



February 22, 2022

Mr. Kamal Azari  
1399 Spring Hill Road  
Petaluma, CA 94952

**RE: HYDROGEOLOGIC REPORT FOR GENERAL PLAN POLICY WR-2E  
1321 SPRING HILL ROAD, PETALUMA, CALIFORNIA  
SONOMA COUNTY APN 020-050-026  
EBA JOB No. 21-2983**

Dear Mr. Azari:

This Report presents the results of a groundwater availability study conducted for the property located at 1321 Spring Hill Road in Petaluma, California, referred to herein as the "project site" (see Figure 1, Appendix A for site location). The groundwater availability study was implemented to comply with requirements set forth in Policy WR-2e of the Sonoma County General Plan (SCGP). Based on information provided to EBA Engineering (EBA), it is our understanding that a hydrogeologic study is being required by the County of Sonoma Permit and Resource Management Department (PRMD) for the project due to the property's location in a Class 4 Groundwater Availability Zone. This revised hydrogeologic report is being required by PRMD to fulfill the additional information requested in a letter dated October 18, 2021.

The purpose of Policy WR-2e is to determine whether there are adequate existing and future groundwater supplies to accommodate the proposed development demands and to estimate the effects of drawdown, if any, within the designated cumulative impact area (CIA). This report was prepared to meet these objectives.

## **1.0 BACKGROUND INFORMATION**

### **1.1 Project Description**

The project site consists of a 16.7-acre (AC) parcel located at 1321 Spring Hill Road, in Petaluma, California and is further identified as Sonoma County Assessor's Parcel Number (APN) 020-050-026. A site plan illustrating the general project site features is presented as Figure 2 (Appendix A). Currently, there are no existing structures on the project site. Additional features on-site include two 5,000-gallon water storage tanks located within the northwest portion of the existing parcel. The remainder of the property consists of undeveloped grasslands, vineyard, and minor stands of oak and pine trees.

Ground elevations across the project site range from approximately 320 to 440 feet above mean sea level (MSL).

One water supply well currently exists at the project site and is herein identified as WELL-1321. WELL-1321 is located in the northern portion of the project site, and reportedly yields 18 gallons per minute (GPM) (Appendix E). According to information received from the client, WELL-1321 will be utilized for water supply for the proposed development for the project site. At the time of the site visit on May 26, 2021, EBA personnel measured the depth to water (DTW) from top of casing (TOC) of WELL-1321 to be approximately 34.20 feet. A well log available for WELL-1321 states the well was completed to a depth of 400 feet. Please refer to Figure 2 (Appendix A) for the location of this well.

The proposed site improvements include the construction of a 2,809 square foot tasting room building and a 302 square foot restroom building that will be used for wine tasting and special events. The remainder of the proposed site improvements include patio/walkway areas, patio/terrace areas, access driveways, and parking lot areas.

## **1.2 Local Hydrogeology**

The project site is located in a Class/Zone 4 groundwater availability area as defined in the SCGP. A Class 4 area corresponds to “areas with low or highly variable water yield”. The regional groundwater flow surrounding the project site likely mirrors regional topography, which generally flows towards an unnamed intermittent drainage to the southeast. The unnamed intermittent drainage runs through the project site from the west to east and has a small streamside conservation area, per the Sonoma County Riparian Corridor Combining Zone, along the eastern property line. Water was not observed in the drainage at the time of the May 2021 site visit.

Geologic mapping of the Petaluma Quadrangle by the California Geological Survey (CGS) (Bezore et al., 2002) provides detail of the units underlying the project site. These units from youngest to oldest include Miocene Wilson Grove Formation (Twg), Miocene Sonoma Volcanics (Tv), and Jurassic to Cretaceous age Franciscan bedrock (KJfm). The geology observed during EBA’s site visit, as well as the well logs reviewed as part of the preparation of this Report, was generally consistent with the CGS map findings.

A geologic map and cross section of the site vicinity is presented as Figure 3 and 4 (Appendix A), respectively. According to the CGS map, WELL-1321 is completed in Twg. However, the corresponding WWDR indicates that WELL-1321 is also completed in Tv. According to the WWDR, the upper 45 feet of WELL-1321 is completed in Twg, while the portion of the well from 45 to 400 feet below ground surface (BGS) is completed in Tv. These units are evident in the WWDR by the descriptions indicating the presence of clay, and “blue volcanics”. According to *Bulletin 118-4* (CDWR, 2003), yields of groundwater to wells in Tv deposits can range from slight to moderate with specific yields ranging from zero to 15 percent. It should be noted that the geology in the immediate vicinity of the project site is highly variable, and the cross section (Figure 4, Appendix A) was based

upon interpretation of WWDRs and large-scale geologic mapping. As such, it should be considered a generalized interpretation of geologic structure.

