



MEMORANDUM

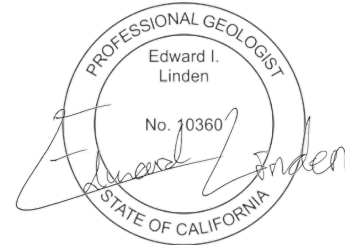
May 8, 2025

RCS Job No. 820-NPA01

To: Mr. Mike Muelrath
Applied Civil Engineering (ACE)
mike@appliedcivil.com

From: Edward Linden, Anthony Hicke & Kendall Tipton
Richard C. Slade & Associates LLC (RCS)

Re: Tier 1 Water Availability Analysis for a
Vineyard Expansion Project at
275 Long Ranch Road
St Helena, Napa County, CA 94574



Introduction

This Memorandum presents the results of a Water Availability Analysis (WAA) by Richard C. Slade & Associates LLC, Consulting Groundwater Geologists (RCS), for a proposed vineyard expansion project at 275 Long Ranch Road (the subject property), located in the Pritchard Hill area of Napa County, CA. This document was prepared on behalf of the project engineer, Applied Civil Engineering (ACE), to provide hydrogeologic analyses pertaining to the proposed project to demonstrate conformance with applicable requirements of Napa County's WAA Guidelines (2015) and updates to the Guidelines by Napa County (2022a & 2024a). The following list is a summary of the three WAA Tiers and their applicability to the proposed project.

- A "Tier 1" WAA ("Groundwater Use for Napa County") consists of calculating an estimate of the annual groundwater recharge that occurs at the subject property and comparing that estimate to the proposed groundwater extractions from the property (Napa County, 2015 & 2024a). A Tier 1 WAA is required for the proposed project.
- No wells are known to exist within 500 feet of the project well, and no offsite natural springs used by others for water supply purposes are known to exist within 1,500 feet of the project well. Therefore, "Tier 2" WAA ("Well & Spring Interference") criteria have been presumptively met for the proposed project, according to current Napa County WAA requirements (2015 & 2024a).
- A "Tier 3" WAA ("Groundwater / Surface Water Interaction") is not required for the proposed project to conform with current County WAA requirements because the project well is not located within 1,500 feet of any "Significant Streams" (Napa County, 2024a; PBES & LSCE, 2023a & 2023b). Tier 3 WAA criteria have therefore been presumptively met for the proposed project, according to current Napa County WAA requirements (2015 & 2024a).

Site Conditions and Project Description

The subject property consists of a single parcel that is identified by Napa County Assessor's Parcel Number (APN) 032-030-070. The total assessed acreage of this parcel is 152.63 acres, according to the May 30, 2024, version of the County's GIS parcel layer (Napa County, 2024b). Figure 1, "Regional Map," shows the approximate boundary of the subject property superimposed



MEMORANDUM

on a topographic map of the area. Also shown on Figure 1 are Napa County's "Significant Streams" and "Significant Streams" 1,500-foot (-ft) buffer areas (PBES & LSCE, 2023a & 2023b); the local groundwater basin (DWR, 2021); and local watersheds tributary to the Napa River (LSCE & MBK, 2013).

Figure 1 shows that the entire subject property is outside of the local groundwater basin, which is defined in Department of Water Resources (DWR) Bulletin 118 as the Napa Valley Subbasin of the Napa-Sonoma Groundwater Basin (DWR, 2021). Based on watersheds defined by LSCE & MBK (2013), the vast majority of the subject property is contained within the Napa River Watershed near Napa (orange boundary on Figure 1). Only a small, northern portion of the property falls within the Conn Creek Watershed (purple-green boundary on Figure 1).

Figure 2, "Property Map", and Figure 3, "Geologic Map", show some of the same data that are shown on Figure 1, but add several additional features (depending on the Figure) that include the locations of:

- The project well, "Well A";
- An onsite non-project easement well, "Ovid Easement Well 12";
- Known and possible offsite wells; and
- Tier 2 WAA buffer zones (500 feet and 1,500 feet) around Well A.

Most of the subject property is within "Significant Stream" buffer areas that surround three different creeks (all unnamed in PBES & LSCE, 2023a) that have been defined by the County as "Significant Streams". However, as shown on Figure 2, the location of the project well is not within any "Significant Stream" buffer areas.

The locations of the known and possible offsite wells discussed herein were primarily approximated using records retrieved from the County's Electronic Document Retrieval website (PBES, 2024), using information provided by Applied Civil Engineering, and using RCS internal records. Documents obtained from the County's Electronic Document Retrieval website that were used to help identify the locations of offsite wells included State Well Completion Reports (WCRs, also known as "driller's logs") and well drilling permits issued by Napa County, among various other documents. Note that the locations of offsite wells shown on the Figures prepared for this Memorandum should not be considered an exhaustive representation of all offsite sources of groundwater near the subject property; other offsite wells and springs may exist in the area that were not observed and/or were not represented in the County records reviewed. Furthermore, the wells that are shown may not exist precisely at the locations shown, or they may not exist at all.

From communications with and review of data provided by the project engineer (Mr. Mike Muelrath of ACE), and from the field reconnaissance visit by an RCS geologist to the subject property on March 19, 2024, the following key items were noted and/or observed:

- The subject property is currently developed with 6.2 acres of vineyards, a main residence, an ADU, a guest cottage, and landscaping. Undeveloped areas exist in the northeast and northwest portions of the subject property. These undeveloped areas are primarily covered by vegetation.
- The proposed project consists of a 14.0-acre expansion of the existing 6.2 acres of vineyard to a proposed total future planted area of 20.2 acres.
- Two active water supply wells exist at the subject property — Well A & Ovid Easement Well 12. Well A is the only well proposed to supply water for onsite uses.



MEMORANDUM

Ovid Easement Well 12 is an easement well that supplies water to a nearby property via an existing water easement.

- Offsite areas surrounding the subject property consist primarily of vineyards, wineries, and some residences. Naturally vegetated and/or wooded hillsides (i.e., undeveloped areas) are present offsite to the north, east, southeast, and west.
- During the March 2024 site visit, the RCS geologist traveled along roads in the immediate vicinity of the subject property to identify likely locations of nearby, offsite wells. RCS refers to such work as a “windshield survey”. During this survey, the RCS geologist attempted to identify likely offsite well locations by observing typical wellhouse enclosures, pressure tanks, storage tanks, power lines, or wellheads.

Local Geologic Conditions

The subject property is located within the northern portion of California’s Coast Ranges Geomorphic Province. This geologically complex region generally consists of northwest trending mountain ranges and valleys that are oriented subparallel to the San Andreas Fault (CGS, 2002). The basement rocks of the region primarily consist of Mesozoic-aged marine sediments, whereas the younger, overlying earth materials are generally comprised of Cenozoic-aged sedimentary and volcanic materials. Figure 3, “Geologic Map,” illustrates the types, lateral extents, and boundaries between the various earth materials mapped at ground surface in the region by others. Specifically, Figure 3 has been adapted from the results of regional geologic field mapping, as published by the California Geological Survey (CGS) in 2017 (Wagner & Gutierrez). As shown on Figure 3, the key earth materials mapped at ground surface in the area of the subject property from geologically youngest to oldest, include the following:

Recent Surficial Deposits (map symbol Qls on Figure 3)

Landslide deposits¹ (map symbol Qls) have been mapped in the region by others, and occur within the view of Figure 3 to the north of the subject property (yellow-colored area along the northern edge of Figure 3). These deposits are comprised of the upslope parent materials from which they are derived and can vary widely in composition and degree of deformation. However, because of their distance from the subject property, landslide deposits mapped in Wagner & Gutierrez are not expected to play a role in groundwater availability at the subject property.

Sonoma Volcanics (map symbol Psvasl on Figure 3)

The Sonoma Volcanics include many diverse types of volcanic materials that were deposited and emplaced during the Miocene and Pliocene geologic epochs (4.3 to 4.35 million years ago [mya] for Psvasl, based on radiometric ages) (Wagner & Gutierrez, 2017). The specific Sonoma Volcanics materials within the view of Figure 3 consist of andesitic lava flows of the Stags Leap Volcanic Center (map symbol Psvasl). These andesitic lava flows are exposed at ground surface across the entirety of the subject property.

RCS’s interpretation of the driller’s descriptions of the drill cuttings listed on the WCRs for Well A and Ovid Easement Well 12 reveals that rocks typical of the Sonoma Volcanics were encountered to the total depth of each borehole. Typical driller-terminology for the drill cuttings on those logs included: “red volcanics;” “red volcanic ash;” “tan volcanic tuff;” “fractured black volcanics;” “hard

¹ Note that it was not a part of our Scope of Hydrogeologic Services for this project to study, investigate, analyze, determine, or opine on the potential activity of any landslides, and/or on the potential impact that any landslides might have on any structures or wells.



MEMORANDUM

black volcanics"; "red ash"; "red volcanics"; "black, red volcanics"; and "hard grey volcanics." Therefore, based on the available subsurface geologic data, the Sonoma Volcanics are interpreted by RCS to extend to depths of at least 1,000 ft bgs (feet below ground surface) in the vicinity of Well A.

The earth materials belonging to the Sonoma Volcanics are generally favorable for construction of a productive water well where they are hard and highly fractured, where they are deeply weathered, and where the individual grains (clasts) are relatively large and the pore spaces between the grains are uncemented and well connected (in sedimentary and deeply weathered materials). Where such zones occur, these earth materials are considered the main water-bearing earth materials in the region. In contrast, volcanic ash flows and deeply weathered volcanic tuffs tend to be fine-grained, clay-rich, and often have limited permeability; these fine-grained materials often yield groundwater to wells at only limited flow rates.

Geologic Structure

Within the view of Figure 3, several northwest-trending faults² are visible (Wagner & Gutierrez, 2017). Faults can serve to increase the frequency and degree of fracturing in the local earth materials, including those known to occur in the proximal Sonoma Volcanics. Whenever and wherever such fractures occur, they are thought to increase the amount of open area in the rock fractures which, in turn, could increase the capacity of the local earth materials to store and transmit groundwater. Conversely, faults can also act as barriers to groundwater flow and can even act as conduits for hydrothermal fluids that can produce deleterious effects on groundwater quality. It is not known if any geologic structures (faults, folds, etc.) that are known to or might possibly exist in the vicinity of the subject property have any influence on groundwater flow (e.g., act as groundwater flow barriers) due to a lack of requisite data necessary for RCS to make such a determination.

Key Construction and Testing Data for Project Well

A DWR Well Completion Report (WCR, or "driller's log") is available for Well A (WCR2021-005572) and is included in the Appendix to this Memorandum. The construction characteristics of Well A were derived from the WCR for this well, as follows:

Well A (WCR2021-005572)

- The well was constructed in March and April of 2021, by Huckfeldt Well Drilling, Inc. (Huckfeldt), of Napa, California.
- An initial pilot borehole was drilled by the direct air rotary method to a depth of 1,000 ft bgs.
- The well was constructed using 8-inch diameter steel casing set to a depth of 994 ft bgs.
- Casing perforations are factory-milled slots with slot aperture widths of 0.06 inches (60-slot). Casing perforations were placed between the depths of 674 ft to 814 ft bgs; 834 ft to 934 ft bgs; and 954 ft to 974 ft bgs.
- A cement sanitary seal was emplaced from ground surface to a depth of 61 ft bgs.

² The RCS scope of services for the subject property does not include any efforts to define or determine local seismicity; to define or determine the potential activity of any faults in the region; or to define or determine the potential for fault rupture.



MEMORANDUM

As stated above, the earth materials encountered in the borehole of Well A, as described by the well driller, are interpreted by RCS to belong to the Sonoma Volcanics. Thus, based on the interpreted depths of the geologic formations in the borehole, the perforated casing intervals in Well A exist solely within the materials of the Sonoma Volcanics. Accordingly, groundwater directly accessible to Well A is derived exclusively from the Sonoma Volcanics.

Pumping Test of Project Well

On March 8, 2023, Ray's Well Testing Service (RWTS) performed an 8-hour pumping test of Well A using the existing installed pump equipment in the well. Data recorded as part of the testing by RWTS include the following:

- The static water level (SWL) reported by RWTS immediately preceding the pumping period was 671 ft brp (below the wellhead reference point).
- The intake of the installed well pump was set at a depth of 945 ft.
- The flow rate reported from the well at the beginning of the 8-hour pumping period was 54 gpm, but that pumping rate was increased to 64 gpm within approximately 15 minutes.
- The flow rate reported from the well for the final 7 hours and 45 minutes of pumping was 64 gpm.
- Water levels gradually declined at a very slow rate throughout the pumping test. During the last 4 hours of the test, the pumping water level (PWL) decreased by only 0.1 ft per hour. The final PWL reported at end of the 8-hour pumping test was 674.9 ft brp, for a total drawdown of only 3.9 ft during the pumping period. Based on these values, the short-term specific capacity³ measured at the end of the pumping test was 16.4 gpm/ft.

Groundwater Depth Measurement by RCS Geologist During Site Visit

During the March 19, 2024, site visit, the RCS geologist measured the water level in Well A at a depth of 685 ft brp during non-pumping conditions. In preparation for collection of the RCS water level measurement, the well reportedly remained un-pumped for more than 12 hours before the site visit so that a reliable SWL could be measured.

Water Use

Information and data supporting existing and proposed future water uses were provided by the project engineer (ACE) and were generally based on estimates found in the WAA Guidelines (Napa County, 2015). Below is a summary of water uses at the subject property, and a brief description of the sources of water that are proposed to supply each of those uses.

Existing Water Demands

Current onsite water demands include those of the vineyard, the main residence, an accessory dwelling unit (ADU), a guest cottage, and landscaping. These current onsite water demands are met by groundwater pumped from Well A.

³ Specific capacity (in gpm/ft of water level drawdown, or gpm/ft) is a commonly used measure of well efficiency, calculated by dividing the discharge rate from a well at the end of a pumping period by the water level drawdown at the end of that pumping period.



MEMORANDUM

The following existing annual water demands were estimated by ACE, based on values provided in Napa County's 2015 WAA Guidelines Document:

- The demand for the existing 6.2 acres of vineyards is 4.65 AFY⁴.
 - Vineyard demand estimates assume 0.5 AFY/acre for irrigation and 0.25 AFY/acre for heat protection = 0.75 AFY/acre total.
- The demand for existing domestic uses is 1.75 AFY, consisting of:
 - 0.75 AFY for the main residence with moderate landscaping
 - 0.5 AFY for the ADU
 - 0.5 AFY for the guest cottage
- The total demand for existing landscaping irrigation is approximately 6.1 AFY.
 - Existing landscaping consists of approximately 12,000 ft² of lawn areas and approximately 100,000 ft² of non-lawn landscaping.
 - For the lawn areas, it was assumed that water demands would be 0.1 AFY per 1,000 ft² of lawn (after accounting for the first 1,000 ft², which are assumed to be included in the residential demand estimate above).
 - $(12,000 \text{ ft}^2 - 1,000 \text{ ft}^2) \times 0.1 \text{ AFY}/1,000 \text{ ft}^2 = 1.1 \text{ AFY}$.
 - For the non-lawn landscaping, it was assumed that water demands would be 0.1 AFY per 2,000 ft² of non-lawn landscaping.
 - $100,000 \text{ ft}^2 \times 0.1 \text{ AFY}/2,000 \text{ ft}^2 = 5.0 \text{ AFY}$.

Existing onsite water demands can thus be calculated as the sum of vineyard demands (4.65 AFY), domestic demands (1.75 AFY), and landscaping demands (6.1 AFY), totaling 12.50 AFY. These onsite demands are met entirely by groundwater pumped from Well A. Additional groundwater extractions from the subject property occur from the other onsite water well, Ovid Easement Well 12, via an existing water supply easement. For the purposes of this Tier 1 WAA for the subject property, it has been assumed that groundwater extractions from Ovid Easement Well 12 are currently 7.77 AFY (calculated below). Addition of the existing groundwater extractions estimated from Well A (12.50 AFY) to the total estimated from the onsite Ovid Easement Well 12 (7.77 AFY) results in a current groundwater extraction total from the subject property of 20.27 AFY.

