinum var. *pubescens*	bracken fern
Quercus chrysolepis	canyon live oak
Quercus garryana	Oregon white oak
Quercus kelloggii	California black oak
Ranunculus occidentalis	western buttercup
Ranunculus sp.	buttercup
Ribes roezlii	Sierra gooseberry
Rosa sp.	rose
Rubus armeniacus	Himalayan blackberry
Rubus leucodermis	white-stemmed raspberry
Rubus parviflorus	thimbleberry
Rubus ursinus	California blackberry
Rumex acetosella	sheep sorrel
Rumex crispus	curly dock
Rumex pulcher	fiddle dock
Salix lasiandara ssp. lasiandra	Pacific willow
Sanicula bipinnatifida	purple sanicle
Sanicula crassicaulis	Pacific snakeroot
Sanicula laciniata	coast blacksnakeroot
Saxifraga mertensiana	Merten's saxifrage
Scirpus microcarpus	small-flowered bulrush
Scoliopus bigelovii	slink-pod

Scientific Name	Common Name
Senecio minimus	coast fireweed
Sherardia arvensis	field madder
Sidalcea asprella	Harsh checker mallow
Silybum marianum	milk thistle
Sisyrinchium bellum	blue-eyed-grass
Sonchus oleraceus	common sow thistle
Spergularia rubra	purple sand spurry
Stachys ajugoides	hedge nettle
Stachys sp.	hedge-nettle
Stellaria media	common chickweed
Stipa pulchra	purple needlegrass
Synthyris reniformis	snow queen
Taraxacum officinale	dandelion
Thalictrum fendleri var. polycarpum	meadow rue
Torilis arvensis	rattlesnake weed
Toxicodendron diversilobum	poison-oak
Trifolium dubium	little hop clover
Trifolium hirtum	rosy clover
Trifolium repens	white clover
Trillium ovatum	western trillium
Triphysaria pusilla	dwarf orthocarpus
Trisetum cernum	nodding trisetum
Triteleia laxa	Ithuriel’s spear
Typha latifolia	broadleaf cattail
Umbellularia californica	California-bay
Usnea longissima	long-beard lichen (CRPR 4.2)
Vaccinium ovatum	evergreen huckleberry
Verbascum sp.	mullein
Veronica persica	Persian speedwell
Vicia americana var. *americana*	American vetch
Vicia sativa	vetch
Vicia tetrasperma	slender vetch
Viola glabella	stream violet
Viola sempervirens	evergreen violet
Whipplea modesta	modesty
Woodwardia fimbriata	giant chain fern

(*Nassella* spp. - *Melica* spp. Herbaceous Alliance), which also has an S Rank of 3. The native and non-native grassland types are not distinguishable on aerial imagery, thus were not mapped separately. Most of the native grass cover is in the grasslands on APN 223-061-043 in the western portion of the property. The native grasses stands are intermixed with areas dominated by harding grass and other non-native grasses. This includes the undisturbed western portion of the new proposed Rock Pit cultivation area. The grasslands on the eastern portion of the property have much lower cover of native grasses.

Approximately 50 acres of Oregon white oak woodland (*Quercus garryana* Forest and Woodland Alliance) were identified on the parcel and mapped based on aerial imagery (see Figure 2). Oregon white oak woodland also has an S Rank of 3. Oregon white oak is also common along the grassland margins as individual trees or small stands that may not be shown in Figure 2 if not apparent in ariel images.

The stands of Douglas-fir and mixed hardwoods do not meet the criteria for any special status natural communities.

6.3. Wetlands

Several relatively small emergent wetlands with rushes, horsetails, and other hydrophytic vegetation occur in the grasslands, often associated with watercourses. None of these areas are within or near cultivation areas or other areas of potential disturbance and will not be impacted. Impacts to wetlands from pond construction are not addressed in this report as that issue is addressed in several other environmental documents for the project.

6.4. Invasive Plants

Four highly invasive plants were documented on the property (Figure 4). This includes Scotch broom (*Cytisus scoparius*), French broom (*Genista monspessulana*), yellow starthistle (*Centaurea solstitialis*), and Himalayan blackberry (*Rubus armeniacus*). These plants all have Cal-IPC ratings of High.

7. POTENTIAL FOR FALSE NEGATIVE SURVEYS

Potential factors that could result in a ack of detection of special status plants include plants that have a seed bank on the site but currently no above ground individuals, grazing, disease, disturbance, and adverse climatic conditions.

Seeds of some species can persist for years or decades in the soil until suitable conditions occur for germination. Legumes such as Humboldt County milk-vetch (*Astragalus agnicidus*) can persist for years or decades in seed bank and emerge after logging or other environmental changes. Plants that grow from underground structures such as bulbs and tubers, including white-flowered rein orchid (*Piperia candida*) and lilies (*Lilium* spp.), can remain dormant or suppressed under unfavorable conditions.

Plants can also be consumed by livestock, deer, or invertebrates or succumb to disease. These factors could damage identifying characters such as flowers and leaves or remove entire above ground portions of the plants resulting in negative detections.

The climatic conditions were relatively dry in the spring of 2021 with lower-than-normal rainfall accumulation. Temperature, which is the primary factor controlling plant phenology, was within normal ranges. Although the spring was dry, plant phenology in general did not seem to be affected, many species were at peak bloom during typical timing.

8. IMPACT ASSEMENT AND RECOMMENDATIONS

8.1. Special Status Plants

Long-beard lichen
The occurrence of long-beard lichen is not near any cultivation areas or other areas of potential disturbance and will not be impacted.

8.2. Special Status Natural Communities

Native grassland communities
The development of the Rock Pit cultivation area will impact approximately 4,844 square feet of grassland that has approximately 25% cover of California oatgrass and approximately 10 % cover of purple needle grass (Figure 5). These grasses are mixed with non-native grasses including rattlesnake grass, Harding grass, colonial bentgrass, orchard grass, and wild oat.

Potential mitigation for the impact includes control of invasive weeds in the grasslands. The western portion of the property includes an approximately 2-acre area that has similar native grass cover and species composition as the Rock Pit, but also has a significant infestation of Scotch broom (Figure 6). Removal of the Scotch broom from the meadow would likely benefit California oatgrass, purple needle grass, and other native plants and prevent further degradation of the grassland. This would likely require a special permit for restoration from the County.

Oregon white oak woodland
The stands of Oregon white oak will not be impacted by the project. There are stands of Oregon white oak around the perimeter of the grassland at Rock Pit that were included in the Douglas-fir and mixed hardwood vegetation. The trees should not be impacted.

Figure 5. Special Status Grassland Impact Map.

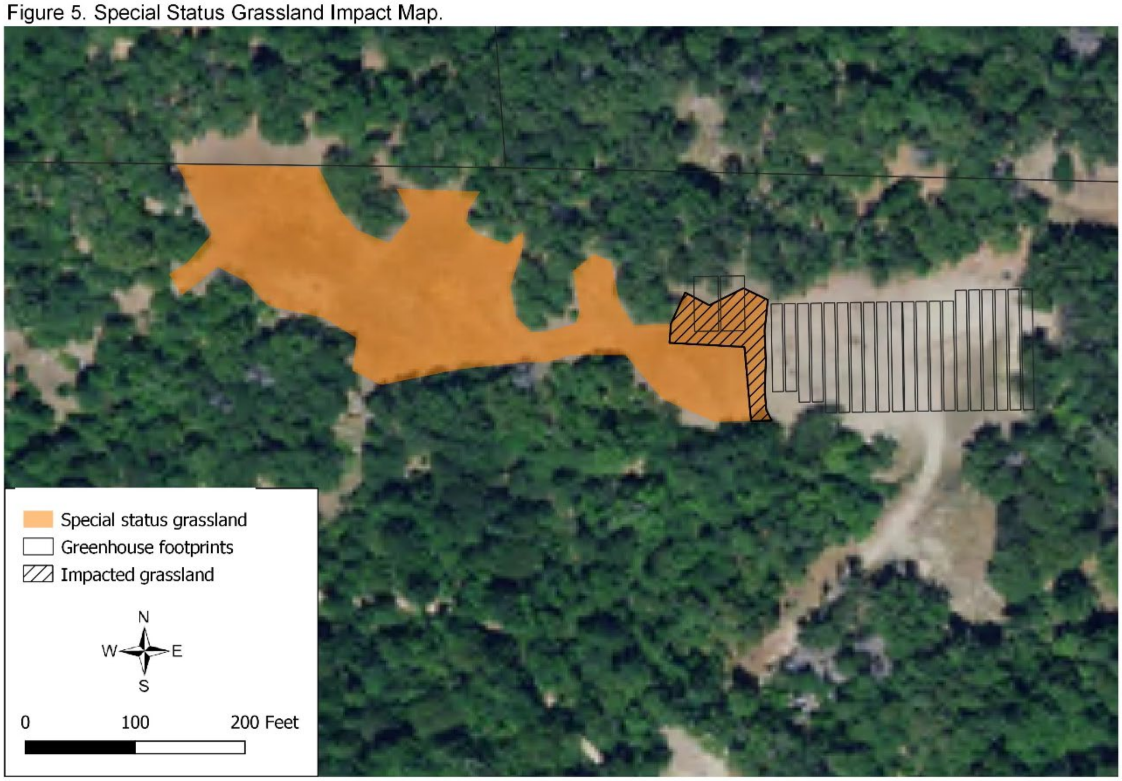
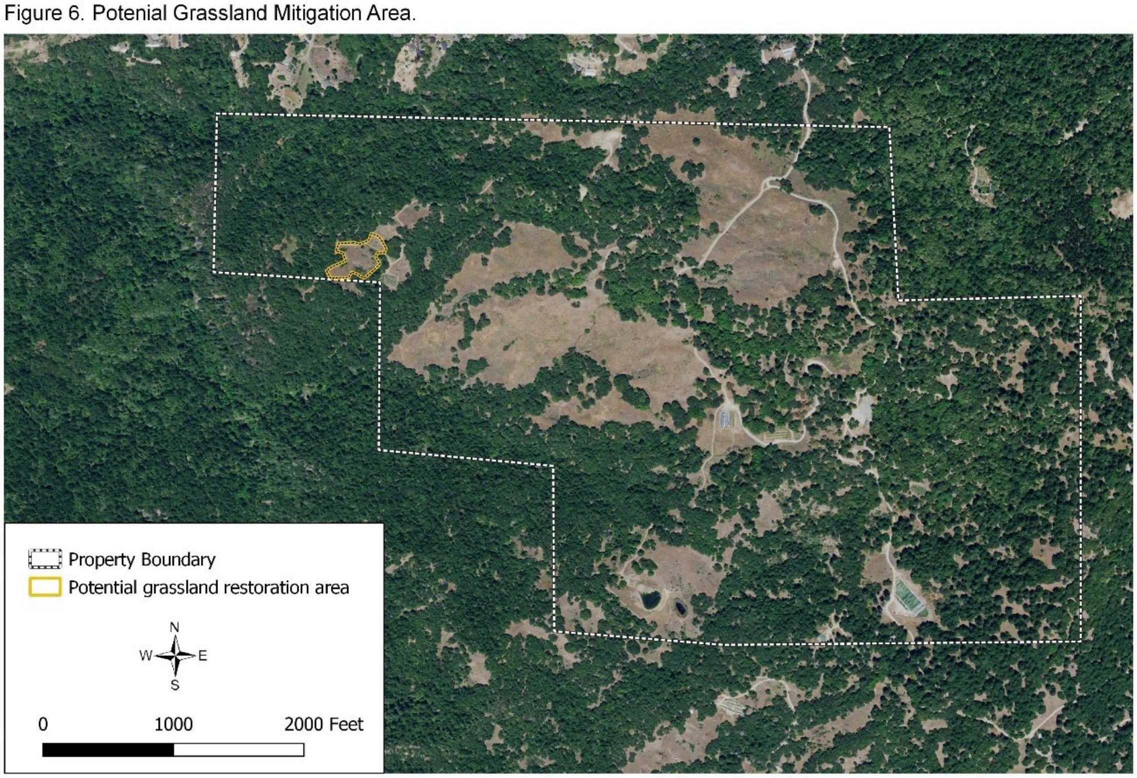


Figure 6. Potenial Grassland Mitigation Area.



8.3. Invasive Plants

It is recommended Scotch broom, French broom, yellow starthistle, and Himalayan blackberry be controlled to prevent further spread. Information on control of these species can be found at:

Scotch broom
https://wric.ucdavis.edu/information/natural%20areas/wr_C/Cytisus.pdf

French broom
https://wric.ucdavis.edu/information/natural%20areas/wr_G/Genista.pdf

Yellow starthistle
https://wric.ucdavis.edu/information/natural%20areas/wr_C/Centaurea_solstitialis.pdf

Himalayan blackberry
https://wric.ucdavis.edu/information/natural%20areas/wr_R/Rubus.pdf

9. REFERENCES

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APPENDIX A. Site Plan

PROPOSED CULTIVATION SUMMARY

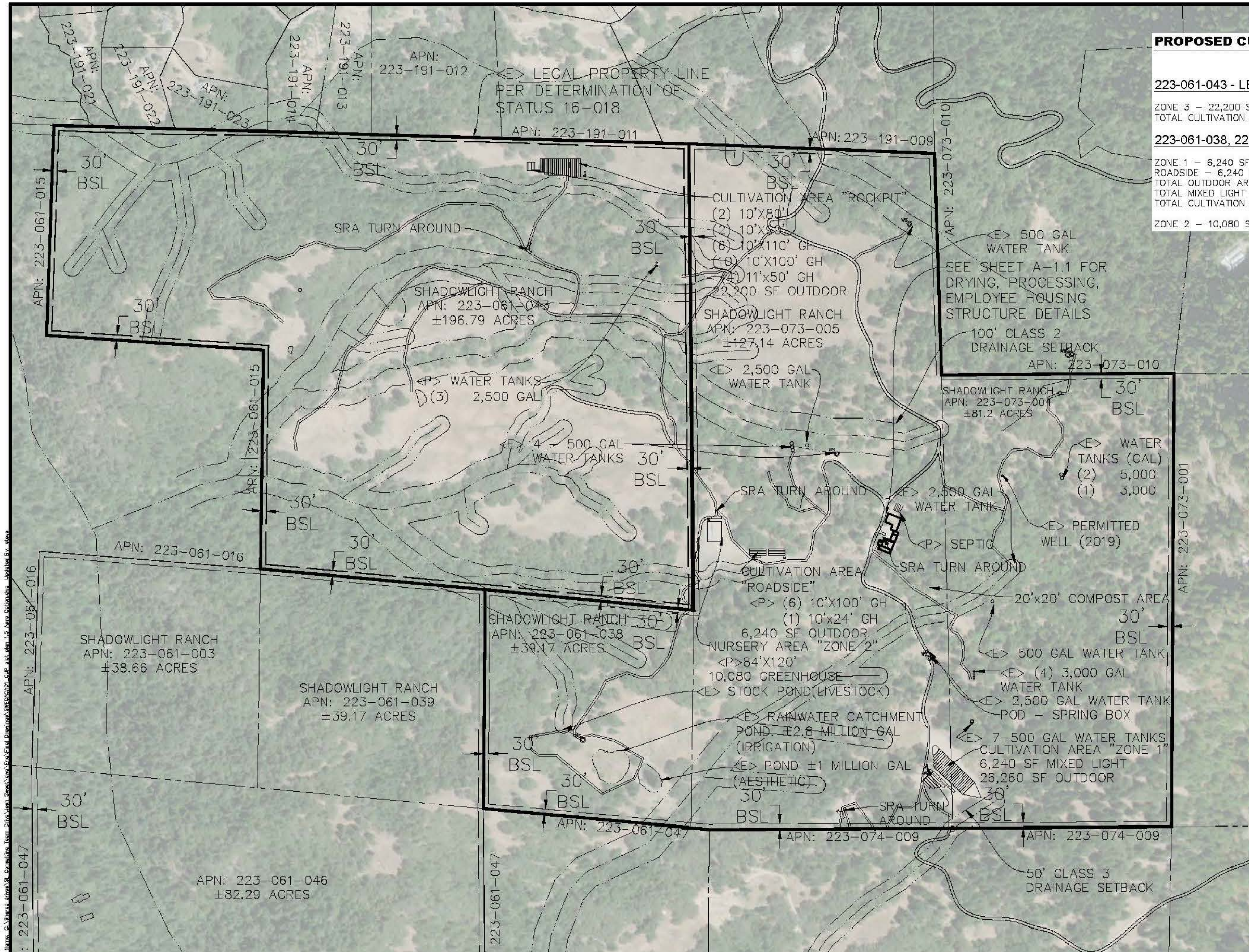
223-061-043 - LEGAL PARCEL 1

ZONE 3 – 22,200 SF OUTDOOR
TOTAL CULTIVATION AREA = 22,200 SF OUTDOOR

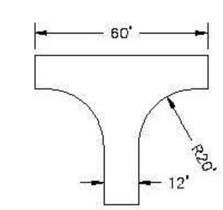
223-061-038, 223-073-004,-005 - LEGAL PARCEL 2

