# Water Availability Analysis APN 025-380-017

Three Twins Vineyards 704 Greenfield Rd St. Helena, California 94558

Three Twins

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## Introduction

Three Twins is seeking to plant an additional 2.5 gross acres of vineyard at the Three Twins Ranch located at 704 Greenfield Road (APN 025-380-017, 23 acres +/-) which is located near the northeast shore of Lake Hennessey (Figure 1). Existing vineyard acreage is 4.76 (+/-) acres. Irrigation of existing and proposed vineyards uses groundwater from an existing on-site well. This Water Availability Analysis (WAA) was developed based on the guidance provided in the Napa County Department of Planning, Building, & Environmental Services' Water Availability Analysis Guidance Document formally adopted by the Napa County Board of Supervisors in May 2015.

The WAA includes the following elements: estimates of existing and proposed water uses within the project recharge area, compilation of drillers' logs from the area and characterization of local hydrogeologic conditions, and performance of analyses to estimate groundwater recharge relative to proposed uses (Tier 1 of the WAA) and a screening analysis of the potential for well interference at neighboring wells located within 500-ft of the project wells (Tier 2 of the WAA).

## Limitations

Groundwater systems of Napa County and the Coast Range are typically complex, and available data rarely allows for more than general assessment of groundwater conditions and delineation of aquifers. Hydrogeologic interpretations are based on the drillers' reports made available to us through the California Department of Water Resources, available geologic maps and hydrogeologic studies, and professional judgment. This analysis is based on limited available data and relies significantly on interpretation of data from disparate sources of disparate quality.



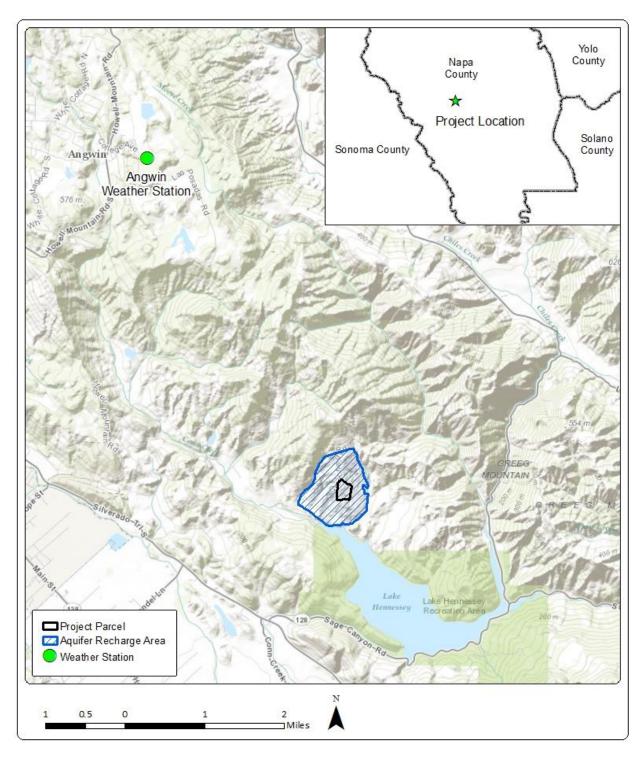


Figure 1: Project location map.



## Hydrogeologic Conditions

The project parcel is set in the mountains east of the Napa Valley. The local bedrock is volcanic sand and gravel of the Tertiary aged Sonoma Volcanics Formation (Figure 2; map unit Tss). The Tss unit is part of a one-square mile block bounded on its north edge by a fault contact with the Rhyolite Flows of the Sonoma Volcanics (map unit Tsr) and to the east and west by parallel northwest to southeast trending faults which run about 5 miles to the northwest beginning near Lake Hennessey (Figure 2). All faults are approximately located. An eight-acre area capping a subtle ridgeline within the Tss block is mapped as the Pumiceous Ash Flow Tuff (map unit Tst) and is in the western third of the project parcel. To the east of the project area is a contact between the Tss and a large block of the metagraywacke of the Cretaceous-age Franciscan Complex (map unit Kfm).

Wells 1 - 3 and 6 - 8 have been located within the ridgetop Tst. Based on map interpretation the Tst unit has a maximum thickness of 240 ft. All wells penetrating the Tst unit are 350 ft or deeper and are assumed to penetrate the Tss. The Tss unit is intersected by both wells on the project parcel (Well 1 and Well 2, Figures 2 and 3) and is assumed to be the primary project aquifer. It is described as "crossbedded, coarse-grained volcanic sandstone, and cobble conglomerate with well-rounded to angular andesite and basalt clasts. [It] also includes tuffaceous silt, bedded tuff, clay and diatomite" (Graymer et al., 2007). Wells drilled in the Sonoma Volcanics typically yield between 16 gpm to less than 50 gpm, however, of the subunits within the Sonoma Volcanics the Tss has a slightly higher well yield potential than the tuffs (Tst) (LSCE, 2013).

The Tsr unit primarily consists of rhyolite lava flows with intercalated rhyolite tuff in places (Graymer et al., 2007). This unit has a very low primary porosity and groundwater occurs primarily in fractures resulting in great variability in production in wells intersecting this unit. Due to this and the presence of the fault contact between the Tss and Tsr, the units are not considered to be hydrologically connected and the project aquifer and associated recharge area (Figure 2) do not include the Tsr unit.

The Kfm unit is described as gray, foliated, jadeite-bearing metagraywacke with brown weathering (Graymer et al., 2007). Primary porosity in the Kfm and other rocks of the Franciscan Complex is very low and groundwater occurs primarily in fractures. Similar to the Tsr unit, well yields are variable depending on the degree of fracturing however yields are generally quite low and on the order of a few gallons per minute; dry test holes are also common within these rocks (LCSE, 2013). Kfm and Tss are considered hydrologically separate, therefore the contact between Kfm and Tss is defined as the eastern project recharge area boundary (Figure 2).

Driller's logs (Well Completion Reports) for wells on and around the project parcel were obtained from the California Department of Water Resources. A subset of these logs for wells that could be located with reasonable accuracy was compiled and georeferenced based on parcel and location sketch information (Figure 2). Appendix A contains copies of these well logs.



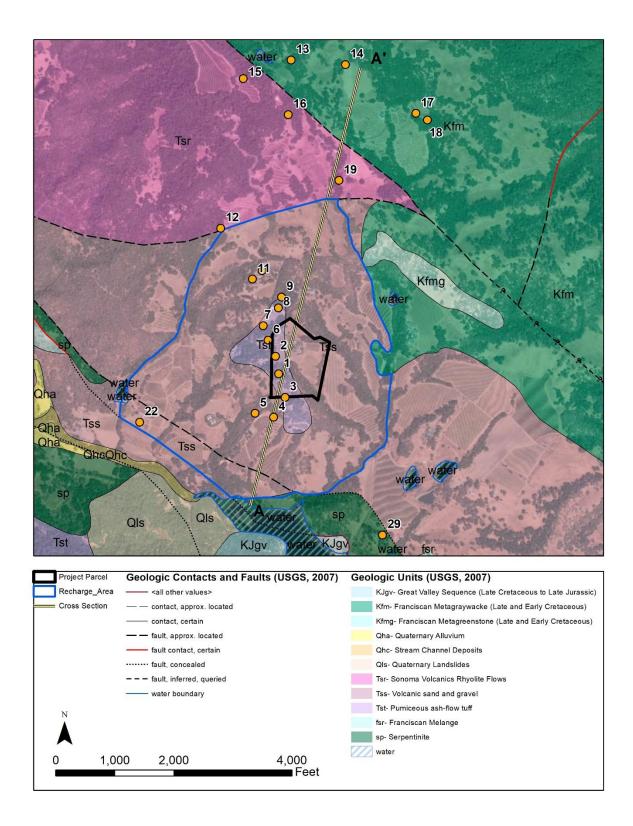


Figure 2: Surficial geology and locations of wells in the vicinity of the project parcel (Graymer et al., 2007).



There are two wells located on the project parcel. <u>The project well, Well 1, serves as the source</u> <u>for irrigation</u> and is in the southeastern quadrant of the project parcel (Figure 2). The older of the two wells, Well 2, serves the residence and is located immediately south of the driveway at the western edge of the parcel.

Well 1 was completed in 2016 to a depth of 510 feet. At the time of completion, this well had a static water level of 130 feet and an estimated yield of 120 gpm. Based on a 4-hour air lift pump test at estimated pumping rate of 120 gpm with 170 feet of drawdown, Well 1 has an estimated specific capacity of 0.71 gpm/ft of drawdown. The geologic log on the available Well Completion Report (Appendix A) indicates upper layers of clay and changing with increasing depth to river gravel, then shale and shale clay down to 225 ft where volcanic gravel and more consolidated volcanic rocks were logged down to 500 ft. Shale was encountered at a depth of 500 feet.

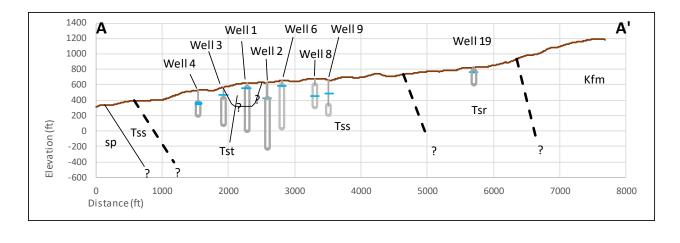
Well 2 is located approximately 350 ft to the northwest of Well 1. A well completion report is not available for Well 2, but a well inspection and pump test conducted on September 16, 2015 by Ray's Well Testing Service provides some details about its construction and performance. The 2015 report states that the depth probe reached a depth of 272 feet before hitting an obstruction; the observed static water level was 243 ft. Based on a 5-hour pump test at 12.9 gpm with 2 feet of drawdown, Well 2 has an estimated specific capacity ( $S_c$ ) of 6.45 gpm/ft drawdown.

The wells in the surrounding area have depths ranging from 198 to 840 feet and static water levels vary widely from 25 to 230 feet (Table 1, Figures 2 and 3). Pump test information obtained at the time of development was available for several of these wells and indicate a wide variety of specific capacities from 0.004 to 0.53 gpm/ft of drawdown. The driller's reports include a wide variety of rock descriptions, but the most common are brown clay, gray clay, gray sand and gravel, sandy clay and gravels with occasional mention of boulders. These descriptions are consistent with the volcanic sedimentary deposits described by Graymer et al. (2007).

Some of these neighboring wells are located near the project wells. Well 6 on an adjacent parcel (APN 025-380-008) is located approximately 260 feet west-northwest of Well 2 and 660 ft from Well 1. Well 3, located on the parcel to the south (APN 025-380-012) is 376 ft from Well 1 and 419 ft away from project Well 2. All other neighboring wells are located more than 500 feet away from either of the two project wells.

Well ID	1	2	3	4	5	6	7	8	9	10	12	14	19	29
Year Completed	2016	Unk.	2006	Unk.	1981	2010	2003	1978	1986	1990	1998	1995	1993	1996
Depth (ft)	510	272	470	318	265	600	840	350	440	340	325	350	198	200
Static Water Level (ft)	130	243	105	174	40	70	205	230	175	80	70	21	61	25
Top of Screen (ft)	210	Unk.	155	Unk.	45	60	218	90	340	60	125	50	52	40
Bottom of Screen (ft)	510	Unk.	470	Unk.	220	600	798	350	440	250	325	350	198	200
Pumping Rate (gpm)	120	12.9	100	20	10	20	20	10	1	1	1	50	2	50
Drawdown (ft)	170	2	Unk.	201	110	590	Unk.	Unk.	440	240	325	Unk.	195	120
Test Length (hrs)	4	5	5	1.66	Unk.	15	1	Unk.	1	3	4	3	2	4
Specifc Capacity (gpm/ft)	0.76	6.45	Unk.	0.74	0.14	0.04	Unk.	Unk.	0.004	0.01	0.004	Unk.	0.01	0.53
Map Unit	Tst	Tst	Tst	Tss	Tss	Tst	Tst	Tst	Tss	Tss	Tsr	Kfm	Tsr	sp

Table 1: Well completion details for the project well and wells on nearby parcels.



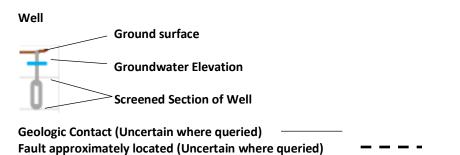


Figure 3: Hydrogeologic cross section A -A' through the vicinity of the project parcel (see Figure 2 for location).