### **1.3 Local Climate**

According to the Sonoma County Water Agency's County Wide Rainfall Map (SCWA, 2005), rainfall at the project site is approximately 32 inches per year. As an update to the September 28, 2021 hydrogeologic report, EBA re-evaluated the mean annual potential evapotranspiration ( $ET_o$ ) in the vicinity of the project site to be approximately 44.19 inches per year based on reference  $ET_o$  Tables provided in the California Irrigation Management Information System (CIMIS) Reference Evapotranspiration Website (CIMIS, 2022).

## **2.0 RESEARCH**

The following subsections provide a summary of the scope of research performed and the corresponding findings used to implement the groundwater availability study. The scope of the research was developed to comply with the Policy WR-2e guidelines.

### **2.1 Site Reconnaissance**

EBA conducted a site reconnaissance of the property on May 20, 2021 and a follow up DTW measurement for the project site well (WELL-1321) on May 26, 2021. The purpose of the site reconnaissance was to observe existing site features, site topography, local geology, etc. At the time of the site reconnaissance, the existing on-site features were generally consistent with those described in Subsection 1.1 (*Project Description*) of this report.

Nearby developments and property use were also observed during the site reconnaissance. Additionally, no active spring activity was observed in the areas explored. In regard to water supply wells, six off-site water supply wells were visually identified in proximity of the project site. Please be advised that due to the limited public access, visual observations were confined to what could be seen from the property and public access roads.

Included in the six off-site water supply wells visually identified above, three water supply wells were located on the property adjacent to the project site at 1399 Spring Hill Road, Petaluma, California. During the site reconnaissance EBA personnel was able to measure DTW on two of the three wells at the property located at 1399 Spring Hill Road. The well (North Well) on the northern portion of the property measured a DTW of 47.1 feet. The well (South Well) on the southern portion of the property measured a DTW of 60.2 feet. Please refer to Figure 2, Appendix A for location of these wells.

The site reconnaissance was supplemented with review of Google Earth Pro aerial imagery for the area. EBA also utilized the web service ParcelQuest and County of Sonoma GIS services to assess the use of all parcels located in the CIA (discussed below

in Section 3.0). Findings from this research were generally consistent with the above descriptions. These sources also provided information that was used for the CIA water usage and water balance calculations.

## 2.2 Water Well Drillers Reports (WWDRs)

WWDRs maintained by the California Department of Water Resources (CDWR) were reviewed to obtain pertinent information for the area regarding water supply use, well completion depths, yields, etc. The scope of the CDWR research encompassed available records for wells located within Section 1 of Township 4 North (T4N), Range 8 West (R8W) and Section 6 of Township 4 North (T4N), Range 7 West (R7W), Mount Diablo Baseline and Meridian. The off-site search boundary was designed to approximately mirror the shape of the CIA in order to obtain available information representative of the local hydrogeologic conditions. The results of this research identified 10 WWDRs for water supply wells (see Figure 2, Appendix A). Please note that locations were determined based on information provided in the WWDR, which, for the majority of the WWDRs, was incomplete or missing. In the case of incomplete or missing well location information, an assumed location was derived based on air photos and observations as to the locations of the well. It should be noted that while the project site well (WELL-1321) is completed in Sonoma Volcanics, most of the wells in the vicinity of the project site are completed in the Wilson Grove Formation. Due to the project site well being completed in a different geologic formation than the wells in the vicinity of the project site, an evaluation based on their successful completion in a water-bearing zone which is geologically consistent was unable to be completed. The breakdown on the following page provides a summary of the well/borehole and water supply characteristics as described in the pertinent WWDRs:

<b>TABLE 1 RESULTS FROM WWDR RESEARCH</b>		
<i>Description</i>	<i>On-Site</i>	<i>Off-Site</i>
Number of Water Supply Wells	1 <sup>(1)</sup>	9
Drilling Depths (feet BGS)	400	150 to 319
Static Groundwater Levels (feet TOC)	34.20 <sup>(2)</sup>	20 to 80
Reported Yields (GPM)	18 <sup>(3)</sup>	5 to 20
Specific Capacity (GPM/ft)	0.1463 <sup>(3)</sup>	0.0446 to 0.625 <sup>(4)</sup>

WWDR: Water Well Drillers Report  
 BGS: Below Ground Surface  
 GPM: Gallons per Minute  
 GPM/ft: Gallons per Minute per Foot of Drawdown

(1): WELL-1321 Well log is available for this well.

