Cleveland Biological, LLC

Cindy Cleveland
Principal Biologist
cindycleve@gmail.com
805.234.3759

Memorandum

Date: 1.8.20
To: Bill Kesselring
Organization: KVCS, Inc.
From: Cindy Cleveland
Email: cindycleve@gmail.com
Cc:
Re: Biological Resource Assessment Memo Vali Vineyards Reservoir APN 026-281-067

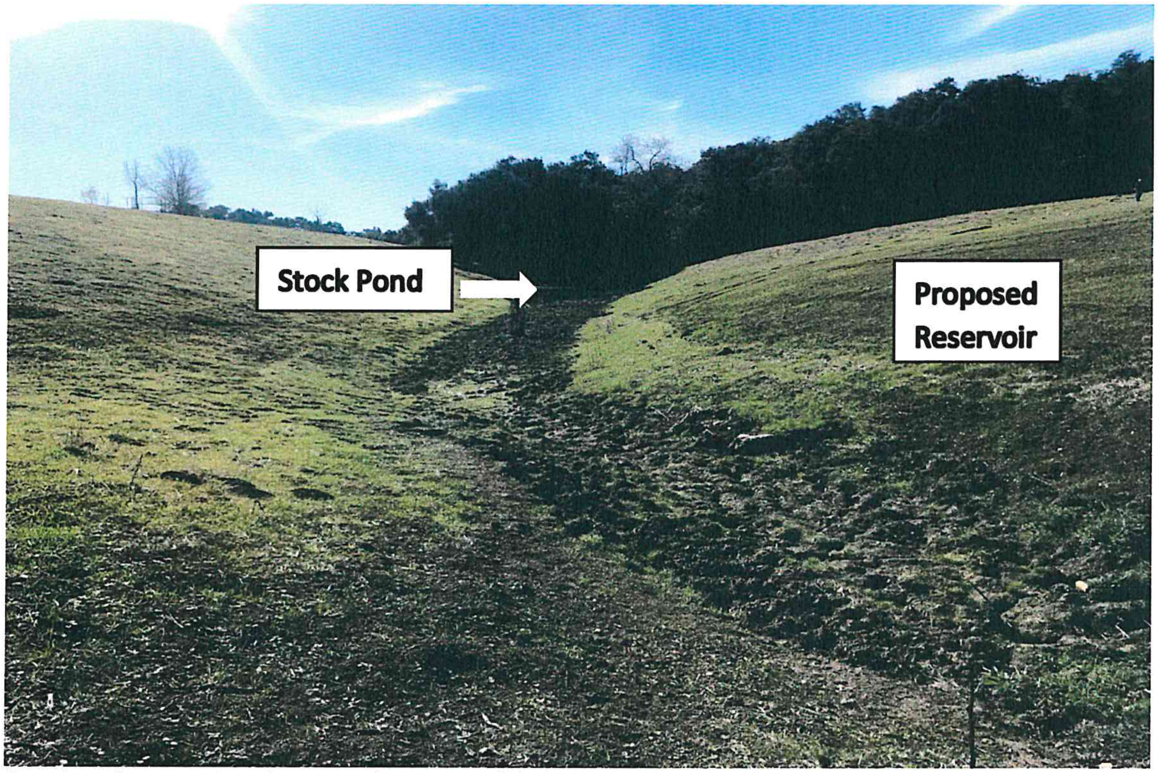
Bill Kesselring, KVCS, Inc. contacted Cleveland Biological, LLC to complete a Biological Resource Assessment (BRA) Memo for a proposed reservoir located at APN 026-281-067, Paso Robles, California. The proposed 4.43 acre-feet reservoir is to provide water for a vineyard operation. There is an unnamed ephemeral creek which borders the southern portion of the proposed reservoir.

Cleveland Biological, LLC completed an online data search and California Natural Diversity Database 5-mile special status survey for the proposed reservoir site to identify any known or potential special status species which may be impacted by the proposed project. Cleveland Biological, LLC biologist Cindy Cleveland also performed a site visit on January 3, 2020 to visually survey and photograph the existing site conditions. This BRA Memo presents the results of the online surveys, the site visit, and professional opinion of any possible impacts to the ephemeral creek.

The proposed reservoir will provide water for a vineyard operation. The edge of the proposed reservoir is within 300-feet of the unnamed creek but will not directly impact the unnamed creek. The unnamed creek has a small earthen dam to create a stockpond for cattle use (see photographs below). The unnamed creek is part of a meandering headwater drainage system in the Santa Lucia Coastal Range which eventually flows into the Salinas River. The unnamed creek did not contain standing water except for the stockpond and appears to lack any riparian vegetation or gravel substrates. The unnamed creek likely holds water only after heavy rains. The unnamed creek is currently impacted from cattle use. Upland habitats are newly converted grasslands into vineyards or nonnative grasslands that have been used for stock.

No special status species were listed in the CNDDB at or near the proposed reservoir site and none were observed during the site visit. The final proposed reservoir will likely have no direct impacts to the unnamed creek. Both direct and indirect impacts may occur during the proposed reservoir construction. These impacts will be mitigated by proposed fencing around the unnamed creek during construction activities. No construction workers or vehicles should be allowed in the unnamed creek during any construction activities.

I trust the above information is sufficient for your reporting requirements at this time. Please let me know if you have any questions. Thank you for the opportunity to assist you with this project.



Overview of unnamed creek. Proposed reservoir will be located to the right of the unnamed creek.

Small stockpond on unnamed creek that is formed from an earthen dam. Stockpond is located south of proposed reservoir.

I trust the above information is sufficient for your reporting requirements at this time. Please let me know if you have any questions. Thank you for the opportunity to assist you with this project.

Looking upstream from proposed reservoir on unnamed creek.

Looking upstream on from proposed reservoir on unnamed creek.

I trust the above information is sufficient for your reporting requirements at this time. Please let me know if you have any questions. Thank you for the opportunity to assist you with this project.

