



Stillwater Sciences

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TECHNICAL MEMORANDUM

DATE: 6 May 2017
TO: David Manthorne, CDFW
FROM: Joel Monschke, Stillwater Sciences
SUBJECT: APN 221-021-003 Erosion Remediation

I hereby state that all work described in the attached Technical Memorandum for the APN 221-021-003 Erosion Remediation Project follows accepted engineering practice and was completed under my direction. The project proposes to stormproof one agricultural pond, and treat several gullies to decrease sediment delivery to Salmon Creek in Southern Humboldt County.



Joel Monschke

5/6/17

Joel Monschke, P.E. Date
Senior Civil Engineer/Hydrologist
Stillwater Sciences

1 INTRODUCTION

Stillwater Sciences was contracted by the owner of APN 221-021-003, to perform a site assessment of the erosion issues and water diversion on the property and develop remediation plans to decrease sediment delivery to Salmon Creek and impacts related to water use. The property and site locations are shown on the Plot Plan in Appendix A. The project proposes to remediate gully erosion at two locations, upgrade a pond spillway, and maintain/permit a point of diversion. Additionally, grading plans have been submitted to Humboldt County for retroactive permitting of the existing off-channel pond and permitting of a new off-channel pond (Design Plans are included in Appendix B). Note that the existing pond has not provided sufficient irrigation water the last several seasons and the landowner has been trucking in water.

2 FIELD OBSERVATIONS

Stillwater Sciences' engineer/hydrologist (Joel Monschke) visited APN 221-021-003 on 24 March 2017. The property is situated on moderately (25–35%) sloping land approximately 6.7 miles west of Miranda in the Salmon Creek watershed. The vegetation on the property is approximately 50% hardwood/conifer timber and 50% grassland.

During this visit, an assessment of the road and erosional features was conducted. Results have guided recommendations to remediate gully erosion at two sites, upgrade the existing pond spillway, and reshape approximately $\frac{1}{4}$ mile of road to prevent runoff concentration and rilling.

The locations of each site is shown in Appendix A, Sheet 2. Photos of each site are included in Appendix C. The point of diversion consists of a shallow cistern in an intermittent watercourse.

3 GEOLOGY AND SOILS

The subject property is in southern Humboldt County, situated on a hillside that drains toward Salmon Creek, which drains into the South Fork of the Eel River near the town of Miranda. The property is located within the seismically active Franciscan Geologic Complex. Specifically, the geology underlying the project site is composed of Central Belt Franciscan *mélange* which typically contains serpentine clay soils with rocky outcroppings interspersed throughout the landscape. Due to the typically high clay content, Central Belt Franciscan *mélange* is generally more susceptible to landslides than Coastal Belt Franciscan formations which are composed of well-consolidated mudstone and sandstone. Although most the subject property is underlain by Central Belt Franciscan *Mélange*, there is a rocky knoll on the western extent of the property that exhibits characteristics more typical of the coastal belt including rocky soil, thick vegetation dominated by Douglas fir, and steep stable topography.

Around the rocky knoll, soils generally consist of reddish brown silty loam with gravel content of 25% to 50%. At other sites, soils are comprised of clay serpentine with some gravel, cobble and boulder sized rock interspersed within the clay matrix. Sub-surface soils were observed in a road cut adjacent to the proposed garage pad. At this site, reddish brown gravelly silt was evident throughout the soil profile to a depth of 8 feet below ground surface (bgs) with gravel content increasing from approximately 25% near the surface to 50% at 8-foot depth.

Several gullies were identified on the property caused by surface water concentrations associated with current road drainage and past land disturbance. The project site lies approximately 2 miles to the east of the Briceland Fault (California Department of Conservation interactive map viewer).

4 IMPLEMENTATION PLAN

4.1 Gully Remediation 1 (southwest corner of property)

There is an actively eroding gully in the southwest portion of the property downslope from the outlet of a 12" diameter ditch relief culvert on the main community road. Armor several headcuts and install additional grade control structures using a total of approximately 30 cubic yards of 0.5–1.0 foot rock (see current conditions in Photos 1 and 2 in Appendix C). Engineer to oversee construction.