Estimate of Ovid Easement Well 12 Annual Production

Ovid Easement Well 12 extracts groundwater from the subject property for offsite use on an adjacent property to the northwest known as Ovid Winery, located at 255 Long Ranch Road (APNs 032-030-065 and -066). The average annual volume of water extracted by Ovid Easement Well 12 is not known by RCS, ACE, or the property owner. Review of a 2018 WAA for the Ovid Winery by Summit Engineering, Inc. (Summit) provides some data regarding the possible annual extractions by Ovid Easement Well 12; that 2018 WAA was obtained from Napa County (PBES, 2024) and is included in the Appendix to this Memorandum. According to Summit's 2018 WAA, the Ovid Winery property was projected to ultimately use 24.34 AFY of groundwater. Four water wells were described as supplying the demands of the property, with three of the wells providing 23.54 AFY for the various irrigation demands and the fourth well supplying 0.80 AFY for winery and domestic demands. Ovid Easement Well 12 (the onsite easement well) is shown as

⁴ AFY = acre-feet per year; 1 acre-foot $\approx$ 325,851 gallons



MEMORANDUM

one of those three irrigation supply wells for the property. Furthermore, data suggest that an additional well (presumably used for irrigation) has since been drilled on the Ovid Winery property (WCR2021-003697; included in Appendix to this Memorandum). This assertion is based on review of the WCR RCS obtained from Napa County (PBES, 2024); no WAA associated with that WCR or drilling permit was observed in the Napa County online files. Based on the foregoing information, RCS surmises that Ovid Easement Well 12 is one of four irrigation wells currently used to provide irrigation water to the Ovid Winery property.

Although specific details of groundwater extraction on a per-well basis are not available in the Summit 2018 WAA, a likely scenario for the Ovid irrigation wells is that their relative contributions to the overall 23.54 AFY demand is proportional to the operational pumping rates of those wells. Test data in the 2018 WAA by Summit for the irrigation wells indicate a combined irrigation supply capacity of 139.8 gpm (40.1 gpm from Ovid Well 1, 22.5 gpm from Ovid Well 5, and 77.2 gpm from Ovid Easement Well 12). Pumping test data is not available for the more recently drilled Ovid Well (WCR2021-003697), but a rough estimate of its operational pumping rate can be calculated by dividing the driller-reported post-construction airlift⁵ rate (190 gpm) by two. This results in an estimated operation pumping rate for the more recently drilled Ovid Well of approximately 95 gpm. Addition of the estimated pumping rate from the newer Ovid Well (95 gpm) to the overall production rate available from the older Ovid irrigation wells (139.8 gpm) results in an overall irrigation supply capacity of roughly 234.8 gpm for the Ovid Winery property. Thus, the 77.2 gpm pumping capacity of Ovid Easement Well 12 (the onsite easement well) is projected to account for approximately 33% of the overall irrigation supply capacity of the Ovid Winery property. Assuming for the purposes of the subject WAA that the contributions of each Ovid irrigation well to Ovid's reported 23.54 AFY irrigation demand total are proportional to the operational pumping rate available from each well, Ovid Easement Well 12 may supply on the order of 7.77 AFY to the Ovid property. Thus, for the purposes of this Tier 1 WAA for the subject property, it has been assumed that groundwater extractions from Ovid Easement Well 12 are currently 7.77 AFY.

Proposed Future Water Demands

Many of the future onsite demands will be unchanged relative to the current onsite demands (the main residence, the ADU, the guest cottage, and landscaping), but vineyard demands will increase as a result of the proposed vineyard expansion (i.e., the project). Onsite water demands will continue to be met by groundwater pumped from Well A.

The following summarizes the proposed future onsite water demands that are estimated by ACE to exist following development of the proposed vineyard expansion project:

- The demand for the 20.2 acres of vineyards (6.2 acres existing + 14.0 acres proposed) will be 15.15 AFY.
 - Vineyard demand estimates assume 0.5 AFY/acre for irrigation and 0.25 AFY/acre for heat protection = 0.75 AFY/acre total (no change).
- The demand for existing domestic uses will be 1.75 AFY (no change).

⁵ It is the experience of RCS that airlift rate estimates reported on WCRs tend to be on the order of twice as high as the actual operational pumping rates in a given well, and that these "test" rates are not representative of future well productivity. Operational pumping rates in wells with WCRs that only show airlift "test" rates may therefore be only half - or less - of those reported airlift "test" rates.



MEMORANDUM

- The total demand for existing landscaping irrigation will be approximately 6.1 AFY (no change).

Future onsite water demands can be calculated as the sum of vineyard demands (15.15 AFY), domestic demands (1.75 AFY), and landscaping demands (6.1 AFY), which total 23.00 AFY. These onsite demands are met entirely by groundwater pumped from Well A. The total future onsite groundwater extractions can then be calculated by adding the total proposed extractions from Well A (23.00 AFY) to the estimated extractions from Ovid Easement Well 12 (7.77 AFY), resulting in a property-wide groundwater extraction total of 30.77 AFY.

Proposed Pumping Rates from Project Well

To estimate the pumping rates that would be required from Well A to meet the demands that it is proposed to supply, the following assumptions and calculations were made in coordination with ACE:

- Groundwater pumping from Well A to meet vineyard and most of the landscaping demands would occur during a 22-week irrigation season (154 days per year) for an average of 12 hours per day (720 minutes per day).
- Groundwater pumping from Well A would occur year-round (365 days) for an average of 12 hours per day to meet the domestic demands (including associated moderate landscaping irrigation demands).

Under these assumptions, the highest groundwater demand period would occur during the irrigation season, when the vineyard, landscaping, and domestic demands would occur simultaneously. The minimum pumping rate required from Well A to meet the seasonally high groundwater demands during the assumed 22-week irrigation season would be approximately 64.6 gpm, calculated as follows:

Minimum Required Pumping Rate to Meet Groundwater Demands for Vineyard and Landscaping

$$= (15.15 + 6.1 \text{ AF}) \times \frac{325,851 \text{ gallons}}{\text{AF}} \times \frac{\text{Irrigation Season}}{154 \text{ days}} \times \frac{\text{day}}{720 \text{ minutes}} = 62.4 \text{ gpm}$$

Minimum Required Pumping Rate to Meet Groundwater Demands for Domestic Use

$$= 1.75 \text{ AF} \times \frac{325,851 \text{ gallons}}{\text{AF}} \times \frac{1 \text{ Year}}{365 \text{ days}} \times \frac{\text{day}}{720 \text{ minutes}} = 2.2 \text{ gpm}$$

Minimum Required Pumping Rate to All Groundwater Demands

$$= 62.4 \text{ gpm} + 2.2 \text{ gpm} = 64.6 \text{ gpm}$$

As evidenced by the pumping test of Well A by RWTS, Well A is capable of supplying groundwater at a rate of at least 64 gpm. That testing rate is nearly the same as the 64.6-gpm pumping rate required to meet the proposed onsite demands. That pumping test by RWTS reported very little water level drawdown throughout the test, reaching a maximum drawdown of only 3.9 feet at the end of the continuous 8-hour pumping period. According to data in the RWTS report for that pumping test, an additional 270 feet of available drawdown remained at the end of the 8-hour pumping period (270 feet being the vertical distance between the final pumping water level and the reported depth of the pump intake). Thus, it is clear that Well A can be successfully pumped at (or even higher than) the 64.6 gpm minimum required pumping rate calculated above.



MEMORANDUM

Alternatively, the daily duration of pumping could be slightly increased to 727 minutes per day (instead of 720 minutes per day). Such an increase in daily pumping duration would reduce the minimum required pumping rate from Well A to only 63.9 gpm, which is less than the pumping rate that RWTS demonstrated Well A as being capable of providing.

Tier 1 WAA – “Groundwater Recharge Estimate”

Napa County promulgated additional guidelines for WAA preparation with respect to groundwater recharge calculations in response to the Governor’s Executive Order N-7-22 (Napa County, 2022a & 2024a) and the drought⁶ in the State at that time. For projects that require a WAA and are located outside of the Napa Valley Subbasin of the Napa-Sonoma Valley Groundwater Basin, the County requires that the average annual volume of groundwater recharge be calculated on a parcel-specific basis. The County also requires that parcel-specific groundwater recharge estimates used in WAAs for projects outside of the Napa Valley Subbasin consider “average rainfall” to be the average annual rainfall that occurred during the 10-water-year period of 2012 to 2021, as defined in the County’s 10-year average precipitation dataset (PBES & LSCE, 2022).

Groundwater recharge on a long-term average annual basis at the subject property can be estimated as a percentage of average rainfall that falls directly on the subject property and becomes available to deep percolate into the local aquifer system(s) over the long-term. The actual percentage of rainfall that deep percolates can vary based on numerous site-specific conditions, such as the slope of the land surface; the soil types present; the evapotranspiration rate; the intensity and duration of the rainfall; etc. The three key parcel-specific variables used by RCS to calculate groundwater recharge herein are precipitation, deep percolation rate as a function of precipitation, and ground surface slopes.

Parcel-Specific Precipitation

Spatial analysis of the County’s 10-water-year average rainfall dataset (PBES & LSCE, 2022) determined that the area-weighted average rainfall per water year for the 10-water-year period of 2012 to 2021 on the subject property was 2.36 ft (28.32 inches). Multiplying this rainfall average with the 152.63-acre assessed area of the property results in a total of 360.21 AFY. This value represents the average volume of precipitation that falls on the subject property each water year, based on the County’s 10-water-year dataset. A portion of the precipitation that falls on the subject property does not undergo deep percolation to become groundwater within the aquifer system(s) underlying the subject property, instead leaving the property through some other surficial hydrologic process. The actual percentage of rainfall that undergoes deep percolation is a function of numerous local and regional conditions, including ground surface slope; soil type; ground cover; evapotranspiration; and rainfall characteristics, among other possible factors.

Parcel-Specific Deep Percolation Rate

Estimates of groundwater recharge as a percentage of rainfall are presented for several watersheds tributary to the Napa River in the report titled “Updated Napa County Hydrogeologic Conceptual Model” (LSCE&MBK, 2013). The boundaries of those watersheds are shown on Figures 8-3 and 8-4 in that report, and those same watershed boundaries (as provided by MBK Engineers) are shown on Figure 1 of the subject Memorandum. The entire subject property is

⁶ A “prolonged drought analysis” is no longer required for WAA preparation due to the required use of the 10-year annual rainfall average or the unit groundwater use of 0.3 AFY/acre (Napa County, 2022b).



MEMORANDUM

located within the watershed referred to by LSCE & MBK as the "Napa River Watershed near Napa", but only a small portion of the property falls within the "Conn Creek Watershed". According to LSCE & MBK (2013), the Conn Creek Watershed is wholly contained by the Napa River Watershed near Napa. LSCE & MBK calculated on their Table 8-9 that 17% of the average annual rainfall that occurs within the Napa River Watershed near Napa undergoes deep percolation and enters the underlying aquifer systems (i.e., the groundwater recharge rate), whereas the groundwater recharge rate for the Conn Creek Watershed was reported as 21%.

For the purposes of the subject Tier 1 WAA, the 17% groundwater recharge rate for the Napa River Watershed near Napa was assumed to apply to the entire subject property, in lieu of consideration of the higher 21% assigned to the Conn Creek Watershed as applicable to any portion of the subject property. By considering only the lower groundwater recharge rate, a more conservative analysis is provided, with a lower volumetric estimate of annual groundwater recharge.

Parcel-Specific Effect of Slope on Groundwater Recharge Area

The watershed-wide estimates by LSCE & MBK (2013) of groundwater recharge rates for the watersheds tributary to the Napa River were based on water balance calculations that considered rainfall throughout the entire watershed, which inherently include all slopes within the watershed. Many basic geologic references logically assume that the potential for groundwater recharge is reduced on steeper slopes because steeper slopes tend to increase surface water runoff rates, and that less time is therefore available for rainfall to percolate (infiltrate) into the ground before running off as surface flow. LSCE & MBK (2013) assert on their page 56 that deep percolation recharge from rainfall is "significantly reduced" for land areas with slopes angles (inclinations) greater than 30°. On page 11 of LSCE & MBK (2013), an assessment of slope angles in excess of 30° is also mentioned and attributed to "LSCE 2011" therein; that document is likely to be the reference listed as "2011a" on page 134 of LSCE & MBK. Page 29 of LSCE (2011) states that "areas in which the slope of the land surface exceeds 30 degrees, beyond which recharge potential is significantly reduced". No other references or data are presented in the above-referenced documents to quantify the qualitative description of "significantly reduced". Because the various factors that affect groundwater recharge are likely interrelated (Yeh et al., 2009), assigning a value to define the amount that recharge is diminished as a function of slope is extremely difficult. No references were reviewed by RCS that quantify the possible reduction of deep percolation that might occur as a function of ground surface slope angle.

For the purposes of this Tier 1 WAA, and to provide a more conservative and site-specific estimate of groundwater recharge for the subject property, it has been assumed that deep percolation at the subject property does not occur on areas where slopes exceed 30°. It is accordingly assumed that any rainfall that occurs on areas where slopes exceed 30° would instead leave the property through some surficial hydrologic process (e.g., surface runoff, evapotranspiration, etc.).

Spatial analysis of a U.S. Geological Survey (USGS) digital elevation model (2020) determined that 3.3% (5.04 acres) of the ground surface area within the subject property is sloped in excess of 30°. The areas of the subject property where ground surface slopes were calculated to be greater than 30° are shown on Figure 2 as red areas. Therefore, based on the preceding discussions of deep percolation rate as a function of ground surface slope, the potential groundwater recharge area of the subject property was reduced by 3.3% to account for the steeply sloped portions of the property. The resulting area considered to offer potential for groundwater recharge at the subject property is 147.59 acres.



MEMORANDUM

Parcel-Specific Groundwater Recharge

Based on the values and assumptions presented above, the average volume of groundwater recharge that occurs at the subject property each water year can be calculated by multiplying the 17% groundwater recharge rate in LSCE & MBK (2013) with the average volume of rainfall received each water year (360.21 AFY), and then reducing the volume by 3.3% to account for the steeply sloped portions of the property that are assumed to not offer groundwater recharge potential. This calculation results in a parcel-specific average annual groundwater recharge rate of 59.21 AFY. This recharge rate not only considers the County's current 10-year precipitation average methodology, but it also conservatively constrains the potential recharge areas at the subject property based on ground surface slope. This 59.21 AFY total is therefore the volume of groundwater that can be extracted annually from the subject property under to the County's current WAA requirements (2015 & 2024a).

The proposed project conforms with Tier 1 WAA conditions because the proposed total volume of groundwater extractions from the subject property of roughly 30.77 AFY is less than the annual groundwater extraction volume from the subject property allowable under current Napa County requirements (59.21 AFY).

Tier 2 WAA – Review of Possible “Well & Spring Interference”

RCS reviewed publicly available records for evidence of wells (PBES, 2024) and springs (PBES, 2024) near the subject property. This review did not result in the discovery of any known or possible wells within 500 ft of the project well (Well A), or any known or possible offsite springs that are documented as being used for water supply purposes within 1,500 ft of the project well. Therefore, the Tier 2 WAA requirements for the proposed project are presumptively met, and a Tier 2 WAA is not required for the proposed project (Napa County, 2015 & 2024a).

Tier 3 WAA – Review of Possible “Groundwater/Surface Water Interaction”

According to the County's updates to WAA requirements (Napa County, 2024a), a Tier 3 WAA is required if a project well is located within 1,500 ft of a “Significant Stream”, as defined by Napa County. As discussed above, the watercourses that Napa County has defined as Significant Streams for the purposes of Tier 3 WAA review are available as GIS data available from a County GIS data source, where they are referred to as “Significant Streams” and “Significant Streams_1500ft_Buffer” (PBES & LSCE, 2023a & b). Figure 1 shows that the project well (Well A) is not within any Significant Stream buffer areas. Therefore, the Tier 3 WAA requirements for the proposed project are presumptively met, and a Tier 3 WAA is not required for the proposed project (Napa County, 2015 & 2024a).