Cleath-Harris Geologists, Inc.
75 Zaca Lane, Suite 110
San Luis Obispo, CA 93401
(805) 543-1413

June 5, 2020

Bill Kesselring
1015 Nipomo Street
San Luis Obispo, CA 93401

Subject: **Hydrogeologic Impact Assessment of Proposed Agricultural Reservoir Vali Family Vineyard, 7365 Adelaida Road, San Luis Obispo County, California, APN 026-281-067**

Dear Mr. Kesselring:

Cleath-Harris Geologists (CHG) herein presents an hydrogeologic impact assessment related to the proposed construction of an agricultural pond, pursuant to the San Luis Obispo County Title 22. Section 22.52.150 F, 4, b. The proposed 4.43 acre-foot off-stream pond is located at an elevation of 1630 feet in the hills south of Adelaida Road, west of Paso Robles, San Luis Obispo County (Figure 1). The pond will store water pumped from a well about 500 feet distant. The well and reservoir are part of the water system that will irrigate 69 acres of newly planted vineyards.

REQUIREMENTS

The Ordinance requires that information be provided as stated in Section 5 for the major grading permit.

1. A description of the agricultural use to be supported by the proposed reservoir, pond, or basin. If the proposed reservoir, pond, or basin is in support of a future agricultural use, then the application shall include a planting plan showing the location of the future crops.
2. Information regarding the property's use of water and proposed use of water after construction of the proposed reservoir, pond or basin.
3. Estimated evaporative water loss from the surface of the reservoir, pond or basin, based on site specific conditions.
4. A well interference and draw-down analysis, which evaluates how increased pumping would affect neighboring wells. This analysis shall take into consideration site specific variables such as the number and spacing of wells on site, pumping rates, properties of the aquifer and, the duration over which pumping has and will occur.

This letter report provides the required information and the analysis.

PROJECT FACILITIES

The existing irrigation well and proposed reservoir are at an elevation of about 1,630 feet. The well is about 510 feet from the western property line, 420 feet from the southern property line and 220 feet from the southeastern property line.

The proposed agricultural reservoir has a maximum depth of 20 feet and a surface area of 19,800 square feet with 2:1 slopes from the top at 1628 feet elevation down to the bottom of the reservoir at 1608 feet elevation. The plans and specifications (8/20/19) for the reservoir were prepared by Eric J. Gobler, R.C.E. (Figure 2).

VINEYARD PLAN

The planted vineyard blocks are shown on Figure 3.

USE OF WATER

Currently, the land has been cleared and partially planted. Irrigation will ensue with the planting of the vineyard. With the planting of 69 acres of vineyards, the water demand is estimated by the vineyard manager to occur over about ½ the year with an annual production of 14 acre-feet. A spreadsheet on Table 1 shows the plantings and the estimated water use. No frost irrigation is planned according to the vineyard manager.

The proposed use for the agricultural reservoir is to allow operational flexibility in the vineyard irrigation schedule. Instantaneous discharge from the well may not be sufficient to meet the demand for the vineyard blocks.. The agricultural reservoir serves to provide that instantaneous discharge, which otherwise could be met by running the well longer- supplying more, smaller acreage vineyard blocks, or installing additional wells.

Therefore, the water level impact from the use of the reservoir will evaluate the drawdown in a possible adjacent well due to the increased pumping duration required to offset pond evaporation during the irrigation season.

POND EVAPORATION

With a lined pond, there will be water loss from the off-stream surface water reservoir due to evaporation. The property is located in ETo Zone 6. The annual evaporative loss from the reservoir (based on pan evaporation at 49.7 inches in this zone) is estimated at 1.9 acre-feet (AF), equivalent to an annual average daily water loss of 1,677 gallons. At an average pumping rate of 35 gallons per minute, the irrigation wells will need to pump 48 minutes per day, year-round, or

96 minutes per day for the irrigation season, to offset a daily evaporative loss of 1,677 gallons (1.9 acre-feet per year).

EXISTING WATER WELLS IN THE STUDY AREA

The project well has a depth of 472 feet, producing from the Monterey Formation outside of any State-designated groundwater basin. The depth to water in the well was at 34 feet on 9/3/2019. The well pump is designed to discharge 35 gallons per minute. No other wells are on the subject property.

CHG reviewed the State of California well completion report (WCR) files and found only a few wells in the area with WCRs, and the locations were not specific. However, based on our site reconnaissance, in-house well information and discussions with the vineyard owner and a neighbor, we found that no wells exist any closer than the nearest residence. The nearest residence is 730 feet to the west. The location of the well serving this residence is not specifically known but for purposes of this evaluation, we assume that it is near the residence.

HYDROGEOLOGIC IMPACT ANALYSIS

No specific well that could be impacted by pumping the project well was located during our research and property visit. However, it is possible that an adjacent well exists to the west of the property near the existing residences. This analysis of the potential impact considers the factors that affect the drawdown with distance from the project well and the pumping necessary to offset the evaporative loss of the reservoir.

Fractured Rock Aquifer Description and Extent

One factor in analyzing drawdown with distance due to pumping a well is the specific thickness and areal extent of the fractured rock aquifer zones tapped by the well.

The fractured rock aquifers are within the Monterey Formation. These aquifers are 5 to 20 feet thick hard ledges of fractured calcareous siltstone and sandstone interbedded within a predominantly non-water bearing diatomaceous shale sequence. The fractured calcareous siltstone and sandstone beds are where most of the water is found. The formation has been folded with west-east trending fold axes (Figure 4).

The well completion report for the project well describes the producing formation as dark brown shale with hard layers and the perforated interval is from 90 to 470 feet depth. Based on the top of the perforated interval being where the first water was encountered, there is probably a fractured rock aquifer between 90 and 100 feet. The pumping test drawdown at the project well suggests that another producing fractured rock aquifer is at about 150 feet depth (where the drawdown flattens on the semi-logarithmic plot). The total aquifer thickness is estimated to be about 40 feet based on well completion reports from the project well and other wells on separate parcels at this address.