4.2 Gully 2 Remediation (northern portion of property)

Additional gulying is evident in the northern portion of the property along approximately 100 feet of small channel adjacent to the shallow cistern/well (POD1). Work in this area will involve relocation of three water tanks that are located in a wet area at the head of the Class III watercourse (Photo 3, Appendix C), armoring of the channel adjacent to the cistern (Photo 4, Appendix C), and channel armoring and minor excavation of oversteepened banks where the watercourse flows through an old failed pond berm (Photo 5, Appendix C). A total of approximately 30 cubic yards of 0.5–1.0 foot rock will be used. Engineer to oversee construction.

4.3 Pond Spillway Remediation

The spillway of the existing pond has been filled by sediment from road runoff and water is currently flowing over the dike. Although there is no evidence of erosion or concentrated flow due to dense vegetation growth, work is needed to construct an armored spillway and provide minimum 2 feet of freeboard. Upgrade pond dike per Sheets 4 and 9 of the Grading Plan in Appendix B.

4.4 Other Recommendations (not requiring 1602 notification)

There are several road related drainage issues that are causing erosion but do not require 1602 notification. Recommendations at these include:

- Install three waterbars on the main driveway between the community road and the primary residence.
- Surface with gravel and crown the seasonal road from the primary residence to the existing pond.

4.5 Erosion control BMPs (to be used at all sites where soil is disturbed)

- Erosion and sediment control best management practices (BMPs) shall be installed prior to the wet season (October 1 through April 30).
- Sensitive areas and areas where existing vegetation is being preserved shall be protected with construction fencing; fencing shall be maintained throughout construction activities.

- All areas disturbed during grading activities shall be seeded with native grass seed and mulched with rice straw.
- Prior to seeding and straw, disturbed areas should be roughened by track walking with a dozer.
- Straw shall be applied at a uniform rate of approximately 4,000 lbs per acre by hand.
- At the completion of the project, straw wattles shall be placed as directed by the engineer or geologist.

All sediment control BMPs shall be maintained throughout the wet season until new vegetation has become established on all graded areas.

5 PROJECT IMPACTS

Site Number	Length of Channel Impacted (feet)	Width of Impact (feet)	Riparian area of Impacted (square feet)	Volume of Material Moved (cubic yards)
Gully 1	120	4	480	30
Gully 2	80	4	320	50
Pond	0	0	0	20
Total	200	8	800	100

6 CONSTRUCTION COST ESTIMATES FOR 1602 SITES

The total permit cost per site is \$2,805. Additionally, per Table 1 and Attachment E of the LSAA there is an additional \$3,000 cannabis remediation fee. Therefore, the total fee for this project is \$5,805.

Table 1. Summary of approximate construction costs.

Site #	Total construction cost	Total DFW permit fee
Gully 1 (southwest)	\$4,000	\$561
Gully 2 (north)	\$4,000	\$561
Pond Spillway	\$2,000	\$561
POD1 (cistern in Class III watercourse)	\$500	\$561
POD2 (existing pond)	\$500	\$561
Total	\$11,000	\$2,805

7 CONSTRUCTION SCHEDULE

Implementation of this project will be completed by 15 October 2018. Work will only occur during the dry season.

8 LATITUDE AND LONGITUDE FOR SITES REQUIRING 1602 NOTIFICATION

Table 3. Latitude and longitude for 1602 sites.

Site number	Latitude	Longitude
Gully 1	40.2353	-123.9548
Gully 2 and POD1	40.2366	-123.9529
Pond and POD2	40.2362	-123.9517

9 WATER USE AND STORAGE

9.1 Water Sources

This property uses water from a jurisdictional shallow cistern for domestic purposes and a pond that is filled primarily through rainfall catchment and road drainage for irrigation purposes. The pond likely has some minor amounts of shallow groundwater inflow and outflow so we have included it as both a remediation site and POD in the LSAA notification.