MEMORANDUM

Key Conclusions and Recommendations

1. The proposed project is a vineyard expansion.
2. All water demand for the project will be met using groundwater pumped from an onsite well.
3. Total onsite groundwater extractions for the project are projected to be 23.00 AFY and will consist exclusively of vineyard irrigation, domestic uses, and landscape irrigation. All groundwater supply for the property will be pumped from existing onsite Well A.
4. Parcel-specific average annual groundwater recharge at the subject property was estimated to be 59.21 AFY. The proposed groundwater extractions from the project well (Well A) for use at the subject property are 23.00 AFY. The total extractions for the entire subject property are 30.77 AFY, which includes extractions from the Ovid Easement Well 12 that is used by a neighboring property. Both volumes are less than the estimated parcel-specific average annual groundwater recharge. The proposed project is thus compliant with Tier 1 WAA requirements (Napa County, 2015 & 2024a) because proposed annual groundwater extractions do not exceed the estimated annual parcel-specific groundwater recharge.
5. A pumping test of Well A was performed by RWTS. The pumping rate of the project well (Well A) was monitored for eight hours in March 2023 by RWTS, during which time the well continuously pumped groundwater at a rate of at least 64 gpm with very little water level drawdown during the test. This pumping rate is nearly equal to the rate necessary to meet the proposed project demands (64.6 gpm). Based on the results of the pumping test, Well A could be pumped at a slightly higher rate, or for a slightly longer duration to meet the demands of the subject property.
6. A Tier 2 WAA is not necessary for the proposed project because the project well is located greater than 500 feet from the known and possible locations of wells, and greater than 1,500 feet from the locations of known and possible offsite springs that are used for water supply purposes (Napa County, 2015 & 2024a). Tier 2 WAA requirements have thus been presumptively met for the proposed project.
7. A Tier 3 WAA is not necessary for the proposed project because the project well is located greater than 1,500 feet from a "Significant Stream" (Napa County, 2015). Tier 3 WAA requirements have been presumptively met for the proposed project and the project well.

Closure/Disclaimer

This Memorandum regarding RCS's WAA for a proposed vineyard expansion project at 275 Long Ranch Road, in the Pritchard Hill area of Napa County, CA, has been prepared for Applied Civil Engineering and applies only to the evaluation of the subject property for the requirements discussed herein. This WAA has been prepared in accordance with the care and skill generally exercised by reputable professionals, under similar circumstances, and in this or similar localities. No other warranty, either express or implied, is made to the conclusions or professional advice presented herein.



MEMORANDUM

References

- CGS, 2002 (California Geological Survey). *California Geomorphic Provinces*. Note 36.
<https://www.conservation.ca.gov/cgs/Documents/Publications/CGS-Notes/CGS-Note-36.pdf>
- DWR, 2021 (California Department of Water Resources). *Bulletin 118 California Groundwater Basins*. Version 6.2.
Published 12/6/21.
- LSCE, 2011 (Luhdorff & Scalmanini Consulting Engineers). *Napa County Groundwater Conditions and Groundwater Monitoring Recommendations*. Prepared for Napa County Department of Public Works. February 2011.
- , 2022. *Napa Valley Subbasin Groundwater Sustainability Plan*. January 2022.
- LSCE & MBK, 2013 (LSCE & MBK Engineers). *Updated Hydrogeologic Conceptualization and Characterization of Conditions*. Prepared for Napa County. January 2013.
- Napa County, 2015. *Water Availability Analysis (WAA) - Guidance Document*. Prepared for Napa County Board of Supervisors, Adopted May 12, 2015.
- , 2022a. *FAQ – Napa County Well Permit Standards (including response to Governor’s Executive Order N-7-22), July 15, 2022*. Accessed 12/3/22 at:
<https://www.countyofnapa.org/DocumentCenter/View/25906/Well-Permit-Standards-FAQs---15-July-2022>
- , 2022b. *WAA & Napa County Practices*. Stakeholder Outreach Meeting, held virtually, November 28, 2022.
- , 2024a. *Interim Napa County Well Permit Standards and WAA Requirements - January 2024*. January 10, 2024. <https://www.countyofnapa.org/DocumentCenter/View/25905/Well-Permit-Standards-and-WAA-Requirements--January-10-2024?bid>.
- , 2024b. *Parcels_public*. Last Updated 5/30/24. Downloaded 5/30/24 from: <https://gisdata.countyofnapa.org/>
- PBES, 2024 (Napa County Planning, Building & Environmental Services). *Electronic Document Retrieval | Napa County, CA*. Accessed in 2024. <https://services.countyofnapa.org/OBPBESPAV/Search/PBESDocs/index.html>
- PBES & LSCE, 2022. *MeanPrecip_WY_2012_2021_PRISM*. Feature Layer by PBES.Admin. Credits:
<https://prism.oregonstate.edu/recent/> (data modified by LSCE and Napa Co. PBES). Updated 10/20/22.
Accessed 12/14/22.
<https://napacounty.maps.arcgis.com/home/item.html?id=985a11dfb2ab45518254354036c93aa2>
- , 2023a. *Significant_Streams*. Feature Layer by PBES.Admin. Updated 5/17/23.
<https://www.arcgis.com/home/item.html?id=3e3a0f5a59f147e1ae99723f8420f096>
- , 2023b. *Significant_Streams_1500ft_Buffer*. Feature Layer by PBES.Admin. Updated 5/17/23.
<https://www.arcgis.com/home/item.html?id=8f3927797b6f490c89a8b07778dfed6f>
- Summit, 2018 (Summit Engineering, Inc). *Water Availability Analysis*, Prepared for Ovid Winery, 255 Long Ranch Road, October 2018.
- USGS, 2020 (U.S. Geological Survey). *USGS 1/3 arc-second n39w123 1 x 1 degree*. Digital Elevation Model (DEM) raster digital data. 3D Elevation Program (3DEP). Published 3/17/20.
- Wagner & Gutierrez, 2017 (Wagner, D.L. and Gutierrez, C.I.). *Preliminary Geologic Map of the Napa and Bodega Bay 30' x 60' Quadrangles, California*. 1:100,000-scale. California Geological Survey.



MEMORANDUM

FIGURES

Figure 1: Regional Map

Figure 2: Property Map

Figure 3: Geologic Map

APPENDIX

- 1) State Well Completion Report for Well A (WCR2021-005572)
- 2) Pumping Test Data Sheets by Ray's Well Testing Service (RWTS) for Well A
- 3) 2018 Water Availability Analysis by Summit Engineering for Ovid Winery
- 4) State Well Completion Report for 2021 Ovid Well (WCR2021-003697)

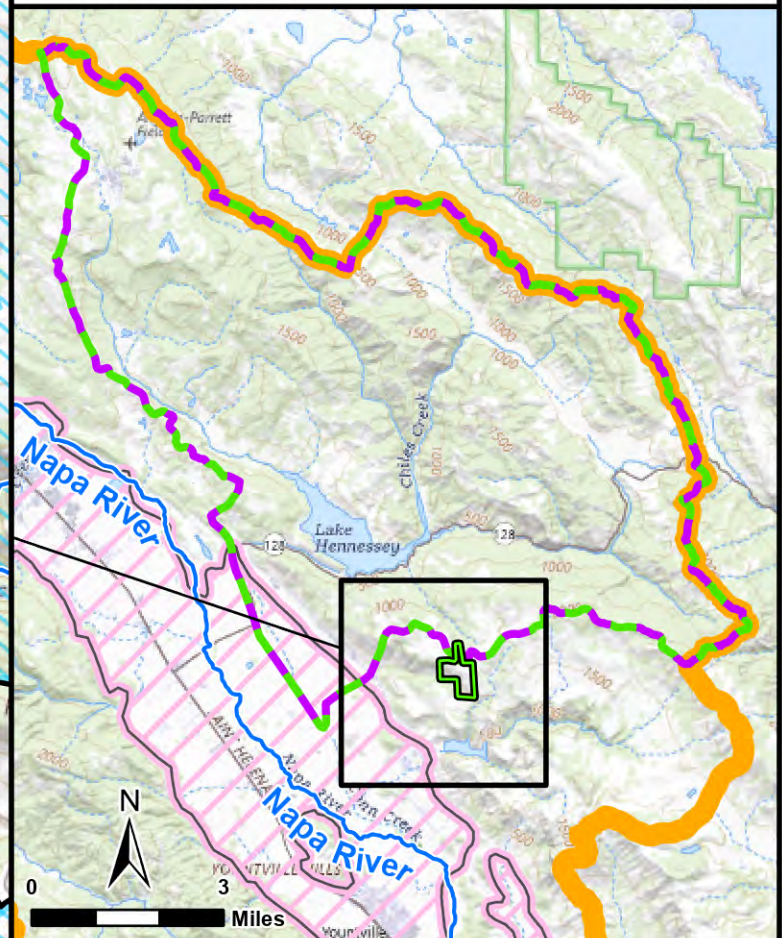
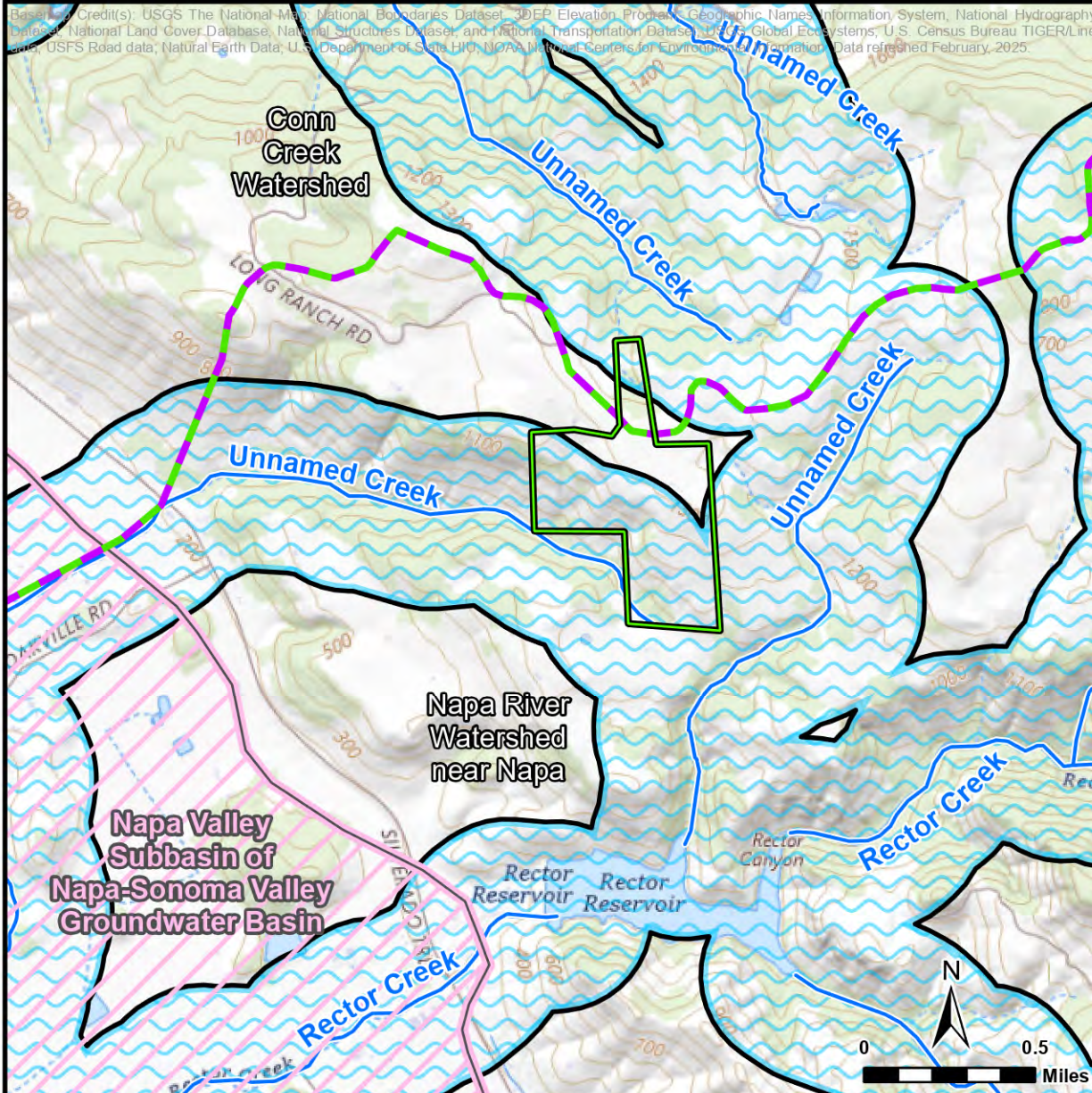
Basemap Credit(s): USGS The National Map, National Boundaries Dataset, 3DEP Elevation Products, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line files; USFS Road data; Natural Earth Data; U.S. Department of State HIC; NOAA National Centers for Environmental Information Data retrieved February, 2025.