## Water Demand

#### **Existing Use**

Existing condition water use in the project recharge area consists of residential use, irrigation use for vineyards, and winery use. Existing uses were determined using satellite photo interpretation to determine the number and size of residences and publicly available vineyard and winery data from the County of Napa to determine vineyard acreage and winery production. Annual rates for the various uses have been estimated primarily based on Napa County's Water Availability Analysis Guidance Document, dated May 2015 (Napa County, 2015). Within the project recharge area, the existing residential use is estimated to total 24.98 acre-ft/yr, the existing irrigation use is estimated to total 51.45 acre-ft/yr, and the existing winery use including duties for employees and guests is estimated to total 0.40 acre-ft/yr. The total estimated existing use is 76.82 acre-ft/yr (Tables 2 through 7). Approximately 6.9 acre-ft/yr or 8.9% of the existing water use occurs on the project parcel. The project parcel is approximately 23 acres which represents 6.2% of the approximately 370-acre project recharge area.

Within the project recharge area, there are seven oversized main residences, fifteen main residences, six secondary residences, and nine uncovered pools. Many of these residences contain more than 1,000 ft<sup>2</sup> of lawn. In total there is an estimated 28,200 ft<sup>2</sup> of lawns above and beyond the 1,000 ft<sup>2</sup> per residence assumed by the residential water uses. The project parcel contains one main residence, one secondary residence, an uncovered pool, and approximately



Proposed Use

6,900 ft<sup>2</sup> of lawn. The project parcel also contains approximately 18,000 ft<sup>2</sup> of drought-tolerant landscaping. Because 1,000 ft<sup>2</sup> of the parcel's lawn has already been excluded from the residential water use calculations, all 18,000 ft<sup>2</sup> of drought tolerant landscaping are included in the residential water use calculations.

There are several vineyards within the project recharge area. Based on publicly available vineyard data from the County of Napa, there are approximately 99.29 acres of vines within the project recharge area. Of this, 4.76 acres are located on the project parcel.

A winery, the MJA Winery (APN 025-3800-021), is also located within the project recharge area. Based on publicly available winery data from the County of Napa, this winery has an annual production of 15,000 gallons and has three full-time employees. The winery also hosts tastings for up to 3,900 guests per year and hosts marketing events for up to 420 guests per year. There are no other publicly registered wineries within the project recharge area.

	Residential Use	Irrigation Use	Winery Use	Total Use
	(acre-ft/yr)	(acre-ft/yr)	(acre-ft/yr)	(acre-ft/yr)
Existing Use	24.98	51.45	0.40	76.82

24.98

Table 2: Existing and proposed groundwater uses within the project recharge area.

Use Category	# of Units	Use per Unit (ac-ft/yr)	Use per 1,000 square feet above first 1,000 (ac-ft/yr)	Annual Water Use (ac-ft/yr)
Oversized Main Residence	7	1.00		7.00
Main Residence	15	0.75		11.25
Secondary Residences	6	0.35		2.10
Pools	9	0.10		0.90
Lawns (ft <sup>2</sup> )	28,200		0.10	2.82
Drought-Tollerant Landscaping (ft <sup>2</sup> )	18,172		0.05	0.91
TOTAL				24.98

 Table 3: Calculation of estimated existing and proposed residential use within the project recharge area.

52.30

0.40

77.67



Use Category	Number of	Use per Acre	Annual Water
	Acres	(ac-ft/yr)	Use (ac-ft/yr)
Vineyard Irrigation	99.29	0.50	49.65
Orchard Irrigation	0.45	4.00	1.80
TOTAL			51.45

Table 4: Calculation of estimated existing irrigation use within the project recharge area.

Table 5: Calculation of estimated existing and proposed winery use within the project recharge area.

Use Category	Annual Production (gal/yr)	Use per 100,000 gal of production	Annual Water Use (ac-ft/yr)
Winery Process Use	15,000	2.15	0.32
Winery Domestic Use	15,000	0.50	0.08
Winery Employee Use (see Table 6)			0.04
Winery Guest Use (see Table 7)			0.06
TOTAL			0.40

Table 6: Calculations of estimated existing and proposed employee use within the project recharge area.

Work Category	# of Employees	# Work Days per Year	Use per Employee (gal/day)	Annual Water Use (ac-ft/yr)
Full-time	3	260	15	0.036
TOTAL				0.036

Table 7: Calculations of estimated existing and proposed guest use within the project recharge area.

Visitor Category	Annual # of	Use per Visitor	Annual Water Use
	Visitors	(gallons)	(acre-ft/day)
Tasting/Tours	3,900	3	0.036
Marketing Events	420	15	0.019
TOTAL			0.055



#### **Proposed Use**

In the proposed condition, an additional 1.7 acres (2.5 acres gross) of grape vines will be added on the project parcel, increasing the vineyard area on the project parcel to 6.46 acres and vineyard area within the project recharge area to 101 acres. On-site residential water use is unchanged and no winery is proposed for the project parcel.

On the project parcel, the proposed vineyard expansion will increase the irrigation demand from 4.18 acre-ft/yr to 5.03 acre-ft/yr (Table 8). Within the project recharge area, the proposed vineyard expansion will increase the irrigation water use from 51.45 acre-ft/yr to 52.3 acre-ft/yr (Table 9) and will increase the total water use from 76.82 acre-ft/yr to 77.67 acre-ft/yr (Table 2). Approximately 7.72 acre-ft/yr or 9.9% of the proposed water use occurs on the project parcel which represents 6.2% of the recharge area.

Use Category	Number of Acres	Use per Acre (ac-ft/yr)	Annual Water Use (ac-ft/yr)
Vineyard Irrigation Orchard Irrigation	6.46 0.45	0.50 4.00	3.23 1.80
TOTAL			5.03

Table 8: Calculation of estimated proposed irrigation use on the project parcel.

Table 9: Calculation of estimated proposed irrigation use within the project recharge area.

Use Category	Number of	Use per Acre	Annual Water
	Acres	(ac-ft/yr)	Use (ac-ft/yr)
Vineyard Irrigation	101.0	0.50	50.50
Orchard Irrigation	0.45	4.00	1.80
TOTAL			52.30

## **Groundwater Recharge Analysis**

The Soil Water Balance (SWB) model developed by the U.S. Geological Survey (Westenbroek et al., 2010) was used to produce a spatially distributed estimate of annual recharge in the vicinity of the project parcel defined by the project recharge area. This model operates on a daily timestep and calculates runoff based on the Natural Resources Conservation Service (NRCS)



curve number approach and Actual Evapotranspiration (AET) and recharge based on a modified Thornthwaite-Mather soil-water-balance approach (Westenbroek et al., 2010).

This approach simulates potential recharge from infiltration of precipitation and does not account for the capacity of the project aquifer materials to accept recharge. As discussed above under Limitations, groundwater occurring at significant depths may not be directly related to the recharge generated on the overlying landscape. Significant additional recharge may occur through streambed infiltration, and/or groundwater inflows from outside the defined project recharge area, however quantifying these recharge components is beyond the scope of this analysis.

Estimated recharge rate for the project parcel is reported as an area-weighted proportion of estimated recharge rate for the approximately 370-acre project recharge area. Although it is possible to calculate the model estimate of recharge specifically on the project parcel, the differences in recharge rate estimates should not be considered accurate at the parcel scale. The factors controlling spatial variation in the rate of groundwater infiltration to the underlying geologic materials comprising the aquifer are not known with certainty; therefore, we consider the estimated groundwater recharge rate to be valid only as a spatial average for the project recharge area.

#### Model Development

The eastern boundary of the project aquifer recharge area was defined by the locations of the contact between Tss and Kfm and along a tributary to Lake Hennessey. The northern boundary was defined by the fault contact between Tss and Tsr, the western boundary was defined by an unnamed tributary to Conn Creek, and the southern boundary was defined by a fault mapped along the main stem of Conn Creek (Figures 2 and 3). This area is underlain by the Tss units of the Sonoma Volcanics Formation with a small area mapped as Tst and is approximately 370 acres in size.

The model was developed using a 10-meter resolution rectangular grid and water budget calculations were made on a daily time step. Key spatial inputs included a flow direction map developed from the USGS 10-meter resolution Digital Elevation Model (DEM), a land cover dataset developed from the National Land Cover Dataset and modified based on the Napa County shapefile of agricultural areas and interpretation of 2016 aerial photography (Figure 4), a distribution of Hydrologic Soil Groups (A through D classification from lowest to highest runoff potential; Figure 5), and Available Water Capacity (AWC) developed from the NRCS Soil Survey Geographic Database (SSURGO).

A series of model parameters were assigned for each land cover type/soil group combination including a curve number, dormant and growing season interception storage values, and a rooting depth (Table 10). Curve numbers were assigned based on standard NRCS methods. Interception storage values and rooting depths were assigned based on literature values and previous modeling experience. Infiltration rates for hydrologic soil groups A through D were applied based on Cronshey et al. (1986) (Table 11) along with default soil-moisture-retention relationships based on Thornthwaite and Mather (1957) (Figure 6).



Daily precipitation and daily minimum and maximum air temperature data were compiled for the Angwin weather station which is located approximately 4.8 miles northwest of the project parcel (Figure 7). This station was selected because it represents the best available climate station in proximity to the project site with a long and continuous period of record. Based on the PRISM dataset which describes the spatial variations in long-term precipitation for the continental U.S., the 1980 to 2010 mean annual precipitation at the Angwin weather station location was 42.5 inches versus 35.7 inches for the project recharge area (PRISM, 2010). The precipitation data was scaled down by a factor of 0.84 to account for the difference in precipitation between the station location and the project recharge area. Water Year 2010 was selected to represent average water year conditions for the analysis because it represents a recent year with near long-term average precipitation conditions (37.3 inches at the scaled Angwin weather station). The model was also evaluated for water year 2014 to represent drought conditions. Water year 2014 precipitation was 21 inches or approximately 56% of long-term average conditions.



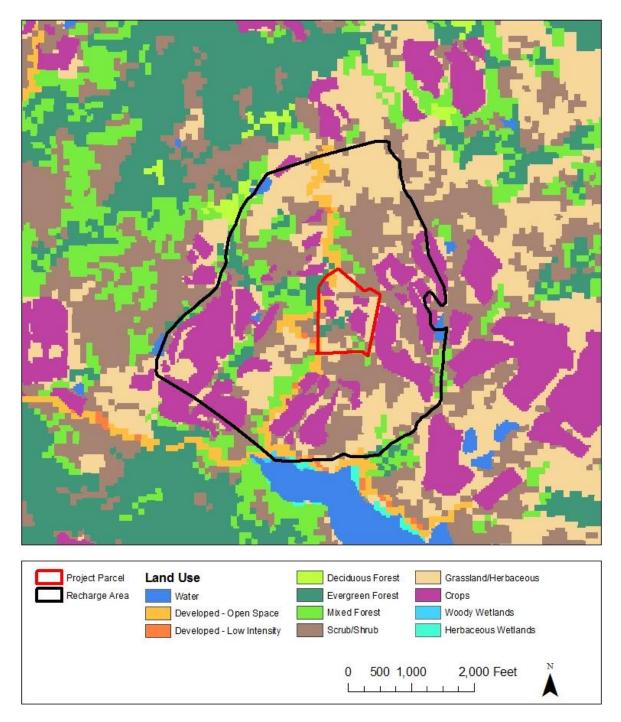


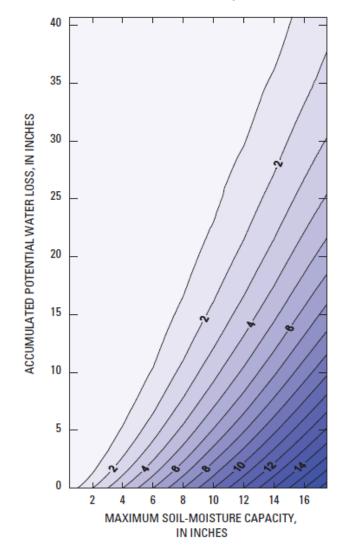
Figure 4: Land cover map used in the SWB model.





Figure 5: Soil map used in the SWB model.





SOIL MOISTURE RETAINED, IN INCHES

Figure 6: Soil-moisture-retention table (Thornthwaite and Mather, 1957).

	Curve Number	Interception Storage Values	ption Storage Values	Rooting Depths (ft)
Land Cover	C Soils	Growing Season	Dormant Season	C Soils
water	100	0.000	0.000	0.00
developed open space	82	0.010	0.005	2.00
developed - low intensity	82	0.010	0.005	2.00
developed - high intensity	06	0.005	0.002	2.00
evergreen forest	70	0.050	0.050	4.00
mixed forest	70	0.050	0.035	4.50
shrub/scrub	65	0.080	0.015	2.70
grassland/herbaceous	71	0.005	0.004	1.00
woody wetlands	06	0.050	0.035	4.50
herbaceous wetland	91	0.000	0.000	1.00
vineyard	75	0.080	0.015	2.00

Table 10: Soil and land cover properties used in the SWB model.