The extent of the aquifers tapped by the project well is defined by the structural fold within which the well is located. The groundwater reservoir within this fold is not well constrained on the geologic maps but we estimate that it is probably no more than ½ mile wide (north-south) and one mile long (west-east). The groundwater in storage within this structural compartment is very roughly estimated to be about 250 acre-feet (2 percent fracture porosity, 40 foot aquifer thickness, area of 320 acres).

Based on the extent of the groundwater reservoir, any wells located more than 1,000 feet to the north and south of the project well are most likely in separate fold compartments and, therefore, would not be affected by pumping at the well.

Aquifer Characteristics

Two pumping tests were performed that provide pertinent information on drawdown in the project well: one performed by Filipponi & Thompson Drilling (F&T) after the well was completed (4/20/2016) and one performed by Cal West Rain on 12/20/2018. Based on the F&T pumping test (Figure 5), the transmissivity (T) of the producing aquifers in the well is 240 gallons per day per foot. Storage (S) for the fractured Monterey Formation shales cannot be determined from a pumping test without a monitoring well. Under unconfined conditions, the Storage value could be 0.02. Under confined conditions it would be much lower. For this calculation, we assume that the Storage would be under semi-confined conditions, roughly 0.001.

This review of other wells in the general vicinity illustrates how variable productivity is in this formation. An off-site 450-foot deep well near the property (WCR 538156) that pumped 60 gallons per minute noted two sandstone beds with a combined thickness of 42 feet within a perforated interval of 200 feet. Another off-site 405-foot deep well near the property (WCR 538157) pumped only 3 gpm from 28 feet of sandstone.

Potentially Impacted Adjacent Wells

During our site reconnaissance, we observed one well along Adelaida Road about 1,500 feet to the north. This well would not be likely to tap the same aquifers in the same geologic structure as the project well and therefore would not be impacted. It is possible that there are wells near the residences located to the west (along the trend of the structure), approximately 730 feet distant. For purposes of this analysis, we assumed that there is an adjacent well that taps the same aquifers at 730 feet distance from the pumped well.

Distance-Drawdown Estimation

Calculations of drawdown with distance typically assume areally extensive aquifers with uniform aquifer characteristics. While the hydrogeologic conditions at this property do not fit these assumptions for long term pumping, it is the standard analytical approach to reach a value for distance drawdown. For the proposed short term daily pumping duration, these assumptions are valid. For long term (irrigation season duration), we have used both this calculation method and a more general approximation to represent distance drawdown.

Pumping time required to supply irrigation demand (25,000 gallons/day during pumping season) is estimated at 714 minutes/day during the 6 month irrigation season. An additional 96 minutes would be required to meet the evaporative demand (assuming totally full reservoir storage) bringing total daily pumping to 810 minutes during the 180 day irrigation season.

Using these values in the C. V. Theis chart[1], the drawdown, after 0.529 days of pumping (the average daily duration required for pumping the project demand plus the evaporative demand) at 35 gallons per minute at a distance of 730 feet in an areally extensive aquifer, would be minimal. The total drawdown at 730 feet distance for the total annual pumpage from the well (17.5 gpm for 180 days) is calculated at 27 feet. The difference in drawdown at a distance of 730 feet for the pumping to meet the irrigation demand and evaporative demand versus the pumping solely to meet the irrigation demand (96 additional minutes per day of pumping) would not be significant.

The calculation of the interference for the irrigation season with and without the reservoir, using 17.5 gpm and 20 gpm respectively, pumping for 180 days results in a difference drawdown of 3.68 feet.[2] This is the drawdown impact resulting from the use of the reservoir.

Regional long term lowering of groundwater level within the groundwater storage reservoir due to pumping the project well may occur. The amount of average regional lowering of the groundwater level due pumping water into the surface water reservoir to compensate for evaporation, over one year, if the total groundwater storage estimate is 250 acre-feet (without considering recharge), is less than one foot. Recharge to this groundwater reservoir will offset this lowering to some extent.

[1] Theis, Charles V., 1963, "Chart for the computation of drawdowns in the vicinity of a discharging well", in Shortcuts and Special Problems in Aquifer Tests, US Geological Survey Water Supply Paper 1545C, pages C10-C15 and plate 1

[2] Driscoll, F.G., 1986, Groundwater and Wells, Johnson Filtrations Systems, Inc.
Theis, C.V., 1935, The relationship between the lowering of the piezometric surfaces and the rate and duration of discharge of a well using groundwater storage, Transactions, American Geophysical Union, Washington, D.C., pp 518-524

CONCLUSION

Groundwater pumping to compensate for pumping into a reservoir with evaporative losses over one year is calculated to result in 3.68 feet of decline in the local groundwater reservoir, with no recharge being considered.