**Figure 1
Regional Map**

RCS Job No. 820-NPA01

May 2025

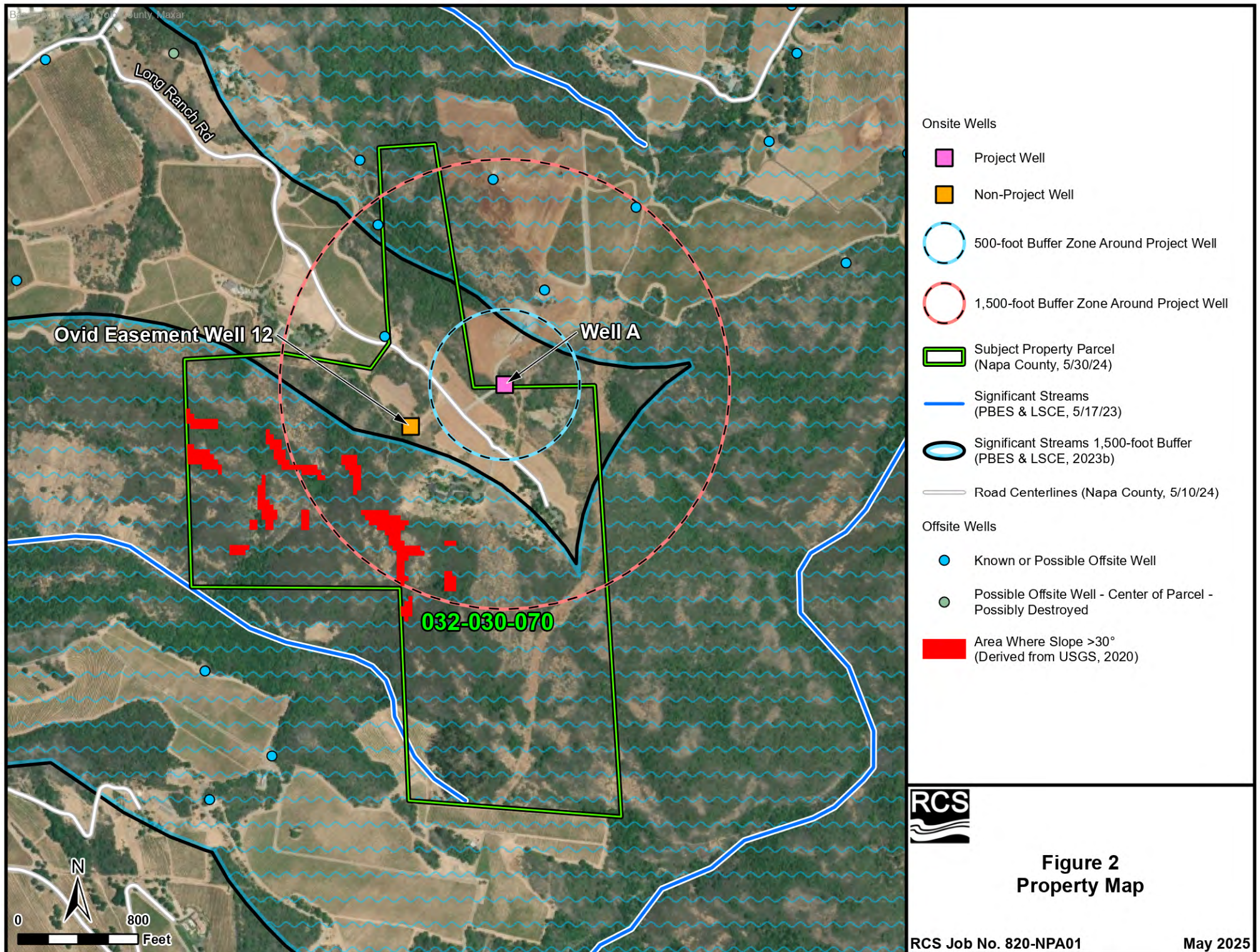


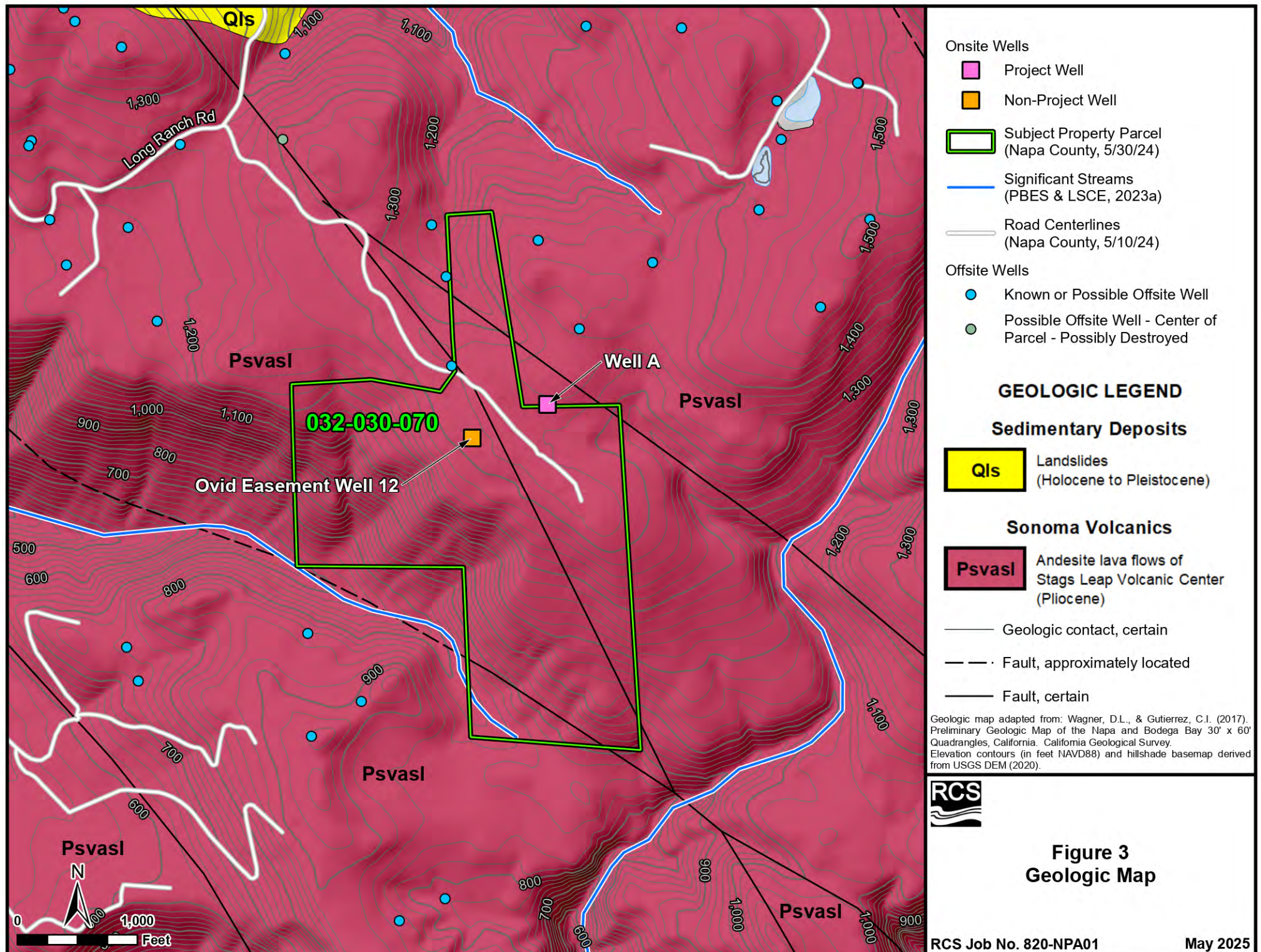
LEGEND

- Subject Property Parcel (APN 032-030-070; Napa County, 5/30/24)
- Significant Streams (PBES & LSCE, 2023a)
- Significant Streams 1,500-foot Buffer (PBES & LSCE, 2023b)
- Groundwater Basin (DWR, 2021)

Selected Watersheds in LSCE & MBK (2013)

- Conn Creek Watershed
- Napa River Watershed near Napa





Owner's Well Number	1-2021	Date Work Began	03/18/2021	Date Work Ended	04/27/2021
Local Permit Agency	Napa County Planning Building and Environmental Services				
Secondary Permit Agency		Permit Number	E21-00117	Permit Date	03/12/2021

Geologic Log - Free Form		
Depth from Surface Feet to Feet		Description
0	4	red top soil
4	20	red volcanic ash
20	30	tan volcanic tuff
30	130	fractured black volcanics
130	185	hard black volcanics
185	220	soft red volcanics
220	235	red ash
235	265	black, red volcanics
265	305	hard black volcanics
305	320	red volcanics
320	360	reddish brown ash
360	430	red volcanics
430	460	hard black volcanics
460	510	hard reddish brown volcanics
510	520	hard gray volcanics

Page 1 of 3

WELL A

520	560	hard reddish brown volcanics
560	620	hard black volcanics
620	640	mixed volcanics
640	670	dark brown volcanics
670	760	hard black volcanics
760	775	hard black, red volcanics
775	865	hard black volcanics
865	890	hard black, red volcanics
890	935	red welded ash
935	1000	hard black volcanics

Casings

Casing #	Depth from Surface Feet to Feet		Casing Type	Material	Casings Specifications	Wall Thickness (inches)	Outside Diameter (inches)	Screen Type	Slot Size if any (inches)	Description
1	0	674	Blank	Low Carbon Steel	Grade: ASTM A53	0.25	8			
1	674	814	Screen	Low Carbon Steel	Grade: ASTM A53	0.25	8	Milled Slots	0.06	
1	814	834	Blank	Low Carbon Steel	Grade: ASTM A53	0.25	8			
1	834	934	Screen	Low Carbon Steel	Grade: ASTM A53	0.25	8	Milled Slots	0.06	
1	934	954	Blank	Low Carbon Steel	Grade: ASTM A53	0.25	8			
1	954	974	Screen	Low Carbon Steel	Grade: ASTM A53	0.25	8	Milled Slots	0.06	
1	974	994	Blank	Low Carbon Steel	Grade: ASTM A53	0.25	8			

Annular Material

Depth from Surface Feet to Feet		Fill	Fill Type Details	Filter Pack Size	Description
0	61	Cement	10.3 Sack Mix		
61	600	Other Fill	See description.		pea gravel
600	994	Other Fill	See description.		#6 sand

Other Observations:

WELL A

Borehole Specifications		
Depth from Surface Feet to Feet		Borehole Diameter (inches)
0	1000	15

Certification Statement			
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief			
Name <u>HUCKFELDT WELL DRILLING INC</u>			
Person, Firm or Corporation			
<u>994 KAISER ROAD</u>	<u>NAPA</u>	<u>CA</u>	<u>94558</u>
Address	City	State	Zip
Signed <u>electronic signature received</u>	<u>05/06/2021</u>	<u>439746</u>	
C-57 Licensed Water Well Contractor	Date Signed	C-57 License Number	

DWR Use Only											
CSG #	State Well Number				Site Code				Local Well Number		
					N						W
Latitude Deg/Min/Sec						Longitude Deg/Min/Sec					
TRS:											
APN:											



Phone: 707 823 3191 **Fax:** 707 317 0057 **Email:** rayswelltesting@gmail.com **Lic#:** 903708

Address: 4853 Vine Hill Rd, Sebastopol Ca 95472

Date: 03/08/23

Report #: 14470

Report By: Zack Mikalonis

Subject Property Address: 275 Long Ranch Rd, St. Helena 94574

Customer Name: Mike Muelrath

WELL DATA:

Location/Description of well:	Inside gate, left of driveway before house
Type of Well:	Drilled
Depth of Well:	994 – Per Well Log
Diameter of Well Casing:	8" Steel – Per Well Log
Sanitary Seal (plate seal at top of well):	Yes
Annular Well Seal (in ground seal of bore hole):	61 Feet Cement – Per Well Log

PUMP DATA:

Pump HP and Type:	25 HP 460V 3 Ph Goulds 65L20
Depth of Pump Suction:	945 Feet – Per Installer Records
Size of Tee at Well Head:	3" Tee
Submersible Cable Size:	#2-4 Cable
Water Level Control:	Yaskawa iQPump 1000 controller
Backpressure Test:	54 GPM @ 50 PSI @ 671', 25.5/25.3/25.1 Amps

WELL PRODUCTION SUMMARY (see next page for pumping log):

Length of Test:	8 Hours		
Type of Test:	Constant Pumping Rate		
Static Water Level:	671 Feet	Starting Flow	54 GPM
Water Level Drawdown:	3.9 Feet		
Final Pumping Level:	674.9 Feet	Final Flow	64 GPM

WELL PRODUCTION DATA & PUMPING LOG:

Date	Time	Interval	Water Level	Appearance	Sulfur Odor	Sand	GPM
03/08/23	08:20 AM	Start	671	Slight Yellow Tint	Mild	No	54
03/08/23	08:35 AM	15 Minutes	673	Slight Yellow Tint	Mild	No	64
03/08/23	08:50 AM	15 Minutes	673.5	Slight Yellow Tint	Mild	No	64
03/08/23	09:05 AM	15 Minutes	673.6	Slight Yellow Tint	Mild	No	64
03/08/23	09:20 AM	15 Minutes	673.7	Slight Yellow Tint	Mild	No	64
03/08/23	09:35 AM	15 Minutes	673.8	Slight Yellow Tint	Mild	No	64
03/08/23	09:50 AM	15 Minutes	673.9	Slight Yellow Tint	Mild	No	64
03/08/23	10:05 AM	15 Minutes	673.9	Slight Yellow Tint	Mild	No	64
03/08/23	10:20 AM	15 Minutes	674	Clear	Mild	No	64
03/08/23	10:50 AM	30 Minutes	674.1	Clear	Mild	No	64
03/08/23	11:20 AM	30 Minutes	674.1	Clear	Mild	No	64
03/08/23	11:50 AM	30 Minutes	674.2	Clear	Mild	No	64
03/08/23	12:20 PM	30 Minutes	674.4	Clear	Mild	No	64
03/08/23	01:20 PM	1 Hour	674.6	Clear	Mild	No	64
03/08/23	02:20 PM	1 Hour	674.7	Clear	Mild	No	64
03/08/23	03:20 PM	1 Hour	674.8	Yellow Tint	Mild	No	64
03/08/23	04:20 PM	1 Hour	674.9	Slight Yellow Tint	Mild	No	64

Final Pumping Level: 674.9 Feet
Final Flow Rate: 64 Gallons Per Minute

Water levels and well depth are measured as feet below top of well casing unless otherwise noted.

DISCLAIMER:

Results of well production are accurate only at time of test. We cannot predict future production or water yield.

WATER QUALITY: (The following samples are being analyzed, please refer to follow up report)

Analysis Choice: Basic Residential + Irrigation **Turnaround:** Standard

WATER AVAILABILITY ANALYSIS

Ovid Winery
255 Long Ranch Road

St. Helena, California
APN 032-030-065,066

RECEIVED

DEC 20 2018

Napa County Planning, Building
& Environmental Services



CIVIL STRUCTURAL ELECTRICAL WATER|WASTEWATER

Project No. 2017079

June 2018

Revised: October 2018

TABLE OF CONTENTS

PROJECT SUMMARY	2
SITE DESCRIPTION	3
WATER DEMAND.....	3
EXISTING WATER DEMAND	3
PROPOSED WATER DEMAND	3
WINERY PROCESS WATER DEMAND	4
DOMESTIC WATER DEMAND	4
IRRIGATION WATER DEMAND	5
TOTAL WATER DEMAND	7
TIER I ANALYSIS: WATER USE CRITERIA.....	7
WATER AVAILABILITY	8
TIER II ANALYSIS: WELL INTERFERENCE	9
TIER III ANALYSIS: GROUNDWATER AND SURFACE WATER INTERACTION.....	10
CONCLUSION	10

LIST OF ENCLOSURES

Enclosure A:	Water System Site Plan (prepared by RSA+)
Enclosure B:	Water Demand and Tier 1 Recharge Analysis NOAA Precipitation Normals Site Slope Analysis
Enclosure C:	Well Test Logs and Pump Tests
Enclosure D:	Tier II Analysis: Well Drawdown Calculation Tables

PROJECT SUMMARY

Ovid Winery is applying for a Track 1 vineyard planting at the existing facility at 255 Long Ranch Road, St. Helena (APN: 032-030-065, & 066). The facility plans to plant an additional 31.5 acres of vineyard, to increase the total vineyard size from the existing 15.4 acres to 46.9 acres total. The additional vineyard will be planted in two separate phases. The 3.6 acre onsite fruit orchard will be removed as part of vineyard development. Phase I will introduce 23.5 acres of new vineyard, and after these vines are established, Phase II will introduce 8 acres of new vineyard. No changes to the current Use Permit for the existing winery facility are proposed. Summit has prepared the following Water Availability Analysis, which provides a comparison between the proposed water use and the available water capacity on the property, to justify the increase in vineyard acreage.

Total annual water demand at Ovid Winery associated with the proposed replant for Phase I is 32.09 ac-ft/year while the young vines are being established, and reducing to 28.34 ac-ft/year during Phase II. After the phased installation of vines is complete and the vines reach maturity, the long-term annual water demand is 24.34 ac-ft/year. This estimate represents an increase of 13.75 ac-ft per year from the current water usage. The site is not located within the Napa Valley floor or Miliken-Sarco-Tulucay (MST) groundwater deficient area, so the water availability criterion is based on estimated rainfall-recharge for the project site. The Tier 1 analysis shows that the total project acreage (including adjacent vineyard parcel owned by Metamorphosis, LLC, totaling 2 parcels) is approximately 73.62 acres, as summarized in the table below:

Table 1. Project Parcels and Use

APN	Description	Parcel Size (ac)
032-030-065	Vineyard	32.17
032-030-066	Winery & Vineyard	41.45
TOTAL		73.62

The Phase I annual water demand is anticipated to be 32.09 ac-ft per year while new vines are being established, which is below the estimated 34.01 acre-ft/year of rainfall recharge for a typical rainfall year. The Phase II short term annual water demand is anticipated to be 28.34 ac-ft/year, which is also less than the estimated annual rainfall recharge, reducing to 24.34 ac-ft/year after the Phase II vines are established.

The winery parcel peak domestic and process water demand can be met with the existing domestic well #11 (located on an adjacent residential parcel, APN: 032-030-068) operating for 8 hours per day at 4.8 gpm. The well completion report is provided in Enclosure C, which includes an 8-hour pump test completed in March of 2017, and showing a 75 GPM well yield.

SITE DESCRIPTION

The winery facility is located on a 41.45 acre parcel along Long Ranch Road and on the eastern hillsides of the County, in an agricultural area with vineyards to the east and west and sparse residential properties to the north and south. The site topography slopes downward to the south and west to the Napa Valley floor and the Napa River. Surface drainage typically flows overland to the southwest, with a small portion of the site draining to the north towards Lake Hennessy. Prior to the development of the winery, the property was used as agricultural land. No distillation occurs at the facility. A water system map for the facility is provided in Enclosure A.

The existing winery parcel (APN: 032-030-066) consists of winery buildings, onsite vineyards, landscaping, a sanitary sewage pressure distribution leach field, and a winery process wastewater hold and haul storage system. Water sources for the project consist of four groundwater wells, including one domestic water supply well, Well #11. Irrigation water supply is provided by three agricultural wells, Wells #1, #5 and #12.