Table 11: Infiltration rates for NRCS hydrologic soil groups (Cronshey et al., 1986).

Soil Group	Infiltration Rate (in/hr)
A B C D	> 0.3 0.15 - 0.3 0.05 - 0.15 <0.05

0 E I

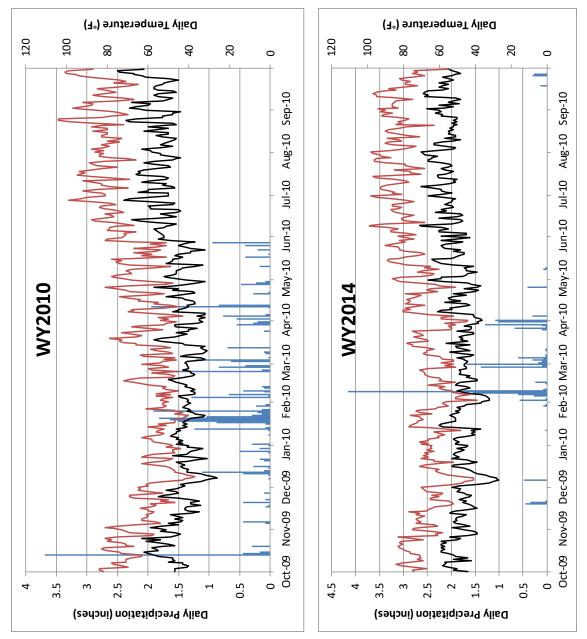


Figure 7: Daily precipitation (blue bars) and minimum (black lines) and maximum (red lines) air temperature used in the SWB model.

# Results

The simulated Water Year 2010 (average water year) recharge results indicate that recharge varied across the project recharge area from 1.24 to 19.9 inches, excluding areas classified as water where the model assumed zero recharge (Figure 8 and Table 12). Spatially averaged over the project recharge area, the 37.3 inches of precipitation was partitioned as follows: Actual Evapotranspiration (AET) = 20.5 inches, Runoff = 9.3 inches, and Recharge = 7.6 inches (Table 12). The simulated water year 2014 (dry water year) recharge results indicate that recharge varied averaged over the project recharge area, only 3.3 of the 21 inches of precipitation was recharged Spatially across the project recharge area from 0.016 to 13.1 inches (Figure 9 and Table 10). (Table 12)

ш О Recharge as a percentage of annual precipitation ranged from 20% in the average water year to 16% in the dry water year. Runoff as a percentage of annual precipitation was lower in the dry water year (16%) compared to the average water year (25%).

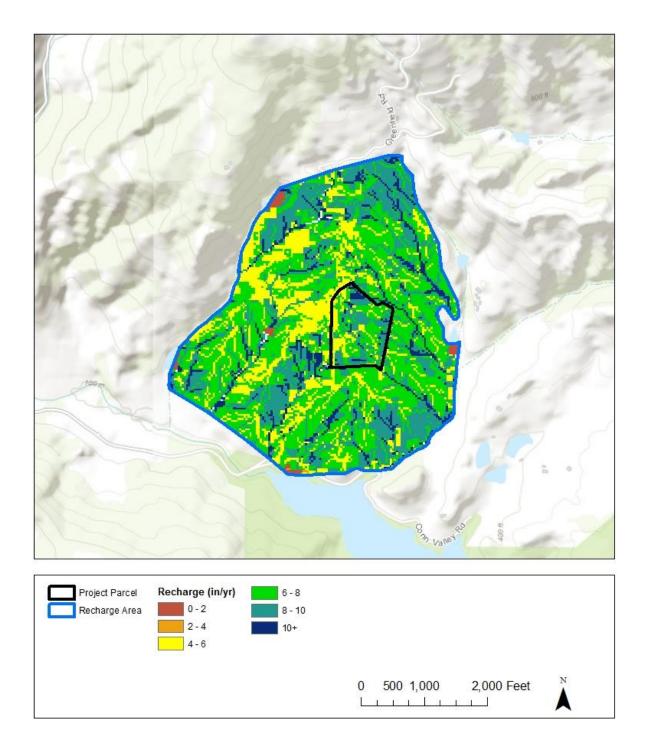
Groundwater recharge estimates can also be expressed as a total volume by multiplying the calculated recharge by the project aquifer recharge area of 370 acres. This calculation yields an estimate of total recharge of 101.8 ac-ft during the drought conditions of water year 2014 and of 234.3 ac-ft for the average water year of 2010. Representative estimates of recharge rates on the project parcel are 6.3 ac-ft/yr for dry water years and 14.6 ac-ft/yr for average water years in proportion to the size of the project parcel (23 acres) relative to the simulated recharge area (Table 13).

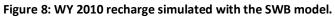
The project recharge area lies within the lower reaches of the Conn Creek watershed, and a water budget estimate is available for this watershed from LSCE (2013). The simulated Water Year 2010 average AET for the project recharge area represents approximately 55% of the precipitation which is similar to the results for the Conn Creek watershed (53%). The simulated Water Year 2010 runoff for the project recharge area represents approximately 25% of the precipitation which agrees very well with the results for the Conn Creek watershed (25%). The simulated Water Year 2010 groundwater recharge for the watershed represents approximately 20% of the precipitation which is also similar to the results for the Conn Creek watershed (21%).

	2010 Nor	mal Year	2014 Dry Year				
		% of		% of			
	inches	precip	inches	precip			
Precipitation	37.3		21.0				
AET	20.5	55%	14.4	69%			
Runoff	9.3	25%	3.3	16%			
Recharge	7.6	20%	3.3	16%			

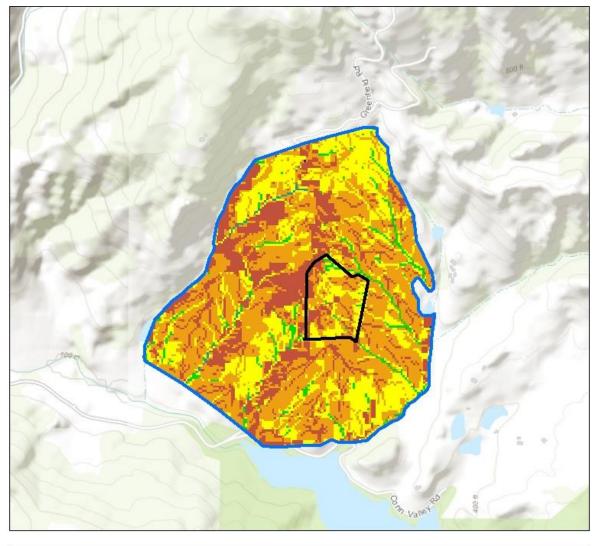
#### Table 12: Summary of water balance results from the SWB model.











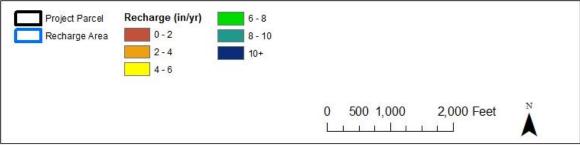


Figure 9: WY 2014 recharge simulated with the SWB model.



# **Comparison of Water Demand and Groundwater Recharge**

The total proposed groundwater use for the project recharge area is estimated to be 77.7 acreft/yr; total proposed groundwater use on the project parcel is about 7.7 acre-ft/yr. Proposed groundwater use in the project recharge area is equivalent to 33% of the estimated mean annual groundwater recharge of 234.3ac-ft/yr and 76% of the estimated dry water year recharge of 101.8 ac-ft/yr (Table 13). This comparison indicates that there is a substantial surplus of groundwater resources in terms of estimated annual groundwater recharge. Given the magnitude of this surplus, the increase in water use associated with the proposed vineyard expansion (approximately 0.85 acre-ft/yr) is highly unlikely to result in reductions in groundwater levels or depletion of groundwater resources over time.

Table 13: Comparison of proposed water use to average and dry year groundwater recharge in the project areaand on the project parcel.

		Avera	ge Water Ye	ar (2010)	Dry Water Year (2014)					
	Total Proposed Demand (ac-ft/yr)	Recharge (ac-ft/yr)	Recharge Surplus (ac-ft/yr)	Demand as % of Recharge	Recharge (ac-ft/yr)	Recharge Surplus (ac-ft/yr)	Demand as % of Recharge			
Project Reacharge Area	77.7	234.3	156.7	33%	101.8	24.1	76%			
Project Parcel	7.7	14.6	6.8	53%	6.3	-1.4	122%			

## **Well Interference Analysis**

The WAA guidance document indicates that a well interference analysis (Tier 2 WAA) is required if neighboring wells lie within 500-feet of the project well. The closest neighboring well to the project well (Well 1) on the project parcel is Well 3, which is located about 376 feet south of the project well on the adjacent parcel APN 025-380-012. A driller's report was obtained from the DWR for both the project well and the neighboring well. The second well on the project parcel (Well 2) is located 360 ft north of Well 1 and provides water for domestic use. Exhaustive efforts to obtain the Well Completion Report for Well 2 from the State Department of Water Resources and from the property owner's representative have been unsuccessful; the Well Completion Report cannot be obtained.

## Approach

To evaluate potential well interference, we used a procedure demonstrated by Weight and Sonderegger (2000, pp. 426-7) to estimate the radius of influence of the project well (Well 1) using available data to estimate key aquifer hydraulic parameters and distance-drawdown well function equations (Driscoll 1986, p. 237 and Bedient, Huber and Vieux, 2013). The radius of influence ( $r_0$ ) can be described as the horizontal distance from the well to the edge of the "cone of depression" in the aquifer formed by pumping from a well. If the radius of influence is less than the distance between Well 1 and the nearest adjacent well (Well 3), then it is unlikely that there will be significant well interference caused by operation of Well 1. The 2015 Napa County



guidance document pertaining to WAA's allows for 10 to 15 feet of water level drawdown attributable to well interference, but this criterion is only valid if the radius of influence of the project well extends beyond a potentially-impacted neighboring well. For wells with casing diameter of six inches or less, drawdown of 10 feet is recommended as a threshold of concern; for wells with casing diameter greater than six inches, drawdown of 15 feet is recommended as a threshold of concern.

The Napa WAA guidance recommends applying the Theis equation to wells located within 500 ft of the project well to estimate drawdown. The Theis equation (from Bedient, Huber and Vieux, 2013) is as follows:

$$s' = (Q/4\pi T) W(u)$$

with W(u) being the well function where

 $u = (r^2S/4Tt)$ 

and the well function integral expanded as a series as:

$$W(u) = -0.5772 - ln(u) + u - (u^2/2 \cdot 2!) + (u^3/3 \cdot 3!) - (u^4/4 \cdot 4!)...$$

where:

s' = drawdown (units in ft) r = radial distance (units in ft) S = storativity (dimensionless) T = transmissivity (units in ft<sup>2</sup>/day)

Q = discharge at the well (in gpm)

t = time (days)

Several assumptions are made when using the Theis equation:

1. The aquifer is homogeneous, isotropic, uniformly thick and of infinite areal extent.

2. Prior to pumping, the piezometric surface is horizontal

- 3. The fully penetrating well is pumped at a constant rate.
- 4. Flow is horizontal within the aquifer.
- 5. Storage within the well can be neglected.
- 6. Water removed from storage responds instantaneously with a declining head.

The well function equation above can be algebraically transformed to solve for  $r_o$  after the method of Weight and Sonderegger (2000):

### $r_o = [0.3 \text{ T t S}^{-1}]^{0.5}$





To estimate the likely radius of influence  $(r_o)$  of the project well (Well 1) and the potential drawdown (s) within that radius, estimates of the parameters T, t and S defined above are required.

#### **Estimated Aquifer Parameters**

Typically, a time-drawdown pump test would be performed on the project well to determine aquifer parameters to be used in a well interference analysis; however, no pump test data is available for the project well. Well 2 was the subject of a five hour pump test in September 2015. Given the relatively close proximity (360 ft) of Well 2 to the project well (Well 1) and the fact that the two are located in the same geologic unit (including the neighboring Well 3), this test has been used to estimate aquifer properties that can be used in the well interference analysis. Consequently, the potential drawdown of groundwater elevation caused by operation of the project well was evaluated using data gathered from the interpretation of the pump test performed on Well 2 along with the evaluation of a range of hydraulic aquifer properties listed in the Napa WAA document.

Transmissivity (T) of the aquifer at the well can be estimated by two methods. First, T can be roughly approximated using single well pump test data and well theory, limited by a set of assumptions (Driscoll 1986, p. 1021). In this method, an empirical equation for confined and unconfined aquifers relates specific capacity ( $S_c$ , gallons per minute per foot of drawdown determined from a pump test) to transmissivity as:

 $2,000 \text{ S}_c = T \text{ (confined aquifers)}$   $1,500 \text{ S}_c = T \text{ (unconfined aquifers)}$ where S<sub>c</sub> is in units of gallons per minute per foot (gpm/ft) and T is in units of gallons per day per foot (gpd/ft). This method of estimating T is very generalized and should not be relied upon if time-drawdown pump test data are available.