ZONE 1 – 6,240 SF MIXED LIGHT 26,260 SF OUTDOOR
ROADSIDE – 6,240 SF OUTDOOR
TOTAL OUTDOOR AREA = 32,500 SF OUTDOOR
TOTAL MIXED LIGHT AREA = 6,240 SF MIXED LIGHT
TOTAL CULTIVATION AREA = 38,740 SF CANOPY

ZONE 2 – 10,080 SF NURSERY



22x34 SHEET: 1"=300'
11x17 SHEET: 1"=600'
0 150 300 600
NORTH



SRA HAMMERHEAD TURN AROUND DETAIL

THE HILLS, LLC
GARBERVILLE, CA 95542
PROPOSED SITE PLAN

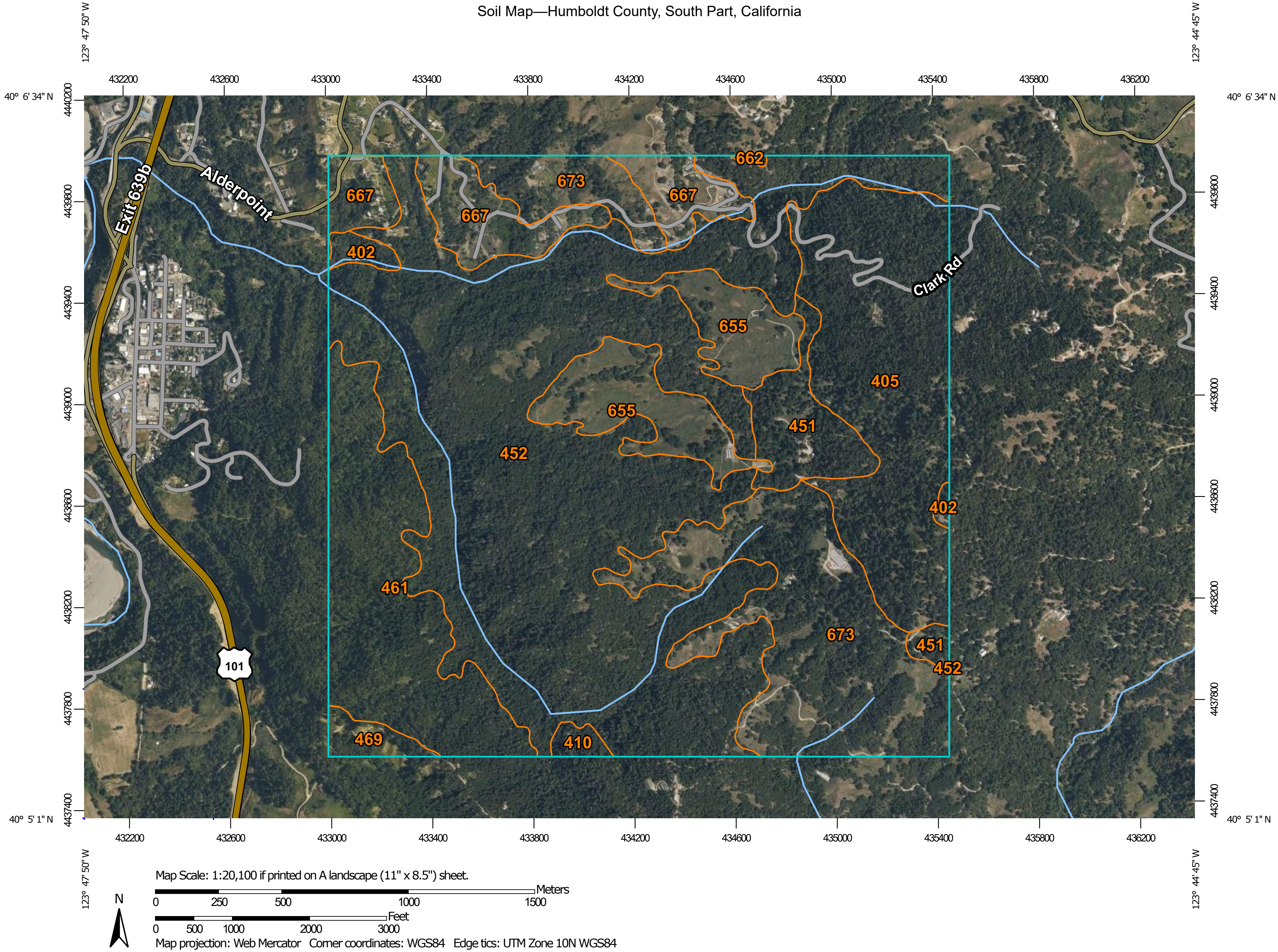
DATE	REVISIONS
5-5-20	LEGAL PARCEL PROPERTY LINES BOLDED

PROJ. MGR.: SL
PROJ. ASSOC.: SL
DRAWN BY: SL
DATE: 04-06-20
SCALE: AS NOTED

SHEET
C2
SWEGACA01

APPENDIX B. NRCS Soil Map

Soil Map—Humboldt County, South Part, California



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Humboldt County, South Part, California
Survey Area Data: Version 9, Jun 1, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 8, 2019—Jun 21, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
402	Tannin-Wohly-Rockyglen complex, 50 to 75 percent slopes	9.4	0.6%
405	Tannin-Wohly-Rockyglen complex, 30 to 50 percent slopes	199.6	13.8%
410	Rockyglen-Hollowtree-Rock outcrop complex, 50 to 100 percent slopes	6.1	0.4%
451	Burgsblock-Coolyork-Tannin complex, 15 to 30 percent slopes	48.2	3.3%
452	Burgsblock-Coolyork-Tannin complex, 30 to 50 percent slopes	622.8	43.1%
461	Tannin-Burgsblock-Rockyglen complex, 30 to 50 percent slopes	151.6	10.5%
469	Tannin-Burgsblock-Rockyglen complex, 50 to 75 percent slopes	12.4	0.9%
655	Yorknorth-Witherell complex, 15 to 30 percent slopes	94.0	6.5%
662	Yorknorth-Witherell complex, 30 to 50 percent slopes	1.0	0.1%
667	Dryfield-Yorknorth-Witherell complex, 5 to 30 percent slopes	84.0	5.8%
673	Coolyork-Yorknorth complex, 30 to 50 percent slopes	214.8	14.9%
Totals for Area of Interest		**1,444.0**	**100.0%**

APPENDIX C. Special Status Natural Community Scoping List.

Scientific Name	Common Name	Primary lifeform	Global rarity	State rarity
Abies grandis	Grand fir forest	Tree	G4	S2.1
Abronia latifolia - Ambrosia chamissonis	Dune mat	Herb	G3	S3
Acer macrophyllum	Bigleaf maple forest and woodland	Tree	G4	S3
Acer negundo	Box-elder forest and woodland	Tree	G5	S2.2
Aesculus californica	California buckeye groves	Tree	G3	S3
Alnus incana	Mountain alder thicket	Shrub	G4	S3
Alnus viridis	Sitka alder thickets	Shrub	G5	S3?
Alopecurus geniculatus	Water foxtail meadows	Herb	G3?	S3?
Arbutus menziesii	Madrone forest	Tree	G4	S3.2
Arctostaphylos bakeri	Stands of Baker manzanita	Shrub	G1	S1.2
Arctostaphylos (canescens, manzanita, stanfordiana)	Hoary, common, and Stanford manzanita chaparral	Shrub	G3	S3
Arctostaphylos montana	Mount Tamalpais manzanita chaparral	Shrub	G2	S2
Arctostaphylos (nummularia, sensitiva)	Glossy leaf manzanita chaparral	Shrub	G2	S2
Arctostaphylos patula - Arctostaphylos nevadensis	Green leaf manzanita - Pinemat manzanita chaparral	Shrub	G5	S3
Argentina egedii	Pacific silverweed marshes	Herb	G4	S2
Bolboschoenus maritimus	Salt marsh bulrush marshes	Herb	G4	S3
Bromus carinatus - Elymus glaucus	California brome - blue wildrye prairie	Herb	G3	S3
Calamagrostis nutkaensis	Pacific reed grass meadows	Herb	G4	S2
Calocedrus decurrens	Incense cedar forest and woodland	Tree	G4	S3.2
Carex (aquatilis, lenticularis)	Water sedge and lakeshore sedge meadows	Herb	G5	S3
Carex barbarae	White-root beds	Herb	G2?	S2?
Carex densa	Dense sedge marshes	Herb	G2?	S2?
Carex echinata	Star sedge fens	Herb	G4?	S3?
Carex integra	Small-fruited sedge meadows	Herb	G4?	S2?
Carex luzulina	Woodland sedge fens	Herb	G3	S2?
Carex nudata	Torrent sedge patches	Herb	G3	S3
Carex obnupta	Slough sedge swards	Herb	G4	S3
Carex (pansa, praegracilis)	Sand dune sedge swaths	Herb	G4?	S3?
Carex serratodens	Twotooth sedge seeps	Herb	G3	S3?
Ceanothus (oliganthus, tomentosus)	Hairy leaf - woolly leaf ceanothus chaparral	Shrub	G3	S3
Cephalanthus occidentalis	Button willow thickets	Shrub	G5	S2
Chamaecyparis lawsoniana	Port Orford cedar forest and woodland	Tree	G3	S3.1

Scientific Name	Common Name	Primary lifeform	Global rarity	State rarity
Chrysolepis chrysophylla	Golden chinquapin thickets	Shrub	G2	S2
Chrysolepis sempervirens	Bush chinquapin chaparral	Shrub	G4	S3.3
Corylus cornuta var. californica	Hazelnut scrub	Shrub	G3	S2?
Darlingtonia californica	California pitcher plant fens	Herb	G4?	S3
Deschampsia cespitosa - Hordeum brachyantherum - Danthonia californica	Coastal tufted hair grass - Meadow barley - California oatgrass wet meadow	Herb	GNR	S3
Equisetum (arvense, variegatum, hyemale)	Field horsetail - scouringrush horsetail - variegated scouringrush wet meadow	Herb	GNR	S3
Eriophyllum staechadifolium - Erigeron glaucus - Eriogonum latifolium	Seaside woolly-sunflower - seaside daisy - buckwheat patches	Herb	G3	S3
Festuca idahoensis - Danthonia californica	Idaho fescue - California oatgrass grassland	Herb	GNR	S3
Frangula californica - Rhododendron occidentale - Salix breweri	California coffee berry - western azalea scrub - Brewer's willow	Shrub	G3	S3
Frankenia salina	Alkali heath marsh	Herb	G4	S3
Fraxinus latifolia	Oregon ash groves	Tree	G4	S3.2
Garrya elliptica	Coastal silk tassel scrub	Shrub	G3?	S3?
Glyceria Ã—occidentalis	Northwest manna grass marshes	Herb	G3?	S3?
Grindelia (camporum, stricta)	Gum plant patches	Herb	G2	S2
Hesperocyparis macnabiana	McNab cypress woodland and forest	Tree	G3	S3.2
Hesperocyparis pigmaea	Mendocino pygmy cypress woodland	Tree	G1	S1
Hesperocyparis sargentii	Sargent cypress woodland	Tree	G3	S3.2
Heterotheca (oregona, sessiliflora)	Goldenaster patches	Herb	G3	S3
Hydrocotyle (ranunculoides, umbellata)	Mats of floating pennywort	Herb	G4	S3?
Isoetes (bolanderi, echinospora, howellii, nuttallii, occidentalis)	Quillwort beds	Herb	G3	S3?
Juglans hindsii and Hybrids	Hindsâ€™s walnut and related stands	Tree	G1	S1.1
Juncus lescurii	Salt rush swales	Herb	G3	S2?
Juncus (oxymeris, xiphioides)	Iris-leaf rush seeps	Herb	G2?	S2?
Leymus cinereus - Leymus triticoides	Ashy ryegrass - creeping ryegrass turfs	Herb	G3	S3
Leymus mollis	Sea lyme grass patches	Herb	G4	S2
Lupinus chamissonis - Ericameria ericoides	Silver dune lupine - mock heather scrub	Shrub	G3	S3

Scientific Name	Common Name	Primary lifeform	Global rarity	State rarity
Morella californica	Wax myrtle scrub	Shrub	G3	S3
Nassella spp. - Melica spp.	Needle grass - Melic grass grassland	Herb	G3	S3
Notholithocarpus densiflorus	Tanoak forest	Tree	G4	S3.2
Nuphar lutea	Yellow pond-lily mats	Herb	G5	S3?
Oenanthe sarmentosa	Water-parsley marsh	Herb	G4	S2?
Picea sitchensis	Sitka spruce forest and woodland	Tree	G5	S2
Pinus balfouriana	Foxtail pine woodland	Tree	G3	S3
Pinus contorta ssp. contorta	Beach pine forest and woodland	Tree	G5	S3
Pinus muricata - Pinus radiata	Bishop pine - Monterey pine forest and woodland	Tree	G3	S3.2
Populus fremontii - Fraxinus velutina - Salix gooddingii	Fremont cottonwood forest and woodland	Tree	G4	S3.2
Populus trichocarpa	Black cottonwood forest and woodland	Tree	G5	S3
Pseudotsuga menziesii - Calocedrus decurrens	Douglas fir - incense cedar forest and woodland	Tree	G3	S3
Pseudotsuga menziesii - Notholithocarpus densiflorus	Douglas fir - tanoak forest and woodland	Tree	G3	S3
Quercus garryana (tree)	Oregon white oak woodland and forest	Tree	G4	S3
Quercus lobata	Valley oak woodland and forest	Tree	G3	S3
Quercus parvula var. shrevei	Shreve oak forests	Tree	G2	S2
Quercus wislizeni - Quercus chrysolepis (shrub)	Canyon live oak - Interior live oak chaparral	Shrub	G4	S3
Rhododendron columbianum	Western Labrador-tea thickets	Shrub	G4	S2?
Rubus (parviflorus, spectabilis, ursinus)	Coastal brambles	Shrub	G4	S3
Ruppia (cirrhosa, maritima)	Ditch-grass or widgeon-grass mats	Herb	G4?	S2
Salix gooddingii - Salix laevigata	Goodding's willow - red willow riparian woodland and forest	Tree	G4	S3
Salix hookeriana	Coastal dune willow thickets	Shrub	G4	S3
Salix lucida ssp. lasiandra	Shining willow groves	Tree	G4	S3.2
Salix sitchensis	Sitka willow thickets	Shrub	G4	S3?
Sarcocornia pacifica (Salicornia depressa)	Pickleweed mats	Herb	G4	S3
Schoenoplectus (acutus, californicus)	Hardstem and California bulrush marshes	Herb	GNR	S3
Schoenoplectus americanus	American bulrush marsh	Herb	G5	S3.2
Scirpus microcarpus	Small-fruited bulrush marsh	Herb	G4	S2
Selaginella (bigelovii, wallacei)	Bushy spikemoss mats	Herb	G4	S3

Scientific Name	Common Name	Primary lifeform	Global rarity	State rarity
Sequoia sempervirens	Redwood forest and woodland	Tree	G3	S3.2
Sparganium (angustifolium)	Mats of bur-reed leaves	Herb	G4	S3?
Spartina foliosa	California cordgrass marsh	Herb	G3	S3.2
Stuckenia (pectinata) - Potamogeton spp.	Pondweed mats	Herb	G3	S3?
Torreyochloa pallida	Floating mats of weak manna grass	Herb	G3	S3?
Trifolium variegatum	White-tip clover swales	Herb	G3?	S3?
Tsuga heterophylla	Western hemlock forest	Tree	G5	S2
Umbellularia californica	California bay forest and woodland	Tree	G4	S3
Vaccinium uliginosum	Bog blueberry wet meadows	Shrub	G4	S3
Vitis arizonica - Vitis girdiana	Wild grape shrubland	Shrub	G3	S3
Zostera (marina, pacifica) Pacific Aquatic	Eelgrass beds	Herb	GNR	S3

Global (G) Rankings
G1 = Less than 6 viable element occurrences (EOs) OR less than 1,000 individuals OR less than 2,000 acres.
G2 = 6-20 EOs OR 1,000-3,000 individuals OR 2,000-10,000 acres.
G3 = 21-80 EOs OR 3,000-10,000 individuals OR 10,000-50,000 acres.
G4 = Apparently secure; this rank is clearly lower than G3 but factors exist to cause some concern; i.e., there is some threat, or somewhat narrow habitat.
G5 = Population or stand demonstrably secure to ineradicable due to being commonly found in the world

State (S) Rankings
S1 = Less than 6 EOs OR less than 1,000 individuals OR less than 2,000 acres
- S1.1 = very threatened
- S1.2 = threatened
- S1.3 = no current threats known

S2 = 6-20 EOs OR 1,000-3,000 individuals OR 2,000-10,000 acres
- S2.1 = very threatened
- S2.2 = threatened
- S2.3 = no current threats known

S3 = 21-80 EOs or 3,000-10,000 individuals OR 10,000-50,000 acres
- S3.1 = very threatened
- S3.2 = threatened
- S3.3 = no current threats known

S4 = Apparently secure within California; this rank is clearly lower than S3 but factors exist to cause some concern; i.e. there is some threat, or somewhat narrow habitat.
S5 = Demonstrably secure to ineradicable in California.