(2): WELL-1321 as measured during the May 20, 2021 site reconnaissance.

- (3): As reported by WELL-1321 well yield test performed on October 3, 2019.
- (4): Calculation includes a 20 percent correction factor for drawdown to account for inherent inefficiencies associated with air lift testing methods.

Please note that the breakdowns provided in Table 1 should be considered estimates based on interpretation of the WWDR information.

### **2.3 CASGEM Data**

The California Statewide Groundwater Elevation Monitoring (CASGEM) Program database was researched to identify historical groundwater elevation data that might be available in the area. Findings from this research found the closest CASGEM monitoring well with historical, and current, data (Well ID: 382277N1226740W001) to be located approximately 3,960 feet to the northeast from WELL-1321. Historical groundwater elevation data from this well has been recorded since 1989 and exhibits relatively stable levels

([http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/brr\\_hydro.cfm?CFGRIDKEY=28237](http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/brr_hydro.cfm?CFGRIDKEY=28237)). Although this CASGEM well (Wilson Grove Formation) is completed in different lithology than the project site well (Sonoma Volcanics), this data appears to indicate that groundwater recharge in the area is occurring at a similar rate to usage. Please refer to Appendix D for the hydrograph, provided by CASGEM, which includes the historical groundwater elevation data in the respective well.

### **2.4 Assessor's Parcel Maps**

County of Sonoma assessor's parcel maps for the area were reviewed to assist in identifying neighboring property boundaries and addresses. This information, in turn, was used to establish the number of properties within the designated CIA area (discussed in Section 3.0 [*Cumulative Impact Area*]) for this study. As an update to the September 28, 2021 hydrogeologic report, EBA re-evaluated the CIA and reduced its size from 155 acres to 60 acres. Findings from this exercise identified 10 properties (including the project site) ranging in size from approximately 1.03 to 16.72 AC. It should be noted that two parcels within the CIA were not included in this analysis due to their limited area of impact. Of these 10 properties, well/borehole information was identified for four properties (including the project site) within the CIA as determined from the WWDRs.

### **2.5 Zoning Information**

Zoning designation records maintained by PRMD were reviewed for neighboring properties within the designated CIA to evaluate potential future uses and implications of the proposed project on future groundwater use in these areas. Findings from this research revealed that the project site is zoned as Land Extensive Agriculture District (LEA). The site is zoned as LEA B6 100, RC 50/50 per the County of Sonoma Zoning Code Regulations. The following is intended to define zoning codes identified at the project site and surrounding properties within the CIA.

*“Land Extensive Agriculture District (LEA) is intended to enhance and protect lands best suited for permanent agricultural use and capable of relatively low production per acre of land; and to implement the provisions of the Land Extensive Agriculture land use category of the General Plan and the policies of the Agricultural Resources Element. (Ord. No. 4643, 1993.)”*

*“The Riparian Corridor (RC) is intended to protect biotic resource communities, including critical habitat areas within and along riparian corridors, for their habitat and environmental value, and to implement the provisions of the General Plan Open Space and Resource Conservation and Water Resources Elements.”*

*“Valley Oak Habitat Combining District (VOH) is intended to protect and enhance valley oaks and valley oak woodlands and to implement the provisions of Section 5.1 of the general plan resource conservation element.”*

All the properties adjacent to the project site and within the CIA are also located in a LEA zone.

With regard to zoning density, combining districts for the County specifying residential density and/or minimum parcel or lot size for the parcels, lots and/or the area includes B6. The B6 district designation specifies the maximum permitted density (i.e., minimum acreage for a single dwelling unit) for individual parcels. In the CIA, the B6 district designations include densities of 60 to 100 AC.

## **2.6 Well Yield Certification Tests**

A water yield test was performed October 3, 2019 on WELL-1321 by Les Peterson Drilling and Pump, Inc. The water yield test was conducted by pumping water from WELL-1321 for approximately 8 hours with a total measurement time of 16 hours for water level recovery. The water level in the well at the start of the test was 37 feet (initial static water level) from TOC and ended with a post-test water level at 42 feet from TOC, for a percent recovery of 95.93%. Discharge and drawdown were calculated to be 18 GPM and 123 feet, respectively. Specific capacity was calculated to be 0.1463. Please find a copy of the water yield test in Appendix E.