WATER DEMAND

EXISTING WATER DEMAND

Current water use at the facility and adjacent vineyard parcel, also owned by Metamorphosis, LLC, is based on the following needs:

- Process needs for production capacity of 18,000 gallons of wine per year
- Full Time Employees = 7 per day
- Part Time Employees = 3 per day
- Tasting Visitors = 35 peak per day
- Special Event = 40 peak per event with meals, up to 6 events per year
- Special Event = 75 peak per event, up to 2 events per year
- Irrigation of 15.4 acres of vineyard
- Irrigation of landscape and onsite orchard (estimated based on Napa County WAA guidelines and irrigation records for the orchard)

PROPOSED WATER DEMAND

Anticipated water use at the facility and adjacent vineyard parcels will be based on the following needs:

- Process needs for production capacity of 18,000 gallons of wine per year
- Full Time Employees = 7 per day
- Part Time Employees = 3 per day
- Tasting Visitors = 35 peak per day
- Special Event = 40 peak per event with meals, up to 6 events per year
- Special Event = 75 peak per event, up to 2 events per year

- **Irrigation of 46.9 acres of vineyard**
- Irrigation of landscape (estimated based on Napa County WAA guidelines)

WINERY PROCESS WATER DEMAND

Water demand for wine production is expected to correlate to the process wastewater (PW) generated at the facility. Based on typical flow data from wineries of similar size and characteristics, the approximate process water demand for the current wine production is calculated as follows:

Existing Annual production	=	18,000 gal wine/year
PW generation rate	=	9 gal PW/gal wine ^a
Annual PW Flow	=	18,000 gal wine x 9 gal PW/gal wine
	=	162,000 gal PW/year
Average PW Flow	=	(162,000 gal PW/year) / (365 days)
	=	450 gal PW/day
Peak PW Flow	=	(162,000 gal PW/year x 16 ^b %) / (30 day)
	=	890 gal PW/day
Annual Production Water Demand	=	(162,000 gal water/yr) / (325,851 gal/ac-ft)
	=	0.50 ac-ft water/year

^a Generation rate based on process water use records for the facility

^b The harvest month of September accounts for approximately 16.4 percent of the annual water demand based on facilities of a similar size and operation.

The approximate annual water use associated with the existing production capacity is 162,000 gallons of water per year, or 0.50 ac-ft per year. Winery process water demand will continue to be provided by the existing domestic Well #11. Refer to Enclosure B for wastewater generation and water demand estimates.

DOMESTIC WATER DEMAND

Domestic water use at the facility is determined based on the total number of employees, visitors and event guests. Domestic water is currently supplied by the domestic Well #11. Sanitary sewage generation is expected to be equivalent to the water demand for domestic uses. Using Napa County Environmental Management's Table 4 from "Regulations for Design, Construction, and Installation of Alternative Sewage Treatment Systems", annual domestic water usage is estimated as follows:

Table 2. Existing Domestic Water Use at Ovid Winery

Use Type	Maximum Quantity (persons/day)	Water Demand (gal/person)	Daily Demand (gal/day)	Number of Days (days/year)	Annual Water Use (gal/year)
Full Time Employee	7	15	105	365	38,325
Part Time Employee ^a	3	15	45	365	16,425
Tasting Visitors	35	3	105	365	38,325
Special Event	40	15	600	6	3,600
Special Event	75	15	1,125	2	2,250
Total Water Use					98,925
Total Water Use (ac-ft/yr)					0.30

^a Part time employees are assumed year round, as a conservative estimation

The estimated existing annual domestic water use is 98,925 gallons per year, or 0.30 ac-ft per year. Annual average domestic water use is approximately 271 gallons per day, with a typical day typical day water demand (no special events) of 255 gallons per day. No changes are proposed to the employee, visitation, or marketing plan at this time. Refer to Enclosure B for wastewater generation and water demand estimates.

IRRIGATION WATER DEMAND

- Vineyard Irrigation**

Water from the agricultural wells (Wells #1, #5 and #12) is currently used to irrigate 15.4 acres of vineyards. The total acreage of vineyard will increase by 31.5 acres (to 46.9 acres total), according to the vineyard planting plan. Napa County Water Availability Analysis Phase 1 standard rates for vineyard irrigation are 0.2 to 0.5 ac-ft/acre/year. Vineyard irrigation demand for established vineyards was estimated using a rate of 0.5 ac-ft per acre of vineyard. The existing vineyard irrigation is estimated to be:

$$15.4 \text{ acres} \times 0.5 \text{ ac-ft/acre/year} = 7.7 \text{ ac-ft/yr} = 2,509,053 \text{ gal/yr}$$

Vineyard irrigation demand for new vines, before they have been fully established, was estimated by the vineyard management staff as 1.0 ac-ft/acre/year for 3 years, before the vines reach maturity. Therefore the short term demand for establishing 23.5 acres of new vineyard in Phase I is estimated to be:

$$23.5 \text{ acres} \times 1.0 \text{ ac-ft/acre/year} = 23.5 \text{ ac-ft/yr} = 7,657,499 \text{ gal/yr}$$

During Phase II, the vines from Phase I will be reduced to the established watering rate of 0.5 ac-ft/acre. Combined with the existing vines, the total acreage of established vineyard will be 38.9. The irrigation demand for established vineyards at the start of Phase II is calculated as follows:

$$38.9 \text{ acres} \times 0.5 \text{ ac-ft/acre/year} = 19.45 \text{ ac-ft/yr} = 6,337,802 \text{ gal/yr}$$

The short term demand for establishing 8 acres of new vineyard in Phase II is estimated to be:

$$8.0 \text{ acres} \times 1.0 \text{ ac-ft/acre/year} = 8.0 \text{ ac-ft/yr} = 2,606,808 \text{ gal/yr}$$

As the newly planted vines mature, the water demand will reduce back to the expected 0.5 ac-ft/acre/year for the entire 46.9 acres of vineyard. The final vineyard irrigation water demand is estimated to then be:

$$46.9 \text{ acres} \times 0.5 \text{ ac-ft/acre/year} = 23.45 \text{ ac-ft/yr} = 7,641,206 \text{ gal/yr}$$

The total proposed vineyard irrigation demand during the establishment of the new vines in Phase I will be approximately 10,456,878 gallons per year and in Phase II will be approximately 9,234,937 gallons per year. Once the new vines are well established the irrigation demand decreases. Should the short term water demand (in Phase I or Phase II) exceed the estimate for annual recharge and lead to decreasing water levels in the site wells, water will be supplied from an offsite source and trucked into the facility. Due to the conservative nature of the annual recharge estimate, it is unlikely that offsite water supplies will be utilized.

- Landscape/Orchard Irrigation

Water from the agricultural wells is used to irrigate landscaping and existing orchards on the winery parcels. The total acreage of landscape will not change from the approximately 3.3 acres of landscaping, but the existing 3.6 acres of orchard will be replaced with vineyard. The landscape irrigation demand was estimated based on the Napa County WAA guideline of 0.5 ac-ft/ 100,000 gallons of wine. The orchard demand was estimated based on meter readings for orchard irrigation, indicating approximately 0.55 ac-ft/acre/year, or 2 ac-ft/year total.

$$\text{Landscape Irrigation Demand} = 0.5 \frac{\text{ac} \cdot \text{ft}}{\text{year}} \times \frac{18,000 \text{ gal}}{100,000 \text{ gal}} = 0.09 \frac{\text{ac} \cdot \text{ft}}{\text{year}}$$

$$\text{Orchard Irrigation} = 0.55 \frac{\text{ac} \cdot \text{ft}}{\text{year}} \times 3.6 \text{ acres} = 2 \frac{\text{ac} \cdot \text{ft}}{\text{year}}$$

TOTAL WATER DEMAND

The total water demand at the facility associated with the proposed vineyard expansion after the new vines are established is expected to be 24.34 ac-ft per year, which is equivalent to 7.9 million gallons per year. This will occur when Phase I & II are complete, and includes an overall increase in irrigation demand of 13.75 ac-ft/year due to the removal of existing orchard and new vineyard. Refer to Enclosure B for wastewater generation and water demand estimates.

Table 3. Total Projected Long-Term Annual Water Demand

Water Use	Average Gallons per day	Gallons per year	Acre-Feet per year
Wine Production	450	162,000	0.50
Domestic Use	271	99,000	0.30
Vineyard Irrigation	31,189 ^a	7,641,206	23.45
Landscape Irrigation	120 ^a	29,327	0.09
Total	32,030	7,931,533	24.34

^a Estimated assuming that during the months of November through February no irrigation is required.

Based on the proposed new vineyard and removal of existing orchard, there is an overall increase in projected water demand of about 13.75 ac-ft/year (see Table 4) in the long term.

Table 4. Water Demand Comparison

Water Use	Existing (ac-ft)	Proposed (ac-ft)	Difference (ac-ft)
Wine Production	0.50	0.5	0.0
Domestic Use	0.30	0.3	0.0
Vineyard Irrigation	7.70	23.45	15.75
Landscape Irrigation	0.09	0.09	0.0
Orchard Irrigation	2.00	0	-2
Total	10.59	24.34	13.75

TIER I ANALYSIS: WATER USE CRITERIA

The Tier I analysis criteria for all parcels not located within the "Napa Valley Floor" is based on a site specific recharge, per the WAA guidelines. Ovid Winery is not located within the Napa Valley floor, therefore a Tier I analysis estimating annual recharge is required.

Luhdorff & Scalmanini Consulting Engineers (LSCE) previously prepared a Hydrogeologic Conceptualization and Characterization of Conditions for the groundwater and hydrogeology of the Napa Valley, including a detailed study of the anticipated rainfall recharge in several individual watersheds. The Ovid Winery parcels are located

predominantly within the Napa River at Napa watershed, with approximately 18 acres of one parcel located within the Conn Creek watershed. The annual average recharge is estimated using groundwater recharge estimate of 17% of precipitation, corresponding to the Napa River at Napa watershed, as this is a more conservative estimation than the Conn Creek recharge percentage (21%). A brief discussion on surface geology, soil characteristics, and annual precipitation is also included below for this parcel.

Annual precipitation was estimated from precipitation normals from the National Oceanic and Atmospheric Administration climate database for the period between 1981-2010. The site precipitation was assumed to be 33.79 inches per year, from the Yountville station. This station is proximal to the project site, and also falls within the Napa County isohyetal boundary as the site, indicating that rainfall patterns are typically similar across the isohyet.

The site geology has been previously characterized by various hydrogeological efforts, with a recent summary conducted by Michael Malone in 2016. That report states that the Sonoma Volcanics generally cover the site, with bedrock consisting of the Great Valley Assemblage at depths between 500 and 900 feet in the site vicinity. The capability of the volcanic rocks, ash and tuff to store and transmit water is dependent upon the frequency and volume of fractures, with lava flow rocks associated with the Sonoma Volcanics typically capable of providing high yielding groundwater aquifers. In this report, groundwater recharge was indicated as being primarily from rainfall infiltration, with a range of 5 to 15% expected but no references or calculations to support this estimate.

The site slope ranges from substantially flat to upwards of 31%, with limited areas of steeper slopes. To account for the reduced infiltration expected from land sloped at greater than 30%, a site slope analysis was prepared based on the Napa County GIS contours. The total site area with slopes greater than 30% is approximately 2.58 acres, which will be removed from the parcel acreage when calculating recharge. Therefore, the total land area available for recharge is approximately 71.04 acres.

Utilizing the rainfall recharge fraction of 17%, according to the LSCE groundwater characterization, the anticipated annual recharge for a typical year would be calculated as:

$$\text{Typical Annual Recharge} = 71.04 \text{ acres} \times 33.79 \frac{\text{inches}}{\text{year}} \times \frac{1 \text{ foot}}{12 \text{ inches}} \times 17\% = 34.01 \frac{\text{ac} - \text{ft}}{\text{year}}$$

WATER AVAILABILITY

The total estimated water demand of 32.09 ac-ft/year in the short term (Phase I) represents 94% of the anticipated water recharge for the project. The long term demand of 24.34 ac-ft/year likewise represents 72% of the typical annual recharge. There are 4 wells currently serving the winery and vineyards, as indicated on the attached Water System Map (Enclosure A). Well information is in Enclosure C.

The domestic well will be required to supply sufficient water to meet the domestic and process demands. The peak water demand should include 1,380 gal/day of domestic water and 890 gal/day of process water, for a total of 2,300 gal/day; therefore the domestic well will be required to supply on average 4.8 gpm over 8 hours. The existing domestic well should have sufficient capacity to supply the potable water demand.

TIER II ANALYSIS: WELL INTERFERENCE

A Tier II analysis is required for parcels not located within the "Napa Valley Floor" per the WAA guidelines. This analysis is included to estimate any potential interference between wells and springs that could affect their supply capacity due to water usage. The objective of the Tier II analysis is to determine if any well (existing or in the future) within 500 feet of the project's wells could be affected by the drawdown of the project's wells. The analysis was performed for all wells onsite that are within 500 feet of the property line, to cover any possibility of an existing neighboring well or future well within a 500 ft range from the existing property wells.

- Method

Using the Theis equation as indicated in the WAA Napa County guidelines, the groundwater drawdown from all property wells to the edge of the parcel was determined. The assumed closest distance that any neighboring well could be located is the edge of the parcel. Due to the limited data on the aquifer, values that would yield a conservative drawdown estimate were selected from Napa County Water Availability Analysis guidelines.

Assumptions:

- Aquifer Thickness of 75 ft.
- Hydraulic Conductivity moderate range of 10 to 30 ft/day for project site (Water Availability Analysis Figure F-3)
- Specific Storage range of 1.5×10^{-5} to 3.1×10^{-4} (1/ft) (Water Availability Analysis table F3)

The Theis equation can be seen below along with an example calculation, for the domestic well.

$$\text{Theis Equation: Drawdown} = \frac{\text{Flow}}{(4\pi \times \text{Transmissivity})} \times W(u)$$

$$W(u) = \int_u^\infty \frac{1}{\omega} e^{-\omega} d\omega$$

$$u = \frac{(\text{Distance}^2 \times \text{Specific Storage})}{(4 \times \text{Transmissivity} \times \text{Time})}$$

$$\text{Transmissivity} = \text{Hydraulic Conductivity} \times \text{Aquifer Thickness}$$

Example for the domestic well drawdown effect on possible wells on adjacent properties, with the pumping time estimated based on the amount of time the well is anticipated to run to meet the daily demand (40 minutes per day):

$$u = \frac{(120 \text{ ft})^2 \times (1.50 \times 10^{-5})}{4 \times 10 \frac{\text{ft}}{\text{day}} \times 75 \text{ ft} \times .0278 \text{ day}} = 7.20 \times 10^{-5}$$

With this value of u , $W(u) = 5.40$

$$\text{Drawdown} = \frac{75 \frac{\text{gal}}{\text{min}} \times 0.1337 \frac{\text{cuft}}{\text{gal}} \times 1,440 \frac{\text{min}}{\text{day}}}{4\pi \times 10 \frac{\text{ft}}{\text{day}} \times 75 \text{ ft}} \times 5.40 = 8.27 \text{ ft}$$

The table below shows a summary of the worst case scenario of drawdown results for the onsite wells closest to neighboring non-project parcels. More detailed tables can be found in Enclosure D, Tier II Well Drawdown Calculation Tables.

Table 4. Well Drawdown Calculations

	Use	Well Flow Rate (gpm)	Distance to Property Line (ft)	Estimated Drawdown (ft)
Well #11	Domestic/ Process	75	120	8.27
Well #1	Irrigation	40	162	6.88
Well #5	Irrigation	22.5	50	4.95
Well #12	Irrigation	77.2	500	9.71

Results

Using very conservative estimates for aquifer thickness, specific storage, and hydraulic conductivity, based on values from the Water Availability Analysis guidelines adopted by Napa County, none of the wells should produce a drawdown greater than 10 feet on any existing or future wells that could be adjacent to the property. The Water Availability Analysis guidelines establish a 10 foot drawdown as the default criteria to determine significant adverse effects. Since the wells estimated drawdown is less than 10 feet, no significant drawdown impact is expected for wells in adjacent parcels. It should be noted that there are no known offsite wells located within close proximity to the property boundaries.

TIER III ANALYSIS: GROUNDWATER AND SURFACE WATER INTERACTION

Based on the screening criteria from the Water Availability Analysis guidelines from May 2015, a Tier III analysis is not required for either the Napa Valley Floor, MST or all other areas, unless substantial evidence determines the need for such analysis. Due to the lack of substantial evidence, no analysis is needed for Tier III.