APPENDIX D. Photos of the Potential Mitigation Area.

Photos of the potential mitigation area shown in Figure 6. The site has relatively high cover of California oatgrass (*Danthonia californica*) and purple needlegrass (*Stipa pulchra*) with an infestation of Scotch broom (*Cytisus scoparius*).

LINDBERG GEOLOGIC CONSULTING
David N. Lindberg, Certified Engineering Geologist

ENGINEERING GEOLOGIC SOILS EXPLORATION REPORT

Proposed New Processing Facility
Shadow Light Ranch, Clark Road
Garberville, Humboldt County, California

Assessor's Parcel Number: 223-073-005

Prepared for:
Mr. Joshua Sweet

____
David N. Lindberg, CEG 1895, Exp. 02/29/2020

October 3, 2019 LGC Project No. 0260.03

Post Office Box 306 Cutten, California 95534 (707) 442-6000

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ENGINEERING GEOLOGIC R-2 SOILS EXPLORATION REPORT
Proposed New Processing Facility
Report of Findings for Mr. Joshua Sweet
Shadow Light Ranch, Clark Road, APN: 223-073-005
Garberville, Humboldt County, California

1.0 INTRODUCTION
1.1 Site and Project Description
This report presents the results of the site-specific, engineering-geologic soils exploration conducted by Lindberg Geologic Consulting (LGC) at the location noted above (Figure 1), Assessor's parcel 223-073-005 (Figure 2), at the end of Clark Road, a short distance east of Garberville. Proposed new developments on this parcel consist of a 6,250-square foot, single-story, cannabis processing/warehouse building, with parking areas and driveway (Figure 3).

TABLE 1 – PROJECT LOCATION INFORMATION	
Latitude and Longitude*	40.0975° North and -123.7651° West
Legal Description	Ptn. of West ½ Sec. 20, T4S, R4E, HB&M
Parcel Size	136 Assessed Acres (127.14 GIS acres)
USGS Quadrangle	Garberville, Calif., 7.5-minute topographic quadrangle map (1970)

*Centroid of parcel per Humboldt County Web GIS

Lindberg Geologic Consulting (LGC) was retained by Mr. Joshua Sweet, who is proposing to construct a cannabis-processing building on this site. There is an existing (30' x 40') shop building on-site which will be expanded upon. Parking will be provided on-site, adjacent to the new building. Power will be made available to this site. Water is available on-site, and sewage disposal will be provided with an on-site wastewater treatment system. Ingress and egress will be via an existing ranch road off of Clark Road.

Included in this report are brief assessments of the potential geologic hazards associated with the proposed site developments. Recommendations are provided as necessary and appropriate (in our opinion) to mitigate potential negative effects of those identified geologic hazards on the proposed site developments. Recommendations are provided for design professionals such as architects and engineers to utilize for grading and foundation design, and planning the new building and associated developments.

1.2 Scope of Work
The Scope of Services for this investigation included identifying and assessing geologic and soil hazards with a potential to affect the proposed development, characterizing the subgrade soils, developing grading and foundation design recommendations, and preparation of this report. The following information, recommendations, and design criteria are presented in this report:

- Description of site terrain and local geology.
- Interpretation of subsurface soil and groundwater conditions based on our explorations.
- Logs of soil profile characteristics observed within backhoe test excavations.
- Assessment of potential earthquake-related geologic and geotechnical hazards including surface fault rupture, liquefaction, differential settlement, and site slope instability.

- Discussion of potential geologic hazard mitigation measures as necessary.
- Seismic design parameters per the 2016 California Building Code (CBC), including Seismic Design Category, Site Class, and Spectral Response Accelerations.
- Brief discussion of generally-appropriate foundation design options.
- Recommendations regarding foundation element design, including:
    - Allowable bearing pressures (dead, live, and seismic loads)
    - Evaluation of potential foundation settlement
    - Minimum foundation embedment
- Recommendations for earthwork; site and subgrade preparation; fill material; fill placement and compaction requirements; and criteria for temporary excavation support.
- Recommendations for construction materials observation and testing.

Excluded from our scope of work was any environmental assessment for the presence or absence of any hazardous waste, toxic, or corrosive materials. Although we have explored subsurface conditions as part of this investigation, we have not conducted any analytical laboratory testing of samples obtained for the presence of hazardous material(s). LGC prepared a wastewater disposal system design for an earlier, proposed but not implemented, project at this location.

1.3 Limitations

This report has been prepared for the exclusive use of our client, Mr. Joshua Sweet, his contractors and subcontractors, and appropriate public authorities for specific application to the proposed project. LGC strives to comply with the engineering-geologic standard of care common to the local area at the time this work was performed. LGC makes no other warranty, express or implied.

The analyses and recommendations presented in this report are based on data obtained from existing maps and reports, field observations and limited subsurface explorations. Methods used indicate subsurface conditions only at specific locations where our exploratory test excavations were made, only to the depths penetrated, and only at the time the exploratory test excavations were installed. Samples can not always be relied on to accurately reflect stratigraphic or lithologic variations that commonly exist between sampling locations, nor do they necessarily represent conditions at any other time. Any results of analyses of samples obtained during this project are on-file in our office.

The recommendations included in this report are based, in part, on assumptions about subsurface conditions that may only be tested during earthwork. Accordingly, the applicability and validity of these recommendations is contingent upon LGC being retained to provide a complete professional service. LGC assumes no responsibility or liability for the adequacy of the recommendations when they are applied in the field unless LGC is retained to observe construction earthwork. We are available to discuss a schedule of such observations as may be advisable to provide assurance of the validity of our recommendations.

Do not apply any of this report’s conclusions or recommendations if the nature, design, or location of the proposed development is changed. If changes are contemplated, it is important that LGC be contacted promptly, and consulted to review the impact of the changes on the applicability of the recommendations in this report. Note that LGC is not responsible for any claims, damages, or other liability associated with any other party's interpretation of the subsurface data, or our site-specific recommendations, or reuse of this report for other projects or locations without our express written authorization.

2.0 FIELD EXPLORATION AND LABORATORY TESTING

2.1 Field Exploration Program

A Certified Engineering Geologist from our office visited the project site on March 30, 2018. A field investigation was performed to assess the in-situ soil and groundwater conditions, and to estimate the engineering characteristics and properties of the subsurface materials at the project site. Our explorations included exploratory backhoe test excavations located in the vicinity of the proposed new processing/warehouse development. Exploratory backhoe test excavations were located to provide insight into subsurface conditions at this building location. Soils observed in the test excavations were field-logged and classified in general accordance with ASTM D-2488 visual-manual procedures. Exploratory backhoe test excavation locations are shown on the site image (Figure 3). Soil profile logs are attached (Figures 6 & 7), as well.

We have also observed the soil profile in excavations at various locations on this parcel and in the greater Garberville area, where we have encountered similar soil profiles. Soil stratigraphy, as exposed in our test borings, was logged in the field in general accordance with ASTM standards.

2.2 Laboratory Testing

Soil samples were retained from the field exploration for textural analysis for leachfield suitability. Soils from 3-feet below grade were reported to be Sandy Clay Loam and Loamy Sand by the laboratory. Soil samples from the 5-foot depth were Sandy Loam. No other laboratory analyses were performed. Subsurface soils appeared to be uniformly-distributed across this site and, in stratigraphic order, consisted of undisturbed, in-place native topsoil (silt and fine sand), medium dense sand with silt, clay and gravel. Groundwater was not encountered to the depth of approximately 10 feet below the existing ground surface (bgs).

3.0 SITE AND SUBSURFACE CONDITIONS

3.1 Topography and Site Conditions

This subject property is gently- to steeply-sloping, approximately 136 acres in area, and is 1.5 miles east of downtown Garberville. The proposed building site elevation is approximately 1,400 feet above mean sea level, based on the USGS Garberville 7.5' topographic quadrangle map (Figure 1). The parcel slopes down to the west, with slope gradients of approximately 15 to 30 percent. On the north side of the parcel, mainly beyond the property line, the ground slopes more steeply to the northwest, into Bear Canyon Creek. The nearest mapped watercourses are Bear Canyon Creek, which flows east to west, approximately 700 feet northwest of the subject parcel, and South Fork Eel River, approximately 1.6 miles to the west (Figure 1).

3.2 Geologic Setting

This parcel is located within California's northern Coast Ranges Geomorphic Province, a seismically active region in which large earthquakes are expected to occur during the economic life span (50 years) of any developments on the subject property. Mapping by McLaughlin *et al*., (2000), shows that the site is located on a Quaternary landslide deposit underlain by older (late-Pleistocene to Miocene) non-marine deposits associated with the Wildcat Group, and by Cretaceous rocks of the Broken formation of the Central belt of the Franciscan Complex Figure 4). The site of this proposed new development, while mapped on a Quaternary landslide deposit, however, appeared stable in its present configuration; no evidence of active landsliding was observable at the proposed building location.

Earth materials encountered in the on-site exploratory backhoe test excavations, beneath approximately 1 foot of soft, dark brown topsoil; consisting of brown to yellowish-brown, medium soft to stiff silty sandy clay (CL), or Sandy Clay Loam/Loamy Sand by the USDA soil classification system. Silty sandy clay on-site was found to contain approximately 65 percent sand, 10 to 30 percent clay, 10 to 20 percent silt, and 26 to 46 percent gravel.

Free water was not encountered to a depth of approximately ten feet below grade in late March 30, 2108 in exploratory test excavations for the septic system nearby on-site. We have observed similar soil and groundwater conditions consisting of medium soft to stiff silty sandy clay at other sites around the Garberville area in borings and backhoe test pits. Underlying the material mapped as a Quaternary landslide deposit, at some undetermined depth at the subject property, are non-marine deposits associated with the Wildcat Group, and Cretaceous rocks of the Broken Formation of the Central Belt of the Franciscan Complex. Franciscan rocks are present in the subsurface at some depth much greater than our exploratory backhoe test excavations.

The near-surface soils are topsoil composed predominantly of silty fine sand with clay and gravel. Soils, based on our exploratory test excavations, are interpreted to be generally uniformly distributed across the site of the proposed developments. In the areas explored, the soil profile consisted of approximately 1 foot of soft and loose topsoil. Beneath this topsoil, we observed medium soft to stiff silty sandy clay to the total depth explored, six feet bgs. Groundwater, as mentioned, was not encountered in any of our exploratory backhoe test excavations.

3.3 Seismicity

This project site is located within a seismically active region in which large earthquakes from a variety of sources have the potential to occur during the economic life span (50 years) of a typical structure. North of Cape Mendocino and the Mendocino triple junction, the regional tectonic framework is controlled by the Cascadia subduction zone (CSZ), wherein the Gorda and Juan de Fuca oceanic plates are being actively subducted beneath the North American continental plate.

According to the geologic mapping by the state of California, the subject parcel is not within an area zoned for special earthquake fault studies. In other words, this site is not located within an area in proximity to any faults zoned as active by the State.

3.4 Regional Seismicity

Regionally, the project site is subject to ground motion from a number of seismic sources including the Little Salmon fault to the north and northeast, and the Cascadia subduction zone to the west, and the San Andreas fault to the west-southwest. The Cascadia subduction zone is considered capable of producing a great earthquake with an estimated magnitude (moment magnitude, M_w) of 9.0. The subducting Gorda plate is a common source of the historic earthquakes felt in the vicinity of Garberville. To the west, at Shelter Cove, the San Andreas fault moved during the 1906 San Francisco earthquake. Recent (since ~1850) Gorda plate earthquakes have ranged in magnitude up to 7.4 (in the earthquake of November, 1980).

3.5 Subsurface Conditions

On the days of our field investigations, to explore soil and groundwater conditions, exploratory backhoe test excavations were extended 10 feet bgs in the vicinity of the proposed building site. The soil profile, as exposed in the exploratory backhoe test excavations was described in general accordance with ASTM D 2488 standards. More detailed descriptions of the subsurface stratigraphy encountered within our exploratory backhoe test excavations are provided in the attached boring logs (Figures 6 and 7).

Within the uppermost, portion of the soil profile, we encountered in-place, undisturbed native topsoil. Below the topsoil our exploratory backhoe test excavations exposed an intact soil profile, consisting of native mineral soil. An intact soil profile, including the original sod and topsoil, was encountered in all of our excavations.

3.6 Groundwater Conditions

Groundwater was not encountered during our field exploration to a depth of 10 feet bgs in our exploratory backhoe test excavations. Secondary porosity appeared to be well-developed in the spoils retrieved from the excavations. No soil mottling, suggestive of transient elevated groundwater conditions, was observed in the excavations. Groundwater levels on this site will likely fluctuate with seasonal or long-term climatic variations, and changes in land use. Groundwater could conceivably rise to above six feet bgs for relatively-brief periods during extended mid- to late-winter precipitation events, but we consider this to be of low probability.

Due to the subject parcel being underlain by soil materials with well-developed secondary porosity, groundwater is not expected to be encountered at foundation depths during the dry-season (May through October). Wet-season (November through April) earthwork could be adversely affected by soils subject to temporary, seasonal saturation within anticipated foundation depths. Generally, groundwater conditions are not anticipated to negatively affect foundation performance or foundation construction. Seasonally-perched groundwater has some (probably low) potential to occur, making earthwork problematic during the wet-season months.

4.0 GEOLOGIC HAZARDS

The focus of our geologic hazard assessment for this project site primarily included seismic ground shaking due to near and far seismic sources, the potential for liquefaction of loose, near-surface saturated soils, tsunami, and differential settlement due to undocumented fill soils. Our assessment of these and other common potential hazards is presented below.

4.1 Seismic Ground Shaking and Surface Fault Rupture

As described, the project site is in a seismically active area proximal to multiple seismic sources capable of generating moderate to strong ground motions. Given the proximity of the San Andreas fault, the Mendocino fault, and the Cascadia subduction zone (offshore to the northwest), as well as other active faults within and offshore of northern California, the project site will doubtless experience strong ground shaking during the economic life span (50 years) of any proposed developments.

The San Andreas fault is the nearest recognized active fault (CDMG, 1998 and 2000). The subject parcel, however, is not located within any Alquist-Priolo earthquake fault zones, in which State law requires special studies for structures for human occupancy. Due to the distance from the project site to the nearest recognized active fault, and based on the information available, the potential for ground surface fault rupture to occur at the project site is considered minimal.

4.2 Liquefaction

Liquefaction is a loss of soil strength that results in fluid mobility through the soil. Liquefaction typically occurs when uniformly-sized, loose, saturated sands or silts that are subjected to strong shaking in areas where the groundwater is less than 50 feet below ground surface. In addition to the necessary soil and groundwater conditions, the ground acceleration must be high enough, and the duration of the shaking must be sufficient, for liquefaction to occur. Strong ground shaking is anticipated, but loose, well-sorted, saturated sands less than 50 feet bgs are appear at the site.