## **2.7 Documentation of Expended Effort**

Approximately 50 hours have been expended in identifying existing wells within the area of interest, as well as other pertinent information with respect to the local hydrogeologic conditions, property uses, and determination of aquifer characteristics. This estimate reflects the cumulative time expended by EBA in researching the information (i.e., site reconnaissance, literature searches, interviews, and telephone calls) and performance of various calculations.

In an effort to compare present groundwater levels to historical groundwater levels in water wells in the vicinity of the project site, EBA personnel attempted to contact property

owners adjacent to the project site with the intention of measuring groundwater levels in their wells. EBA sent out letters in the mail requesting access to neighboring wells. All attempts made by EBA to contact owners of neighboring wells failed. However, the owner of the project site is the owner of the adjacent property to the west of the project site, which contains two water wells. This property is located at 1399 Spring Hill Road, Petaluma and contains two water wells with recorded historical groundwater levels. The historical groundwater levels used for comparison for the wells in the vicinity of the project site were taken from their respective Department of Water Resources (DWR) driller logs and were reported by Boudreau in his *Geology & Groundwater Potential* (2005) report in 2005.

On May 20, 2021 EBA personnel were able to measure the groundwater levels in two of the existing wells from the Boudreau report located at 1399 Spring Hill Road, Petaluma. Recent groundwater levels were found to have mildly decreased in both wells from the historical groundwater levels in the Boudreau report. The well in the northern portion (North Well) of the property located at 1399 Spring Hill Road decreased from 27 feet to 47.1 feet below TOC. The well in the southern portion (South Well) of the property decreased from 38 feet to 60.2 feet below TOC. EBA remobilized to the site on June 2, 2021 to measure DTW in WELL-1321. DTW was measured at 35 feet BGS at that time.

It should be noted that during the time of the site visit by EBA to measure groundwater levels in water wells in the vicinity of the project site, Sonoma County was experiencing a drought. This prolonged dry period may have lowered the groundwater levels in these wells below their average values. As such, it is reasonable to assume that groundwater levels will increase under a normal year or average precipitation. Please refer to Figure 2, Appendix A for the location of these wells.

### **3.0 CUMULATIVE IMPACT AREA**

The definition of “cumulative impact area” corresponds to the change in a specific area resulting from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable future projects. Based on this criterion, existing and future site development characteristics and zoning designations for surrounding properties were considered, coupled with the site hydrogeology and the nature of the proposed development, to estimate the CIA for the project.

After a discussion with PRMD personnel (Robert Pennington), the boundary of the CIA to the north, south, east and west of the project site well were updated based upon a combination of factors including topography and hydrogeology.

Please refer to Figure 2 (Appendix A) for an illustration of the updated CIA boundary as defined above. The overall size of the CIA is approximately 60 AC and encompasses 10 properties (including the project site).

#### 4.0 SUMMARY OF EXISTING / PROJECTED GROUNDWATER USE

At the time of this report, there was no water usage reported by the client from WELL-1321 at the project site. As previously mentioned, the project site will reportedly be utilized as a tasting room facility. With this proposed project, the existing water required for domestic and irrigation water use for the tasting room will come from the on-site well (WELL-1321). As an update to the September 28, 2021 hydrogeologic report, EBA re-evaluated the projected annual groundwater use (domestic and irrigation) for the proposed project. BC Engineering Group's projected annual irrigation water use estimate of 238,336 gallons per year (GPY) was reduced to 9,360 GPY by water conservation measures estimated by Louise Leff (landscape architect). An 80 percent septic return flow offset was applied to BC Engineering Group's projected annual domestic water use estimate (294,640 GPY), creating a reduction in overall projected groundwater usage (Santa Rosa Plain Groundwater Sustainability Agency, 2021). The reduced projected annual groundwater use for the project site is as follows:

##### **Annual:**

##### **BC Engineering Original Group's Projected Annual Groundwater Use Estimate:**

- Domestic = 294,640 gallons per year (GPY)
- Irrigation = 238,336 GPY

TOTAL = Approximately 532,976 GPY

DAILY FLOW = Approximately 1,460 GPD = 1.64 Acre Feet / Year (AF/yr)

##### **BC Engineering Revised Projected Annual Groundwater Use Estimate:**

- Domestic = (294,640 GPY) – (235,712 GPY, [80% septic return flow]) = 58,928 GPY
- Irrigation = 9,360 GPY

TOTAL = Approximately 304,000 GPY (68,288 GPY after offsets for septic return flow)

DAILY FLOW = Approximately 830 GPD = 0.93 AF/yr. (Approximately 187 GPD = 0.21 AF/yr after offsets for septic return flow.)