Very truly yours,
CLEATH-HARRIS GEOLOGISTS

Timothy S. Cleath, CHG #81
President

Neil Currie, PG
Project Geologist

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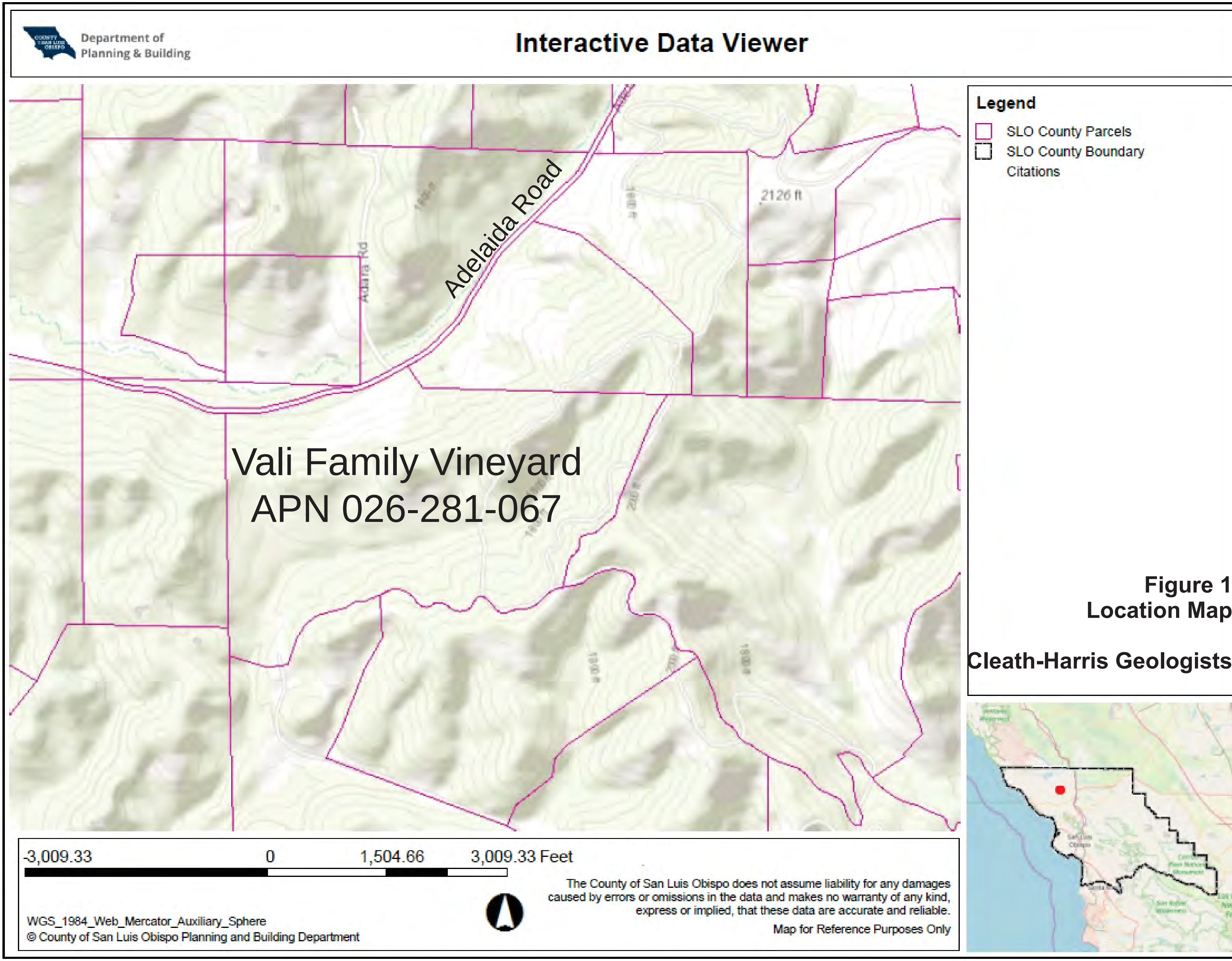
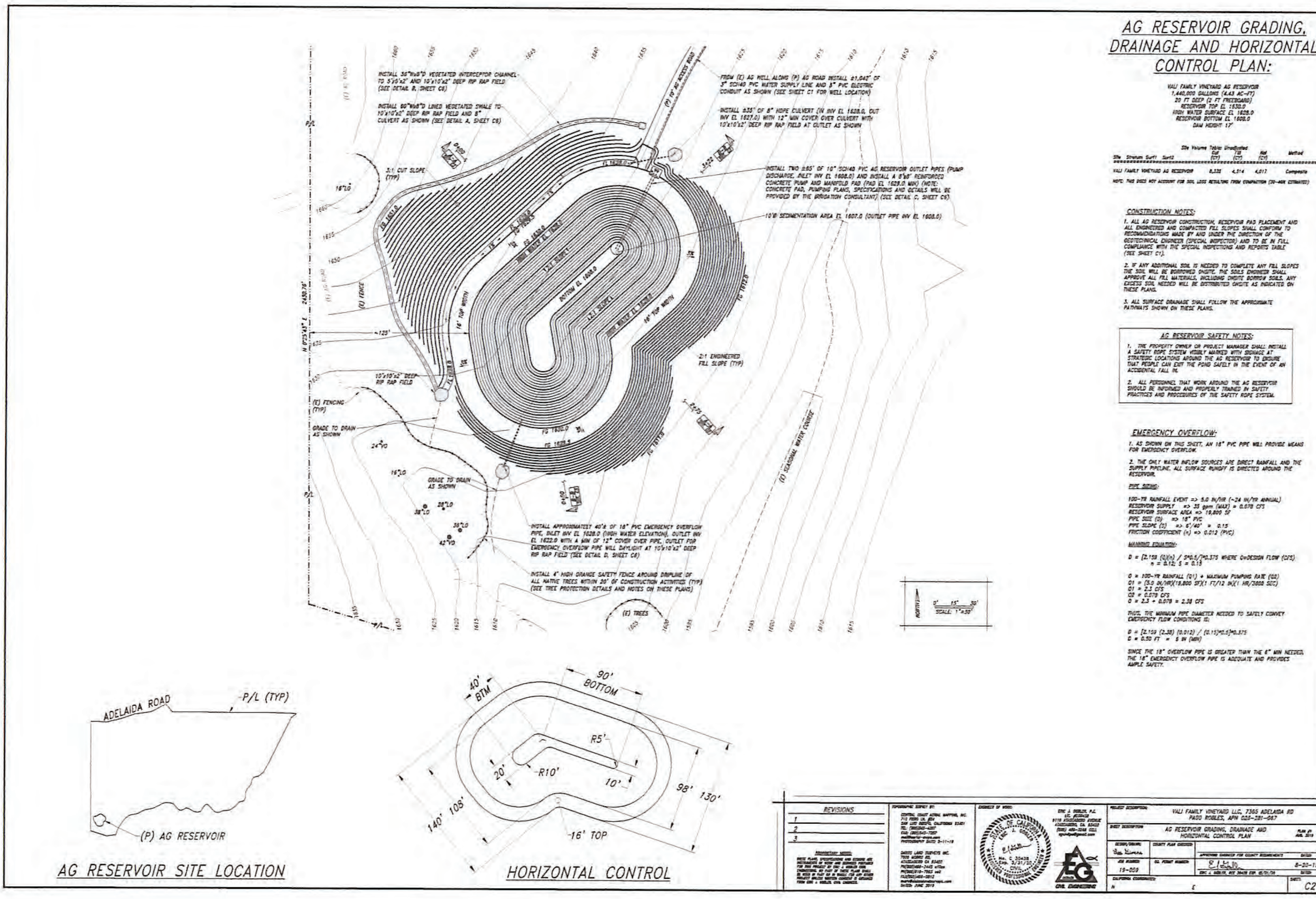