CONCLUSION

Total annual water demand at Ovid Winery, associated with the existing Use Permit, removal of 3.6 acres of existing orchard, proposed planting of 31.5 new acres of vineyard, is estimated to be 24.34 ac-ft per year, representing an increase of 13.75 ac-ft per year from the current water uses. The Tier I analysis estimates the groundwater allotment for the project parcels is a total of 34.01 ac-ft/year, based on a site specific recharge analysis. This water availability analysis establishes that the estimated water demand for the facility represents

OVID WINERY
Water Availability Analysis
June 21, 2018
Revised: October 22, 2018

SUMMIT ENGINEERING, INC.
Project No. 2017079

94% of the total water availability for the combined parcels per year in the short term, during vineyard establishment in Phase I, and 24.34 ac-ft/year or 72% once the vines are mature and Phase II is complete.

OVID WINERY

Water Availability Analysis

November 2, 2018

SUMMIT ENGINEERING, INC.

Project No. 2017079

ENCLOSURE A

OVERALL SITE PLAN

SITE SLOPE ANALYSIS

OVID WINERY

Water Availability Analysis

November 2, 2018

SUMMIT ENGINEERING, INC.

Project No. 2017079

ENCLOSURE B

WATER DEMAND AND TIER I RECHARGE

NOAA PRECIPITATION NORMALS

SUMMIT ENGINEERING, INC.	OID WINERY Water Availability Analysis Water Demand	PROJECT NO. 2017079 BY: SW CHK: GG
--------------------------	--	---

WATER DEMAND

WINERY DEMAND

Domestic Demand

Annual SS Water Use	=	99,000 gal/yr	
Typical Daily SS Flow	=	255 gpd	
Peak SS Flow (events w/o meals)	=	1,380 gpd	(2 times/year)
Peak SS Flow (events w/meals)	=	855 gpd	(6 times/year)

Winery Production Demand

Annual Wine Production	=	18,000 gal/yr	
Wine to PW Generation Rate	=	9.0 gal PW to gal wine	
Annual PW Water Use	=	162,000 gal/yr	
Average Day Flow	=	450 gpd	
NCEM Peak Day Flow	=	450 gpd	
Average Day Harvest Flow	=	780 gpd	
Average Day Peak Harvest Month Flow	=	890 gpd	

Total Domestic & Process Water Demand

Total Winery Annual Water Demand	=	261,000 gal/yr	
Peak Day Winery Water Demand	=	2,300 gpd	
Well Supply required (8 hr operation)	=	4.8 gpm	
Peaking Factor	=	2.3	
Maximum Daily Demand	=	5,175 gal	
Storage Recommended	=	6,000 gal	
Storage Available	=	11,000 gal	

IRRIGATION DEMAND

Vineyard Irrigation

Vineyard Irrigation Water Use (per NC-PBES)	=	0.5 ac-ft./ac/yr	
Existing Acres of Vineyard (per PPI)	=	15.4 acres	
Existing Vineyard Irrigation Demand	=	2,509,053 gal/yr	
New Vineyard Irrigation Water Use (per facility)	=	1 ac-ft./ac/yr	
Proposed Acres of Vineyard (per PPI)	=	31.5 acres	
Short Term (re-plant) Vineyard Demand	=	10,264,307 gal/yr	
Proposed Vineyard Irrigation Demand	=	5,132,153 gal/yr	

Overall Estimated Water Demand - Established Vines

Domestic Demand	=	99,000 gal/year	
Winery Production Demand	=	162,000 gal/year	
Vineyard Irrigation (Long Term)	=	7,641,206 gal/year	
Landscape Irrigation (Per Napa County WAA guidelines)	=	29,327 gal/year	
TOTAL (Long Term)	=	7,931,533 gal/year	
		24.34 ac-ft/year	

PHASED WATER DEMAND

Phase I (during new vine establishment)

New Vineyard Proposed	=	23.5 acres	
Domestic Demand	=	99,000 gal/year	
Winery Production Demand	=	162,000 gal/year	
Landscape Irrigation (Per Napa County WAA guidelines)	=	29,327 gal/year	
Existing Vineyard	=	2,509,053 gal/year	
Phase I (3 years)	=	7,657,499 gal/year	
TOTAL (Phase I)	=	10,456,878 gal/year	
		32.09 ac-ft/year	

Phase II (during new vine establishment)

New Vineyard Proposed	=	8 acres	
Domestic Demand	=	99,000 gal/year	
Winery Production Demand	=	162,000 gal/year	
Landscape Irrigation (Per Napa County WAA guidelines)	=	29,327 gal/year	
Existing Vineyard	=	6,337,802 gal/year	
Phase II (3 years)	=	2,606,808 gal/year	
Phase II Total	=	9,234,937 gal/year	
		28.34 ac-ft/year	

SUMMIT ENGINEERING, INC.	OID WINERY Water Availability Analysis Estimated Parcel Specific Annual Recharge	PROJECT NO. 2017079 BY: SW CHK: GG
--------------------------	---	---

Estimated Annual Recharge

Parcel Size	=	73.62 acres
Slopes > 30%	=	2.58 acres
Annual Typical Rainfall	=	33.79 inches/year
Recharge Percentage	=	17%

Parcel APNs:

032-030-065	32.17 ac
032-030-066	41.45 ac

Summary of
Monthly Normals
1981-2010

Generated on 07/31/2017

Elev: 95 ft. Lat: 38.395° N Lon: 122.357° W

Station: YOUNTVILLE, CA US GHCND:USC00049859

Temperature (°F)																						
Mean							Cooling Degree Days						Heating Degree Days				Mean Number of Days					
							Base (above)						Base (below)									
Month	Daily Max	Daily Min	Mean	Long Term Max Std. Dev.	Long Term Min Std. Dev.	Long Term Avg Std. Dev.	55	57	60	65	70	72	55	57	60	65	Max >= 100	Max >= 90	Max >= 50	Max <= 32	Min <= 32	Min <= 0
1	58.1	36.6	47.4				3	2	1	-7777	0	0	240	301	393	547	0.0	0.0	28.4	0.0	6.9	0.0
2	62.8	38.8	50.8				8	2	-7777	-7777	0	0	125	175	258	398	0.0	0.0	27.7	0.0	2.8	0.0
3	66.7	41.6	54.2				59	38	18	3	0	0	86	126	199	339	0.0	0.0	30.8	0.0	0.9	0.0
4	71.5	42.6	57.1				92	59	26	8	2	-7777	31	58	115	246	0.0	0.5	29.8	0.0	0.0	0.0
5	78.9	47.4	63.2				255	198	121	38	6	3	3	7	23	96	0.0	2.7	30.8	0.0	0.0	0.0
6	84.4	50.8	67.6				378	318	229	99	28	16	0	-7777	1	21	0.7	7.1	30.0	0.0	0.0	0.0
7	85.9	52.7	69.3				443	381	288	139	35	16	0	0	-7777	6	0.9	6.8	31.0	0.0	0.0	0.0
8	86.5	52.4	69.5				448	386	293	143	38	18	0	0	-7777	5	0.5	8.8	31.0	0.0	0.0	0.0
9	84.8	50.5	67.7				379	319	232	107	38	21	0	-7777	2	28	1.5	7.4	30.0	0.0	0.0	0.0
10	78.5	45.8	62.2				227	172	101	28	5	3	6	13	35	117	0.0	1.8	31.0	0.0	0.0	0.0
11	66.5	40.7	53.6				43	23	7	1	-7777	-7777	85	125	199	343	0.0	0.0	29.7	0.0	1.8	0.0
12	58.6	36.4	47.5				2	1	-7777	-7777	0	0	234	295	387	542	0.0	0.0	30.3	0.0	9.4	0.0
Summary	73.6	44.7	59.2				2337	1899	1316	566	152	77	810	1100	1612	2688	3.6	35.1	360.5	0.0	21.8	0.0

@ Denotes mean number of days greater than 0 but less than 0.05.
-7777: a non-zero value that would round to zero
Empty or blank cells indicate data is missing or insufficient occurrences to compute value.

Summary of
Monthly Normals
1981-2010
Generated on 07/31/2017

Precipitation (in.)								
	Totals	Mean Number of Days				Precipitation Probabilities Probability that precipitation will be equal to or less than the indicated amount		
	Means	Daily Precipitation				Monthly Precipitation vs. Probability Levels		
Month	Mean	>= 0.01	>= 0.10	>= 0.50	>= 1.00	.25	.50	.75
1	6.26	@	@	@	@			
2	6.84	@	@	@	@			
3	4.76	@	@	@	@			
4	1.86	@	@	@	@			
5	1.23	@	@	@	@			
6	0.16	@	@	@	@			
7	0.00	@	@	@	@			
8	0.06	@	@	@	@			
9	0.33	@	@	@	@			
10	1.48	@	@	@	@			
11	4.03	@	@	@	@			
12	6.78	@	@	@	@			
Summary	33.79	0.0	0.0	0.0	0.0			

@ Denotes mean number of days greater than 0 but less than 0.05.
-7777: a non-zero value that would round to zero
Empty or blank cells indicate data is missing or insufficient occurrences to compute value.

Summary of
Monthly Normals
1981-2010

Generated on 07/31/2017

Elev: 95 ft. Lat: 38.395° N Lon: 122.357° W
Station: YOUNTVILLE, CA US GHCND:USC00049859

Growing Degree Units (Monthly)												
Base	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
40	229	302	439	511	718	828	909	913	829	687	408	234
45	93	167	286	362	563	678	753	758	679	532	260	99
50	21	57	151	215	408	528	598	603	529	377	130	22
55	3	8	59	92	255	378	443	448	379	227	43	2
60	1	-7777	18	26	121	229	288	293	232	101	7	-7777
Growing Degree Units for Corn (Monthly)												
50/86	129	180	261	322	447	509	569	566	509	438	249	135

Growing Degree Units (Accumulated Monthly)												
Base	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
40	229	531	970	1481	2199	3027	3936	4849	5678	6365	6773	7007
45	93	260	546	908	1471	2149	2902	3660	4339	4871	5131	5230
50	21	78	229	444	852	1380	1978	2581	3110	3487	3617	3639
55	3	11	70	162	417	795	1238	1686	2065	2292	2335	2337
60	1	1	19	45	166	395	683	976	1208	1309	1316	1316
Growing Degree Units for Corn (Monthly)												
50/86	129	309	570	892	1339	1848	2417	2983	3492	3930	4179	4314

Note: For corn, temperatures below 50 are set to 50, and temperatures above 86 are set to 86
M indicates the value is missing
-7777: a non-zero value that would round to zero
Empty or blank cells indicate data is missing or insufficient occurrences to compute value.

OVID WINERY

Water Availability Analysis

November 2, 2018

SUMMIT ENGINEERING, INC.

Project No. 2017079

ENCLOSURE C

WELL LOGS AND PUMP TESTS

SUMMIT 



Phone: 707 823 3191 Fax: 707 317 0057 Email: rayswelltesting@gmail.com Lic#:903708

Address: 4853 Vine Hill Rd, Sebastopol Ca 95472

Date: 03/22/17

Report #: 8987 – Well #1

Report By: Cody Monday

Subject Property Address: 255 Long Ranch Rd, Saint Helena, Ca 94574

Customer Name: Jack Bittner

WELL DATA:

Location/Description of well:	Well #1
Type of Well:	Drilled
Depth of Well:	872 Feet per well log
Diameter of Well Casing:	5" PVC
Sanitary Seal (plate seal at top of well):	Yes
Annular Well Seal (in ground seal of bore hole):	21 Feet per well log

PUMP DATA:

Pump HP and Type:	10 HP Goulds 40S100-30
Depth of Pump Suction:	695' per pump records
Size of Tee at Well Head:	2" Galvanized
Submersible Cable Size:	#8 – 4
Water Level Control:	520CS
Backpressure Test:	33.3 GPM @ 100 PSI @ 500.1'

WELL PRODUCTION SUMMARY (see next page for pumping log):

Length of Test:	6 hours		
Type of Test:	Drawdown and constant level testing		
Static Water Level:	500.1 Feet	Starting Flow	33.3 GPM
Water Level Drawdown:	49.4 Feet		
Final Pumping Level:	549.5 Feet	Final Flow	40.1 GPM

WELL PRODUCTION DATA & PUMPING LOG:

Date	Time	Interval	Water Level	Appearance	Sulfur Odor	Sand	GPM
03/22/17	12:25 PM	0 Min	500.1	Yellow tint	No	No	33.3
03/22/17	12:40 PM	15 min	528.7	Clear	No	No	37.9
03/22/17	12:55 PM	15 min	540.2	Clear	No	No	41.3
03/22/17	01:10 PM	15 min	549.5	Clear	No	No	40.1
03/22/17	01:25 PM	15 min	549.5	Clear	No	No	40.1
03/22/17	01:40 PM	15 min	549.5	Clear	No	No	40.1
03/22/17	01:55 PM	15 min	549.5	Clear	No	No	40.1
03/22/17	02:10 PM	15 min	549.5	Clear	No	No	40.1
03/22/17	02:25 PM	15 min	549.5	Clear	No	No	40.1
03/22/17	02:55 PM	30 min	549.5	Clear	No	No	40.1
03/22/17	03:25 PM	30 min	549.5	Clear	No	No	40.1
03/22/17	03:55 PM	30 min	549.5	Clear	No	No	40.1
03/22/17	04:25 PM	30 min	549.5	Clear	No	No	40.1
03/22/17	04:55 PM	30 min	549.5	Clear	No	No	40.1
03/22/17	05:25 PM	30 min	549.5	Clear	No	No	40.1
03/22/17	05:55 PM	30 min	549.5	Clear	No	No	40.1
03/22/17	06:25 PM	30 min	549.5	Clear	No	No	40.1

Final Pumping Level: 549.5 Feet
Final Flow Rate: 40.1 GPM

-Water levels recorded as feet below surface.

-Water levels calculated with air tube readings from existing 1/4" air tube installed in the well.

DISCLAIMER:

Results of well production are accurate only at time of test. We cannot predict future production or water yield.

WATER QUALITY: (The following samples are being analyzed, please refer to follow up report)

Analysis Choice: Residential + Irrigation **Turnaround:** 3 day rush

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM



Phone: 707 823 3191 Fax: 707 317 0057 Email: rayswelltesting@gmail.com Lic#: 903708

Address: 4853 Vine Hill Rd, Sebastopol Ca 95472

Date: 03/22/17

Report #: 8987 – Well #5

Report By: Cody Monday

Subject Property Address: 255 Long Ranch Rd, Saint Helena, Ca 94574

Customer Name: Jack Bittner

WELL DATA:

Location/Description of well:	Well #5
Type of Well:	Drilled
Depth of Well:	792 Feet per well log
Diameter of Well Casing:	5" PVC
Sanitary Seal (plate seal at top of well):	Yes
Annular Well Seal (in ground seal of bore hole):	23 Feet per well

PUMP DATA:

Pump HP and Type:	10 HP Grundfos submersible 40S100-30
Depth of Pump Suction:	735' per pump records
Size of Tee at Well Head:	2" Galvanized
Submersible Cable Size:	#8 – 4
Water Level Control:	520CS
Backpressure Test:	42.1 GPM @ 0 PSI @ 550.2'

WELL PRODUCTION SUMMARY (see next page for pumping log):

Length of Test:	6 hours		
Type of Test:	Draw down and constant level testing		
Static Water Level:	550.2 Feet	Starting Flow	42.1 GPM
Water Level Drawdown:	175.6 Feet		
Final Pumping Level:	725.8 Feet	Final Flow	22.5 GPM

WELL PRODUCTION DATA & PUMPING LOG:

Date	Time	Interval	Water Level	Appearance	Sulfur Odor	Sand	GPM
03/23/17	09:55 AM	0 min	550.2	Orange	No	Fine Iron	42.1
03/23/17	10:10 AM	15 min	693.4	Yellow	No	Trace Metal	26
03/23/17	10:25 AM	15 min	725.8	Yellow	No	Trace Fine Grey	23.1
03/23/17	10:40 AM	15 min	725.8	Clear	No	No	23.2
03/23/17	10:55 AM	15 min	725.8	Clear	No	No	23.2
03/23/17	11:10 AM	15 min	725.8	Clear	No	No	22.5
03/23/17	11:25 AM	15 min	725.8	Clear	No	No	22.5
03/23/17	11:40 AM	15 min	725.8	Clear	No	No	22.6
03/23/17	11:55 AM	15 min	725.8	Clear	No	No	22.6
03/23/17	12:25 PM	30 min	725.8	Clear	No	No	22.5
03/23/17	12:55 PM	30 min	725.8	Clear	No	No	22.5
03/23/17	01:25 PM	30 min	725.8	Clear	No	No	22.5
03/23/17	01:55 PM	30 min	725.8	Clear	No	No	22.5
03/23/17	02:25 PM	30 min	725.8	Clear	No	No	22.5
03/23/17	02:55 PM	30 min	725.8	Clear	No	No	22.5
03/23/17	03:25 PM	30 min	725.8	Clear	No	No	22.5
03/23/17	03:55 PM	30 min	725.8	Clear	No	No	22.5

Final Pumping Level: 725.8 Feet
Final Flow Rate: 22.5 GPM

-Water levels recorded as feet below surface.