The breakdown on Table 2 provides a general synopsis of both the existing and projected groundwater uses associated with the proposed development, as well as estimates of the off-site groundwater use on adjoining and nearby properties located within the CIA. The existing and future groundwater use information for the project site was provided by the property owner. The off-site groundwater use information, in turn, was estimated by EBA



using industry standard values for domestic/incidental use. As part of EBA's analysis, the website ParcelQuest was utilized to determine the number of bedrooms associated with existing dwellings. In regard to future development, 3-bedroom dwellings were assumed for those properties in which an existing dwelling was not identified by ParcelQuest or parcels that could be subdivided in the future. The ensuing groundwater use estimations conservatively assume that the water supply well for each of these parcels is located within the CIA, which may or may not be the case.

As an update to the June 28, 2021 hydrogeologic report, EBA re-evaluated the water use estimates for the existing vineyards within the project site and within the CIA. While there is approximately six AC of existing vineyard within the project site, the irrigation for this vineyard is provided from the neighboring well located on the property at 1399 Spring Hill Road. Because the project site vineyard is not irrigated from the project site well, water use for the project site vineyard was included in the estimate of the existing off-site groundwater use. Water from the well located at 1399 Spring Hill Road is also used to irrigate approximately 8.5 AC of vineyard located at 1399 Spring Hill Road. A water use estimate for the existing vineyard on the project site and the existing vineyard on the property located at 1399 Spring Hill Road was provided by the client. As an update to the September 28, 2021 hydrogeologic report, EBA re-evaluated the water use estimate for the remaining approximately 2.5 AC of existing off-site vineyards within the CIA. Due to the reduction in the CIA area for the current report (discussed above in Section 3.0), the approximately 2.5 AC of existing off-site vineyards within the previous CIA, are no longer within the updated CIA.

In addition to re-evaluating water use estimates for the existing vineyards within CIA, future foreseeable water use estimates were re-evaluated for potential off-site vineyards within the updated CIA. As an update to the September 28, 2021 hydrogeologic report, EBA calculated that 20 AC of grassland were available for future potential off-site vineyard within the updated CIA. The 6 AC of grassland that were located on a property being used by a dairy facility are no longer located within the updated CIA due to the reduction of the CIA. As discussed with Robert Pennington of PRMD, 50% of grasslands in the CIA can be assumed as future potential vineyards. EBA estimated a total of 10 AC (50% of 20 AC) of grassland assumed as future potential vineyards within the CIA. The re-evaluated water use estimates are reflected in Table 2 on the following page.

Water use associated with the 6,000-case winery located at 1399 Spring Hill Road (APN 020-050-009) was estimated as part of the existing off-site groundwater use. According to Appendix A of the Sonoma County General Plan, Water Resource Element, the volume of process water for a winery in Sonoma County is 2.15 acre-feet per 100,000 gallons of wine produced. Taking into consideration the number of gallons in 6,000 cases of wine and the process water value provided by the County, EBA estimated the water use for a 6,000-case winery to be approximately 0.31 acre-feet.

A groundwater offset associated with the removal of existing irrigated landscaping (lawn) located at 1399 Spring Hill Road was estimated as part of the existing off-site groundwater use. According to Appendix A of the Sonoma County General Plan, Water Resource

Element, the volume of water for a landscaped lawn in Sonoma County is 3.6 AF/yr per acre of landscaped lawn. Taking into consideration the number of acres (0.115 AC) of lawn being irrigated and the water value provided by the County, EBA estimated the groundwater offset for a 0.115 AC lawn to be approximately 0.41 AF.