Based on the Planning Scenario (CDMG, 1995), the site is not located in an area of liquefaction potential. Within our exploratory backhoe test excavations, we encountered medium soft to stiff, materials at anticipated foundation load-bearing depths. Groundwater was not encountered in our exploratory backhoe test excavations, and loose saturated sands are unlikely to occur in the shallow subsurface deeper than our exploratory backhoe test excavations. Based on the geologic age, grain-size distribution, and relative density of the native soils, the potential for liquefaction-related settlement or other related phenomenon is considered low.

4.3 Settlement

Based on our exploratory backhoe test excavations, undocumented, non-engineered fill soils are not present at the subject property. Where (if) encountered, undocumented, non-engineered fill soils shall be considered unsuitable as foundation load bearing soils due to the potential for excessive total and differential settlement. The apparent lack of fill soils on this site suggests that foundation elements may be founded in suitable in-place undisturbed native soils, and designed for uniform settlement. For foundations designed in accordance with current building codes and our recommendations, and the standard of care for civil engineering, we estimate that total and differential settlement can be minimized through the design and construction process.

4.4 Landsliding

The proposed building site on the subject property is sloping (~15-30%), at an elevation of approximately 1,400 feet above mean sea level. There are no steep cut slopes associated with the proposed building site on this parcel. Based on the fact that the project location is within an area mapped as a Quaternary landslide, slope instability and landsliding are potential hazards to the project. The risk of instability may be mitigated through prudent grading design, and by setting back structures from steep (>30%) slopes. The State of California mapped the geology and geomorphic features related to landsliding on the Garberville 7.5' Quadrangle in 1983 and showed only areas of "patterned ground" on the parcel (Figure 5).

North of the project location, and beyond the property line, natural, native slopes descend more-steeply to the inner gorge of Bear Canyon Creek. Canyon side slopes are well covered with native vegetation, and appeared, generally, to be stable in their present configuration. Valley slopes in Bear Canyon Creek north of this parcel are predominantly approximately 40 percent, but in some areas are steeper than 50 percent. Given the distance from the proposed building site to any steep slopes, we anticipate a low potential for slope instability at the project site.

4.5 Flooding

In terms of elevation, this site is not close to either the South Fork Eel River, or Bear Canyon Creek. According to the Humboldt County Web GIS system, this parcel is well-above any 100-year flood zone. Consequently, the hazard of flooding at this site is low.

4.6 Tsunami

The hazard of tsunami inundation is low at this inland site 1,400 feet above sea level.

4.7 Soil Swelling or Shrinkage Potential

Subsurface soils at foundation load bearing depths consist predominantly of low plasticity silty clay with fine sand. Soils were soft and moist at the surface, becoming medium soft to stiff, and more sandy with increasing depth. Silty sandy clay soils appeared permeable and well-drained. Based on the generally moist and well-graded nature of the site soils at anticipated foundation load-bearing depths, they do not appear subject to detrimental shrink-swell associated with cyclic seasonal wetting and desiccation. Soils appeared unlikely to be subject to desiccation to depths sufficient to affect a typical foundation system of reinforced concrete, built according to current building codes. The hazard associated with shrink-swell soils is, in our opinion, low.

5.0 CONCLUSIONS AND DISCUSSION

Based on the results of our explorations, it is our opinion that the project site is suitable for its proposed use as described in this report. The subject parcel is developed for cannabis production, similar to several other parcels nearby. Our office was provided with preliminary design plans for the new processing/warehouse construction, but no “civil site plans” were available at the time. Our recommendations apply to construction of lightly-loaded, two-story, wood or steel framed structures, supported on foundation systems consisting of a reinforced (thickened edge) monolithic concrete slab on grade with continuous concrete perimeter footings, and interior spread footings and pads where required. We will recommend that the foundation loads bear in the stiff undisturbed native soils occurring at approximately two feet below the existing surface.

6.0 RECOMMENDATIONS

6.1 Setback Recommendations

There are no steep slopes and watercourses in the immediate vicinity of the proposed project. This site is at least 400 feet higher in elevation than the nearest mapped ephemeral watercourses. From an engineering geologic standpoint, the potential geologic hazard of potential slope instability has been suitably-mitigated by locating the proposed processing/warehouse away from any steep or potentially-unstable slopes. The subject parcel is surrounded by other, similar, privately-owned parcels. Residential and agricultural structures are the nearest developments to this site. Clark Road is paved to the driveway turnout to this property.

6.2 Site Preparation

All earthwork, including but not limited to, site clearing, grubbing, and stripping should be conducted during dry weather conditions. The uppermost one-foot of topsoil and sod should be removed from within the building footprint, and from the area within five feet of the building perimeter, from beneath all driveways, parking areas, and concrete flatwork areas. Topsoil removed should be stockpiled on-site for later use as landscaping fill, or other non-structural fill.

In footing excavations, any deeper, or thicker, native topsoil, or other unsuitable load bearing earth materials encountered at or below the existing ground surface should be removed to a depth sufficient to expose firm, undisturbed native mineral silty sandy clay soil material. Firm undisturbed material is estimated to occur at approximately one to two feet below existing grade.

Approved erosion and sediment controls appropriate for the season, and compliant with State and County regulations, must be in place. When the ground is wet, vehicle and equipment traffic should be restricted to the extent feasible, and care should be taken to avoid rutting and mixing of disturbed soils or topsoil with the underlying native bearing soils. Surfacing the driveway and parking areas with gravel should be a priority prior to any other preliminary earthwork.

6.3 Subgrade Preparation

The area of the building footprint, proposed paved areas and the area five feet beyond the perimeter of these developments, should be stripped of the uppermost one foot of topsoil and any other loose, disturbed material. The exposed ground surface should then be scarified to a depth of 8 inches; moisture conditioned as necessary and appropriate, and compacted in accordance with our compaction standards (below) to a firm and unyielding surface sufficient to support the anticipated building loads. If the exposed subgrade soil is soft or disturbed, or if it proves difficult to compact, it should be excavated additionally to expose more-competent native soil materials. The resulting subgrade should be scarified and conditioned as recommended above. Replace excavated material with engineered fill.

6.4 Temporary Excavations

While none are expected for this project, in general, all temporary construction slopes should be designed and excavated in strict compliance with all applicable local, state, and federal safety regulations including the current OSHA Excavation and Trench Safety Standards.

Construction equipment, building materials, excavated soil, vehicular traffic, and other similar loads should never be allowed near the top of any unshored or unbraced excavation. Where the stability of adjoining buildings, walls, pavements, or other similar improvements is, or may be endangered by excavation operations, support systems (i.e., shoring, bracing, and underpinning) may be needed to provide structural stability and to protect personnel working in excavations.

Since excavation operations are dependent on construction methods and scheduling, the contractor should be solely responsible for the design installation, maintenance, and performance of all shoring, bracing, underpinning, and other similar systems. LGC assumes no responsibility for temporary excavations, the safety thereof, or the design, installation, maintenance, and performance of any shoring, bracing underpinning, or other similar systems.

6.5 Cut and Fill Slopes

No new cut or fill slopes taller than four feet are anticipated for this project. Structural fill on sloping ground (if any) should be placed on a suitably prepared subgrade surface with a slope of no greater than 4H:1V (four horizontal to one vertical) and should be compacted mechanically to reduce any potential for excessive differential settlement.

6.6 Fill Materials

Aggregate Base

Compacted aggregate base material may be used for pavement subgrade, placed beneath footings or floor slabs, or used as trench back-fill. This material should meet the requirements in the Caltrans Standard Specifications for Class 2 Aggregate Base (3/4-inch maximum particle size).

Select Fill

In the case of new construction requiring select fill, it should consist of granular material that may be used as non-expansive fill beneath floor slabs and for the upper portion of pavement subgrades. Select fill should be a soil/rock mixture free of organic material and other deleterious material; on-site native soils are likely not suitable for use as select fill. Select fill material should contain low plasticity clay, well-graded sand, and gravel. The material should contain no particles larger than 3 inches in greatest dimension, and no more than 15 percent larger than 2-inches. Additionally, the material should meet the following specifications:

Plasticity Index (PI):	<12
Liquid Limit (LL):	<30
Percent Passing No. 200 sieve:	50 maximum, 5 minimum

6.7 Compaction Standard

Structural fill and backfill material shall be compacted in accordance with the specifications listed in Table 2 below. Material should be placed in loose horizontal lifts that do not exceed 8-inches in loose thickness. A qualified field technician should be present to perform field density tests at random locations throughout each lift to verify that the specified compaction is being achieved by the contractor.

TABLE 2 – STRUCTURAL FILL PLACEMENT SPECIFICATIONS

Fill Placement Location	Compaction Recommendations (ASTM D 1557-Modified Proctor)	Moisture Content (Percent Optimum)
Granular cushion beneath Floor Slab	90%	-1 to +3 percent
Structural fill supporting Footings	90%	-1 to +3 percent
Structural fill within 5-feet of the building pad	90%	-1 to +3 percent
Roadway fill within 2-feet of pavement grade	95%	-1 to +3 percent
Roadway fill below 2-feet of pavement grade	90%	-1 to +3 percent
Utility trenches under buildings, & paved areas	95%	-1 to +3 percent
Utility trenches beneath landscaped areas	90%	-1 to +3 percent

Where (or if) utility trenches closely parallel a footing, and the trench bottom is within a two horizontal to one vertical plane, projected outward and downward from any below-grade structural element, grout slurry should be utilized to backfill that portion of the trench below this plane. The use of slurry backfill is not required where a narrow trench crosses a footing at or near a right angle.

6.8 Seismic Design Parameters

As noted above in Sections 3.3 and 4.1, the project site is situated within a seismically active area near multiple seismic sources capable of generating moderate to strong ground motions. Given the proximity of significant active faults, the Mad River fault zone, the Mendocino triple junction and the Cascadia subduction zone offshore to the west and northwest, as well as other active faults within and offshore of northern California, this project site will experience strong ground shaking during the economic life span (50 years) of the proposed developments.

Site-specific Seismic Spectral Response Accelerations, obtained from the SEA (Structural Engineers Society of California) and OSHPD (2018) are presented in Table 3. The on-line SEA ground motion parameter calculator provides spectral acceleration values (S_s and S_1) based on the site specific geographic coordinates, the latest available seismic database maintained by the USGS, the site classification, site coefficients, and adjusted maximum considered earthquake values (F_a, F_v, SM_s and SM_1).

Table 3. Spectral Response Accelerations, APN 223-073-005

Site Information	Latitude / Longitude*	40.0975° / -123.7651°
	Occupancy Risk Category (2016 CBC, Sect. 1604.5)	II
	Seismic Design Category (2016 CBC, Sect. 1613.3.5)	E
	Site Class (2016 CBC, Sect. 1613.3.2)	D
Spectral Acceleration	S_s	1.884
	S_1	0.758
Site Coefficients	F_a / F_v	1.0 / 1.5
Response Accelerations	S_{MS}	1.884
	S_{M1}	1.137
	S_{DS}	1.256
	S_{D1}	0.758

* Latitude and longitude of Parcel centroid per Humboldt County WebGIS, September, 2019.

Based on the site conditions and an assumption of the soils within 100 feet of the ground surface, we conservatively classify the site as Site Class D consisting of a “Stiff soil” profile (Section 1613.3.2, 2016 CBC). The parameters in Table 3 are based on this classification and were determined using the 2010 ASCE Standard 7 (w/March 2013 errata), minimum design loads for buildings and other structures.

6.9 Foundation Design

No specific foundation plans were provided to us for the proposed developments, but it was evident from the architect’s drawings that the new building is intended to be supported by a slab on grade foundation. The following foundation recommendations assume that a typical, lightly-loaded, wood or steel framed, single-story warehouse-type structure will be constructed. In our opinion, such structures are best supported by foundations consisting of slab on grade with continuous concrete perimeter footings (thickened edge) in combination with isolated interior spread footings where necessary for column supports or other heavy point loads. A foundation of this type appears suitable for these site conditions. Foundations should be designed by an experienced, licensed civil engineer, in accordance with our recommendations, and the standards of the currently in-force edition of the CBC (2016).

Footings

Foundation systems for this site should be of reinforced concrete to limit potential structural damage due to differential settlement or seismic shaking.

- If necessary to mitigate soft or undocumented fill soils, excavate and replace with suitable engineered fill, placed and compacted as recommended, or CLSM (controlled low strength material) such as concrete sand slurry.
- Trenches backfilled with CLSM shall be 24 inches wide, at minimum.
- Footings should be embedded a minimum of two feet below existing grade.
- Minimum width of footings should be 12 inches, and the minimum thickness should be 6 inches, per 2016 CBC Section 1809 for single story structures.
- Embed drilled piers at least 30 inches into firm undisturbed native soil below any loose topsoil, sod and subsoils; approximately 42 inches below existing grade.

Floor Slab Design

- Concrete floor slabs should be constructed of reinforced concrete.
- Slabs should have a minimum thickness specified by the engineer sufficient to support all anticipated uses.
- Underlie the floor slab with at least 10-inches of compacted Class-1 Type A gravel, or Class-2 aggregate base.
- To reduce the possibility of moisture migration through the slab, a six-mil (minimum) plastic membrane (vapor retarder) should be placed on the prepared gravel subgrade.
- Joints between the membrane sheets and utility openings should be lapped and taped.
- Care should be taken during construction to protect the membrane against punctures.
- Protect the membrane during steel and concrete placement, cover the membrane within at least 1-inch of clean sand; this will also provide for a better concrete finish.

Any difference between the 10 inches of select fill under the floor slabs, and the depth to firm undisturbed native soil at approximately 12 inches bgs, may be made up with additional select fill, or engineered fill, placed and compacted as specified in this report.

Allowable Soil Bearing Pressures

- For design of foundation elements embedded into suitably-dense undisturbed firm granular soils, we recommend an allowable bearing pressure of 1,500 pounds per square foot (psf) for dead load plus long-term live load, in accordance with Table 1806.2 (CBC, 2016).

- Lateral bearing pressure is 100 psf per foot below native grade.
- The cohesion factor for lateral sliding resistance is 130 psf multiplied by the contact area.
- The allowable bearing pressure may be increased by one-third when using alternate load combinations in Section 1605.3.2 (CBC, 2016) that include wind or earthquake loads.
- At minimum, all footings should be designed and sized to be not less than 12 inches wide and 6 inches thick per Section 1809.7 (CBC, 2016).

6.10 Drainage

Grading should be designed with a gradient sufficient to provide for positive drainage by sheet flow. All finished ground surfaces near the proposed structure should be sloped away from the foundations. Per CBC 1804.4, slope ground surfaces around buildings at five percent (minimum) for at least 10 feet from the face of the foundation. Minimum slope for impervious (i.e., paved) surfaces is two percent for at least 10 feet from the face of the foundation of structures.

Landscaping design, grading and construction should be such that no water is allowed to pond anywhere onsite, nor to migrate beneath any structure foundations. Grading must not result in concentrated runoff flowing across the top of fill slopes. Runoff from site developments should be controlled and discharged to drain by sheet flow such that no erosion, sedimentation or discharge of turbid water to rivers or streams will occur. Building roof storm water runoff should be controlled with the installation of gutters and downspouts, or otherwise contained, collected and discharged at suitable outlet points by sheet flow such that no erosion, sedimentation, or ponding will occur.

6.11 Erosion and Sediment Control Recommendations

Adhere to the recommendations on the Grading, Drainage and Erosion Control Plan which we expect will be developed by the project engineer. Except in an emergency, perform no wet-season earthwork and grading. Wet weather conditions can occur any time, but may be expected predominantly from November through April. Storm water erosion and pollution prevention measures should be taken as soon as possible prior to the onset of the winter rains. To the extent feasible for this project, all applicable Humboldt County Erosion Control Standards should be incorporated into the project design and strictly adhered to during construction. We specifically recommend the following erosion and sedimentation control measures:

- Replace topsoil and revegetate disturbed areas immediately following earthwork.
- Mulch exposed flat soil areas with straw and a native grass seed mix.
- Exposed sloping ground, especially fill slopes taller than 10-feet, will not be protected adequately with only straw mulch and seed; use straw wattles, and silt fences as well.
- Cover all temporary soil stockpiles with plastic sheeting (6 mil min.) and anchor securely to prevent wind disturbance.
- Drive no vehicles on the site when soils are wet; at minimum use six inches of crushed rock or gravel to pave areas accessed by construction vehicles.
- Owner or his agent should monitor construction-site conditions before and after runoff-generating rainfall events to verify functioning of erosion control measures.
- Immediately repair all malfunctioning erosion control measures as necessary.