-Water levels calculated with air tube readings from existing 1/4" air tube installed in the well.

DISCLAIMER:

Results of well production are accurate only at time of test. We cannot predict future production or water yield.

WATER QUALITY: (The following samples are being analyzed, please refer to follow up report)

Analysis Choice: Residential + Irrigation **Turnaround:** 3 day rush

QUADRUPLICATE
For Local Requirements

Page 1 of 2

Owner's Well No. _____

Date Work Began 9/1/98, Ended 9/8/98 No. **700329**

Local Permit Agency NAPA CO. ENVIRONMENTAL MGT.

Permit No. 96-10332 Permit Date 8/28/98

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

32-030-006
DWR USE ONLY DO NOT FILL IN
STATE WELL REGISTRATION NO. 10121212
LATITUDE _____ LONGITUDE _____
APN/TRS/OTHER _____

ORIENTATION (±)			DRILLING METHOD		FLUID		DESCRIPTION	
DEPTH FROM SURFACE			METHOD		TYPE		Describe material, grain size, color, etc.	
Fl.	to	Fl.						
0	6		X VERTICAL		Air Rotary		Clay	
6	12				n/a		Clay with some rock	
12	23						Clay	
23	57						Loose wet multi-colored volcanics with clay and ash	
57	63						Hard gray volcanics	
63	220						Loose multi-colored volcanics	
220	264						Firm to hard multi-colored volcanics	
264	360						Gray and black volcanics	
360	415						Black bubbly volcanics	
415	470						Gray volcanics	
470	590						Multi-colored volcanics	
590	650						Black and gray volcanics	
650	795						Multi-colored volcanics	
RECEIVED								
SEP 16 1998								
DEPT. OF ENVIRONMENTAL MANAGEMENT								
TOTAL DEPTH OF BORING <u>795</u> (Feet)								
TOTAL DEPTH OF COMPLETED WELL <u>792</u> (Feet)								

WELL OWNER			
Name _____			
Mailing Address _____			
STATE _____			
WELL LOCATION			
Address <u>SAGE CANYON ROAD</u> Parcel <u>7</u>			
City <u>St. Helena</u>			
County <u>NAPA</u>			
APN Book <u>032</u> Page <u>030</u> Parcel <u>058</u>			
Township _____ Range _____ Section _____			
Latitude _____ NORTH _____ Longitude _____ WEST _____			
LOCATION SKETCH			
NORTH		WEST	
SOUTH		EAST	
Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.			
ACTIVITY (±)			
☒ NEW WELL			
MODIFICATION/REPAIR			
— Deepen			
— Other (Specify) _____			
— DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")			
PLANNED USES (±)			
WATER SUPPLY			
☒ Domestic ☐ Public			
☒ Irrigation ☐ Industrial			
MONITORING _____			
TEST WELL _____			
CATHODIC PROTECTION _____			
HEAT EXCHANGE _____			
DIRECT PUSH _____			
INJECTION _____			
VAPOR EXTRACTION _____			
SPARGING _____			
REMEDICATION _____			
OTHER (SPECIFY) _____			
WATER LEVEL & YIELD OF COMPLETED WELL			
DEPTH TO FIRST WATER _____ (FL) BELOW SURFACE			
DEPTH OF STATIC WATER LEVEL <u>300</u> (FL) & DATE MEASURED <u>9/8/98</u>			
ESTIMATED YIELD <u>150+</u> (GPM) & TEST TYPE <u>Air Lift</u>			
TEST LENGTH <u>4</u> (Hrs.) TOTAL DRAWDOWN <u>Air</u> (FL)			
* May not be representative of a well's long-term yield.			

DEPTH FROM SURFACE			BORE-HOLE DIA. (Inches)	CASING (S)					DEPTH FROM SURFACE			ANNULAR MATERIAL					
				TYPE ($\leq$)				MATERIAL / GRADE				INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	TYPE		
Fl.	to	Fl.	BLANK	SCREEN	CON- DUCTOR	FILL PIPE									Fl.	to	Fl.
0	23		11								0	23		X			
237	795		8								23	792				X	1/8 x 1/4
+2	792			X			PVC/F480	5"	CL200								
412	432			X						.032							
492	512			X						.032							
572	592			X						.032							

ATTACHMENTS (±)

- Geologic Log
— Well Construction Diagram
— Geophysical Log(s)
— Soil/Water Chemical Analyses
☒ Other Adnl Micro-Perfs

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

Continued Perf on Page 2 CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

WEEKS DRILLING AND PUMP COMPANY by Ward Thompson

NAME (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

P.O. Box 176

Sebastopol CA 95473

ADDRESS

CITY 9/10/98 STATE 177681

Signed _____
WELL DRILLER/AUTHORIZED REPRESENTATIVE

DATE SIGNED _____ C-57 LICENSE NUMBER _____



Phone: (707) 823-3191 **Fax:** (707) 317-0057 **Email:** rayswelltesting@gmail.com
Address: 4853 Vine Hill Rd, Sebastopol Ca 95472 **CA Lic. #:** 903708

Well Yield Pump Test for Water Supply Permit

The following capacity testing was performed on well #11 at:

Ovid Napa Valley
255 Long Ranch Rd
St Helena CA 94574

Water flow rate measurements were determined by a Seaflow water meter and verified using a container and stopwatch. Water levels were measured with the existing air tube device that is currently installed in the well.

Please contact **Ray's Well Testing Service, Inc.** with any questions: (707) 823-3191

Respectfully submitted,
Nick Brasesco

Ray's Well Testing Service Inc.**Phone Number:** 707 823 3191**Address:** 255 Long Ranch Rd, St Helena Ca**Well ID** Well 11**Page1 8 -Hour Pump Test Form with Recovery Data****Static Level:** 461.9

Date	Time	Interval	Water Level	Water color:	Odor:	Sand:	GPM
03/22/17	10:20 AM	10 Mins	461.9	Visibly Clear	No	No	75
03/22/17	10:30 AM	10 Mins	466.6	Visibly Clear	No	No	75
03/22/17	10:40 AM	10 Mins	466.6	Visibly Clear	No	No	75
03/22/17	10:50 AM	10 Mins	466.6	Visibly Clear	No	No	75
03/22/17	11:00 AM	10 Mins	466.6	Visibly Clear	No	No	75
03/22/17	11:10 AM	10 Mins	466.6	Visibly Clear	No	No	75
03/22/17	11:20 AM	10 Mins	466.6	Visibly Clear	No	No	75
03/22/17	11:30 AM	10 Mins	466.6	Visibly Clear	No	No	75
03/22/17	11:40 AM	10 Mins	466.6	Visibly Clear	No	No	75
03/22/17	11:50 AM	10 Mins	466.6	Visibly Clear	No	No	75
03/22/17	12:00 PM	10 Mins	466.6	Visibly Clear	No	No	75
03/22/17	12:10 PM	10 Mins	466.6	Visibly Clear	No	No	75
03/22/17	12:20 PM	20 Mins	466.6	Visibly Clear	No	No	75
03/22/17	12:40 PM	20 Mins	466.6	Visibly Clear	No	No	75
03/22/17	01:00 PM	20 Mins	466.6	Visibly Clear	No	No	75
03/22/17	01:20 PM	30 Mins	466.6	Visibly Clear	No	No	75
03/22/17	01:50 PM	30 Mins	466.6	Visibly Clear	No	No	75
03/22/17	02:20 PM	30 Mins	466.6	Visibly Clear	No	No	75
03/22/17	02:50 PM	30 Mins	466.6	Visibly Clear	No	No	75
03/22/17	04:20 PM	30 Mins	466.6	Visibly Clear	No	No	75
03/22/17	04:50 PM	30 Mins	466.6	Visibly Clear	No	No	75
03/22/17	05:20 PM	30 Mins	466.6	Visibly Clear	No	No	75
03/22/17	05:50 PM	30 Mins	466.6	Visibly Clear	No	No	75
03/22/17	06:20 PM	30 Mins	466.6	Visibly Clear	No	No	75

Static level: 461.9

Water level drawdown: 4.7

Final Pumping level: 466.6

Page 2 8 -Hour Pump Test Form with Recovery Data

Date	Time	Interval	Water Level	Recovery %
03/22/17	06:35 PM	15 Mins	462.1	95.74%
03/22/17	06:50 PM	15 Mins	461.9	100.00%

-Water levels recorded as feet below surface.

-Water levels calculated with air tube readings from existing 1/4" air tube installed in the well.

QUADRUPLICATE
For Local Requirements

Page 1 of 1

Owner's Well No. _____

Date Work Began 2-13-01, Ended 3-2-01

Local Permit Agency Napa County Environmental Mgmt.

Permit No. 96-11734 Permit Date 1-26-01

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. **739711**

OWR USE ONLY - DO NOT

STATE WELL NO. / STATION NO.	
LATITUDE	LONGITUDE
APN/TRS/OTHER	

DEPTH FROM SURFACE		DESCRIPTION
FL.	TO FL.	
0	10	hard fractured volcanics
10	30	hard red volcanics
30	150	hard black volcanics
150	200	tan volcanics
200	220	black volcanics
220	320	black & tan volcanics
320	420	dark red volcanics
420	600	black volcanics
600	690	red volcanics
690	740	black volcanics
CONT. CASING LAYOUT		
636	716	screen PVC 8" .032 slot
716	736	blank PVC 8"

RECEIVED
APR 10 2001
DEPARTMENT OF
ENVIRONMENTAL MANAGEMENT

TOTAL DEPTH OF BORING 740 (Feet)
TOTAL DEPTH OF COMPLETED WELL 736 (Feet)

WELL OWNER	
Name	_____
Mailing Address	_____
CITY	STATE ZIP
WELL LOCATION	
Address	<u>1481 Sage Canyon Road</u>
City	<u>Str Helena</u>
County	<u>Napa</u>
APN Book	<u>32</u> Page <u>030</u> Parcel <u>04</u>
Township	Range Section
Latitude	NORTH Longitude WEST
LOCATION SKETCH	
Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.	
WATER LEVEL & YIELD OF COMPLETED WELL	
DEPTH TO FIRST WATER <u>490</u> (FL.) BELOW SURFACE	
DEPTH OF STATIC WATER LEVEL <u>431</u> (FL.) & DATE MEASURED <u>3-2-01</u>	
ESTIMATED YIELD <u>125</u> (GPM) & TEST TYPE <u>air lift</u>	
TEST LENGTH <u>2</u> (Hrs.) TOTAL DRAWDOWN <u>N/A</u> (FL.)	
* May not be representative of a well's long-term yield.	

DEPTH FROM SURFACE			BORE-HOLE DIA. (Inches)	CASING (S)						
				TYPE (≤)				MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS
Fl	to	Fl	BLANK	SCREEN	CON- DOCTOR	FILL PIPE				
0	55	15								
55	740	12								
0	476		X				PVC F480	8	SDR-21	
476	556			X			PVC F480	8	SDR-21	.032
556	636		X				PVC F480	8	SDR-21	

DEPTH FROM SURFACE			ANNULAR MATERIAL			
			TYPE			
Fl	to	Fl	CE- MENT (≤)	BEN- TONITE (≤)	FILL (≤)	FILTER PACK (TYPE/SIZE)
0	53		X			concrete
53	736				X	#6 sand

ATTACHMENTS (S)

- Geologic Log
- Well Construction Diagram
- Geophysical Log(s)
- Soil/Water Chemical Analyses
- Other _____

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME HUCKFELDT WELL DRILLING
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

2110 Penny Lane Napa CA 94559

ADDRESS _____ CITY _____ STATE _____ ZIP _____

Signed _____ DATE SIGNED 4-3-01 C-57 LICENSE NUMBER 439-746

WELL DRILLER/AUTHORIZED REPRESENTATIVE



Phone: 707 823 3191 **Fax:** 707 317 0057 **Email:** rayswelltesting@gmail.com **Lic#:** 903708

Address: 4853 Vine Hill Rd, Sebastopol Ca 95472

Date: 03/29/17

Report #: 8987 – Well #12

Report By: Cody Monday

Subject Property Address: 255 Long Ranch Rd, Saint Helena, Ca 94574

Customer Name: Jack Bittner

WELL DATA:

Location/Description of well:	Well # 12
Type of Well:	Drilled
Depth of Well:	930 Feet
Diameter of Well Casing:	8" I.D. Steel
Sanitary Seal (plate seal at top of well):	Yes
Annular Well Seal (in ground seal of bore hole):	52 feet cement

PUMP DATA:

Pump HP and Type:	25 HP Goulds 70J25
Depth of Pump Suction:	840 feet –according to provided records
Size of Tee at Well Head:	3 inch
Submersible Cable Size:	#4 – 3 w/#8 ground
Water Level Control:	Motorsaver MS777
Backpressure Test:	67.7 GPM @ 100 PSI @ 674.1'

WELL PRODUCTION SUMMARY (see next page for pumping log):

Length of Test:	6 hours		
Type of Test:	Drawdown and constant level testing		
Static Water Level:	674.1 Feet	Starting Flow	67.7 GPM
Water Level Drawdown:	27.7 Feet		
Final Pumping Level:	701.8 Feet	Final Flow	77.2 GPM

WELL PRODUCTION DATA & PUMPING LOG:

Date	Time	Interval	Water Level	Appearance	Sulfur Odor	Sand	GPM
03/28/17	10:20 AM	0 min	674.1	Orange	Slight Metallic	No	67.7
03/28/17	10:35 AM	15 min	692.5	Orange	Slight Metallic	No	72.6
03/28/17	10:50 AM	15 min	697.2	Orange	Slight Metallic	No	79.4
03/28/17	11:05 AM	15 min	699.47	Orange	Slight Metallic	Trace Iron	77.9
03/28/17	11:20 AM	15 min	701.8	Orange	Slight Metallic	Trace Iron	77.2
03/28/17	11:35 AM	15 min	701.8	Orange	Slight Metallic	Trace Iron	77.2
03/28/17	11:50 AM	15 min	701.8	Orange	Slight Metallic	Trace Iron	77.2
03/28/17	12:05 PM	15 min	701.8	Orange	Slight Metallic	Trace Iron	77.2
03/28/17	12:20 PM	15 min	701.8	Orange	Slight Metallic	Trace Iron	77.2
03/28/17	12:50 PM	30 min	701.8	Orange	Slight Metallic	Trace Iron	77.2
03/28/17	01:20 PM	30 min	701.8	Orange	Slight Metallic	Trace Iron	77.2
03/28/17	01:50 PM	30 min	701.8	Yellow Tint	Slight Metallic	No	77.2
03/28/17	02:20 PM	30 min	701.8	Yellow Tint	Slight Metallic	No	77.2
03/28/17	02:50 PM	30 min	701.8	Yellow Tint	Slight Metallic	No	77.2
03/28/17	03:20 PM	30 min	701.8	Yellow Tint	Slight Metallic	No	77.2
03/28/17	03:50 PM	30 min	701.8	Yellow Tint	Slight Metallic	No	77.2
03/28/17	04:20 PM	30 min	701.8	Yellow Tint	Slight Metallic	No	77.2

Final Pumping Level: 701.8 Feet
Final Flow Rate: 77.2 GPM

-Water levels recorded as feet below surface.

-Water levels calculated with air tube readings from existing 1/4" air tube installed in the well.

DISCLAIMER:

Results of well production are accurate only at time of test. We cannot predict future production or water yield.