<b>TABLE 2 SUMMARY OF EXISTING / PROJECTED GROUNDWATER USE</b>			
Description	Existing (AF/yr)	Future Additional (AF/yr)	Future Combined (AF/yr)
<b><i>Project Site Groundwater Use</i></b>			
Domestic and Irrigation Use <sup>(1)</sup>	0	0.93	0.93
Septic Return Flow Offset <sup>(2)</sup>	0	- 0.72	- 0.72
<b><i>Project Site Totals</i></b>	<b>0</b>	<b>0.21</b>	<b>0.21</b>
<b><i>Off-Site Groundwater Use</i></b>			
Single Family Dwellings – Domestic Use <sup>(3)</sup>	6.00	0.75	6.75
Single Family Dwellings – Incidental Use <sup>(4)</sup>	2.00	0.25	2.25
Vineyard Irrigation <sup>(5) (7)</sup>	1.20	6.00	7.20
Winery <sup>(6)</sup>	0.31	0	0.31
Landscape Offset (Lawn) <sup>(8)</sup>	- 0.41	0	- 0.41
<b><i>Off-Site Totals</i></b>	<b>9.10</b>	<b>7.00</b>	<b>16.10</b>
<b><i>Combined Groundwater Use</i></b>			
<b><i>Combined Totals</i></b>	<b>9.10</b>	<b>7.21</b>	<b>16.31</b>

AF/yr: Acre-Feet per Year

- (1) Based on revised domestic water use estimate from BC Engineering Group and a reduced irrigation water use estimate from Louise Leff (landscape architect).
- (2) Based on an 80% septic return flow applied to the projected annual domestic water use.
- (3) Based on 24 existing bedrooms and three future additional bedrooms at an incremental water use of 0.25 AF/yr per bedroom.
- (4) Based on 8 existing dwellings and one future additional dwelling at an incremental water use of 0.25 AF/yr per dwelling.
- (5) Based on a water use estimate provided by the client for 14.5 acres of existing vineyard.
- (6) Based on a 6,000-case winery located at 1399 Spring Hill Road, Petaluma.

- (7) Off-site future additional is based on hypothetical development of vineyards within the CIA. This estimate should be considered extremely conservative since it assumes that water supply for any future off-site vineyards would be from a well located within the CIA and within the same formation as the project site well (Sonoma Volcanics).
- (8) Based on a 0.115 AC lawn located at 1399 Spring Hill Road, Petaluma.

## 5.0 GROUNDWATER AVAILABILITY ANALYSIS

As outlined in the introduction of this report, the primary objectives of the groundwater availability analysis were to evaluate whether there are adequate existing and future groundwater supplies to accommodate the proposed project and to estimate the effects of drawdown within the designated CIA. The following subsections address each of these issues.

### 5.1 Water Supply Capabilities

#### Groundwater in Storage

Due to the fact that the project site contains three different geologic formations mapped on its surface, an estimated volume of water in storage within the entire CIA was not calculated. However, the estimated volume of water in storage within the geologic formation (Sonoma Volcanics) in which the project site well (WELL-1321) is completed in was calculated. As an update to the September 28, 2021 hydrogeologic report, EBA re-evaluated the portion (8.25 AC) of the reduced 60 AC CIA mapped as Sonoma Volcanics. The estimated volume of water in storage within the Sonoma Volcanics was calculated by multiplying the volume of the aquifer by its specific yield. The saturated aquifer thickness of the Sonoma Volcanics was based on the static groundwater level measured during EBA's site reconnaissance on May 26, 2021 and the completion depth recorded in the WWDR of the project site well (WELL-1321). Finally, the aquifer's specific yield or secondary porosity volume was based on literature values (Bulletin 118-4 [CDWR, 2003]). Using this information, the storage capacity for the aquifer (Sonoma Volcanics) was estimated by multiplying the respective variables.

The following provides a breakdown of the calculations:

#### Formation 1: Sonoma Volcanics

- |   |                                   |                                |
|---|-----------------------------------|--------------------------------|
| • | Aquifer Area:                     | 8.25 AC                        |
| • | Average Static Groundwater Level: | 34.2 feet BGS                  |
| • | Aquifer Depth:                    | 400 feet BGS                   |
| • | Aquifer Thickness:                | 366 feet                       |
| • | Effective Porosity:               | 7.5 percent (literature value) |
| • | Calculated Storage Capacity:      | 226 acre-feet (AF)             |

Based on the above calculations, the storage capacity for the Sonoma Volcanics within the CIA equates to 226 AF. It should be noted that although 226 AF of groundwater is

potentially in storage beneath the Sonoma Volcanics within the CIA, this does not necessarily represent the amount of groundwater available for use. Due to the nature of the interaction between groundwater and subsurface geology in the vicinity of the project site, it is not likely that the entire amount of groundwater in storage is able to be efficiently extracted.