6.12 Pavement Design Recommendations

This proposed project includes graveled driveways and an off-street gravel parking area. Based on the soil excavations, pavement areas will be underlain by soils consisting of medium soft silty sandy clay. Based on our field explorations, we recommend design pavement sections consisting of 6-inches of Class 2 aggregate base rock, placed and compacted as recommended above.

Subgrade soils to support the new driveways and parking area should first be stripped of sod and turf, unsuitable surface materials (potentially including up to two feet of topsoil), and any other undocumented fill or other unsuitable materials. Soil subgrades should be compacted to resist deflection by a loaded, 10-yard dump truck, or equivalent.

Pavement subgrade soils should be proof-rolled with a minimum 10-ton vibratory steel drum roller, or with an approved equivalent (e.g., 10-yard dump truck). As outlined in Table 2 above, scarify, moisture condition, and compact the upper 6 to 8 inches of the native subgrade to a minimum of 95 percent of the maximum dry density (per ASTM D 698-91). Moisture content should be controlled to -1 to +3 percent of optimum. Filled subgrade surfaces should be tested, or observed and approved by this office, prior to placement of base rock or pavement.

7.0 ADDITIONAL SERVICES

7.1 Review of Grading and Foundation Plans and Excavations

The conclusions and recommendations provided in this report are based on the assumption that soil conditions encountered during grading will be essentially as exposed during our site exploration, and that the general nature of the grading and use of the property will be as described above. We recommend that final drafts of grading plans be reviewed by our office prior to their approval or implementation.

7.2 Observation and Testing

To assure conformance with the specific recommendations contained within this report, and to assure that the assumptions made in the preparation of this report are valid, LGC should be retained to review foundation design plans, and to observe site grading. We should also review and provide written approval of the exposed foundation and pavement subgrades prior to placement of structural fill, foundation forms, reinforcing steel, or concrete.

8.0 REFERENCES

CBC [California Building Code], 2016, California Code of Regulations, Title 24, Part 2, Volume 2. California Building Standards Commission.

CDMG, 1995, Planning Scenario in Humboldt and Del Norte Counties, California, for a Great Earthquake on the Cascadia Subduction Zone, Special Publication 115.

CDMG, 1996, Probabilistic Seismic Hazard Assessment for the State of California. Mark D. Petersen, William A. Bryant, Chris H. Cramer, Tianqing Cao, and Michael Reichle, California. Department of Conservation, Division of Mines and Geology, Arthur D. Frankel, U.S. Geological Survey, Denver, Colorado. James J. Lienkaemper, Patricia D. McCrory, and David P. Schwartz, U.S. Geological Survey, Menlo Park, California, Open-File Rpt. 96-08.

CDMG, 2000, Digital Images of Official Maps of Alquist-Priolo Earthquake Fault Zones of California, Northern and Eastern Region.

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McLaughlin, R. J., S. D. Ellen, M. C. Blake Jr., A. S. Jayko, W. P. Irwin, K. R. Aalto, G. A. Carver, and S. H. Clarke, Jr., 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.

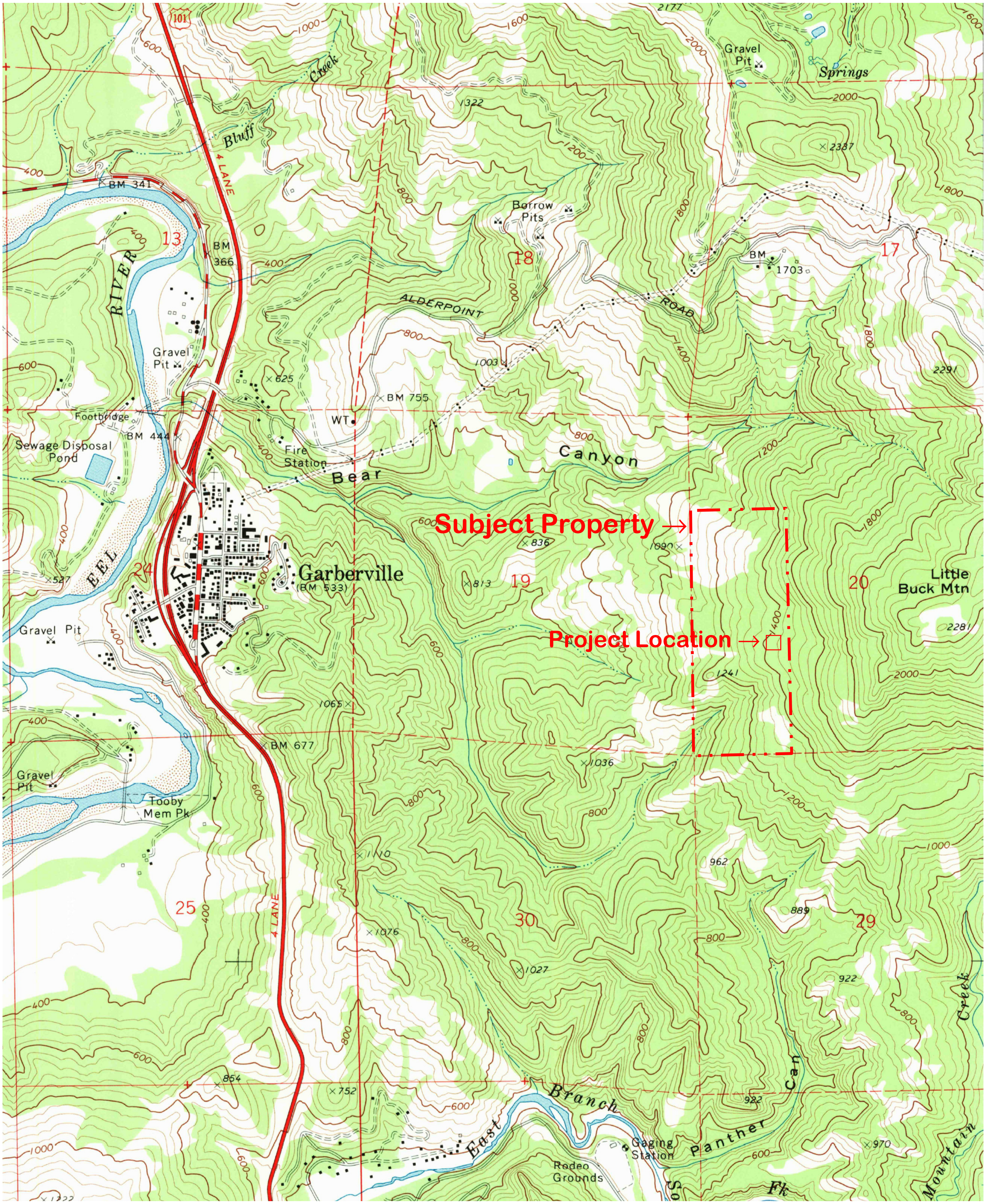
Satake, K., Wang, K., Atwater, B., 2003, Fault slip and seismic moment of the 1700 Cascadia earthquake inferred from Japanese tsunami descriptions. Journal of Geophysical Research, Vol. 108, No. B11, 2535.

SEA (Structural Engineers Society of California) and OSHPD (*Office of Statewide Health Planning and Development)*, 2019, Seismic Design Maps. https://seismicmaps.org/

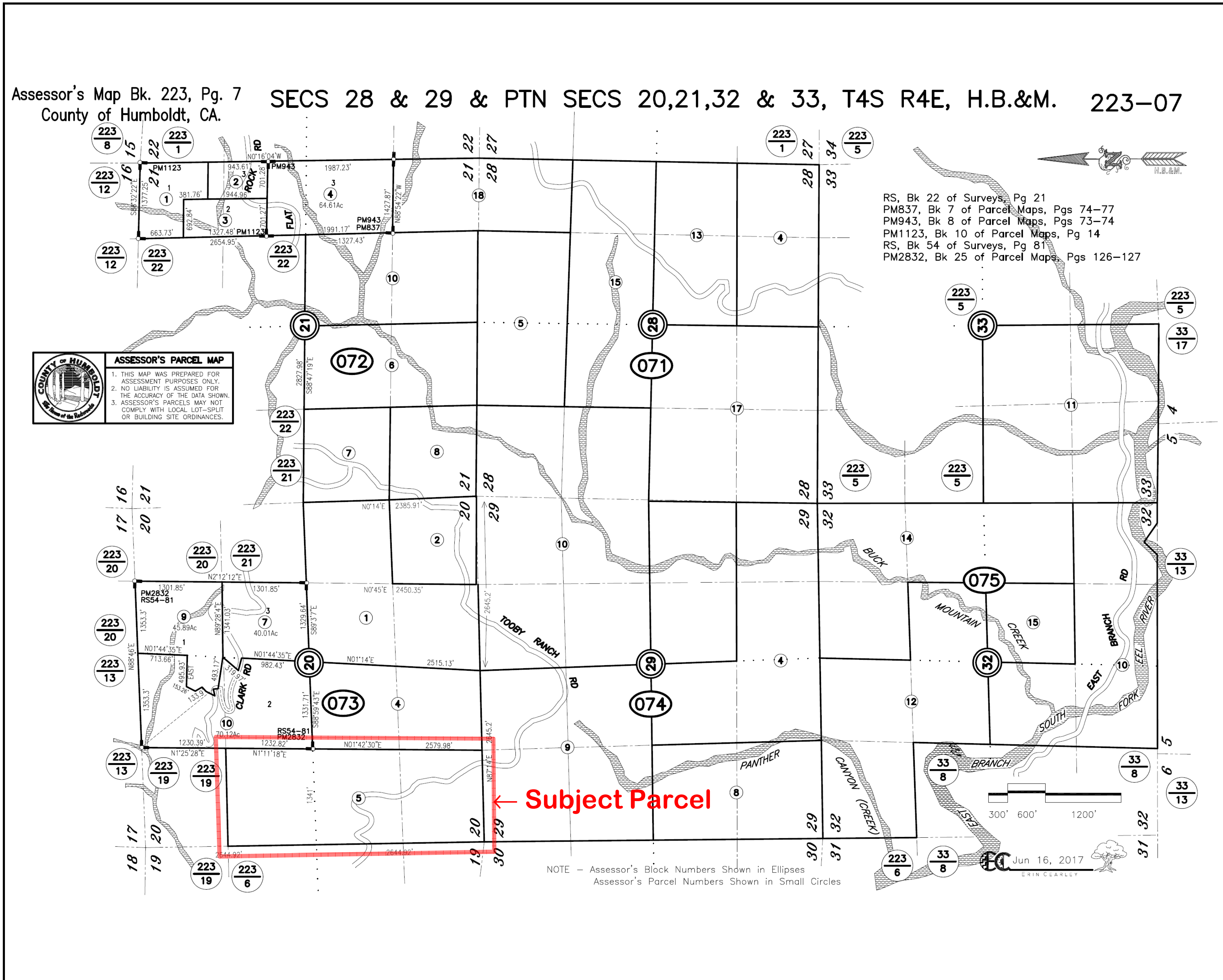
USGS, 1970, Garberville, Calif., 7.5’ topographic quadrangle map.

9.0 LIST OF FIGURES

Lindberg Geologic Consulting	Engineering-Geologic R-2 Soils Exploration Report	Figure 1
Post Office Box 306	Shadow Light Ranch, Clark Road, Garberville, Humboldt County	October 3, 2019
Cutten, CA 95534	APN's 223-073-005, Mr. Joshua Sweet, Client	Project 0260.03
(707) 442-6000	Topographic Location Map (Locations Approximate)	1 inch ≅ 2,100 feet



Modified from: USGS "Garberville, Calif.", 7.5' Quadrangle, (1970). N ≅



Lindberg Geologic Consulting
Post Office Box 306
Cutten, CA 95534
(707) 442-6000

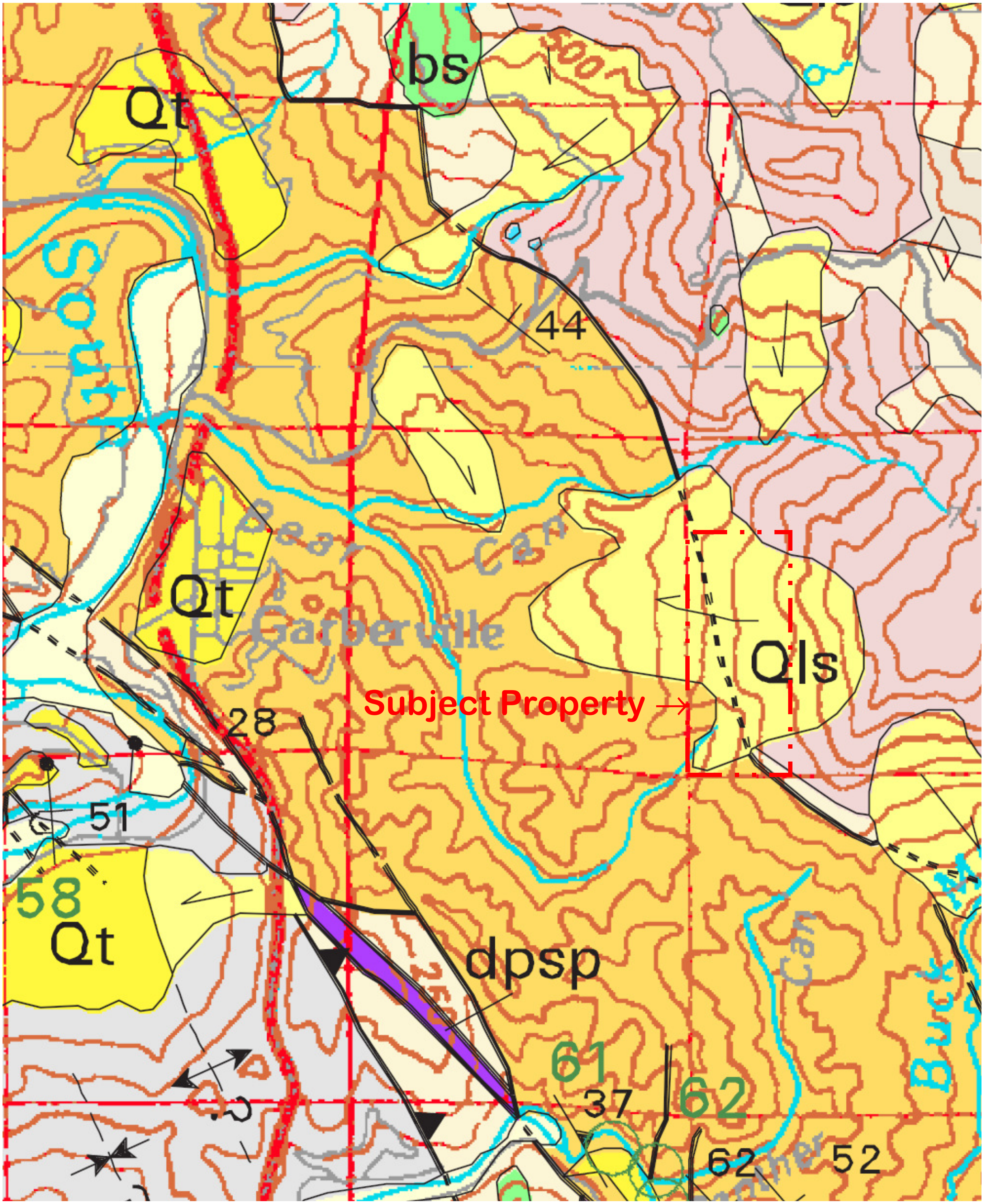
Engineering-Geologic R-2 Soils Exploration Report
Shadow Light Ranch, Clark Road, Garberville, Humboldt County
APN's 223-073-005, Mr. Joshua Sweet, Client
Assessor's Parcel Map; Book 223, Page 7. (Locations Approximate)

Figure 2
October 3, 2019
Project 0260.03
Scale as Shown

Lindberg Geologic Consulting	Engineering-Geologic R-2 Soils Exploration Report	Figure 3
Post Office Box 306	Shadow Light Ranch, Clark Road, Garberville, Humboldt County	October 3, 2019
Cutten, CA 95534	APN's 223-073-005, Mr. Joshua Sweet, Client	Project 0260.03
(707) 442-6000	Satellite Image of Project Location (locations approximate)	1" ≅ 110'

Modified from: Google Earth Imagery of April 21, 2019. N ≅

Lindberg Geologic Consulting	Engineering-Geologic R-2 Soils Exploration Report	Figure 4
Post Office Box 306	Shadow Light Ranch, Clark Road, Garberville, Humboldt County	October 3, 2019
Cutten, CA 95534	APN's 223-073-005, Mr. Joshua Sweet, Client	Project 0260.03
(707) 442-6000	Geologic Map of Project Region	1 inch ≅ 2,300 feet



Modified from: McLaughlin et al., 2000. N ≅

Lindberg Geologic Consulting	Engineering-Geologic R-2 Soils Exploration Report	Figure 4a
P. O. Box 306	Shadow Light Ranch, Clark Road, Garberville, Humboldt County	October 3, 2019
Cutten, CA 95534	APN's 223-073-005, Mr. Joshua Sweet, Client	Project 0260.03
(707) 442-6000	Geologic Map Explanation	No Scale

DESCRIPTION OF MAP UNITS

QUATERNARY AND TERTIARY OVERLAP DEPOSITS

Qal	Alluvial deposits (Holocene and late Pleistocene?)
Qm	Undeformed marine shoreline and aolian deposits (Holocene and late Pleistocene)
Qt	Undifferentiated nonmarine terrace deposits (Holocene and Pleistocene)
Qls	Landslide deposits (Holocene and Pleistocene)
QTog	Older alluvium (Pleistocene and [or] Pliocene)
QTw	Marine and nonmarine overlap deposits (late Pleistocene to middle Miocene)
Ti	Volcanic rocks of Fickle Hill (Oligocene)

COAST RANGES PROVINCE

FRANCISCAN COMPLEX

-- Coastal Belt --

Coastal terrane(Pliocene to Late Cretaceous)

Sedimentary, igneous, and metamorphic rocks of the Coastal terrane (Pliocene to Late Cretaceous):

co1	Melange
co2	Melange
co3	Broken sandstone and argillite
co4	Intact sandstone and argillite
cob	Basaltic Rocks (Late Cretaceous)
cols	Limestone (Late Cretaceous)
m	Undivided blueschist (Jurassic?)