The extent and depth of clay-rich strata overlying the water-bearing strata observed in Well Completion Reports indicates confined aquifer conditions. Consequently, one estimate of T is given by 2,000 S<sub>c</sub>. The pump test of Well 2 in September 2015 (Appendix B) gave S<sub>c</sub> = 6.45 gpm/ft; estimated T from this method is 12,900 gpd/ft, equivalent to about 1,725 ft<sup>2</sup>/day.

T was also estimated by analyzing available time-drawdown pump test data (Appendix B) using specialized software (AQTESOLV) capable of evaluating the data with alternative analytical methods and assumptions regarding the aquifer. This approach may provide both a more site-specific estimate of T along with perspective regarding uncertainty of the estimate of T. Pump test data from a production well alone does not provide an estimate of S (although AQTESOLV reports a value of S).

Values of T were estimated using two solution methods in AQTESOLV, one using the Theis confined aquifer solution and another using the Hantush-Jacob leaky (confined) aquifer solution (Appendix C). The pump test reported some information about well construction and static and pumping water levels. Because a well completion report was not available for Well 2, construction details of the well including the total depth and screened casing intervals were estimated based on knowledge of the construction of surrounding wells. Both the Theis solution and the Hantush-Jacob solution methods resulted in an estimate of 10,772 gpd/ft (1,440 ft<sup>2</sup>/day)



for T and an estimate of 0.001 for S. The T estimate fits well with our empirical estimate of 12,900 gpd/ft falling within the same order of magnitude.

T can also be estimated using reference hydraulic conductivity (K) values for aquifer materials and multiplying by the saturated aquifer thickness (b) based on the definition T = Kb. Napa County Guidance suggests a range of K values between  $10^{-2}$  to  $10^2$  for Fractured Basalt (e.g. Sonoma Volcanics; Appendix G Table F3 in Napa 2015). A saturated aquifer thickness can be estimated by assuming conservatively that it only includes the static water level in the well down to the bottom of the screened interval of the well. Well 1 is screened to a depth of 510 ft and the well completion report for Well 1 reports the static water level to be at 130 ft therefore the estimated saturated aquifer thickness at the project site would be 380 ft. Applying this to the range of K values gives a range of T values from 284 gpd/ft to 2,842,588 gpd/ft.

Storativity (S) can be determined by an analytical pump test utilizing a pumping well and at least one observation well. No such pump test data are available for this site. Consequently, S must be estimated for purposes of evaluating likely values of r<sub>o</sub>. In an unconfined aquifer, S ranges from 0.01 to 0.3, and for confined aquifers they range from about 0.001 to 0.00001 (Lohman 1972). AQTESOLV estimates of S are at the upper end of the range stated for confined aquifers. Given the uncertain value of S due to the lack of observation well data, a range of likely values of S are considered in efforts to estimate the radius of influence of the well and the drawdown of water elevation that might be experienced in neighboring wells.

S can also be calculated using known Specific Storage values for certain aquifer materials and multiplying by the saturated aquifer thickness. Napa County Guidance suggests a range of Specific Storage values between 10<sup>-6</sup> to 2.1<sup>-5</sup> for Rock, fissured (Appendix G Table F3 in Napa 2015). Applying the estimated saturated thickness of 380 ft to the range of Specific Storage values gives a range of storativity from 0.00038 to 0.00798. Given that typical storativity value range from Lohman (1972) the Napa guidance seems to over estimate the upper end of the storativity.

In addition to the data available for the wells located on the project parcel, T and S were estimated for a separate nearby WAA study (APN 025-380-011) authored by OEI in 2016. In that study, estimated T values ranged from 1205 gpd/ft to 1480 gpd/ft (161.1 ft<sup>2</sup>/day to 197.8 ft<sup>2</sup>/day) and S values range between  $10^{-4}$  to  $10^{-5}$ . These estimates were derived from a pump test and located relatively close to the project parcel (to the south) and within similar geology; consequently, these values were considered representative of the project aquifer. The estimates are much smaller than those calculated for the project irrigation well but fall within the range of values suggested by Napa County Guidance and so were used as the lower end of the range of values evaluated.

Time since pumping began (t) was determined using the estimated annual irrigation demand (Table 8) and applying that to typical irrigation season length to determine an estimated daily demand. Assuming a 6-month (or 180 day) irrigation season, the proposed irrigation demand of 5.03 acre-ft becomes a daily demand of 9,105 gallons. Irrigation practices are typically limited by



well pumping capacity and storage tank capacity so assuming storage is not an issue, and the irrigation well pumps at a rate similar to the sustained rate of the domestic well (12.9 gpm) recorded in the 2015 pump test, it would take 11.8 hours to meet the daily demand. The value of t used for this analysis is 0.49 days (11.8 hours/24 hours per day).

#### Estimated Radius of Influence

Based on the equation presented above ( $r_o = [0.3 T t S^{-1}]^{0.5}$ ), the estimated radius of influence of Well 1 extends beyond Well 3, located about 376 feet from Well 1. The validity of the equation used to estimate the radius of influence is constrained by the requirement that the well function w(u) for a given set of parameters (r, S, T and t) remain relatively small (< 0.05, Driscoll, p. 219-220). For the set of parameters applicable to this scenario (t =0.49 days, T = 10,772 gpd/ft and S = 0.001) w(u) = 0.048and the Hantush-Jacob equation estimates a radius of influence of 1258 ft.

### Estimated Drawdown

Potential drawdown of water elevation in Well 3 resulting from pumping of Well 1 was estimated using the standard Theis equation (from Bedient, Huber and Vieux, 2013):

$$s' = (Q/4\pi T) W(u)$$

where the variables are the same as previously defined.

Since specific pump test data was not available for the project well (Well 1), aquifer properties were estimated from pump test data for Well 2 located 360 ft to the north. Estimated T values range from 10,772 gpd/ft from the AQTESOLV analysis as described above up to 12,900 gpd/ft from the empirical relationship described by Driscoll (1986). A storativity value of 0.001 was derived from the AQTESOLV analysis and pumping for 11.8 hours at 12.9 gpm. Applying these parameters, estimated drawdown at Well 3 ranges from 0.37 ft to 0.73 ft.

If we use the minimum values derived from the nearby Tier 2 WAA analysis by OEI in 2016, T of 1,205 gpd/ft (161.1 ft<sup>2</sup>/day) and S of  $10^{-5}$ , and assume the same pumping scheme of 12.9 gpm for 11.8 hours, drawdown at Well 3 is estimated to be 6.2 ft.

The WAA Tier 2 guidelines suggest a threshold of concern for drawdown of 10 ft. Consequently, operation of the project well (Well 1) does not appear to cause significant drawdown in the nearest neighboring well.

### Well Interference Analysis Conclusion

This analysis suggests that pumping at the project irrigation well (Well 1) is unlikely to result in significant drawdown at neighboring wells. In order to perform a more robust analysis of well interference potential, a pump test would need to be performed on the project irrigation well with one or more nearby wells serving as monitoring wells. Such a pump test would be expected to provide more directly applicable estimates of the aquifer parameters T and S used to estimate



the lateral extent of drawdown caused by operation of the project irrigation well and the depth of drawdown of the water surface in any neighboring wells

## Summary

Application of the Soil Water Balance (SWB) model to the project recharge area revealed that average water year recharge was ~7.6 inches/yr or 234.3 ac-ft/yr. During drought conditions, recharge was significantly lower at ~3.3 inches/yr or 101.8 ac-ft/yr. The total proposed Water Use for the project aquifer recharge area is estimated to be 77.7 ac-ft/yr reflecting an increment of additional groundwater use to irrigate an additional 1.7 acres of vineyards. This represents only 33% of the mean annual recharge. The proposed use for the project parcel is 7.7 ac-ft/yr and represents 53% of the mean annual recharge on the parcel indicating that the project is unlikely to result in declines in groundwater elevations or depletion of the groundwater resources over time.

The neighboring well (Well 3) nearest to the project well (Well 1) is located about 367 feet south of the project well. The estimated radius of influence of the project well extends approximately 1258 ft from Well 1 including Well 3. Estimated drawdown caused by operation of the project well is most likely in the range of < 1 ft based on estimated aquifer hydraulics from Well 2; based on aquifer hydraulic parameters estimated for a different well in the aquifer, estimated drawdown could be about 6.2 feet. Since the WAA Tier 2 guidance suggests that up to 10 feet of drawdown in a neighboring well caused by operation of a project well is acceptable, this analysis indicates that there are no significant adverse effects on groundwater elevation on neighboring parcels.

## References

Bedient, Philip B., Huber, Wayne C. and Vieux, Baxter E. (2012) <u>Hydrology and Floodplain Analysis</u> (Fifth Edition), Pearson Education, Inc., New Jersey.

Cronshey, R., McCuen, R., Miller, N., Rawls, W., Robbins, S., and Woodward, D., 1986. Urban hydrology for small watersheds - TR-55 (2nd ed.), Washington, D.C., U.S. Department of Agriculture, Soil Conservation Service, Engineering Division, Technical Release 55, 164 p.

Driscoll, F. 1986. Groundwater and Wells. US Filter/Johnson Screens, St. Paul, MN. 1089 p.

Graymer, R.W. et. al., 2007. Geologic Map and Map Database of Eastern Sonoma and Western Napa Counties, California. Pamphlet to accompany Scientific Investigations Map 2956. U.S. Department of the Interior U.S. Geological Survey.

Luhdorff and Scalmanini Consulting Engineers (LSCE) and MBK Engineers, 2013. Updated hydrogeologic conceptualization and characterization of conditions. Prepared for Napa County.

Napa County, 2015. Water Availability Analysis (WAA) Guidance Document, Adopted by the Napa County Board of Supervisors, May 12, 2015.

PRISM, 2010. 30 arcsecond resolution gridded total precipitation data for the conterminous United States, PRISM Climate Group, Oregon State University, www.prismclimate.org.

Thornthwaite, C.W., and Mather, J.R., 1957. Instructions and Tables for Computing Potential Evapotranspiration and the Water Balance, Publications in Climatology, v. 10, no. 3, pgs 185-311.

Weight, W. and Sonderegger, J. 2000. Manual of Applied Field Hydrogeology. McGraw-Hill. 608p.

Westenbroek, S.M., Kelson, V.A., Dripps, W.R., Hunt R.J., and Bradbury, K.R., 2010. SWB - A Modified Thornthwaite-Mather Soil-Water-Balance Code for Estimating Groundwater Recharge, U.S. Geological Survey Techniques and Methods 6-A31, 60 pgs.



## **APPENDIX A**

## WELL COMPLETION REPORTS



State of California

WELL 1

Well Completion Report WCR Form Submitted 07/05/2016 WCR2016-004586

Owne	r's Well I	Number	025-380-017-000	,	<b>N</b>					
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 Borehole Specifications

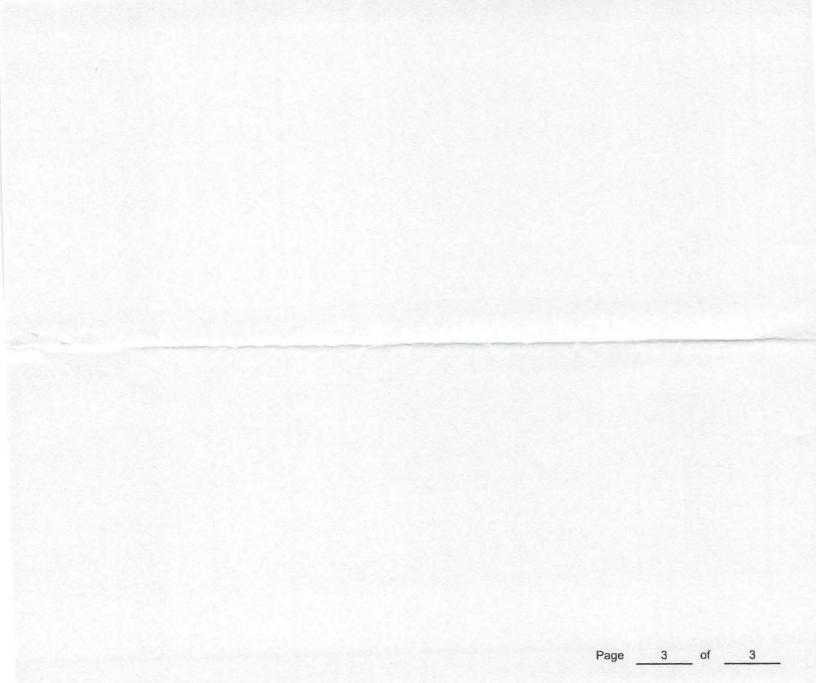
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	Geophysical Log(s) Soil/Water Chemical Analyses 5110 Highway								-	ipa	CA	q	4558	3			
		er Chemical		alyse	s		ADDRESS		<u></u>				CITY			STATE	ZIP
		INFORMATIC		IF IT	EX	ISTS	Signed	LICENSED WATE	er well con	ITRAC	CTOR			12/	12/20	<del>306</del> ;	
11WB 188 BE	W 05 00					ייחס											OSP 03 7883