9.2 Water Storage and Plumbing

Currently domestic water is collected via cistern (POD1) placed in a jurisdictional watercourse and pumped to approximately 15,000 gallons in poly tanks. POD1 typically goes dry in May or June. The existing 200,000 gallon pond is used for irrigation purposes. Considering some seepage and evaporation loss, it is not quite adequate for the current cultivation on the property.

9.3 Water Use

Domestic use on the property is estimated at ~100 gallons per day. The landowner and residents have learned to conserve water because the property does not have a dry season water source for potable water and relies on storage in poly tanks. Cultivation activities have varied over the past several years and are conducted across an area ranging from 10,000 to 22,000 ft². Estimated water use is summarized in the tables below.

Table 4. Water Diversion and Use Summary.

<u>Total Surface Water Diversion By Month (gallons):</u>													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Shallow Cistern	8,000	8,000	6,000	3,000	1,500	-	-	-	-	-	1,500	8,000	36,000
<u>Water Input to Storage by Source (gallons):</u>													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Shallow Cistern	5,000	5,000	3,000									5,000	18,000
Rainwater	50,000	50,000	50,000	-	-	-	-	-	-	-	-	50,000	200,000
<u>Water Use by Source (gallons):</u>													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Shallow Cistern (domestic)	3,000	3,000	3,000	3,000	1,500	-	-	-	-	-	1,500	3,000	18,000
Pond (Irrigation)	-	-	-		5,000	25,000	40,000	50,000	40,000	15,000		-	175,000
Poly Tanks (domestic)					1,500	3,000	3,000	3,000	3,000	3,000	1,500		18,000

Appendix A

Plot Plan

PLOT PLAN APN 221-021-003 HUMBOLDT COUNTY, CA

OWNER:
WILLIAM ERIC JAMES WICKERSHAM
430 CAMBRIDGE AVENUE
PALO ALTO, CA
650-455-8764
ERICWICKERSHAM1@YAHOO.COM

AGENT:
JOEL MONSCHKE PE
STILLWATER SCIENCES
850 G STREET, SUITE K
ARCATA, CA 95521
707-496-7075
JMONSCHKE@STILLWATERSCI.COM

CULTIVATION AREA:
APN 221-021-003 - 4E+4 - 4P+22 000 SF OUTDOOR & MIXED LIGHT CULTIVATION AREA

POND NOTES:
200 800 GALLONS - 4E+
WATER SOURCE TO FILL EXISTING POND: RAINWATER CATCHMENT
1. WATER USE FOR EXISTING POND: IRRIGATION & FIRE SUPPRESSION

ADDITIONAL NOTES:

1. PARCEL BENT FROM HUMBOLDT COUNTY GIS AND ASSESSORS' PARCEL MAPS.
2. SLOPE DIRECTION AND GRADIENT CAN BE DETERMINED USING SCALE BAR AND GRADING LOGS.
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CALIFORNIA LOCATION MAP



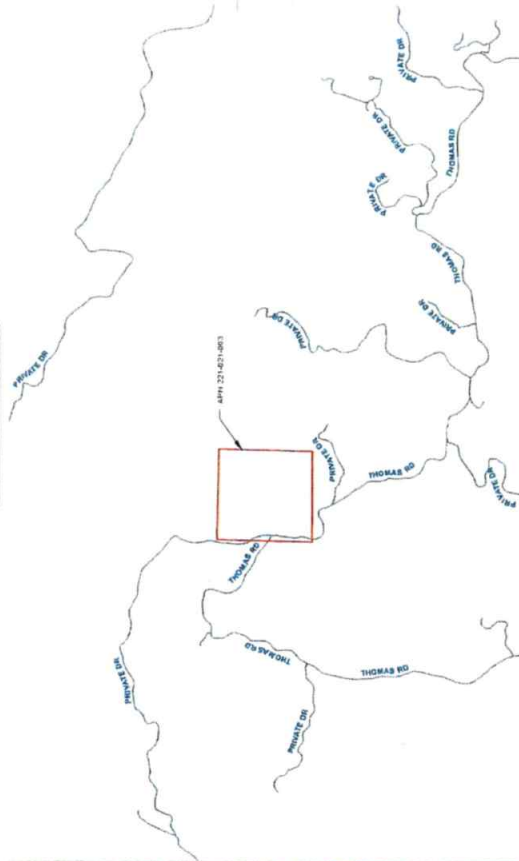
HUMBOLDT COUNTY MAP

CALIFORNIA MAP

REGIONAL LOCATION MAP



VICINITY LOCATION MAP:



APN 221-021-003
PLOT PLAN
HUMBOLDT COUNTY, CA

Change: JM
Drawn: PB & CL
Checked: JM
App'd:

TITLE SHEET

Project: 548120
Date: 1/20/2016
Sheet: 1 OF 2

Total Surface Water Diversion By Month (gallons):

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Shallow Cistern	8,000	8,000	6,000	3,000	1,500	-	-	-	-	-	1,500	8,000	36,000

Water Input to Storage by Source (gallons):

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Shallow Cistern	5,000	5,000	3,000									5,000	18,000
Rainwater	50,000	50,000	50,000	-	-	-	-	-	-	-	-	50,000	200,000

Water Use by Source (gallons):

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Shallow Cistern (domestic)	3,000	3,000	3,000	3,000	1,500	-	-	-	-	-	1,500	3,000	18,000
Pond (Irrigation)	-	-	-		5,000	25,000	40,000	50,000	40,000	15,000		-	175,000
Poly Tanks (domestic)					1,500	3,000	3,000	3,000	3,000	3,000	1,500		18,000

Appendix C
Photos



Photo 1. Gully 1 erosion (downslope segment).

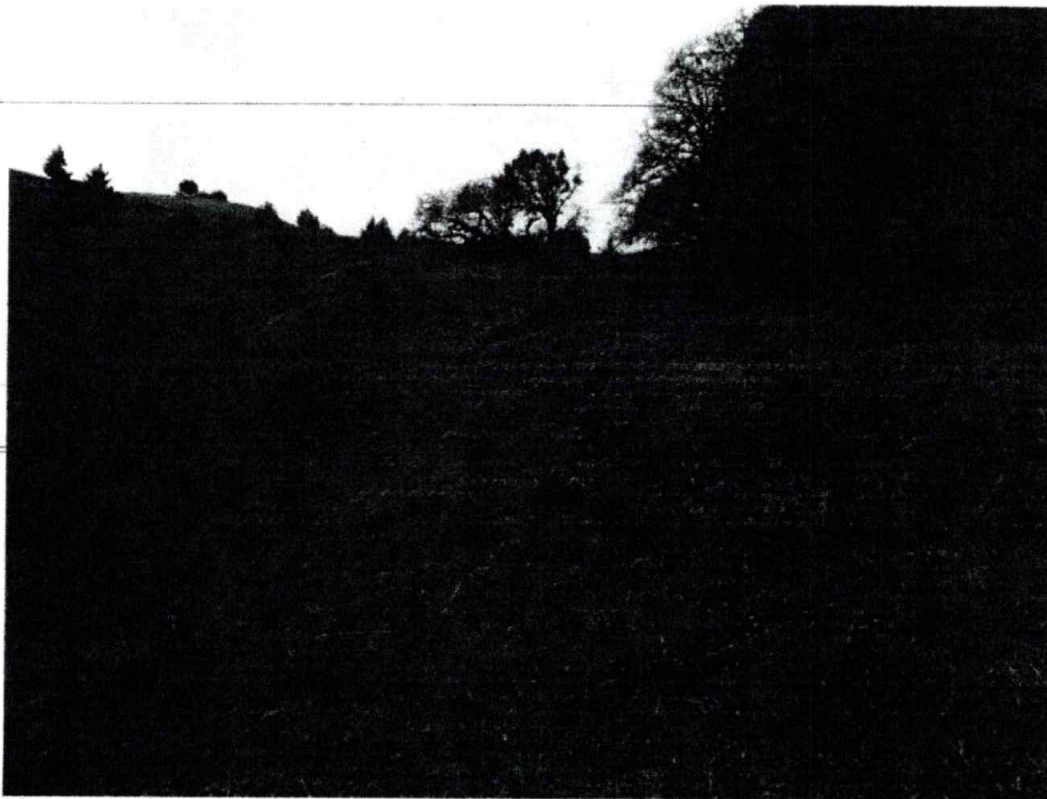


Photo 2. Gully 1 erosion (upslope segment).