King Range terrane (Miocene to Late Cretaceous)

Krp	Igneous and sedimentary rocks of Point Delgada (Late Cretaceous)
m	Undivided blueschist blocks (Jurassic?)

Sandstone and argillite of King Peak (middle Miocene to Paleocene[?]):

krk1	Melange and (or) folded argillite
krk2	Highly folded broken formation
krk3	Highly folded, largely unbroken rocks
krl	Limestone
krc	Chert
krb	Basalt

False Cape terrane (Miocene? to Oligocene?)

fc	Sedimentary rocks of the False Cape terrane (Miocene? to Oligocene?)

Yager terrane (Eocene to Paleocene?)

Sedimentary rocks of the Yager terrane (Eocene to Paleocene?):

y1	Sheared and highly folded mudstone
y2	Highly folded broken mudstone, sandstone, and conglomeratic sandstone
y3	Highly folded, little-broken sandstone, conglomerate, and mudstone
Ycgl	Conglomerate

-- Central belt --

Melange of the Central belt (early Tertiary to Late Cretaceous):

Unnamed Metasandstone and meta-argillite (Late Cretaceous to Late Jurassic):

cm1	Melange
cm2	Melange
cb1	Broken formation
cb2	Broken formation
cwr	White Rock metasandstone of Jayko and others (1989) (Paleogene and [or] Late Cretaceous)
chr	Haman Ridge graywacke of Jayko and others (1989) (Cretaceous?)
cfs	Fort Seward metasandstone (age unknown)
cls	Limestone (Late to Early Cretaceous)

cc	Chert (Late Cretaceous to Early Jurassic)
bs	Basaltic rocks (Cretaceous and Jurassic)
m	Undivided blueschist blocks (Jurassic?)
gs	Greenstone
c	Metachert
yb	Metasandstone of Yolla Bolly terrane, undivided
b	Melange block, lithology unknown

-- Eastern Belt --

Pickett Peak terrane (Early Cretaceous or older)

Metasedimentary and metavolcanic rocks of the Pickett Peak terrane (Early Cretaceous or older):

ppsm	South Fork Mountain Schist
mb	Chinquapin Metabasalt Member (Irwin and others, 1974)
ppv	Valentine Springs Formation
mv	Metabasalt and minor metachert

Yolla Bolly terrane (Early Cretaceous to Middle Jurassic?)

Metasedimentary and metaigneous rocks of the Yolla Bolly terrane (Early Cretaceous to Middle Jurassic?):

ybt	Taliaferro Metamorphic Complex of Suppe and Armstrong (1972) (Early Cretaceous to Middle Jurassic?)
ybc	Chicago Rock melange of Blake and Jayko (1983) (Early Cretaceous to Middle Jurassic)
gs	Greenstone
c	Metachert
ybh	Metagraywacke of Hammerhorn Ridge (Late Jurassic to Middle Jurassic)
c	Metachert
gs	Greenstone
sp	Serpentinite
ybd	Devils Hole Ridge broken formation of Blake and Jayko (1983) (Early Cretaceous to Middle Jurassic)
c	Radiolarian chert
ybi	Little Indian Valley argillite of McLaughlin and Ohlin (1984) (Early Cretaceous to Late Jurassic)

Yolla Bolly terrane

yb	Rocks of the Yolla Bolly terrane, undivided

GREAT VALLEY SEQUENCE AND COAST RANGE OPHIOLITE

Elder Creek(?) terrane

ecms	Mudstone (Early Cretaceous)

Coast Range ophiolite (Middle and Late Jurassic):

ecg	Layered gabbro
ecsp	Serpentinite melange

Del Puerto(?) terrane

Rocks of the Del Puerto(?) terrane:

dpms	Mudstone (Late Jurassic)

Coast Range ophiolite (Middle and Late Jurassic):

dpt	Tuffaceous chert (Late Jurassic)
dpb	Basaltic flows and keratophyric tuff (Jurassic?)
dpd	Diabase (Jurassic?)
dpsp	Serpentinite melange (Jurassic?)
sp	Undivided Serpentinized peridotite (Jurassic?)

KLAMATH MOUNTAINS PROVINCE

Undivided Great Valley Sequence:

Ks	Sedimentary rocks (Lower Cretaceous)

GREAT VALLEY SEQUENCE OVERLAP ASSEMBLAGE

Hayfork terrane

Eastern Hayfork subterrane:

eh	Melange and broken formation (early? Middle Jurassic)
ehls	Limestone
ehsp	Serpentinite

Western Hayfork subterrane:

whu	Hayfork Bally Meta-andesite of Irwin (1985), undivided (Middle Jurassic)
whwg	Wildwood (Chanchelulla Peak of Wright and Fahan, 1988) pluton (Middle Jurassic)
whwp	Clinopyroxenite
whji	Diorite and gabbro plutons (Middle? Jurassic)

Rattlesnake Creek terrane

rcm	Melange (Jurassic and older)
rcls	Limestone
rcc	Radiolarian chert
rcis	Volcanic Rocks (Jurassic or Triassic)
rcic	Intrusive complex (Early Jurassic or Late Triassic)
rcp	Plutonic rocks (Early Jurassic or Late Triassic)
rcum	Ultramafic rocks (age uncertain)
rcpd	Blocky peridotite

Western Klamath terrane

Smith River subterrane:

srs	Galice? formation (Late Jurassic)
srv	Pyroclastic andesite
srgb	Glen Creek gabbro-ultramafic complex of Irwin and others (1974)
srpd	Serpentinized peridotite

MAP SYMBOLS

Contact

Fault

Thrust fault

Trace of the San Andreas fault associated with 1906 earthquake rupture

Strike and dip of bedding:

10 20 Inclined

Vertical

Horizontal

10 20 Overturned

20 Approximate

10 Joint

10 Strike and dip of cleavage

Shear foliation:

10 Inclined

Vertical

Folds:

Synclinal or synformal axis

Anticlinal or antiformal axis

Overturned syncline

Qls Landslide

Melange Blocks:

Serpentinite

Chert

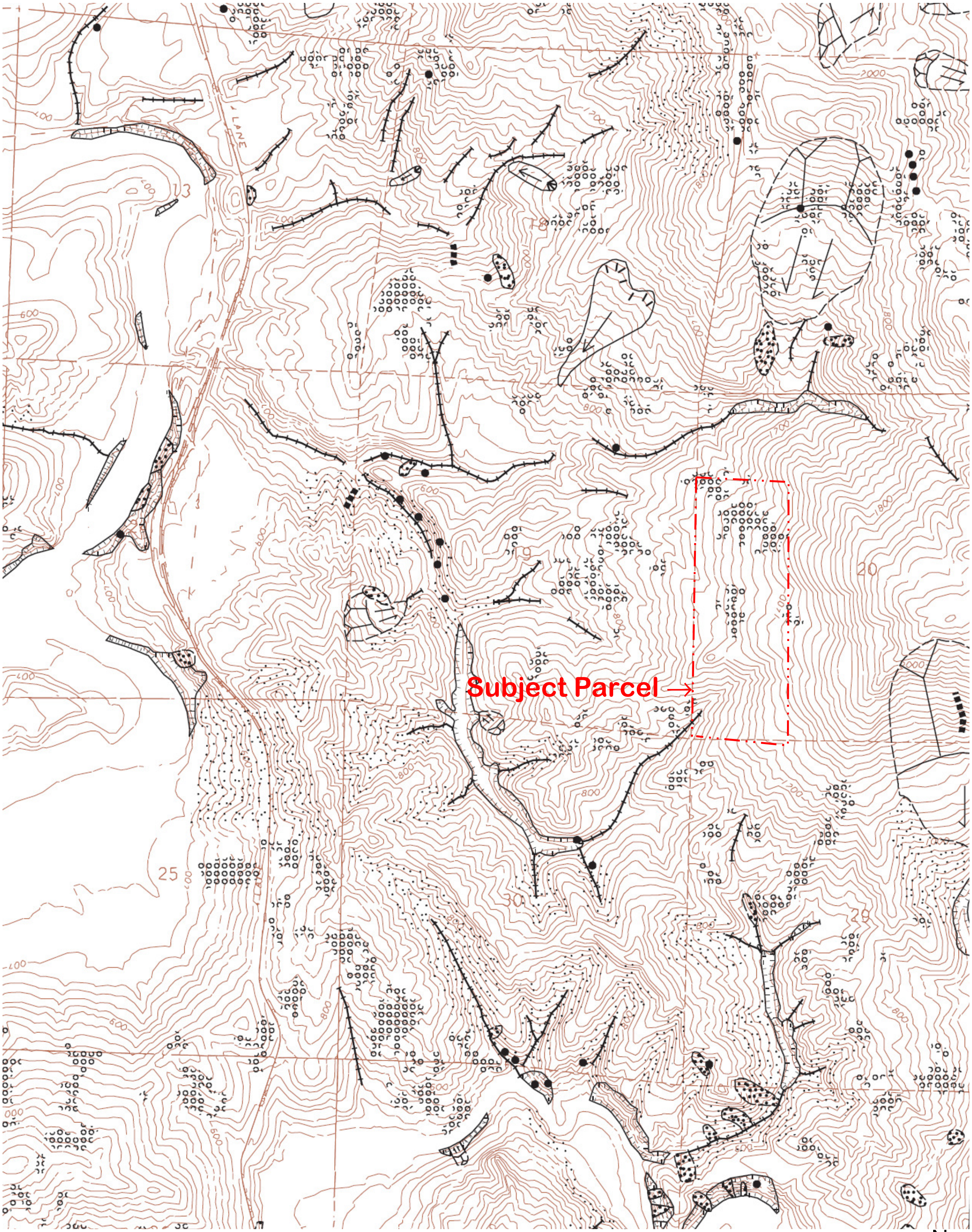
Blueschist

Greenstone

10 Fossil locality and number

GEOLOGY OF THE CAPE MENDOCINO, EUREKA, GARBERVILLE, AND SOUTHWESTERN PART OF THE HAYFORK 30 X 60 MINUTE QUADRANGLES AND ADJACENT OFFSHORE AREA, NORTHERN CALIFORNIA (McLaughlin et al., 2000)

Lindberg Geologic Consulting	Engineering-Geologic R-2 Soils Exploration Report	Figure 5
Post Office Box 306	Shadow Light Ranch, Clark Road, Garberville, Humboldt County	October 3, 2019
Cutten, CA 95534	APN's 223-073-005, Mr. Joshua Sweet, Client	Project 0260.03
(707) 442-6000	Geomorphic Features Related to Landsliding Map	1 inch ≅ 2,300 feet



Modified from: CDMG (Spittler), 1983. N ≅

LABORATORY				FIELD					
Dry Density (pcf)	Moisture Content (%)	Cohesion; Friction Angle (psf; degrees)	Other Tests	Blows/foot*	Sample	Depth (feet)	Graphic Lithology	U.S.C.S. Designation	SOIL DESCRIPTION
								ML	Topsoil, fine sand and silt, dark brown, loose, moist, abundant fine roots, appears well-drained, rich in organic material.
						1			
						2			
						3			
			60% Sand, 9% Silt, 31% Clay						
						4			
						5			
			60% Sand, 21% Silt, 19% Clay					SM	Silty fine sand with clay and gravel, brown, medium dense, moist, friable, granular crumb to subangular blocky structure, well-developed secondary tubular on fracture porosity.
						6			
						7			
						8			
						9			
						10			No mottling or free groundwater. Test Pit-1 backfilled on completion.

* The blow counts have been converted to standard N-value blow counts

SURFACE ELEVATION: 1,400 Feet

TOTAL DEPTH: 10 Feet

GROUNDWATER DEPTH: >10 Feet

LOGGED BY: David N. Lindberg, CEG

BOREHOLE DIAMETER: 18 Inches

EQUIPMENT: Backhoe

HAMMER TYPE: None

LINDBERG GEOLOGIC CONSULTING

PROJECT NUMBER: 0260.03 DATE: March 30, 2018

LOG OF TEST EXCAVATION / BORING

TP-1 **Sweet Warehouse**

Figure No. **6**

LABORATORY				FIELD					
Dry Density (pcf)	Moisture Content (%)	Cohesion; Friction Angle (psf; degrees)	Other Tests	Blows/foot*	Sample	Depth (feet)	Graphic Lithology	U.S.C.S. Designation	SOIL DESCRIPTION
								ML	Topsoil, silt with fine sand, dark brown, soft, abundant fine roots, organic-rich, appears well-drained.
						1			
						2			
			71% Sand, 18% Silt, 11% Clay		X	3			
						4			
			70% Sand, 18% Silt, 12% Clay		X	5		SM	Silty fine sand with clay, brown, medium dense, moist, friable, subangular blocky structure, few roots, well-developed fracture and tube proosity.
						6			
						7			
						8			
						9			
						10			No mottling or free groundwater. Test Pit TP-2 backfilled on completion.