Figure 1
Location Map

Cleath-Harris Geologists



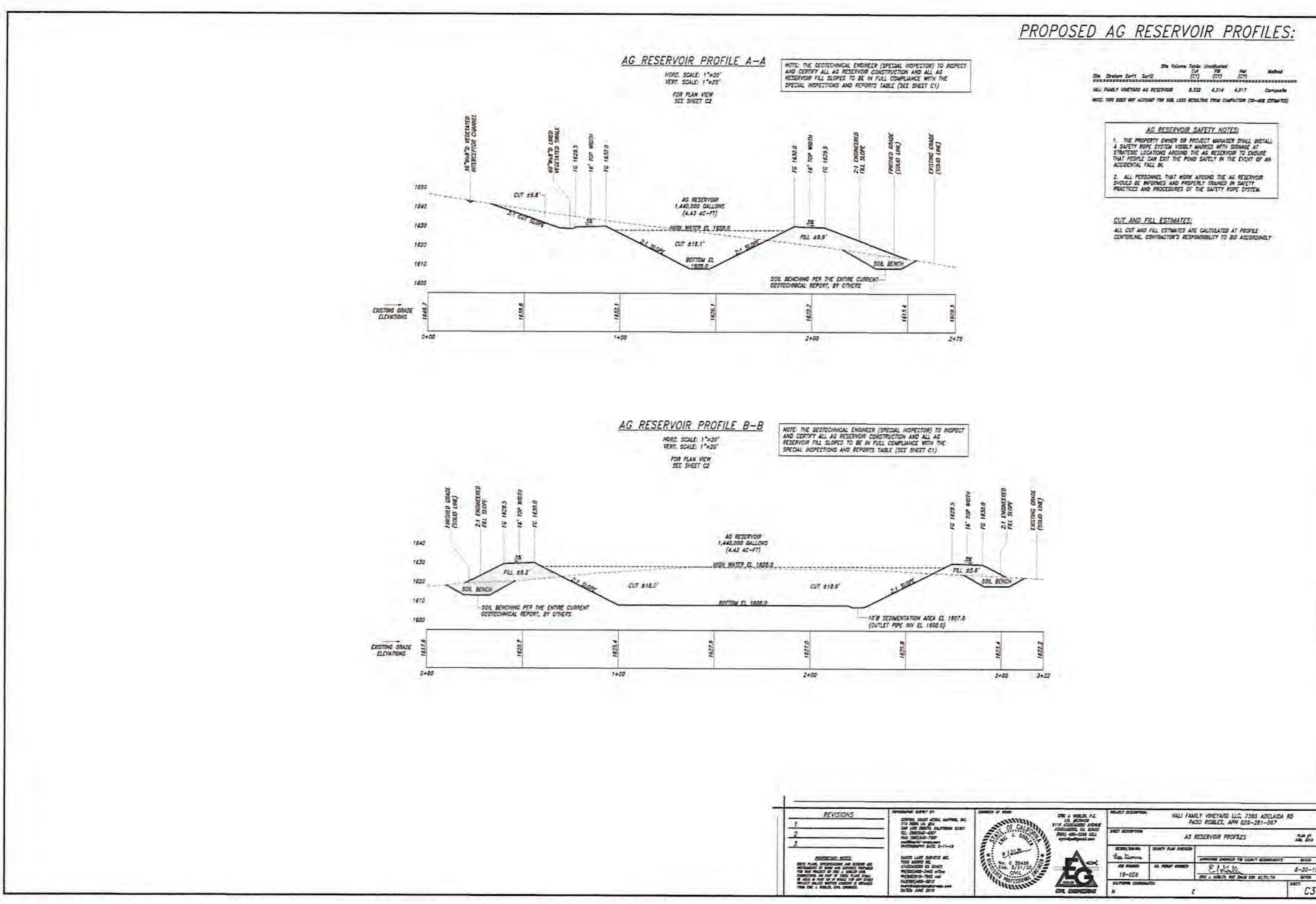
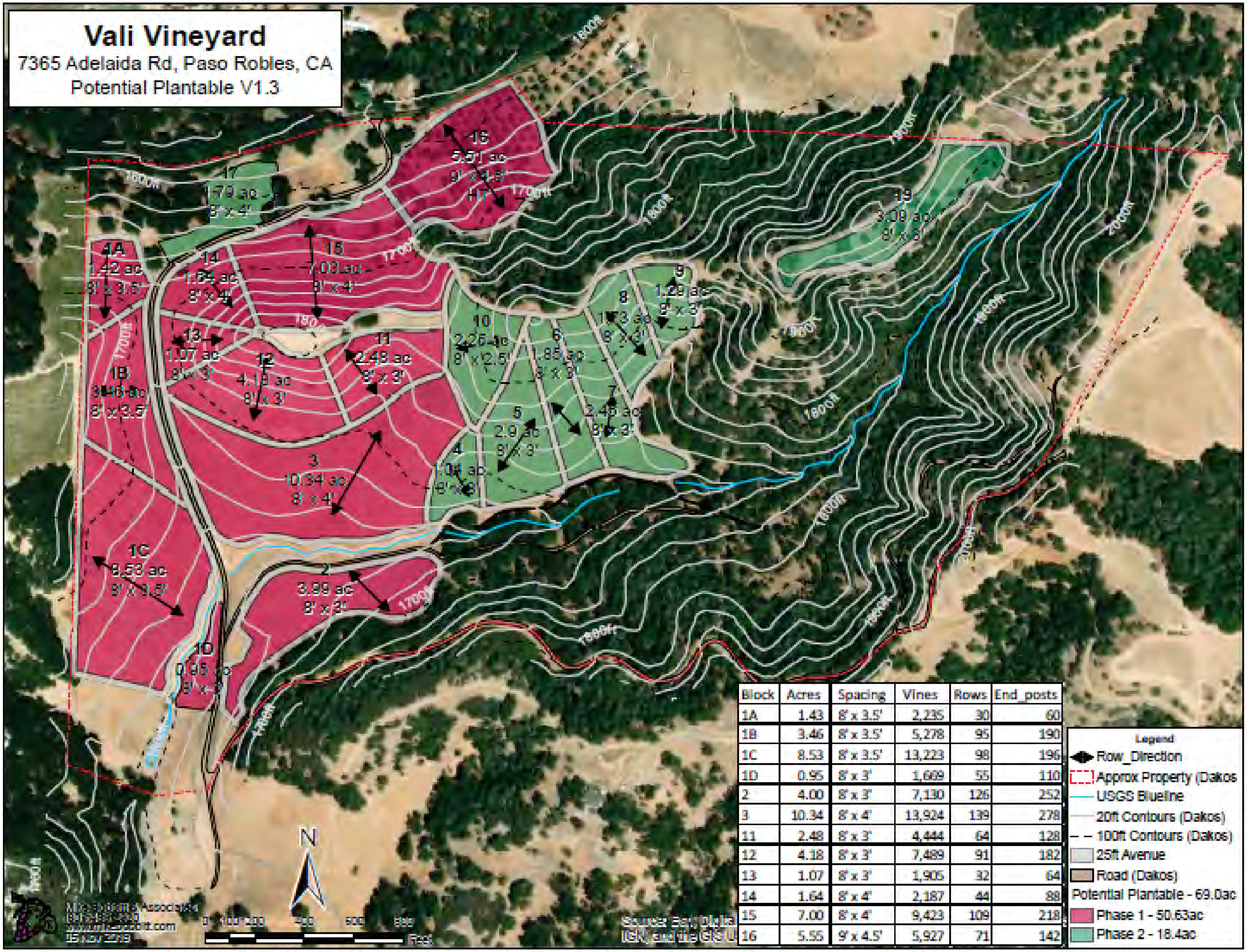