### **Water Budget**

A water budget analysis was performed by comparing groundwater recharge characteristics to the projected on-site groundwater use over a given calendar year. In this regard, the groundwater recharge estimate for the CIA was calculated by assuming that precipitation represents the primary source of potential inflow into the underlying aquifer, and run-off, evapotranspiration, canopy interception and springs represent the primary outflow variables. Whereas other secondary sources of inflow (i.e., groundwater inflow from upgradient boundaries, recharge from irrigation, etc.) and outflow (i.e., groundwater outflow along downgradient boundaries, etc.) contribute to the overall groundwater recharge characteristics, these secondary sources were assumed to be relatively equal, resulting in no net gain or loss. Based on this approach, the following equation was used to calculate potential groundwater recharge:

$$\text{Groundwater Recharge} = P - (R + ET_a + E_{ci} + S)$$

where “P” is equal to precipitation (in AF/yr), “R” is equal to run-off (in AF/yr), “ET<sub>a</sub>” is equal to actual evapotranspiration (in AF/yr), “E<sub>ci</sub>” is equal to evaporative losses related to canopy interception (in AF/yr), and “S” is equal to spring flow (in AF/yr). Details regarding the calculation of each of these variables are presented below.

#### *Precipitation (P)*

The total volume of precipitation that falls within the CIA was calculated by multiplying the average annual precipitation rate (32 inches per year) by the size of the CIA (60 AC).

#### *Run-off (R)*

The percentage of the total precipitation that results as outflow (i.e., run-off) was estimated by comparing the ground slopes within the CIA to run-off coefficients (RCs) for various types of developed and natural settings (ODOT, 2014). In general, slope surfaces were separated by areas identified as “flat” (less than 2 percent), “rolling” (2 to 10 percent) and “hilly” (greater than 10 percent). In this regard, the relative percentages of slopes within the CIA that align with these categories are approximately 0, 50 and 50 percent, respectively. These areas, in turn, were further separated by the types of settings. The following provides a breakdown of the setting types and range of RCs used in the analysis:

- Woodland / Forest: 7.5 AC (RC = 0.15 - 0.20)
- Meadows / Pastureland 51 AC (RC = 0.30 - 0.35)

- Light Residential

1.5 AC (RC = 0.40 - 0.45)

Using the aforementioned variables, the annual run-off volume for each area was calculated by multiplying the respective areas by the annual precipitation volume, followed by multiplying the corresponding products by the applicable RC. The summation of all the area run-off volumes equates to the total annual run-off volume for the entire CIA.

#### *Actual Evapotranspiration ( $ET_a$ )*

As previously noted in Subsection 1.3 (*Local Climate*), the mean annual potential evapotranspiration ( $ET_o$ ) for the area is estimated to be 44.19 inches per year. The  $ET_a$ , in turn, was calculated by multiplying the annual  $ET_o$  by a coefficient of 0.33. This coefficient, determined in *Geohydrology and Water Chemistry of the Alexander Valley, Sonoma County, California* (USGS) (Metzger et al, 2006), represents the ratio between the soil moisture deficit and the  $ET_o$  observed during the months of May through September.

#### *Canopy Interception ( $E_{CI}$ )*

Canopy interception corresponds to the fraction of rainfall that is intercepted by the canopy of trees and shrubs (assumed to be negligible for grassland areas) and subsequently lost to evaporation. This fraction was estimated using equations developed by Helvey and Patric (1965) that utilize gross rainfall, throughput (i.e., rainfall that reaches the ground through spaces in the vegetative canopy and as drip from leaves, twigs and stems), and stemflow (i.e., rainfall that is caught on the canopy and reaches the ground by running down stems) variables. The calculation excluded grassland and vineyard areas as the fraction of canopy interception for these areas is assumed to be negligible. With that being said, all other areas within the CIA were assumed to be subject to canopy interception losses.

#### *Spring Activity (S)*

Although spring flow was not observed at the time of the site visit, spring flow was assumed to have occurred within the CIA due to the known occurrence of spring flow in the area. Given that the entire CIA drains to one point on the project site, EBA assigned spring activity 10% of the total calculated runoff within the CIA.

The results of the water balance calculations using the aforementioned parameters are presented in Table 3 on the following page.