DWR	188	REV.	05-03
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IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

		380 010	35 D'-	Well5
ORIGINAL	STATE OF C. THE RESOUR		<u>3</u> 2 <del>1</del>	Do not fill in
File with DWR	DEPARTMENT OF W		No No	b. 103484
e of Intent No.	WATER WELL DI			-
2 4 Permit No. or Date			State Well No.	08105635
		(12) WELL LOG: T	otal depth_ <u>265</u> ft. Depth	a of completed well <u>265 ft.</u>
		from ft. to ft. Formation	n (Describe by color, cha	
			<u>sandy clay _</u>	——— <u>—</u> —————
(2) LOCATION OF WELL (See County Napa	e instructions): Owner's Well Number 25-380-10	<u>15 - 60</u> 60 - 80	<u>multi color</u>	
CountyNapa Well address if different from aboveGree	enfield Rd		<u>blue sandy c</u> hard & soft	multi color rock
	STW Section		multi offor	
Distance from cities, roads, railroads, fences, etc	·	120 - 190 <		y rock
		190 - 220		te ash
		220 - 260		een & brown rock
			hard & so	
	(3) TYPE OF WORK: New Well Z Deepening	260 265	gray clay w	str of rock
	Reconstruction	<u> </u>	- Â	
	Reconditioning I		$\sim$	
	Horizontal Well	$\overline{\Omega}_{\Lambda} = -IH_{A}$	D.	
	Destruction (Describe destruction materials and	<u> </u>	)	
\$7 70' F	(4) PROPOSED USE			
of see	Domestic	<u> </u>	- <u></u>	
	Irrigation	- 11- 1/	~ 02 ~ · · · ·	
- Corri	Industrial			
	Test Well	MV - a	~ — — — — — — — — — — — — — — — — — — —	
COUNUALLEY RD.	Stock	$\mathcal{W} = \mathcal{O}$	♦	
WELL LOCATION SKETCH	Municipal D			
······································	GRAVED PACK:	7-0		
Rotary 🖾 Reverse 🗆 💦	()			
Cable 🗔 Air 🗆 Drive	reter of bore	$O(M)_{\overline{\lambda}}$		
	et Arm 22 265 4	<u> </u>		
	PERFORATIONS: DOWER Saw	<u></u>		
ft. ft. Dia. Gage of Wall	front To Slot ft ft size	-		
0 45 6 160	5 220 X8x3	-		
(9) WELL SEAL: Was surface sanitary seal provided? Yes	No $\Box$ If yes, to depth <u>22</u> ft.			
Were strata sealed against pollution? Yes		-		
Method of sealing Cement		Work started 9/15	19.81 Complet	ed <u>9/18</u> 1981
(10) WATER LEVELS:	00ft.	WELL DRILLER'S STA		
Standing level after well completion.	40ft.	this well was drilled under the knowledge and belief.	my furisdiction and this re	port is true to the best of my
(11) WELL TESTS:		SIGNED	(Well Driller)	
Type of test Pump	If yes, by whom? <u>driller</u> Bailer X Air lift	NAME Doshier	& Greeson_Dr	illing, Inc
Depth to water at start of test 40 ft	At end of test_ <u>110</u> ft	(Person, fi	m, or corporation) (Typed a-Vallejo Hw	l or printed)
	nours Water temperature	Address 5305 Nap	•	zip 94589-9679
	If yes, by whom? If yes, attach copy to this report	License No. 294001	Date of this reg	0/21/21

DWR 188 (REV. 7-76) IF ADDITIONAL SPACE IS NEEDED. USE NEXT CONSECUTIVELY NUMBERED FORM

		•		· .				•			5WD 110	- 	. · 🔽	Vell	6
ORIGINA File with					WELL (	STATE O הארשי	F_CALIFO	ORNIA ON RÉPO	)RT	$\boxed{0}$		251			
			•			Refer to In			/11 1		S	TATE W			ON NO.
Page Owners	Well No					No	094	9241				1			
Date Wor			9/10		Ended 1/1						LATITUDE		 	LC	
	Permit Ag			,								l			
	nit No.	E1	0-005	36	Permit	Date 11	/30/10		~	,		AP	N/TRS/	OTHER	
1011			GEOLO				I	<u>ري</u> ددي		'	WELL C	WNE:	R		
ORIENTAT	FION (ビ)	<u> </u>	TICAL _	НОР			(SPECIFY)	Name							
		DRILLING		• •	mud <sub>FI</sub>	UID <u>cetc</u>		Mailing							
	FROM FACE				ESCRIPTION		112	<u></u>							
Ft. t	o Ft.	<i>L</i>	)escribe	mater	ial, grain size,	, color, etc	<u>. U N</u>		<u></u>	1	WELL LO	CATIO	)N		
0		topso			clay			Address		Gre	enfiel	d Ro	ad		
20	<u>60</u>	brown	_clay			$\frac{\partial N \mathcal{V}}{\mathcal{V}}$		(Ciţy <u>)</u>	> st.		ena				
60					k imbedde			County	Napa						·····
80				4	rrock	$ \longrightarrow $		APN Book							
140		gray				$\frac{\zeta}{\zeta}$	¥4	Township 10	· ]	Range		Sectio			
160			and the second s		<u>k grây ro</u>			Eat	MIN.	SE	<u>N</u> C.	Long.	DE	l. G.	IW MIN. SEC.
200	220	brown				$\forall \sim$	-	~~ /			КЕТСН -			37 .	CTIVITY·(∠) —
220	280	gray			ite rock		3)501	· i	٦	NORTH	1	••••			NEW WELL
<u>280</u> 300 -	300	gray gray				$\approx \bigcirc$	~ / /		field Way		No			мори	FICATION/REPAIR
340	<u>340</u> 380	gray gráy		Aray	-Oray (	5°		Green			in the second second				Other (Specify)
380	400	<u>-brówn</u>		×1-	v 28	19,471						· · .			: •
400	400-	grav				•					Ĭ			1 1	DESTROY. (Describe Procedures and Material
400	440			1	te rock	•			. *•	·· ,		1. 			Under "GEOLOGIC LOG S ( <u> </u>
440	480		- 1× 11 2		ck sand						per a la calegaria de la caleg				R SUPPLY
480	500				k sand					- ( (					Domestic Public Irrigation Industria
500	520	gray						ESI	Ŧ	11			EAST	+	MONITORING
520	580	grav						В		JÍ		•	E		TEST WELL
580	600				ck sand			695	hield Ra		·			САТНО	DIC PROTECTION
	1							GP							HEAT EXCHANGE
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	)   -							· · · · · · · · · · · · · · · · · · ·	··· · · · · · · · · · ·	<u>\</u>				_ !	SPARGING
								Illustrate or Desc	ribe Distar	ice of W	Vell from Roa	ds, Build	lings,		
	I I · · ·	• .						Illustrate or Desc Fences, Rivers, et necessary. <b>PLEA</b> S	c. and atta SE BE AC	ch a m CURA	ıp. Use additi 「E & COMP	onal pap LETE.	oer if		OTHER (SPECIFY)
	, ,	·				,		WA	TER LE	VEL	& YIELD	OF CO	OMPL	ETED	WELL
· · · · ·	l I							DEPTH TO FIRS							
	I I							DEPTH OF STA							9/11
	 	· · · ·						WATER LEVEL			. (Ft.) & DATE				
	i		600			•		ESTIMATED YIE						air	
1	EPTH OF				600(Feet)			TEST LENGTH						<b>)_</b> (Ft.)	
TOTAL D	EPTH OF	COMPLET	ED WELI	L <u> </u>	(Feet)			* May not be r	representa	tive of	a well's lon	ıg-term	yield.		
	отц				C	ASING (S)				DF	PTH	-	ANN	ULAR	MATERIAL
FROM S		BORE- HOLE	TYPE (	<u> &lt;</u> )		,37			-   Ff	RONE	SURFACE				/PE
		DIA. (Inches)	¥ H +	띖	MATERIAL /	INTERNAL	GAUGE OR WALL		:   —			CE-	BEN-	<b>E</b> 11 ·	FILTER PACK
Ft. t	o Ft.	(mones)	BLANK SCREEN CON-	BUC	GRADE	(inches)	THICKNES			Ft.	to Ft.	MENT (ビ)	TONITE (∠)	FILL  (⊻)	(TYPE/SIZE)
0	60	123/4	x		F480	6	200			0	63	x	<u>, _ /</u>	<u>,</u>	
	140	97/8	X	+++	F480 F480	6	200	factor		53	600	<b>⊢</b> ▲	<sup>·</sup>	· ·	pea gravel
140	200	97/8	x		F480	6	200		*-  _`						
200	220	97/8	X		F480	6	200	factor	у		1			·	
220	240	97/8	x		F480	6	200				1		Ľ		
240	260	97/8	X		F480	6	200	factor	УĽ		1				
		HMENTS	( <u>∠)</u>				,	- CERTIF	<b>ICATIO</b>		TEMENT				
: · _	Geologic	Log		· •	11	-		is report is com		accu	rate to the	pest_of	my kr	lowled	ge and belief.
<b>1</b>		struction Di	agram			McLean	1 & Wil	(TYPED OR PRINTED)	ic.	•	•		· · ·	••••	· · ·
· _	Geophys	sical Log(s)			(PERS					•		•			
· · · -		er Chemical	•			878 El	Centr	o Ave., N	apa,	CA					
_	X Other _	casin	<u>ıg</u>		- ADDRESS	<b>`</b>	· 0			•	CITY 1	/27/	11	STATE	zip 396352
ATTACH A	ADDITIONAL	INFORMATIC	ON, IF IT E	EXISTS.	Signed Signed C-57	LICENSED WATE	R WELLYCONTE	RACTOR				TE SIGNED		`	C-57 LICENSE NUMBER
DWB 199 D	EV 05.02			ידוחח				T CONSECUTIV							OSP 03 788
DWR 188 RI	EV. 05-03		IF ۰.	ADDITI	UNAL SPACE I	S NEEDED,	USE NEX	I CONSECUTIV	LY NUN	NREBE	D FORM				U3r U3 /

A.P.#025-380-008

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Continue casing list:

260 – 280	9 7/8	Blank	F480	6"	200	
280 – 300	9 7/8	Perf	F480	6"	200	factory
300 – 320	9 7/8	Blank	F480	6"	200	
320 <i>:</i> - 340	9 7/8	Perf	F480	6"	200	factory
340 - 360	.9 7/8	Blank	F480	6"	200	
360 - 500	<u>9</u> 7/8	Perf	F480	6"	200	factory
500 - 520	<u>`</u> 9 7/8	Blank	F480	6"	200	
520 - 540	9 7/8	Perf	F480	6"	200	factory
540 - 560	9 7/8	Blank	F480	6"	200	
560 - 600	9 7/8	Perf	F480	6"	200	factory