Figure 2
Reservoir Specifications
Vali Family Vineyard

Cleath-Harris Geologists

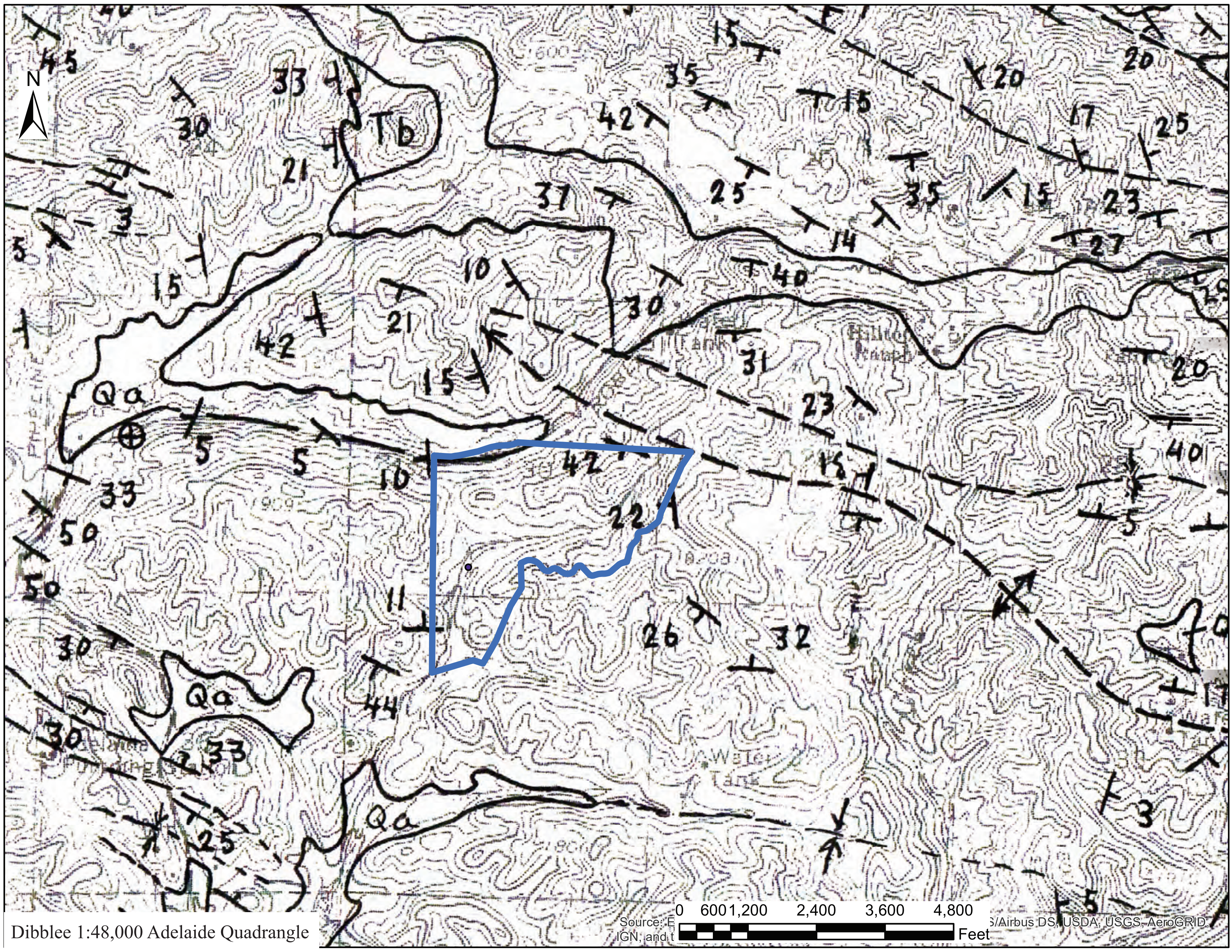


Block	Acres	Spacing	Vines	Rows	End_posts
1A	1.43	8' x 3.5'	2,235	30	60
1B	3.46	8' x 3.5'	5,278	95	190
1C	8.53	8' x 3.5'	13,223	98	196
1D	0.95	8' x 3'	1,669	55	110
2	4.00	8' x 3'	7,130	126	252
3	10.34	8' x 4'	13,924	139	278
11	2.48	8' x 3'	4,444	64	128
12	4.18	8' x 3'	7,489	91	182
13	1.07	8' x 3'	1,905	32	64
14	1.64	8' x 4'	2,187	44	88
15	7.00	8' x 4'	9,423	109	218
16	5.55	9' x 4.5'	5,927	71	142