Photo 3. Existing water tanks in wet area at head of watercourse - to be relocated.

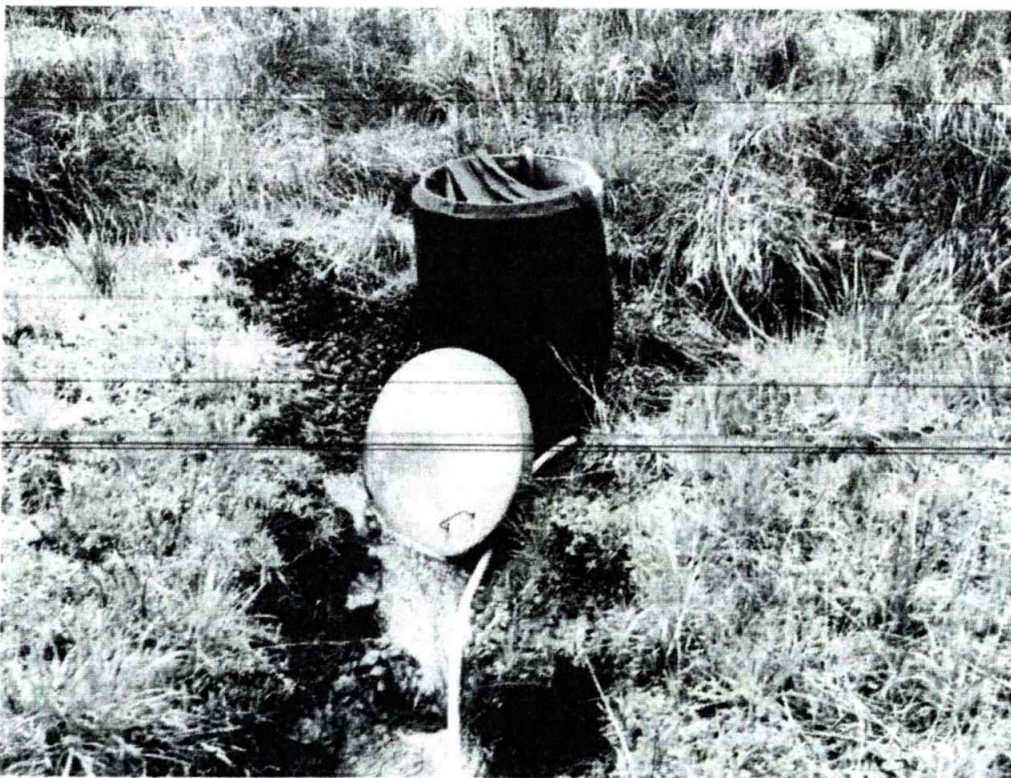


Photo 4. Gully 2 erosion at POD1.



Photo 5. Gully 2 erosion showing segment at downslope extent of failed pond berm.



Photo 6. Existing Pond (POD2).

Water Diversion Records 2020
 Mike ... Farm LLC - Notification No. 1600-2017 ... 311-R1

Month	POD-1: Spring Diversion (gal)	POD-2: Pond (gal)	Domestic Use (gal)	Agricultural Use (gal)
January	0	0	0	0
February	0	0	0	0
March	0	0	0	0
April	0	0	0	0
May	0	0	0	0
June	0	0	0	0
July	0	0	0	0
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
Annual Total	0	0	0	0
Note: Water for domestic & agricultural use is provided by a lined rain catchment pond.				