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ORIGINAL								)F_CALIF(			[ <del>[]]</del>	DWR USE	E ONLY	⊽ٍ_	Vell	7
File with D	WR				WE:					REPOR	T LOI	8 NIC	<u>) _ (</u>		0	
Page _1_ o							-	struction .				3/			. 1	
Owner's W			02			- c 1	0 02	<sup>».</sup> 804	14	16						
Date Work I Local Peri	Began _	0-10- Na	<u>.03</u> ma (	ounty	, Ended z <b>Friv</b> i	<u>1-0</u>	9-03 ontal	Momt				1 1 1		1	 	
Local Peri	mit Age 👽 92	<u>ner 12</u> 2–1238	3					6-10-0	2				AP	N/TRS/C	THER	
Permit	.\o. <u>-</u>		GEO	LOGIC	I LOG -	ermit i	Jate	<u></u>	<u> </u>			WELL O	WNE	R —		
ORIENTATION									N.	ume						
ONENTATIO	n ( <u>-</u> )	DDUINK	~					tonite		ailing Address						
DEPTH FR		METHOD		<u>rar y</u> E	DESCRIP	TION										
Ft. to	Ft				rial, gra	in size,	color, etc	e	ĊĨŢ	Y		WELL TO	САТІ	)). 		
0		brow							Ad	ldress	<u>3 Gr</u>	eenfie	<u>19 y</u>	lay_		
	<u>140 ¦</u>			lcan	ics				Cit	ty	St.	Helena				
	<u>580  </u>	serp		.ne					Ca	N Book _25	Napa	200				
	<u>595  </u> 840	shal		laton	e/ 208	aha		-,	AF	PN Book _25	Page _	380	Parcel	_20		]
393 0	040	00%	Sair	SLOIR	<u>=/_207</u>	5110	<u>te</u>		To   ,	wnship	Range		Sectio •	n		
		LOST	PTE	E DO	JN WET	J. FR	DM 550	ī-	La	ititude <u> </u>				tude	DEG.	MIN. SEC.
					V CASI						CATION SI	KETCH -				TIVITY (≤)
	r	550'	•						ĺ	GRE	ENFIELD	WAY		Ì		CATION/REPAIR
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	- t -								]	/		٦				Cther (Specify)
											HOUSE			ł	D	ESTROY (Describe
					<del>.</del>				ļ		<u> </u>				P. U	rocedures and Materials Inder ' GEOLOGIC LOG'')
										/			1			NED USES (∠)
									{	/			1	/		R SUPPLY Iomestic Public
						<u> </u>			5/	ſ			/	μ		rigation Industrial
									WEST				1	EAST		MONITORING
				·						1			. [		CATHON	TEST WELL
			-							\	(1)F	11 - 10	2'			HEAT EXCHANGE
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398 5	538	blan	k	PVC	5"			·	]	$\mathbf{A}$	10		7		VAF	INJECTION
538 6	6 <b>7</b> 8 ¦	scre	en	PVC	5"	.032	2 slot		]	\			1			SPARGING
	698 _ <u>_</u>	blan	<u>k</u>	PVC	5"				111	ustrate or Describe	— SOUTH Distance of W	ell from Road	ls, Buila	ings.		REMEDIATIÓN
	<u>798 i</u>			_PVC	<u> </u>	.032	<u>2 slot</u>	• <b></b> .	-Fc -ucc	nees, Rivers, etc. an ressary. <b>PLEASE</b> F	id attach á ma BE ACCURAI	p. Úse additie 'E と COMPI	onal pap. LETE.	er if	1	OTHER (SPECIFY)
798 8	<u>818_</u>	blan	<u>k</u>	PVC	<u> </u>				<b> </b>		R LEVEL &				ETED	WELL
	- <u>-</u>									EPTH TO FIRST W						
										EPTH OF STATIC						
								<b></b>	1	ATER LEVEL		(Ft.) & DATE				
TOTAL DEP			01	<u> </u>		·				STIMATED YIELD		_ (GPM) & 1				_lift
TOTAL DEP TOTAL DEP						South				EST LENGTH May not be repri					🗠 (Fl.)	
10 1. 0.1				<u> </u>					<u> </u>	May not be repre	esemance of	<i>u</i> acu <i>s</i> 10 <i>n</i>	rg- <i>ier m</i>	yiesa.		
DEPTH	ч	BORE-				C	ASING (S	)			DEI	РТН		ANNU		MATERIAL
FROM SUR	RFACE	HOLE DIA.		PE(⊻)_		<i>i</i>	INTERNAL	GAUGE	-	SLOT SIZE	FROM S	URFACE	CE-		YT	PE
F1 50	Ft	(Inches)	BLANK	SURCEN CON- DUCTOR	MATE GR/		DIAMETER	I OR WAL	u	IF ANY	Ft. t	o Ft.		BEN- TONITE		FILTER PACK (TYPE/SIZE)
				이리프			(Inches)	THICKNE	.55	(Inches)	F1. (	·	(⊻)	(∠)	(⊻)	(TFE/3/2E)
	25	10	++				<u> </u>				0	22	X			<u>concrete</u>
	840	9	$\downarrow$	_  _	<b>FN</b> 7***	<b>B4</b> 00	<u> </u>				22	818	<b> </b>		X	gravel
	218 238	<b></b>	XX		PVC PVC		5	SDR-2		.032	├──	ı •		<u> </u>		
	230 378		X		PVC		5	SDR-2 SDR-2		.034		;				
	3 <u>70</u> 398		A X	+	PVC PVC		5	$\frac{SDR-2}{SDR-2}$		.032		ı — — — •		┣		<u> </u>
		1MENTS					<u> </u>		<u> </u>	CERTIFICA	TION STA	TEMENT	·	<u> </u>		
	Geologic	Log			ե	the unde	ersigned, c	ertify that I	his n	eport is complet	te and accu	rate to the	best of	f <mark>my k</mark> r	nowledg	ge and belief.
		struction D	Diagram		N I	ME	HUCKET	<u>TLDT</u> W	टा.ग	DRTLLING	· · · · · · · · · · · · · · · · · · · ·					
		ical Log(s)	-			(PERS						_				
_		er Chemica		ses			211 <b>9</b> I	Penny I	an	e			apa	C	A	94559
	Other				ADI	DRESS	Lh.	~ JA.	11.	1A-		CITY 7	-7-0	2	STATE	ZIP
ATTACH ADD	NTIONAL I	NFORMAT	ION. IF	IT EXISTS	5.    Si	oned <u>WELL</u>	DRILLER/AUTH	ORIZED REPRE	SENIAI	NY L		-	TE SIGNE		43	39-746 C-57 LICENSE NUMBER
DR14 155 40 V	11.97			IF ADDI	TIONAL S				<del>-</del> v	ONSECUTIVELY	( NUMBERE					

			V	Vell 8
ORIGINAL	STATE OF C	ALIFORNIA	L	Do not fill in
	THE RESOUR	CES AGENCY	N.	
		ATER RESOURCES	INO.	103317
of Intent No		RILLERS REPORT	State Well No	
Permit No. or Date	225	5RO . 200	Other Well No	snosw Zel
		(12) WELL LOG: $T_{C}$		
			(Describe by color, charact	
			<u>own clay sand</u> lti color d r	
(2) LOCATION OF WELL (See instruc CountyNapa Owner's	tions): Well Number <u>25–380–0</u>		own clay stic	
Well address if different from above <u>Same</u>	well Number $\sim j_{000}$		lti colored r	
TownshipRange	Section		own char with	
Distance from cities, roads, railroads, fences, etc.		135 - 162 6	x clay sandy	
			sandstone	
			It colored r	
·····			ay rock med h	ara
	(3) TYPE OF WORK:	252 350	ay rock soft	
	New Well Deepening	<u> </u>	- <u>A</u>	
	Reconstruction		$\sim$	
	Horizontal Well	<u> </u>	<u></u>	
50 _ 20		-193		
SEV.	Destruction [] (Describe destruction materials and procedures in Item 12			
Strange Center Freidard	(4) PROPOSED USE		C N	
The Court	Domestic	-		
			<u> </u>	
CONN VALLEY RA	Industrial	<u> ~~~</u>		
VALUE .	Test Well	A = - C	<u> </u>	
CON	Municipat			
WELL LOCATION SKETCH	Other	<u>}</u>		
(5) EQUIPMENT: (6) GRAVE				
Rotary C Reverse C No	Size			·
Cable Air X Strangener of b	ore <del>823}44</del>	$\mathbb{A}^{\mathbb{A}}$		
Other D Bucket D Packed from_	- tol - to	s (U)		
(7) CASING INSTALLED: (8) PERFOR	$\sim$ Nuachine N	<u> </u>		
Steel Plastic & Concrete Type of periff	abion or size of screen	<u> </u>		
from To Dia. Cage or From ft. ft. Wall ft.	To ft.			
$\begin{array}{c c} \mathbf{ft.} & \mathbf{ft.} & \mathbf{wall} & \mathbf{ft.} \\ \hline 0 & 90 & 0 & 160 & 90 \\ \end{array}$	356 1/8x3		·	
		_		
			· · · · · · · · · · · · · · · · · · ·	
(9) WELL SEAL:	Mr. ac	_		
Was surface sanitary seal provided? Yes 🕱 No 🗆	If yes, to depth <u>22</u> ft.			
Frout	o K] Intervalft.			-8/14
(10) WATER LEVELS:		work started	19/0 Completed	<u>0/-4</u> <u>19</u> 70
Depth of first water, if known 240	ft.	WELL DRILLER'S STA This well was drilled under n		t is true to the best of mu
Standing level after well completion 230	ft.	This well was drilled under n knowledge and belief	1.	
(11) WELL TESTS: Was well test made? Yes ⅔ No □ If yes, b	y whom? Drillers	SIGNED JACK	(Well Driller)	
Type of test Pump 🗍 Bailer 🗋	Air lift X	NAME Doshier-G	regson Drillin	g, Inc.
to water at start of testft.	At end of testft	Address 5365 Napa-	-Vallejo HWy	printed)
i ge U gal/min after hours	Water temperature	CityVallejo,	Ca	zip 94590
Was electric log made? Yes 🗌 No 🗌 If yes, b Was electric log made? Yes 🔲 No 🗀 If yes, al	y whom? tach copy to this report	License No. 2940C1	Date of this report	\$/16/78
		IEXT CONSECUTIVELY		

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25-380-16 Well 10 STATE OF CALIFORNIA ORIGINAL THE RESOURCES AGENCY Do not fill in File with DWR DEPARTMENT OF WATER RESOURCES No. 371058 WATER WELL DRILLERS REPORT Well # 1 State Well No. \_\_\_\_\_\_\_ Other Well No. \_\_\_\_\_\_\_\_ otice of Intent No. . Local Permit No. or Date 1:11.69 20 (12) WELL LOG: Total depth 340 ft. Completed depth 250 ft. ft. Formation (Describe by color, character, size or material) from ft. to 40 DHOWN \_ ai (2) LOCATION OF WELL (See instructions): 1 Qwner's Well Number County . Well address if different from above . Range \_3 80 Township\_  $\sim$ Section North MIS Distance from cities, roads, railroads, fencer, etc. spen のわれ nm. NA A 0 (3) TYPE OF WORK: New Well 🕅 Deepening 🗆 rom BUR Reconstruction Reconditioning Horizontal Well Destruction (Describe destruction materials and procedures in Item 12) (4) PROPOSED USE Domestic Irrigation Industrial Test Well Municipal Other (Deseribe) WELL LOCATION SKETCH GRAVEL RACK (5) EQUIPMENT: No Rotary 🔀 Reverse 🔲 Cable Air of hore Other 🗌 Bucke \_ (7) CASING INSTALLED (8) PERFORATIO \_ Type of parfox Steel 🗌 Plastic 🗡 ation of size of \_ Gage or Wall \$lòt \_ From ft. size 160 \_ へ \_ \_ (9) WELL SEAL: \_ Was surface sanitary seal provided? Yes 🔀 No 🗌 If yes, to depth \_2.2 ft. Were strata sealed against pollution? Yes 🔲 No 🗷 Interval Method of sealing \_\_\_\_\_ Work started\_ (10) WATER LEVELS: WELL DRILLER'S STATEMENT: 90 Depth of first water, if known \_ This well was drilled under my jurisdiction and this report is true to the 80 Standing level after well completion ft best of my knowledge and beliej (11) WELL TESTS: Signed Was well test made? No 🗖 If yes, by whom? Yes 🗶 pe of test Pump Bailer 🗋 Air lift 🛛 NAME epth to water at start of test \_\_\_\_\_\_ At end of test 240 Address Discharge \_\_\_\_\_ gal/min after Water temperature . hours No. If yes, by whom? City Chemical analysis made? Yes 🛄 License No. Date of this report Was electric log made Yes 🔲 No 🔽 If yes, attach copy to this report IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM DWR 188 (REV. 12-86) 86 96355

	rceL25-	380-110	
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		CALIFORNIA CES AGENCY	Do not fill in
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		RILLERS REPORT	N₀. 371056
totice of Intent No.	Well #	2	State Well No
Local Permit No. or Date			
			lepth 325 ft. Completed depth 311 ft. (Describe by color, character, size or material)
		$\dot{O} - / 30$	NOW COM
(2) LOCATION OF WELL (See instr			
County Own	ner's Well Number	130-140 2	sand y
Well address if different from above <u>907</u> Township <u>95</u> Range <u>3</u>	80_Section_16	140 - 160	river Sand + groud
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Greufield rds	in St.	160 - 100	A LANGER A
Helena		170-185	Stue Sticky Clay
	(3) TYPE OF WORK:	185 - 160	Sue claud dava
-uers) S	New Well Deepening Reconstruction		A A A A A A A A A A A A A A A A A A A
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21 (1)	Horizontal Well	$\overline{\langle}$	
is CH	destruction materials and pro- cedures in Item 12)	17 - E	<u> </u>
The second se	(4) PROPOSED USE		
	Domestic	- <u>1</u> 0	<u>Als</u>
	Irrigation Industrial		<u> </u>
	Test Well	00	
Conn Valley nd.	Municipal Other	$\frac{1}{2} \frac{1}{2} \frac{1}$	>
WELL LOCATION SKETCH	(Describe)	<u> </u>	
	AVAL RACE	<u> </u>	
Rotary Reverse C	No Size		· · · · · · · · · · · · · · · · · · ·
Other D Bucket Racket		<u> (())</u>	
(7) CASING INSTALLED: (6) PE	REGRATIONS		
Steel Plastic Conserve Type	of partosistian or size of several		
from To Dia. Gage or Fr ft. ft wall	ann Te Slot		
0 317 8 160 10	O TYR Fact		
	AND.		······
(9) WELL SEAL:			
Was surface sanitary seal provided? Yes 🔲 No 🕻	If yes, to depth ft.	-	
Were strata sealed against pollution? Yes 🗌 No Method of sealing	Intervalft.		19 70 Completed 9-24 19 70
(10) WATER LEVELS:		WELL DRILLER'S STA	
Depth of first water, if known 20	ft. ft.	This well was drilled under mu best of my kn <u>owledg</u> e and beliej	y jurisdiction and this report is true to the
(11) WELL TESTS:	D. Mar	Signed	ellean
pe of test Pump	s, by whom?	NAME Fulliam	Well Driller) Drilling
Discharge ft. Discharge ft.	At end of testft. Water temperature	Address 287 - Person fir	m. or conforation) (Typed or printed) (CS)
Chemical analysis made? Yes 🗌 No 🖆 If ye	s, by whom?	City	ZIP <u>94558</u>
	s, attach copy to this report NAL SPACE IS NEEDED, USE	License No. 52466	ERED FORM 86 96355