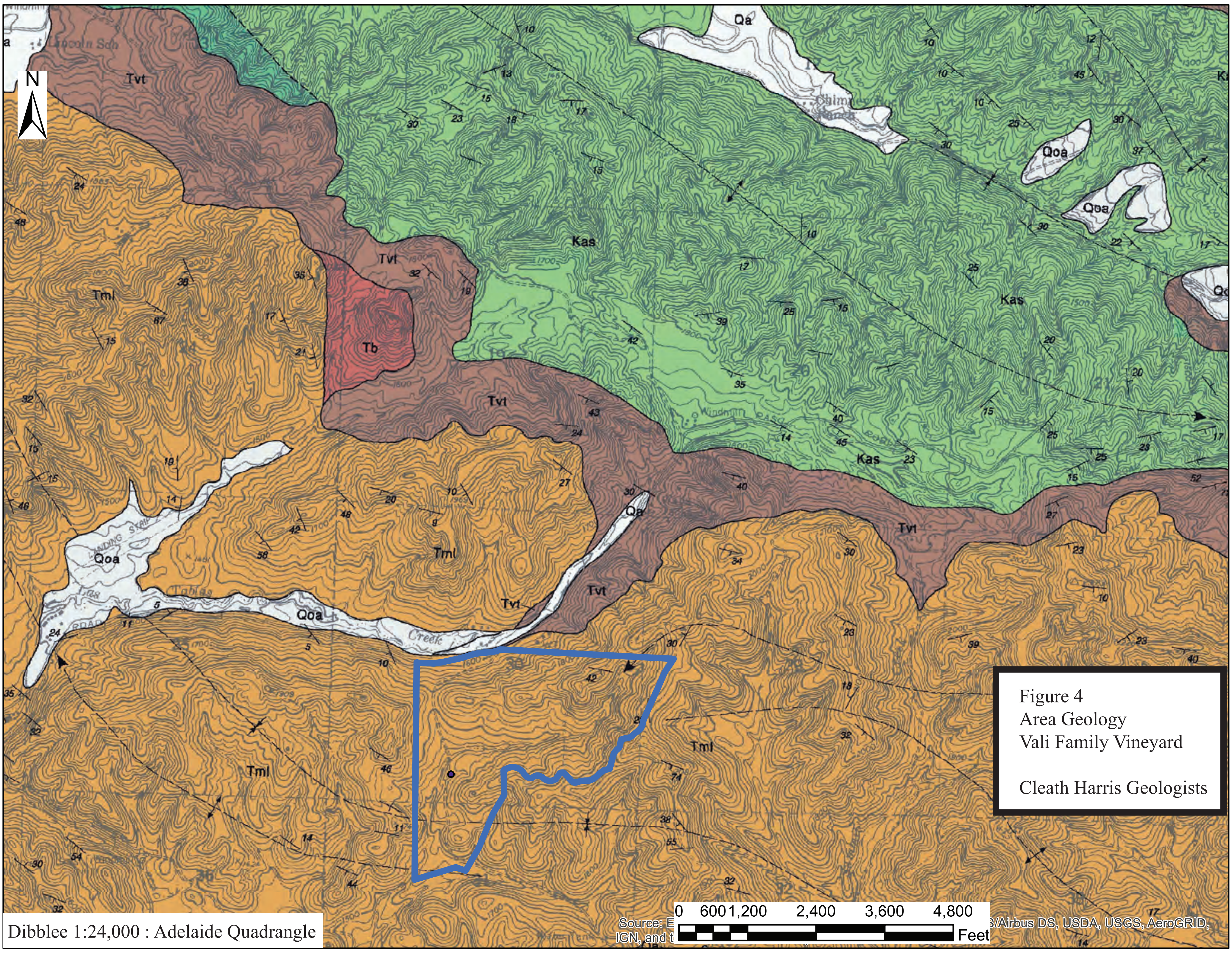
Disclaimer: The information herein was compiled from multiple publically available sources, is considered reliable and the most current available; it is, however, provided without warranty, either express or implied. No liability is assumed either directly or indirectly. Contact a licensed Land Surveyor for any questions regarding legal property boundaries