* The blow counts have been converted to standard N-value blow counts

SURFACE ELEVATION: 1,400 Feet

TOTAL DEPTH: 10 Feet

GROUNDWATER DEPTH: >10 Feet

LOGGED BY: David N. Lindberg, CEG

BOREHOLE DIAMETER: 18 Inches

EQUIPMENT: Backhoe

HAMMER TYPE: None

LINDBERG GEOLOGIC CONSULTING

PROJECT NUMBER: 0260.03 DATE: March 30, 2018

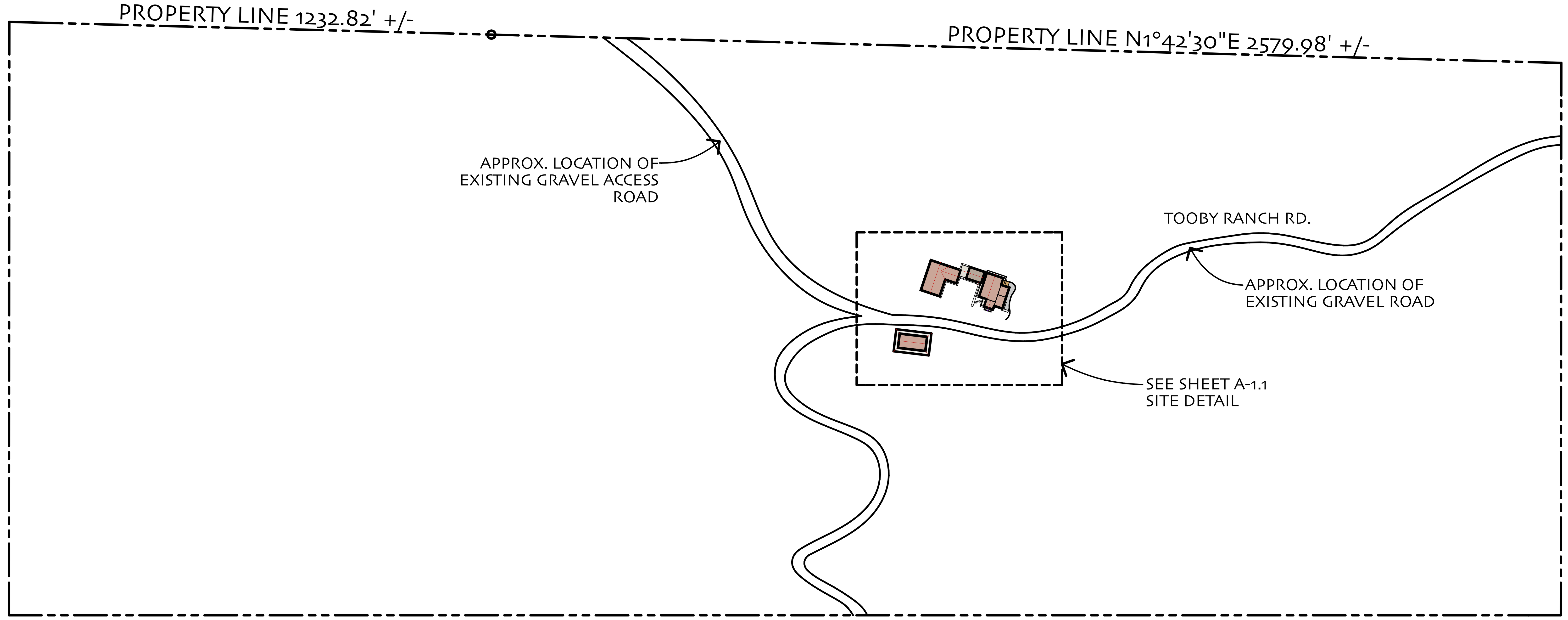
LOG OF TEST EXCAVATION / BORING

TP-2 **Sweet Warehouse**

Figure No. **7**

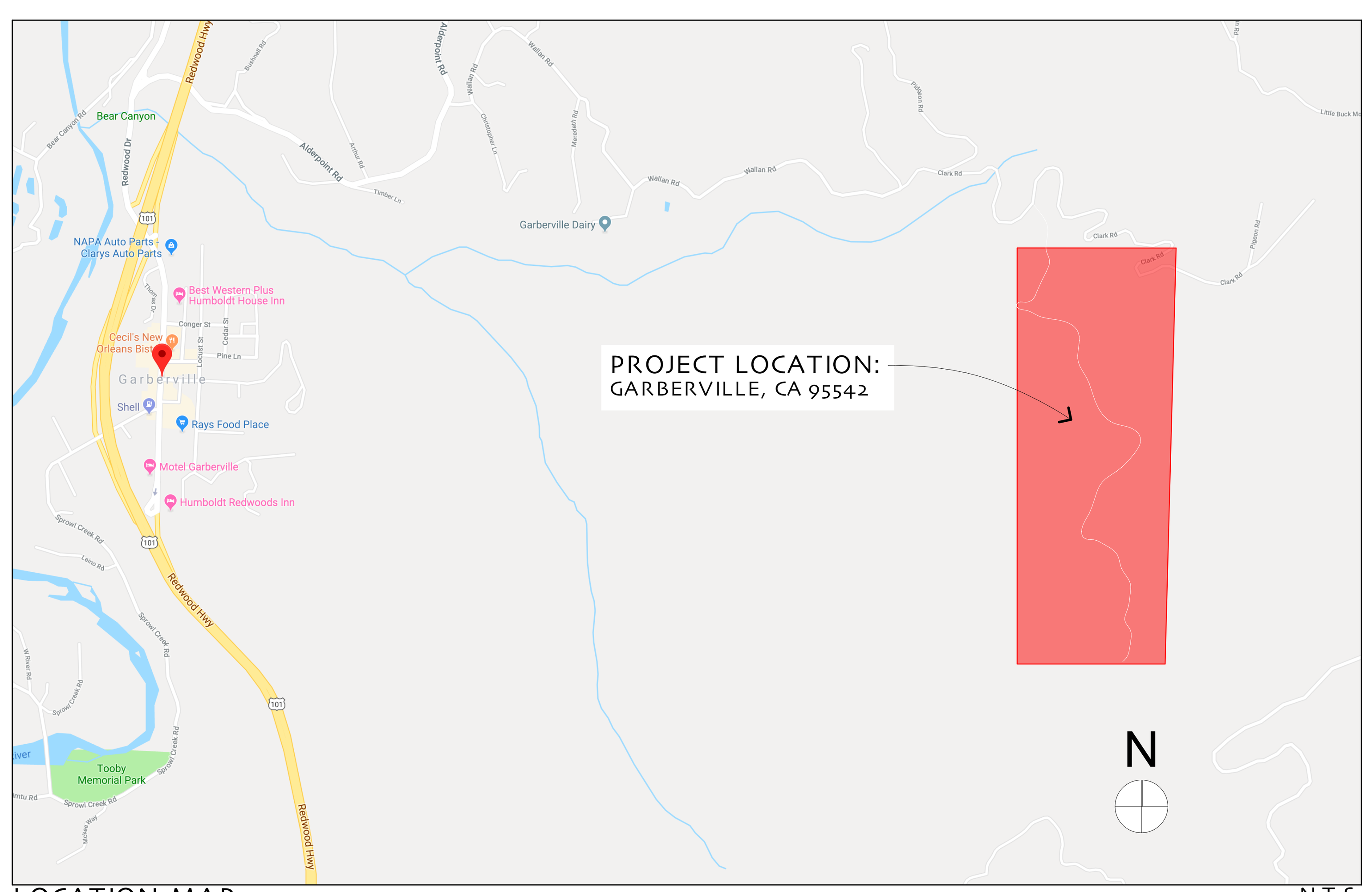
ABBREVIATIONS:

A.B.	ANCHOR BOLT
ACCESS.	ACCESSIBLE
ARCH.	ARCHITECTURAL
ASPH.	ASPHALT
@	AT
BM	BEAM
BLDG.	BUILDING
℄	CENTER LINE
CLR.	CLEAR
CONT.	CONTINUOUS
CONSTR.	CONSTRUCTION
CTR.	CENTER
DBL	DOUBLE
DIM.	DIMENSION
D.F.	DOUGLAS FIR
DN.	DOWN
D.S.	DOWN SPOUT
DWG	DRAWING(S)
(E)	EXISTING
EA	EACH
ELEC.	ELECTRICAL
ELEV.	ELEVATION
E.N.	EDGE NAIL
EQ.	EQUAL
EQUIP.	EQUIPMENT
EXH.	EXHAUST
EXIST.	EXISTING
EXT.	EXTERIOR
EXP.	EXPOSED
EXP. AGG.	EXPOSED AGGREGATE
FIN.	FINISH
FL.	FLOOR
F.O.S.	FACE OF STUD
FOUND.	FOUNDATION
FRMG.	FRAMING
F.R.P.	FIBERGLASS REINFORCED PLASTIC PANELS
GAL.	GALVANIZED
G.B.	GRAB BAR
G.D.	GARBAGE DISPOSAL
GLB	GLUE LAM BEAM
GYP. BD.	GYPSUM BOARD
G.R.	GRADE
H.B.	HOSE BIB
H.C.	HOLLOW CORE
HDWD.	HARDWOOD
HOL. MTL.	HOLLOW METAL
HT.	HEIGHT
H.V.A.C.	HEATING, VENTILATION, AND AIR CONDITIONING
H.W.H.	HOT WATER HEATER
INCL.	INCLUDED
INFO.	INFORMATION
INSUL.	INSULATION
INT.	INTERIOR
JST.	JOIST
JUNC.	JUNCTION
LN.	LINEN
LOUV.	LOUVER (ED)
LTG.	LIGHTING
MANUF.	MANUFACTURER
MAS.	MASONRY
MAX.	MAXIMUM
M.B.	MACHINE BOLT
M.C.	MEDICINE CABINET
MECH.	MECHANICAL
MIN.	MINIMUM
MULL.	MULLION
(N)	NEW
N.I.C.	NOT IN CONTRACT
N.T.S.	NOT TO SCALE
NON-COMB.	NON-COMBUSTIBLE
O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER
PLY.	PLYWOOD
℘	PROPERTY LINE
REQD.	REQUIRED
REF.	REFRIGERATOR
REG.	REGISTER
REINF.	REINFORCED
RWD.	REDWOOD
SECT.	SECTION
SQ.	SQUARE
S.S.	STAINLESS STEEL
STRUCT .	STRUCTURAL
TEMP.	TEMPERED
T&B	TOP & BOTTOM
T.S.	TUBE STEEL
TYP.	TYPICAL
U.N.O.	UNLESS NOTED OTHERWISE
W.C	WATER CLOSET
W/	WITH
W.D.	WOOD



PHASE 1
OVERALL SITE PLAN

SCALE: 1" = 200'-0" (22" X34" PAPER SIZE)
1" = 400'-0" (11" X17" PAPER SIZE)



LOCATION MAP

N.T.S.

NEW WAREHOUSE PROCESSING FACILITY FOR:
JOSH SWEET

CLIENT CONTACT:
JOSH SWEET
P.O. BOX 1126
REDWAY, CA 95560
(310) 710-7549

PROJECT SITE:

GARBERVILLE, CA 95542

APN: 223-073-005

PARCEL SIZE: 136 ACRES

PARCEL ZONING: AGRICULTURE

SHEET INDEX

DRAFT

CONSULTANTS:

STRUCTURAL ENGINEERING:
ATLAS ENGINEERING
MIKE TAYLOR, CA LIC. NO. C68893
252 G STREET
ARCATA, CA 95521
(707) 822-2822

ENERGY CALCULATIONS:
ABBAY TECHNICAL SERVICES
ANNY McQUEENEY, CEA
1125 16TH STREET, ROOM 216
ARCATA, CA 95521
(707) 826-1433

SOILS REPORT:
LINDBERG GEOLOGIC CONSULTING
DAVID N. LINDBERG, CEG
P.O. BOX 306
CUTTEN, CA 95534
(707) 442-6000

DRAFT

GRAPHIC SCALE BAR MEASURES 1 INCH ON FULL SIZE PLANS

DRAFT - PLAN CHECK & CONSTRUCTION SET
NOT FOR CONSTRUCTION

REVISIONS:

JULIAN BERG DESIGNS
ARCHITECTURE & PLANNING
846 A STREET
ARCATA, CALIFORNIA, 95521
TEL: (707) 407-8870
julianbergdesigns.com

LICENSED ARCHITECT
JULIAN ALEX BERG
C-35344
REN. 01/31/21
STATE OF CALIFORNIA

PROJECT TITLE: SHADOW LIGHT RANCH - PROCESSING FACILITY - GARBERVILLE, CA
JOSHUA SWEET • P.O. BOX 1126 • REDWAY, CA 95560 • TEL: (310) 710-7549

SHEET TITLE: OVERALL SITE PLAN
ASSESSOR'S PARCEL NUMBER : 223-073-005

PROJECT NO.:
JS - 1732
DRAWN BY:
JAB/DHV
DATE:
8/21/2019

SHEET # :
A-1

ABBREVIATIONS:

A.B.	ANCHOR BOLT
ACCESS.	ACCESSIBLE
ARCH.	ARCHITECTURAL
ASPH.	ASPHALT
@	AT
BM	BEAM
BLDG.	BUILDING
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CLR.	CLEAR
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CONSTR.	CONSTRUCTION
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H.C.	HOLLOW CORE
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H.V.A.C.	HEATING, VENTILATION, AND AIR CONDITIONING
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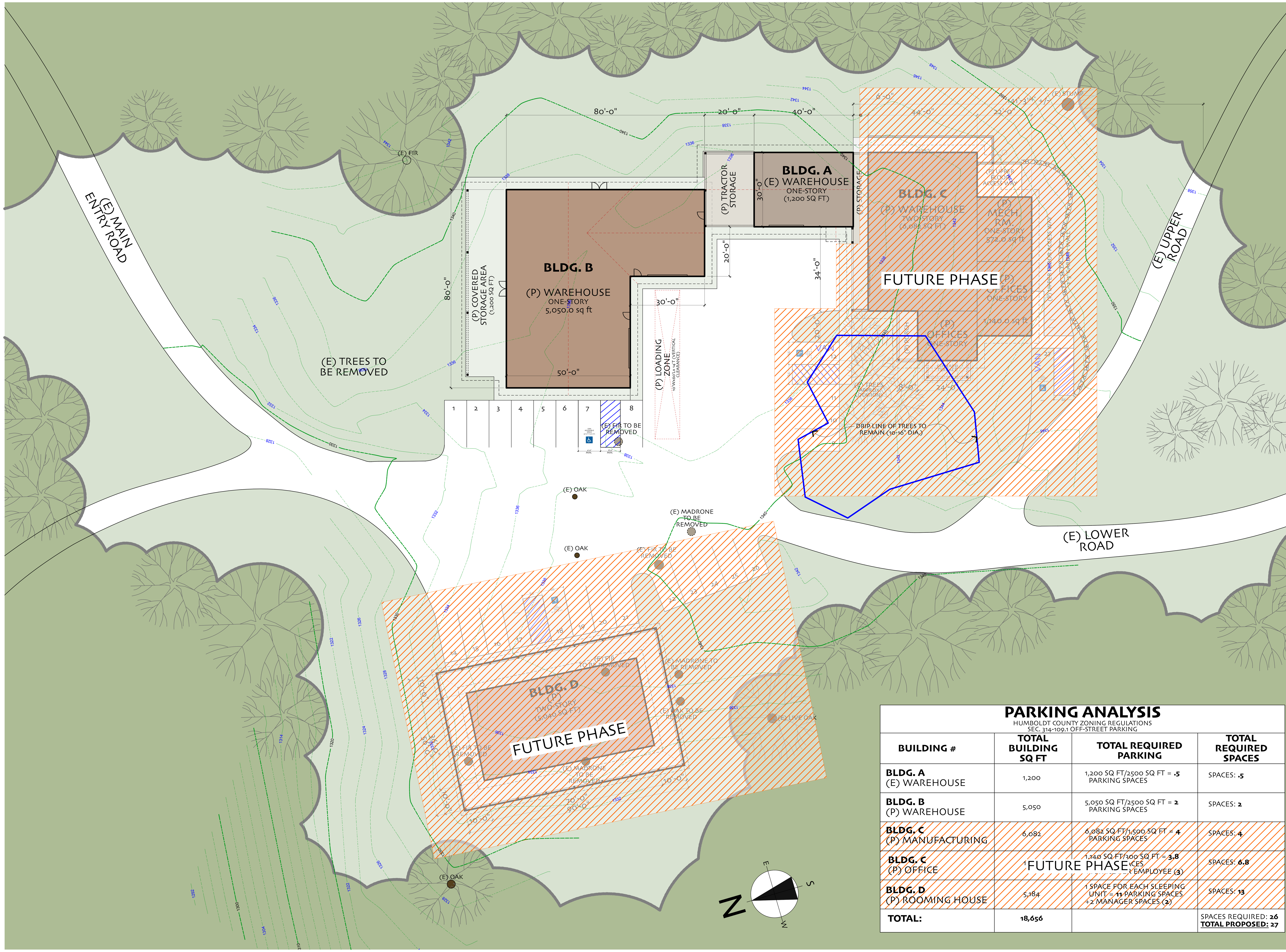

PARKING ANALYSIS

HUMBOLDT COUNTY ZONING REGULATIONS
SEC. 314-109.1 OFF-STREET PARKING

BUILDING #	TOTAL BUILDING SQ FT	TOTAL REQUIRED PARKING	TOTAL REQUIRED SPACES
BLDG. A (E) WAREHOUSE	1,200	1,200 SQ FT/2500 SQ FT = **.5** PARKING SPACES	SPACES: **.5**
BLDG. B (P) WAREHOUSE	5,050	5,050 SQ FT/2500 SQ FT = **2** PARKING SPACES	SPACES: **2**
BLDG. C (P) MANUFACTURING	6,082	6,082 SQ FT/1,500 SQ FT = **4** PARKING SPACES	SPACES: **4**
BLDG. C (P) OFFICE	FUTURE PHASE	1,140 SQ FT/300 SQ FT = **3.8** ...CES ... EMPLOYEE **(3)**	SPACES: **6.8**
BLDG. D (P) ROOMING HOUSE	5,184	1 SPACE FOR EACH SLEEPING UNIT = **11** PARKING SPACES +2 MANAGER SPACES **(2)**	SPACES: **13**
TOTAL:	**18,656**		SPACES REQUIRED: **26** **TOTAL PROPOSED: 27**

PHASE 1
SITE PLAN DETAIL

SCALE: 1" = 20'-0" (22" X34" PAPER SIZE)
1" = 40'-0" (11" X17" PAPER SIZE)

GRAPHIC SCALE BAR MEASURES 1 INCH ON FULL SIZE PLANS

DRAFT - PLAN CHECK & CONSTRUCTION SET
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PROJECT TITLE: SHADOW LIGHT RANCH - PROCESSING FACILITY - GARBERVILLE, CA
JOSHUA SWEET • P.O. BOX 1126 • REDWAY, CA 95560 • TEL: (310) 710-7549
SHEET TITLE: SITE PLAN DETAIL
ASSESSOR'S PARCEL NUMBER: 223-073-005

PROJECT NO.: JS - 1732
DRAWN BY: JAB/DHV
DATE: 8/21/2019

SHEET #: A-1.1

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

<u>Findings Summary</u>

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.