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Local	Permit Ag	enev Na	ιµσ	1						.  ∟					
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		1 1				- <u>.</u>		_	Fences, Rivers, etc. and necessary, PLEASE B	E ACCURA	TE & COMP	LETE.	<i>cr y</i>		
	1	1 1				- <u></u> ,			WATER	LEVEL	& YIELD	OF C	OMPLI	ETED	WELL
		1 •-	•			Ø			DEPTH TO FIRST W	ATER	(Et.) 85	LOW S	URFACE		
	i	1 7							DEPTH OF STATIC						
	·	· · · · · · · · · · · · · · · · · · ·							WATER LEVEL	1 70	_ (Ft.) & DATE	MEASL			4-99
				220	<b>`</b>				ESTIMATED YIELD 1	<u> .</u>	(GPM) & 1		PE	ar	
TOTAL 1	DEPTH OF	BORING		330	(F	eet oor			TEST LENGTH	4 (Hrs.)	TOTAL DRAW	DOWN_	325	_ (Ft.)	
TOTAL 1	DEPTH OF	COMPLET	ΈÐ	WELI	L	325 (Feet)			* May not be repres	sentative a	f a well's lon	g-term	yield.		
		1 . —	T		-										
DE	EPTH SURFACE	BORE-				C	ASING (5)	) T			EPTH SURFACE	ļ			MATERIAL
- FROIN S		HOLE DIA.		YPE(			INTERNAL	GAUGE	SLOT SIZE		SUNFACE	CE-	BEN-	IY	<u>PE</u>
		(Inches)	BLANK	SCREEN CON-	FILL PIPE	MATERIAL / GRADE	DIAMETER	OR WAL	L IF ANY				TONITE	FILL	FILTER PACK
Ft.	to Ft.		8	000	<u>P</u>		(Inches)	THICKNES	SS (Inches)	Ft.	to Ft.	(⊻)	(⊻)	(∠)	(TYPE/SIZE)
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125	165	9 7/8		X		F480	6"	200	factory	20	325		r	X	pea gravel
165	205	9 7/8		-	1	F480	6"	200			1	1			
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ATTACH	ADDITIONAL	INFORMATIO	ON, I	IF IT E	XISTS	S. Signed Signed WELL	DRILLER/AUTHO			<u>×</u>		ie signei		(	C-57 LICENSE NUMBER
DWIC185-1	1.1 11.07			IE		TIONAL SPACE I		USE NEX	T CONSECUTIVELY	NUMBER			-		

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DWR USE ONLY ∃Well 13 ORIGINAL STATE OF CALIFORNIA 8 N 05 W1 | Di File with DWR WELL COMPLETION REPORT TATE WELL NO./STATION NO Refer to Instruction Pamphlet Page\_\_\_\_of <u>ð</u>74365 Owner's Well No. LONGITUDE LATITUDE Date Work Began\_ Local Permit Age Pormit No. **L** APN/TRS/OTHER 00 CPermit Dat CEOLOGIC LOG OBIENTATION ( $\leq$ ) VERTICAL HORIZONTAL ANGLE (SPF DRILLING ora V > FLUID MUC METHOD DEPTH FROM DESCRIPTION Describe material, gray size SURFACE colos WELL LOCATION m ( 10 s Address s City C County. APN Book Page Parce ownship Section Range NORTH Latitude WEST Longitude DEG MIN. SEC DEG. MIN. SEC. LOCATION SKETCH ACTIVITY (≤) NORTH 🗶 NEW WELL U MODIFICATION/REPAIR \_ Deepen \_\_\_\_ Other (Specify) DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG"; PLANNED USES (∠) WATER SUPPLY Domestic . Public 🗶 Irrigation 💷 Industrial WEST EAS MONITORING TEST WELL CATHODIC PROTECTION HEAT EXCHANGE DIRECT PUSH INJECTION VAPOR EXTRACTION SPARGING SOUTH Illustrate or Describe Distance of Well from Roods, Buildings, Frares, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE. REMEDIATION OTHER (SPECIFY) WATER LEVEL & YIELD OF COMPLETED WELL DEPTH TO FIRST WATER \_ 20 .... (Ft.) BELOW SURFACE DEPTH OF STATIC 6-1-00 . (FL) & DATE MEASURED \_ WATER LEVEL. AIN CEFT ESTIMATED YIELD . \_\_\_\_\_ (GPM) & TEST TYPE\_ TOTAL DEPTH OF BORING DDG ) <sub>(Feet</sub> TEST LENGTH \_\_\_\_\_ (Hrs.) TOTAL DRAWDOWN\_ TOTAL DEPTH OF COMPLETED WELL 530 Feed \* May not be representative of a well's long-term yield. CASING (8) ANNULAR MATERIAL DEPTH FROM SURFACE DEPTH BORE-HOLE FROM SURFACE TYPE ( <u></u> ∠ ) TYPE SCREEN CON-DUCTOR FILL PIPE DIA. INTERNAL GAUGE SLOT SIZE MATERIAL / CE- BEN-MENT TONITE BLANK DIAMETER FILTER PACK (Inches) OB WALL IF ANY FILL GRADE Ft. Ft. THICKNESS (TYPE/SIZE) to (Inches) (Inches) Ft. Ft. (∠)  $(\leq)$  $( \leq )$ O 23 10 Ø 23 ACTIC 200 5 Ł 8.0 23 530 PEA GRAUEL 11 Ô 20 11 11 11 Q. 1 11 530 <u>70</u> ATTACIIMENTS (∠) CERTIFICATION STATEMENT ccurate to the best of my knowledge and belief. complete and a entity that this ren Geologic Log Well Construction Diagram маме Geophysical Log(s) \_\_\_ Soil/Water Chemical Analyses ADDRESS \_\_\_ Other . 0 () <u>'</u>\_ Signeo ATTACH ADDITIONAL INFORMATION. IF IT EXISTS. DATE SIGNED WELL DMR 188 BLV 11:07 IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

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ORIGINAL 08NO51 Well 15 STATE OF CALIFORNIA **File with DWR** WELL COMPLETION REPORT WELL NO./STATION NO. STATE Page \_\_\_\_ of \_\_\_\_ Refer to Instruction Pamphlet No. 535601 **Owner's Well No.**. -6-97 111-97 LATITUDE LONGITUDE . Ended. Date Work Began \_\_\_\_ Local Permit Agency \_\_\_\_\_ 07 En UICO N Mental Napa APN/TRS/OTHER 101 59 96-Permit Date . 12- 4-97 Permit No. . GEOLOGIC LOG ORIENTATION (∠) VENTICAL \_ \_ HORIZONTAL \_ \_ ANGLE \_ (SPECIFY) (Ft.) BELOW SURFACE DEPTH TO FIRST WATER \_\_\_\_\_ DEPTH FROM SURFACE DESCRIPTION Ft. te Ft Describe material, grain size, color, etc. WELL LOCATION <u>R L</u> Ó 4 Soil 1075 Greenfield Address . 100 St Helena 4 15 tarch <u> Black</u> City \_ Vol Coc k 28 15 Hard County \_ <u>Ka</u> Da 28 41 Soft Ask APN Book 25 Page 660 Parcel Tan 34 88 Hard 41 45 Township\_ \_ Range es k Section 88 190 Grey Latitude DEG. MIN. SEC. NORTH Longitude. WE8T DEG. MIN. SEC. 190 204 414 - LOCATION SKETCH ·ACTIVITY (二) 204 227 White NORTH NEW WELL Calistaga. 227:262 Brown MODIFICATION/REPAIR Well 391 X 62 Soft IL.L \_ Deepen pocoh 406 Small 391 Alivna Other (Specify) 4. K, . . 406 445 Soft οορ Clay Sand store as. reen DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG" 597 field 445 Sha C 5+ <u>50</u>ft Mixed PLANNED USE(S) EAST Howell A MT Rd WATER SUPPLY .... Domestic Public Irrigation \_, Industrial "TEST WELL" Napa CATHODIC PROTEC - SOUTH TION OTHER (Specify) Illustrate or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc. PLEASE BE ACCURATE & COMPLETE, DRILLING <u>41</u> Rotorc FLUID METHOD WATER LEVEL & YLELD OF COMPLETED WELL DEPTH OF STATIC \_\_\_\_\_\_\_ (FL) & DATE MEASURED \_\_\_\_\_\_\_ ESTIMATED YIELD . 2.5 (GPM) & TEST TYPE AIr Lift TOTAL DEPTH OF BORING \_572\_ (Feet) TEST LENGTH \_\_\_\_\_ (Hrs.) TOTAL DRAWDOWN \_\_\_\_\_ (FL) TOTAL DEPTH OF COMPLETED WELL 500 \* May not be representative of a well's long-term yield. . (Feet) CASING(S) ANNULAR MATERIAL DEPTH DEPTH BORF-FROM SURFACE FROM SURFACE TYPE (스) TYPE HOLE INTERNAL GAUGE SLOT SIZE CON-DUCTOR DIA. BLANK MATERIAL/ BEN-CE. OR WALL DIAMETER IF ANY FILTER PACK GRADE MENT TONITE FILL (inches) THICKNESS Et. Et. Ft. ta (inches) Ft. (TYPE/SIZE) EL. (inchas) to (上) (土) (エ) 23 Ø 23 10 3 <u>PUC.F480</u> 200 0 6 3/5- Cabrand 23 200 9 6 23 9UCF480 200 597 9 X 200:220 PUCF480 6 200 032 9 PUCF480 220 :350 200 9 Y PUC FY80 350 i500 6 200 032 - ATTACHMENTS (之) CERTIFICATION STATEMENT I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief. . Geologic Log (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)  $\mathcal{U}_{c}$ Well Construction Diagram NAME Geophysical Log(s) Hve. George Soil/Water Chemical Analyses ATTIMPES Other 487027 12-21-97 DATE SIGNED ATTACH ADDITIONAL INFORMATION. IF IT EXISTS. Signed WELL DRILLER/AUTHORIZED REPRESENTATIVE 57 LICENSE MIMBE -- DWR 188 REV. 7-90 IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