Figure 3
Block Map of Vineyard Plantings
Vali Family Vineyard

Cleath-Harris Geologists



Dibblee 1:48,000 Adelaide Quadrangle



Dibblee 1:24,000 : Adelaide Quadrangle

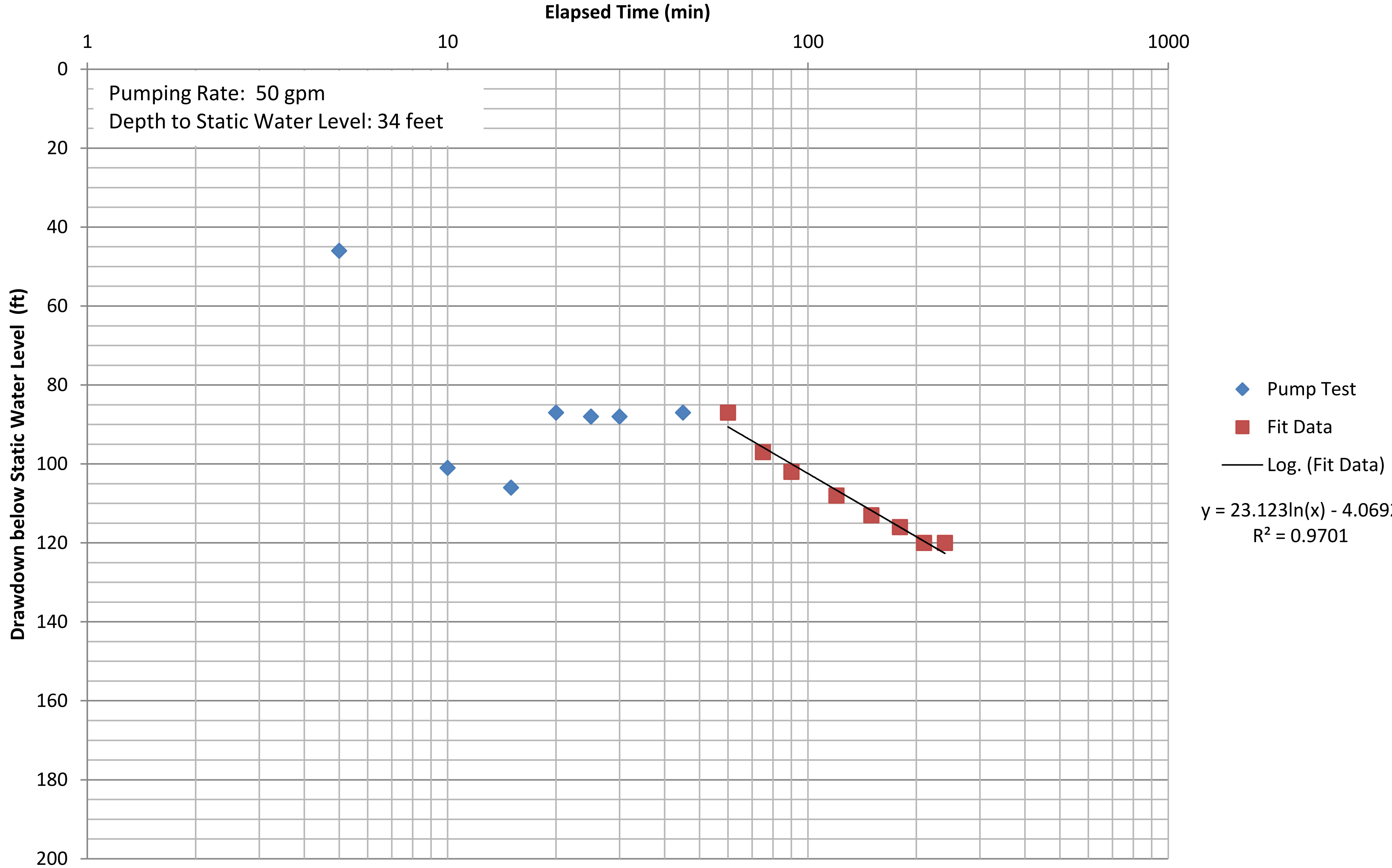
Figure 4
Area Geology
Vali Family Vineyard

Cleath Harris Geologists

Figure 5

Pumping Test Plot, Irrigation Well, April 20, 2016

Vali Family Vineyard, 7365 Adelaida Road, San Luis Obispo County



Block	Variety	Rootstock	Acres	Spacing	Notes	Vine Count	MAY	JUNE	JULY	AUGUST	SEPT	TOTAL
1A	Malbec	420A	1.42	8' x 3.5'	HVY Clay loam	2582	0	12908	20653	12908	12908	59378
1B	Cabernet	1103P	3.46	8' x 3.5'	HVY Clay loam	6273	0	31365	50185	31365	31365	144281
1C	Cabernet	1103P	8.53	8' x 3.5'	HVY Clay loam	15480	0	154796	77398	77398	77398	386990
1D	Cabernet	420A	0.95	8' x 3'	HVY Clay loam	1723	0	17232	17232	17232	13786	65481
2	Merlot	420A	3.99	8' x 3'	Clay Loam	7243	28974	57948	72435	72435	72435	304227
3	Whites	1103P	10.34	8' x 4'	Clay	14073	0	112584	112584	84438	84438	394045
4	Syrah/Mourv	420A	1.04	8' x 3'	Clay	2274	9097	18193	22741	22741	22741	95514
5	Syrah/Mourv	420A	2.90	8' x 3'	Frac Rock	5257	21028	52570	63085	63085	52570	252338
6	Syrah/Mourv	420A	1.85	8' x 3'	Frac Rock	3355	13419	26838	40257	33547	33547	147608
7	Syrah/Mourv	420A	2.45	8' x 3'	Frac Rock	4439	17758	35515	53273	44394	44394	195333
8	Syrah/Mourv	420A	1.73	8' x 3'	Frac Rock	3137	12550	25100	37649	31374	31374	138048
9	Syrah/Mourv	420A	1.29	8' x 3'	Frac Rock	2349	9395	18789	23487	23487	23487	98645
10	Syrah/Mourv	420A	2.25	8' x 2.5'	Frac Rock/light soil	4897	19586	58759	68552	68552	58759	274207
11	Syrah/Mourv	420A	2.48	8' x 3'	Clay Loam	4510	18040	36081	54121	45101	45101	198444
12	Petite Verdot	420A	4.18	8' x 3'	Clay Loam	7583	30330	60660	90990	75825	75825	333630
13	Petite Syrah	420A	1.07	8' x 3'	Clay Loam	1942	7769	15537	19422	19422	19422	81572
14	Zinfandel	420A	1.64	9' x 4.5'	North Head Train	1764	0	14108	17635	17635	17635	67014
15	Grenache	420A	7.03	9' x 4.5'	North Head Train	7557	0	45341	75568	75568	75568	272046
16	Grenache	420A	5.51	9' x 4.5'	North Head Train	5929	0	35577	59294	59294	59294	213459
17	Merlot	420A	1.79	8' x 4'	Clay	2440	9760	19521	24401	24401	24401	102484
19	Sangiovese	420A	3.09	8' x 3'	Frac Rock	5607	22429	56073	89716	78502	56073	302792
						110414	220135	905495	1090678	978705	932523	4127536

gallons pumped a year, 35 gal/min, 12 hours/day, 180 days a year
4536000

Table 1
Estimated Vineyard Water Use
Vali Family Vineyard

Cleath-Harris Geologists