WATER QUALITY: (The following samples are being analyzed, please refer to follow up report)

Analysis Choice: Residential + Irrigation **Turnaround:** 3 day rush

OVID WINERY

Water Availability Analysis

November 2, 2018

SUMMIT ENGINEERING, INC.

Project No. 2017079

ENCLOSURE D

TIER II ANALYSIS: WELL DRAWDOWN CALCULATION TABLES

SUMMIT ENGINEERING, INC.	OVID WINERY Water Availability Tier II: Well Drawdown Analysis	PROJECT NO. 2017079 BY: SW CHK: GG
--------------------------	---	---

Site Specific Parameters

Well Flow:	Low End Specific Storage:
75 gpm	1.50E-05 1/ft
Radius of Influence:	High End Specific Storage:
120 ft	3.10E-04 1/ft
Aquifer Thickness	Low Hydraulic Conductivity:
75 ft	10 ft/day
Pumping Time:	High Hydraulic Conductivity:
0.0278 day	30 ft/day

Theis Drawdown

Scenario	Specific Storage (1/ft):	Hydraulic Conductivity (ft/day)	Theis u value (unitless):	u_a , rounded down (unitless):	u_b , rounded up (unitless):	$W(u_a)$	$W(u_b)$	$W(u)$, interpolated	Theis s value	Drawdown (ft)
High S, Low h	3.10E-04	10	5.35E-02	5.00E-02	6.00E-02	2.468	2.295	2.41	0.0192	3.69
Low S, Low h	1.50E-05	10	2.59E-03	2.00E-03	3.00E-03	5.639	5.235	5.40	0.0430	8.27
High S, High h	3.10E-04	30	1.78E-02	1.00E-02	2.00E-02	4.038	3.355	3.50	0.0093	1.79
Low S, High h	1.50E-05	30	8.63E-04	8.00E-04	9.00E-04	6.555	6.437	6.48	0.0172	3.31

OVID WINERY
Water Availability Analysis
June 21, 2018
Revised: October 22, 2018

SUMMIT ENGINEERING, INC.
Project No. 2017079

Contact:
Steve Worrell
steve@summit-sr.com
(707) 527-0775



SUMMIT ENGINEERING, INC.
463 Aviation Blvd., Suite 200
Santa Rosa, CA 95403
707 527-0775
sfo@summit-sr.com

November 5, 2018

RECEIVED

DEC 20 2018

Brian Bordona
Napa County PBES
1195 Third Street
Room 210
Napa, CA 94559

Napa County Planning, Building
& Environmental Services

RE: Ovid Winery
 Project Number 2017079

Dear Brian:

Summit Engineering is submitting this letter in response to the comments submitted to Metamorphosis Wines, LLC, regarding the Water Availability Analysis (WAA) prepared as part of P18-00275. The following responses, in italics, are intended to aid in review of the revised WAA.

1. Provide rationale and justification of the use of a rainfall recharge factor of 17% to calculate annual recharge rather than the expected 5% to 15% identified in the WAA. The anticipated recharge rate needs to be based on site specific conditions, the Luhdorff & Scalmanini Hydrological Conceptualization and Characterization Report was conducted on a larger watershed scale and may not accurately represent site specific conditions.

The use of 17% is based on the more accurate and specific modeling work completed by LSCE. Additionally, 17% is conservative when considering that a portion of the project site lies within the Napa River at Conn Creek watershed described by LSCE and estimated to have a 21% recharge rate. The reference for 5 to 15% for the site geological report prepared by Michael Malone in 2016 does not speak to where this estimate originates, and does not appear to be based on calculations, observed data, or any other parcel specific information. Therefore the 17% recharge estimate, along with an adjustment for site slope (see below) is used in the estimation of site recharge potential.

2. A discussion of the effects of slope on recharge potential.

An additional site plan indicating approximate slopes is included in the Appendix. The total area of the site with slopes exceeding 30% (2.58 acres) was removed from the potential recharge calculation. The revised estimated recharge is 34.01 acre-feet/year.

3. Confirmation that there are no off-site non-project wells within 500 feet of project wells. Additionally, confirm the parcel acreages: The Site Description on page 3 indicates one of the parcels as 41.42 acres while the acreage for this parcel in Enclosure B the WAA is identified as 42.42 acres.

The nearest offsite non-project well, according to records of well logs from the Department of Water Resources shows a well on APN: 032-010-072, under permit E17-00255. This well is approximately 900 feet away from the property line to project parcel 032-030-065. Regarding the parcel acreage, the Napa County online GIS records were used to update the parcel areas accordingly.

APN: 032-030-065 = 32.17 acres

APN: 032-030-066 = 41.45 acres

The total parcel area has been revised to 73.62 acres total.

4. Provide additional documentation and rationale demonstrating that the existing orchard is currently utilizing 18 acre-feet of water annually. Based on review of County mapping and records, in addition to communications with the Assessor's Division and the Agricultural Commissioner, there only appears to be ± 3 acres of orchard planted at a low density, with no corroborating evidence that the orchard is being farmed for commercial production (also see Item #2.a.v above). The WAA will need to be revised as necessary to reflect actual water use of the orchard.

The vineyard manager has confirmed that approximately 3.6 acres are planted in orchard. Water meter data from 2015 to current shows that approximately 0.55 acre-ft/acre (or about 2 ac-ft/year total), but anecdotal feedback is that the orchards are relatively under-watered and have not been as actively managed in more recent years. The higher estimate was originally used based on the soil type, which includes very well drained rock and gravel. The existing water use estimate has been revised based on the recent meter readings, although we acknowledge this may not be indicative of pre-existing long-term water use for the onsite orchard.

5. Clarification of the "including proposed lot line adjustment" notation in Table 1.

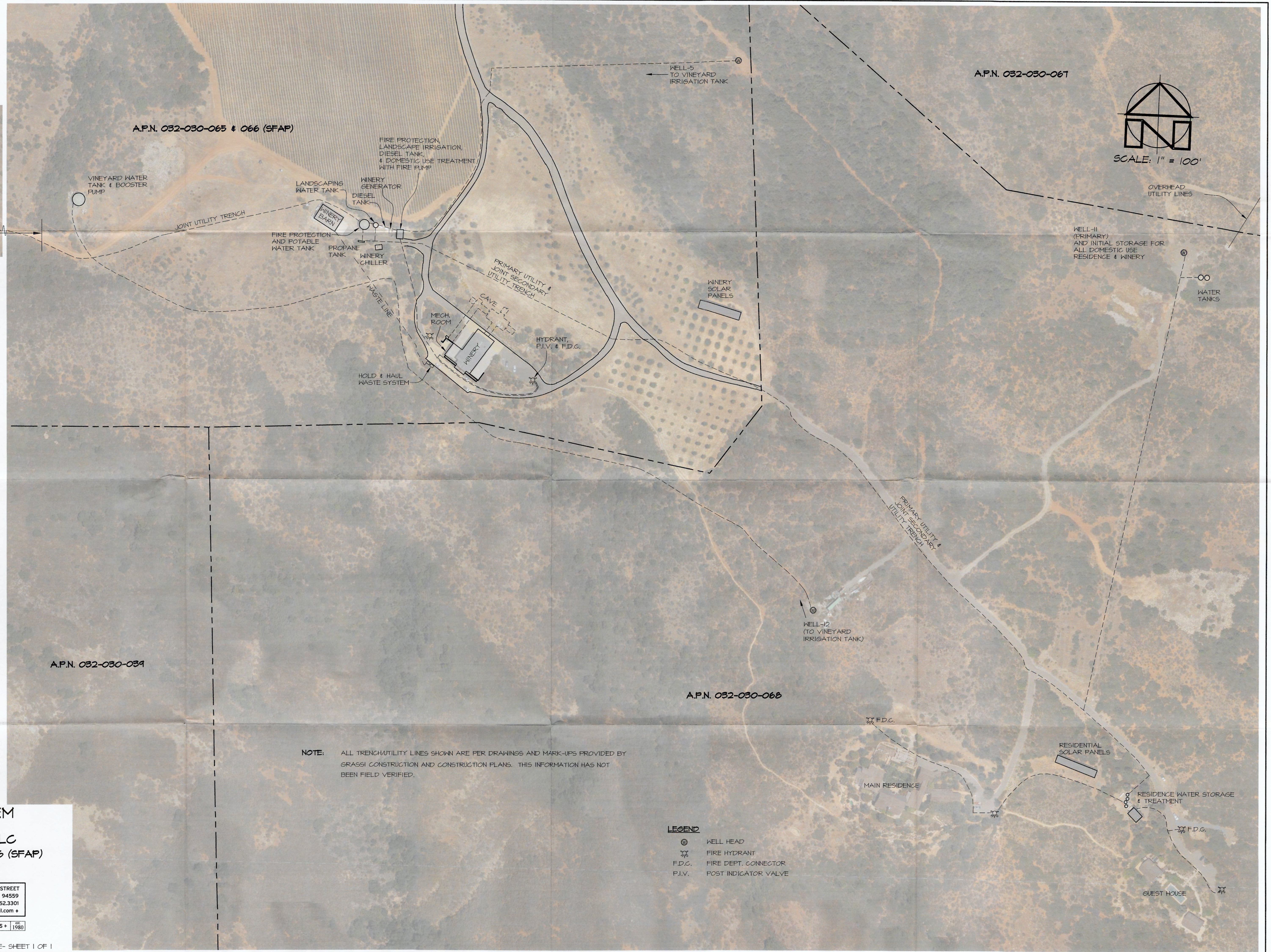
This reference has been removed, no lot line adjustments are proposed.

The revised WAA and associated appendices are included with this letter. Please don't hesitate to contact me with any additional questions you have regarding this project.

Sincerely,

Steve Worrell, P.E.
Project Engineer

cc: Jack Bittner, Metamorphosis Wines, LLC
Annalee Sanborn, PPI



THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF SUMMIT ENGINEERING, INC. AND IS NOT TO BE USED IN WHOLE OR IN PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF SUMMIT ENGINEERING, INC.



**TOTAL SITE AREA
BOTH PARCELS:**

2D AREA = 3,231,849 SF

3D AREA = 3,266,849 SF

Slopes Table					
Number	Minimum Slope	Maximum Slope	Color	2D AREA (SF)	3D AREA (SF)
1	0.00%	30.00%	Green	3119534	3141673
2	30.00%	40.00%	Yellow	56960	60206
3	40.00%	50.00%	Orange	22401	24516
4	50.00%	60.00%	Light Orange	13062	14889
5	60.00%	70.00%	Dark Orange	7275	8651
6	70.00%	80.00%	Red-Orange	4928	6148
7	80.00%	90.00%	Red	3808	4996
8	90.00%	200.00%	Dark Red	3876	5744

WATER AVAILABILITY ANALYSIS

EXISTING SITE SLOPES

OID WINERY
255 LONG RANCH ROAD
ST. HELENA, CALIFORNIA
APN 032-030-065 & 066

SUMMIT
Summit Engineering, Inc.
463 Aviation Blvd., Suite 200 • Santa Rosa, CA 95403
707-527-0775 • www.summit-sr.com

DATE: 2018-10-18
JOB NO: 2017079
SCALE: AS SHOWN
DRAWN: TF
CHECKED: SW
SHEET

State of California
Well Completion Report
 Form DWR 188 Submitted 3/22/2021
 WCR2021-003697

Owner's Well Number 1-2021 Date Work Began 01/08/2021 Date Work Ended 03/05/2021
 Local Permit Agency Napa County Planning Building and Environmental Services
 Secondary Permit Agency _____ Permit Number E20-00326 Permit Date 07/15/2020

Well Owner (must remain confidential pursuant to Water Code 13752)		Planned Use and Activity	
Name	_____	Activity	<u>New Well</u>
Mailing Address	_____	Planned Use	<u>Water Supply Irrigation - Agriculture</u>
City	_____		
State	_____		
Zip	_____		

Well Location			
Address <u>255 Long Ranch RD</u>		APN <u>032-030-065</u>	
City <u>St. Helena</u>	Zip <u>94574</u>	County <u>Napa</u>	Township <u>06 N</u>
Latitude <u>38</u> <u>20</u> <u>29</u> <u>N</u>	Longitude <u>-122</u> <u>20</u> <u>29</u> <u>W</u>	Range <u>04 W</u>	Section <u>30</u>
Deg. Min. Sec.	Deg. Min. Sec.	Baseline Meridian <u>Mount Diablo</u>	
Dec. Lat. <u>38.3413889</u>	Dec. Long. <u>-122.3413889</u>	Ground Surface Elevation _____	
Vertical Datum _____	Horizontal Datum <u>WGS84</u>	Elevation Accuracy _____	
Location Accuracy _____	Location Determination Method _____	Elevation Determination Method _____	

Borehole Information		Water Level and Yield of Completed Well	
Orientation <u>Vertical</u>	Specify _____	Depth to first water <u>590</u> (Feet below surface)	
Drilling Method <u>Direct Rotary</u>	Drilling Fluid <u>Air</u>	Depth to Static _____	
Total Depth of Boring <u>1060</u> Feet		Water Level <u>586</u> (Feet)	Date Measured <u>03/05/2021</u>
Total Depth of Completed Well <u>1058</u> Feet		Estimated Yield* <u>190</u> (GPM)	Test Type <u>Air Lift</u>
		Test Length <u>4</u> (Hours)	Total Drawdown _____ (feet)
		*May not be representative of a well's long term yield.	

Geologic Log - Free Form		
Depth from Surface Feet to Feet		Description
0	8	top soil & cobble
8	15	red ash with embedded rock
15	25	tan ash with embedded rock
25	30	black fractured volcanics
30	55	red ash with embedded rock
55	88	tan ash with embedded rock
88	200	black volcanic rock
200	210	black volcanics with tan ash stringers
210	280	black fractured volcanics
280	310	red soft volcanic rock
310	320	tan sandy ash
320	345	black soft volcanics
345	400	black fractured volcanics
400	420	black, red volcanics
420	480	tan soft volcanics

RECEIVED

JUL 01 2021

Napa County Planning Building &
 Environmental Services

2021 OVID WELL

480	660	black fractured volcanics
660	675	red soft volcanics
675	820	gray volcanic rock
820	835	red volcanic rock
835	920	black fractured hard volcanics
920	940	gray volcanic rock
940	980	gray, green volcanics
980	990	black hard volcanic rock
990	1020	red, black soft volcanics
1020	1025	black hard volcanic rock
1025	1040	black, red soft volcanics
1040	1055	red ash with embedded rock
1055	1060	black hard volcanic rock

Casings

Casing #	Depth from Surface Feet to Feet		Casing Type	Material	Casings Specifications	Wall Thickness (inches)	Outside Diameter (inches)	Screen Type	Slot Size if any (inches)	Description
1	0	578	Blank	Low Carbon Steel	N/A	0.25	8.625			steel
1	578	598	Screen	Low Carbon Steel	N/A	0.25	8.625	Milled Slots	0.06	steel
1	598	738	Blank	Low Carbon Steel	N/A	0.25	8.625			steel
1	738	918	Screen	Low Carbon Steel	N/A	0.25	8.625	Milled Slots	0.06	steel
1	918	978	Blank	Low Carbon Steel	N/A	0.25	8.625			steel
1	978	1038	Screen	Low Carbon Steel	N/A	0.25	8.625	Milled Slots	0.06	steel
1	1038	1058	Blank	Low Carbon Steel	N/A	0.25	8.625			steel

Annular Material

Depth from Surface Feet to Feet		Fill	Fill Type Details	Filter Pack Size	Description
0	60	Cement	10.3 Sack Mix		
60	550	Other Fill	See description.		pea gravel
550	1058	Other Fill	See description.		#6 sand

Other Observations:

2021 OVID WELL

Borehole Specifications		
Depth from Surface Feet to Feet		Borehole Diameter (inches)
0	1060	15

Certification Statement			
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief			
Name <u>HUCKFELDT WELL DRILLING INC</u>			
Person, Firm or Corporation			
994 KAISER ROAD	NAPA	CA	94558
Address	City	State	Zip
Signed <u>electronic signature received</u>	03/22/2021	439746	
C-57 Licensed Water Well Contractor	Date Signed	C-57 License Number	

DWR Use Only											
CSG #	State Well Number				Site Code				Local Well Number		
					N						W
Latitude Deg/Min/Sec						Longitude Deg/Min/Sec					
TRS:											
APN:											