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WELL COMPLETION REPORT Refer to Instruction Pampblet Page \_\_\_\_ of \_\_ №. **535601** Owner's Well No. \_# LATITUDE 12-6-97\_, Ended. LONGITUDE Date Work Began. Napa Environmental <u>o f</u> anagment Local Permit Agency <u>Co</u> 1 1 101 59 Permit Date \_\_\_\_ 12- 4-97 THS/OTHER 96-Permit No. GEOLOGIC LOG WELL OWNER (SPECIPY) ANGLE ORIENTATION (∠) VERTICAL. HORIZONTAL (FL) BELOW SURFACE DEPTH TO FIRST WATER. DEPTH FROM **DESCRIPTION** Describe material, grain size, color, etc. Ft. Ft. to VELL LOCATION Soil 4 1075 Greenfield Rel Address\_ 0 10 St Helena 4 15  $4_{\alpha}$ rcl Black ock City\_ 28 Hord White County. 13 Na 28 41 Soft APN Book \_2\_5\_\_ Page \_ 34 DEA Parcel Tan 41 88 \_ Range Township. Section and Latitude \_\_\_\_\_ 88 190 NORTH Longitude DEG. SEC. MIN SEC. 190 204 414 Sibur - LOCATION SKETCH ACTIVITY (L) 204:227 NORTH White NEW WELL Calistiga 227 262 Brown MODIFICATION/REPAIR we!! X 262 391 <u>S#</u>+ Deepen Locate 391 406 Roc Small nsted \_ Other (Specify) 11314 pope 4116 445 Soft DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG") 445 <u>597</u> Sha Lombo Field 5+ PLANNED USE(S) -Mixed 5*0*FF WEST EAST Howell A (∠) MONITORING MT Rd WATER SUPPLY Domestic Public irrigation Inconstria "TEST WELL" Napa CATHODIC PROTEC SOUTH Illustrate or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc. PLEASE BE ACCURATE & COMPLETE. TION OTHER (Specify) DRILLING Rotord METHOD FLUID WATER LEVEL & YLELD OF COMPLETED WELL DEPTH OF STATIC 244 <u> 12-20-97</u> \_ (Ft.) & DATE MEASURED \_ WATER LEVEL ESTIMATED YIELD - 25 (GPM) & TEST TYPE ALC Lift TOTAL DEPTH OF BORING \_577\_ (Feet) TOTAL DEPTH OF COMPLETED WELL 500 (Feet) \* May not be representative of a well's long-term yield. CASING(S) ANNULAR MATERIAL DEPTH FROM SURFACE DEPTH FROM SURFACE BORE TYPE TYPE ( 스 ) HOLE SLOT SIZE INTERNAL GAUGE OR WALL CE- BEN-MENT TONITE FILL CON-DUCTOR DIA. BLANK MATERIAL/ FILTER PACK (TYPE/SIZE) DIAMETER (inches) GRADE Ft. to Et. (inches) THICKNESS (Inches) Et. to Ft. (之) (∠)  $(\angle)$ 23 10 % 23 PVC.F480 6 Ó 200 C 3/5- Pco. Cornel 9 23 200 6 23 PUCEYSO 200 597 200:220 9 PU<u>CF480</u> <u>6</u> 032 200 <u>220 350</u> 9 PUCF480 6 200 350 500 9 PUC F 480 6 032200 ATTACHMENTS (2) CERTIFICATION STATEMENT I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief. Geologic Log  $W_{cl}$ Well Construction Disgram NAME Geophysical Log(s) bearse Soll/Water Chemical Analyses Other 12-21-97 DATE SIGNED 487027 ATTACH ADDITIONAL INFORMATION. IF IT EXISTS. WFII DRULFR/AUTHORIZED REPRESENTATIVE C-57 LICENSE NUMBER DWR 188 REV. 7-90 IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

ORIGINAL File with DWR	STATE OF CALIF		DISINIDISIW	Well 16
Page of	Refer to Instruction	Pamphlet	STATE WELL N	IO./STATION NO
Owner's Well No.	- No. 77	4364		
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ATTACH ADDITIONAL INFORMATION, IF IT EXIST	Signed Signed	Belline		-00-+486//
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IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

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Page $1$ of $1$	,	•					1	
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Page <u>1</u> of <u>1</u>					Refer to In	nstruction	Pampblet			STATE	WELL NO		ION NO.
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Permit No	GI	EOLO	)GIC	LOG					KELL C	WNE	R —		
ORIENTATION (스)				RIZONTAL			Name Mailing Addr	) [					
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				- <u> </u>			DEPTH OF STAT	RLEVEL & TIC 61					
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TOTAL DEPTH OI	COMPLETED	) WEL	<u>т т</u>	8 (Feet)			* May not be re	presentative of a	well's lon	ig-term	yield.		
DEPTH FROM SURFACE	BORE-	TYPE (		C	ASING(S)	)		DEP1		<u> </u>	INNU		MATERIAL
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	lic Log			11	***								5 JE #2 -
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ATTAC Geolog Well C Geophy	onstruction Diagn valcal Log(s) ater Chemical Ar			ADDRESS	on, firm, or i	CORPORATION)	(TYPED OR PRINTED		Napa		<u>(</u> 8–199		94559 ZIP 439-746

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Page 1 of									Refer to In				(1			VELL NC	./ STAT	
Owner's	Well No.	1-2010	)						No	••E0	11	12798			1	] [ ] [	1	
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Perm	it No. <u>E</u>	10-0025	1 CF				<b>T</b> 7	OG Permit	Date 6/1	7/2010	) ,	· · · ·	_	۹		PN/TRS/	UTHER	
														WELL O	WNE	R —		
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0		BOULD									[	Address 1200 C	<u>Co</u>	nn Valley Road	CATI			
3						V/E	MB	EDDED SA	NDS			City St. Helena	<u>a C</u>	CA				
12 14		BOULD			<u>۱۱</u>							County Napa						
50		GREEN												Page <u>180</u>				
70		BROW							· · · · · ·					_ Range	Sectio	on		
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												Fences, Rivers, etc. and	d at	tance of Well from Roads, A ttach a map. Use additiona	paper		c	THER (SPECIFY)
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TOTAL D	EPTHOF	COMPLE	TEL	) w	EL	<u>_0:</u>	0	(Feet)				May not be repr	res	entative of a well's lo	ong-ter	rm yiel	<u>d.</u>	
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FROM SU	JRFACE	BORE - HOLE		YPE	<u>(</u>	<u>- )</u>								FROM SURFACE		i I	TY	PE
Et to	Ft.	DIA. (Inches)	BLANK	SCREEN	CON-	립		MATERIAL / GRADE	INTERNAL DIAMETER	GAU OR W	ALL				CE- MENT	BEN-	FILL	FILTER PACK
Ft. to	F1.		Ē	ŝ					(Inches)	THICK	NES	S (Inches)		Ft. to Ft.	( <u>¥</u> )	( <u>⁄</u> )	(⊻)	(TYPE/SIZE)
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268	308		+	~		$\left  - \right $		VC F480	5	SDI			-	26 1000		<u>  </u>		PEA GRAVEL
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348	488			~	1		Ρ	VC F480	5	SDI	R-2	.032						
		IMENTS	(∠	)										TION STATEMENT				· · · · · · · · · · · · · · · · · · ·
	— Geologic — Well Cor	Log Instruction D	liagra	m				I, the undersig	ned, certify th	at this rep	porti	is complete and accurat RILLING, INC.	te t	to the best of my knowled	lge and	belief.		
-	Geophysi	cal Log(s)	-		_			(PER: 2110 Per	SON, FIRM, C	RCORPO	97) <sup>-</sup>	TION) (TYPED OR PR	RIN	TED) Napa			CA	94559
	Soil/Wate Other	r Chemical	Ana	alysis	8			ADDRESS		1 hr	∦t	What		CITY	7/0-		STATE	ZIP
ATTACH AL	DDITIONAL II	VFORMATIO	ON, I		EXI	STS.		Signed	L DRILLER/A	UTHORIZ		REPRESENTATIVE	_		7/07/1 TE SIG			439-746 C-57 LICENSE NUMBER
DWR 188 REV	V. 11-97			١	F A	DDIT	ГЮ	VAL SPACE IS	NEEDED,	JSE NEX	XT C	CONSECUTIVELY N	NŪ	MBERED FORM				

ORIGINAL File with DWR	STATE OF CALIF			Well 22
Page of	Refer to Instruction		STATE WELL NO	D./STATION NO
Owner's Well No. Date Work Began 10-14-03	Ended /0-17-0392	2027		LONGITUDE
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Permit No. <b>16 – 12.101</b> GEOLOGIC	Permi@ate_ <b></b>	07	70 10 110	1
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	rial glain size, color, etc.	Sar	WELL LOCATION-	
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				PLANNED USES ( $\leq$ ) water supply
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			- ME	CATHODIC PROTECTION
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			- SOUTH	SPARGING REMEDIATION
		Fences, Rivers, etc. and a necessary, PLEASE BE A	tance of Well from Roads. Buildings, ttach a map. Use additional paper if ACCURATE & COMPLETE.	
		1	EVEL & YIELD OF COMPI	
		DEPTH OF STATIC	er _ <b>\$0</b> _ (Ft.) Below Surfac	-
	······································	estimated yield *	ک (۴۱.) & DATE MEASURED _ ک (GPM) & TEST TYPE	
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TOTAL DEFINIOR COMPLETED WELL		Way not be represen	tative of a well's long-term yield.	
DEP1H FROM SURFACE HOLE TYPE ( ≤ )	CASING (S)	1 11	DEPTH AND FROM SURFACE	ULAR MATERIAL
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Soil/Water Chemical Analyses	ADDRESS	edmin		STATE A 1109/4/1
ATTACH ADDITIONAL INFORMATION, IF IT EXIST	Signed WELL DRILLER/AUTHORIZED REPR	SENTATIVE		3 2486

DVB (SN 44 V 11 97 IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

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# **APPENDIX B**

# PUMP TEST, WELL 2

# 2 pages following





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

Date: 09/16/15 Report #: 7608 Report By: Cody Monday

Subject Property Address:	704 Greenfield Rd, Saint Helena CA 94574
Customer Name:	Josh Clark – Clark Vineyard Management

### WELL DATA:

Location/Description of well: Type of Well: **Depth of Well:** Diameter of Well Casing: Sanitary Seal (plate seal at top of well): Annular Well Seal (in ground seal of bore hole):

To the right of the driveway Drilled Probe stopped in casing at 272 feet 8" O.D. Steel Yes Unknown - please refer to well log

## PUMP DATA:

Pump HP and Type:	2 HP 230V Submersible
Depth of Pump Suction:	Unknown – probe stopped in drop pipe at 113'
Size of Tee at Well Head:	1.25"
Submersible Cable Size:	#10-4
Water Level Control:	PumpSaver 77C
Backpressure Test:	*3.5 GPM @ 70 PSI @ 243.1' @ 8.5 amps

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

Length of Test:	5 Hours
Type of Test:	Drawdown and constant pumping level

Static Water Level:	243.1 Feet	Starting Flow	9.3 GPM
Water Level Drawdown:	2 Feet		
Final Pumping Level:	245.1 Feet	Final Flow	12.9 GPM

#### WATER LEVEL RECOVERY SUMMARY:

Pre Test Static Water Level:	243.1 Feet
Post Test Static Water Level:	243.1 Feet
Water Level Drawdown:	2 Feet
Water Level Recovery:	2 Feet
Water Level Recovery as % of Drawdown:	100.00%
Length Between End of Test and Recovery:	10 Minutes
-	

Page 1

## WELL PRODUCTION DATA & PUMPING LOG:

					Sulfur		
Date	Time	Interval	Water Level	Appearance	Odor	Sand	GPM
09/16/15	10:20 AM	15 Minutes	243.1	Yellow	No	No	9.3
09/16/15	10:35 AM	15 Minutes	244.3	Orange	No	1/2 Pinch Casing	13.7
09/16/15	10:50 AM	15 Minutes	245	Orange	No		
09/16/15	11:05 AM	15 Minutes	245.1	Orange	No	No	12.9
09/16/15	11:20 AM	15 Minutes	245.1	Orange	No	No	12.9
09/16/15	11:35 AM	15 Minutes	245.1	Orange	No	No	12.9
09/16/15	11:50 AM	15 Minutes	245.1	Orange	No	No	12.9
09/16/15	12:05 PM	15 Minutes	245.1	Orange	No	No	12.9
09/16/15	12:20 PM	30 Minutes	245.1	Orange	No	No	12.9
09/16/15	12:50 PM	<b>30 Minutes</b>	245.1	Yellow	No	No	12.9
09/16/15	01:20 PM	30 Minutes	245.1	Yellow	No	No	12.9
09/16/15	01:50 PM	30 Minutes	245.1	Yellow	No	No	12.9
09/16/15	02:20 PM	30 Minutes	245.1	Yellow	No	No	12.9
09/16/15	02:50 PM	<b>30 Minutes</b>	245.1	Yellow	No	No	12.9
09/16/15	03:20 PM	30 Minutes	245.1	Yellow	No	No	12.9

Final Pumping Level:	245.1 Feet
Final Flow Rate:	12.9 GPM

## WATER LEVEL RECOVERY DATA:

Date	Time	Interval	Water Level	<b>Recovery %</b>
09/16/15	03:25 PM	5 Minutes	243.5	80.00%
09/17/15	03:30 PM	5 Minutes	243.1	100.00%

Final post test static level measurement:	243.1 Feet
Final Water Level Recovery as % of Drawdown:	100.00%
Length of time between end of test and recovery:	10 Minutes

\*NOTE: the pump output pressure test indicates plugging, wear or a hole in pipe.

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: Irrigation + arsenic Turnaround: Standard

# APPENDIX C

# PUMP TEST ANALYSIS SUMMARIES FOR AQUIFER HYDRAULIC PARAMETERS

## **3 PAGES FOLLOWING**