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

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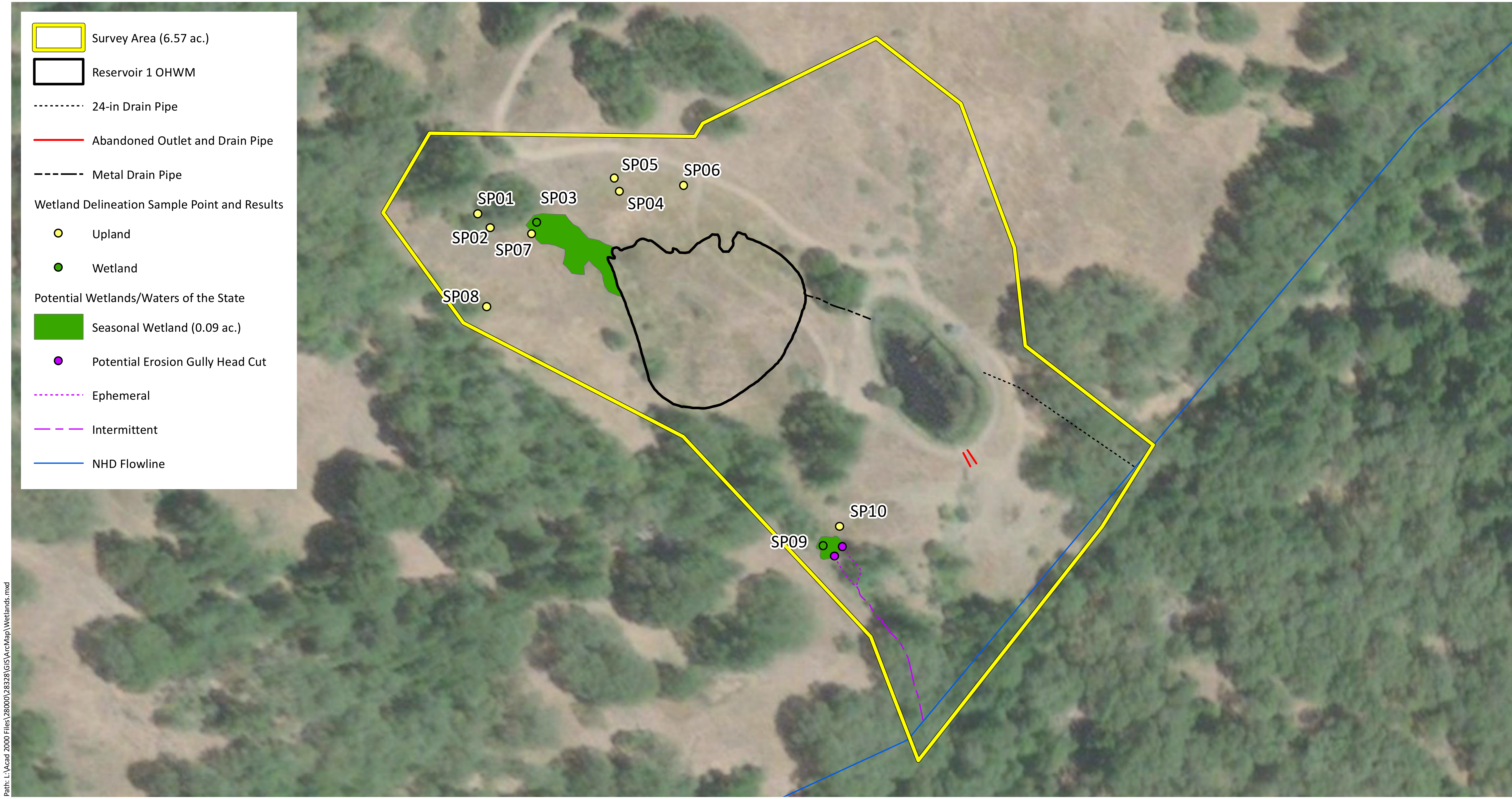


Path: L:\Acad 2000 Files\28000\28328\GIS\ArcMap\Wetlands.mxd

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

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

wra
ENVIRONMENTAL CONSULTANTS

Path: L:\Acad 2000 Files\28000\28328\GIS\ArcMap\Wetlands2014.mxd

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

Figure 3. Wetlands Delineation

Shadow Light Ranch
Humbolt County, California

0 50 100 Feet

N

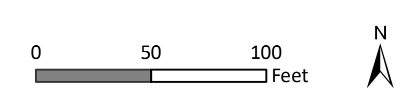
wra
ENVIRONMENTAL CONSULTANTS

Path: L:\Acad 2000 Files\28000\28328\GIS\ArcMap\Wetland8700SQFT.mxd

Sources: 2016 DigitalGlobe Aerial, WRA | Prepared By: njander, 1/28/2019

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



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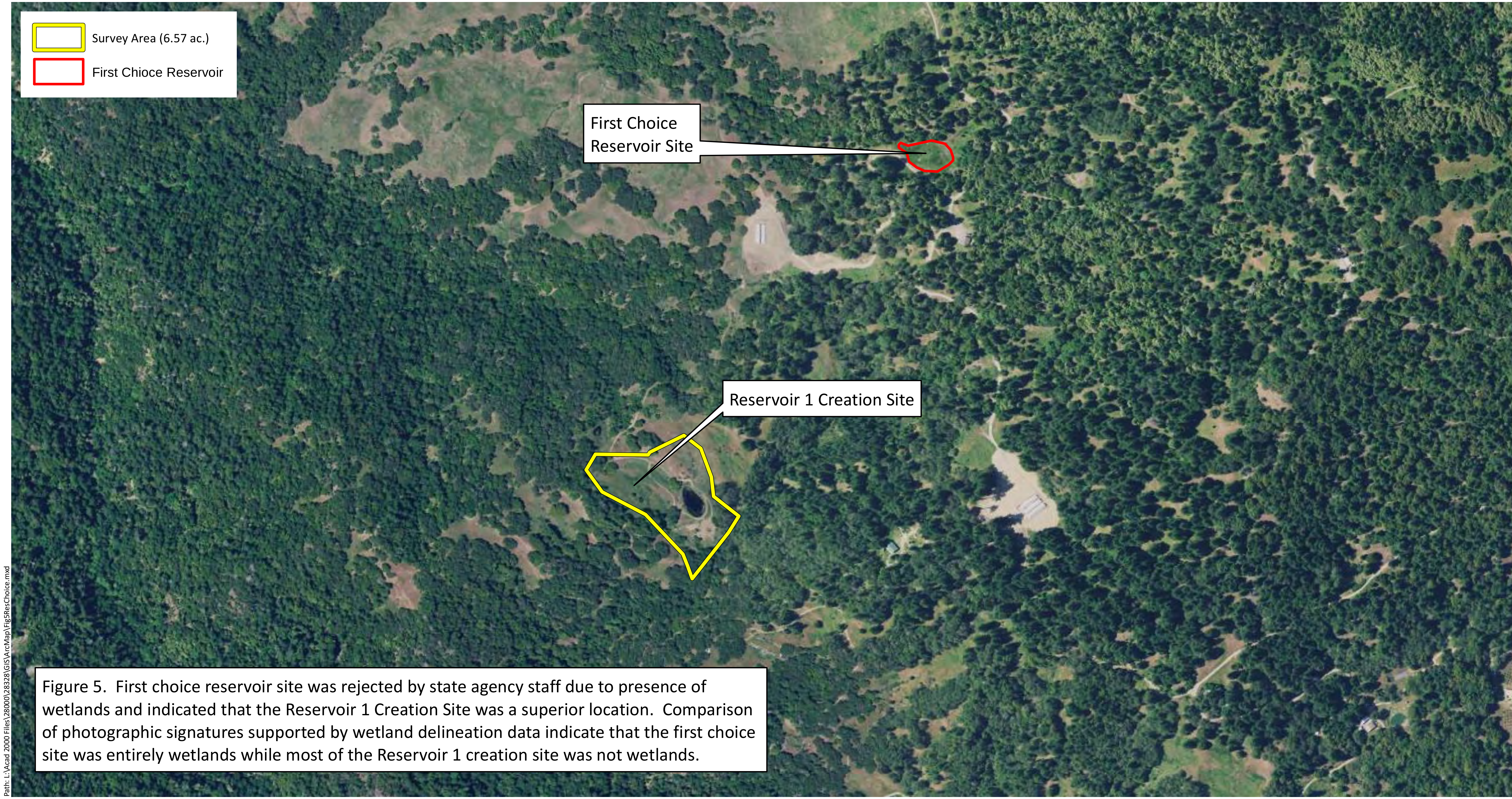


Figure 5. First choice reservoir site was rejected by state agency staff due to presence of wetlands and indicated that the Reservoir 1 Creation Site was a superior location. Comparison of photographic signatures supported by wetland delineation data indicate that the first choice site was entirely wetlands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

Path: L:\Acad 2000 Files\28000\28328\GIS\ArcMap\Fig5ResChoice.mxd

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

Shadow Light Ranch
Humbolt County, California

WRA ENVIRONMENTAL CONSULTANTS

Sources:ESRI, USGS, WRA | Prepared By: njander, 1/31/2019

Figure 6 USGS Map and Survey Area

Shadow Light Ranch
Humbolt County, California

0 50 100 Feet

N

wra
ENVIRONMENTAL CONSULTANTS

Sources:ESRI, USFWS, WRA | Prepared By: njander, 1/31/2019

Figure 7. National Wetlands Inventory and Survey Area

Shadow Light Ranch
Humbolt County, California

0 50 100 Feet

N

wra ENVIRONMENTAL CONSULTANTS

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 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 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)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM **Plot Size:** 10'x10'			
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 %	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)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM Plot Size: N/A			
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 %	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 (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	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)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM Plot Size: N/A			
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 (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	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
Hydric Soil Present?	☐ Yes	☒ No
Wetland Hydrology Present?	☐ Yes	☒ No

Is the Sampled Area within a Wetland? ☐ **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)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM **Plot Size:** N/A			
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 (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	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)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM **Plot Size:** N/A			
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 %	Type[1]	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
Hydric Soil Present?	☐ Yes	☒ No
Wetland Hydrology Present?	☐ Yes	☒ No

Is the Sampled Area within a Wetland? ☐ **Yes** ☒ **No**

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

VEGETATION (use scientific names)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM Plot Size: N/A			
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 (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	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)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM **Plot Size:** N/A			
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 (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	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)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM **Plot Size:** N/A			
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 (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	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)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM **Plot Size:** N/A			
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

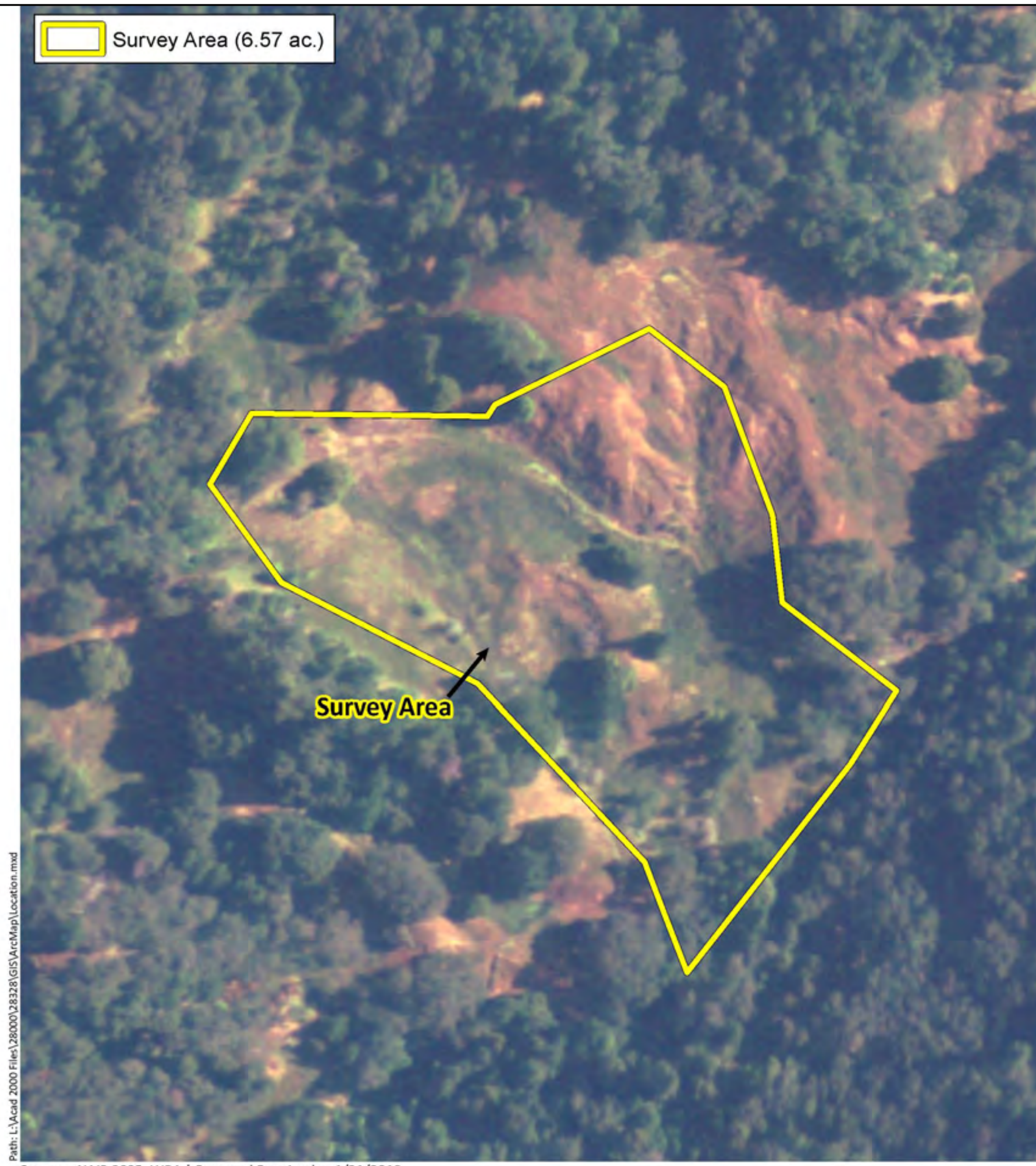
Wetland Hydrology Present ? ☐ **Yes** ☒ **No**

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



Sources: NAIP 2005, WRA | Prepared By: njander, 1/31/2019

Photograph 1. 2005 NAIP Imagery

Shadow Light Ranch
Humbolt County, California

Sources: NAIP 2014, WRA | Prepared By: njander, 1/31/2019

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.

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

Photograph 5. 2016 NAIP Imagery

Shadow Light Ranch
Humbolt County, California

0 50 100 Feet N

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.