<b>TABLE 3 SUMMARY OF WATER BALANCE CALCULATIONS</b>	
<i>Description</i>	<i>Average (AF/yr)</i>
Precipitation (inflow)	+160
Run-Off (outflow)	- 49
Actual Evapotranspiration (outflow)	- 73
Canopy Interception (outflow)	- 1
Springs (outflow)	- 5
<b>Total</b>	<b>+32</b>

AF/yr: Acre-Feet per Year

As presented in Table 3, the estimated volume of water potentially available for groundwater recharge is approximately 32 AF/yr. In regard to the total estimated future groundwater supply requirement (existing plus future development) within the CIA (16.31 AF/yr), this volume equates to approximately 50 percent of the water potentially available for recharge. Conversely, the total estimated future groundwater supply requirement (existing plus future development) for the project site (0.21 AF/yr) equates to less than one percent of the water potentially available for recharge.

## **5.2 Drought Conditions**

The water budget calculations were also performed simulating drought conditions. To accomplish this, EBA assumed 60 percent of the average annual rainfall (19.2 inches per year). The precipitation, run-off, canopy interception, actual evapotranspiration, and spring flow variables in the potential groundwater recharge equation presented in the previous subsection were adjusted accordingly. The results of this exercise indicated that despite the assumed drought conditions, a positive water balance exists during 60 percent of average annual rainfall. Recharge during drought conditions would be approximately 19 AF/yr prior to any groundwater extraction within the CIA. The future combined water use at the project site (0.21 AF/yr) equates to approximately one percent of the water potentially available for recharge during drought years. The total (existing plus future) water use within the CIA (16.31 AF/yr) equates to approximately 86 percent of the water potentially available for recharge during drought years.

It is important to note that while the assumed drought scenario calculations do provide some context to evaluate recharge under periods of extremely limited rainfall, years exhibiting above average rainfall would provide an excess of water being available for recharge. In essence, the historical rainfall amounts used herein account for drought scenarios.

### 5.3 Drawdown Characteristics

Projected drawdown characteristics associated with the proposed project was estimated through the performance of a preliminary analysis using the projected site-specific usage rates, data from the limited pumping test conducted for WELL-2890 on October 16, 2018, and an analytical computer model. The following subsections provide a summary of the various parameters considered in the analysis and the corresponding results.

#### Daily Water Demand

As an update to the September 28, 2021 hydrogeologic report, EBA re-evaluated the projected total annual groundwater use for the proposed project (0.93 AF/yr), as presented in Table 2, which is equivalent to an annual water demand of approximately 303,041 gallons. Therefore, the projected total annual groundwater use for the proposed project of 0.93 AF/yr is equivalent to a maximum daily water demand of approximately 830 gallons per day (GPD).

#### Pumping Rate and Duration

As presented above, the daily water demand is approximately 830 GPD. Whereas the demand would likely occur intermittently throughout the day, the total volume was assumed to be pumped at one time as a conservative measure. Based on the reported pumping rate of WELL-1321 of approximately 18 GPM (Appendix E), the pumping duration required to meet the maximum daily water demand is approximately 46 minutes. Based on known drawdown and recharge characteristics of WELL-1321 it is likely that this well will be solely capable of providing water supply for the proposed project.

#### Aquifer Transmissivity

Determination of aquifer transmissivity was accomplished using available data from the recent pumping test for WELL-1321. The average yield (18 GPM) and drawdown (123 feet) data from the pumping test were used in an empirical transmissivity equation published in *Groundwater and Wells* (Driscoll, 1986). This equation presented is as follows:

$$\frac{Q}{s} = \frac{T}{1500}$$

for a confined aquifer, where “Q” is discharge rate (GPM), “s” is feet of drawdown in the well, and “T” is transmissivity (gallons per day per foot [GPD/ft]). For the purpose of this analysis, the aquifer is assumed to be partially confined based on the description given by the well driller at the time of well installation. The corresponding results from the calculation indicated a transmissivity value of 220 GPD/ft.

### **Well Interference Characteristics**

Due to the project site well (WELL-1321) being completed in a different geologic formation than the rest of the off-site wells within the CIA, an evaluation of well interference was not conducted for the off-site wells. Given that the Wilson Grove overlays the Sonoma Volcanics, the likelihood of negative impacts to wells within the Wilson Grove would appear low. With that being said, assuming a similar well was completed in the same formation as WELL-1321 (i.e., Sonoma Volcanics), EBA calculated an estimated drawdown of approximately five feet at a distance of 50 feet from the well.

## **6.0 SURFACE WATER / AQUATIC HABITAT**

Policy WR-2e requires that the scope of the groundwater assessment encompass potential impacts to surface waters and aquatic habitats. As previously mentioned, the most prominent surface water feature in proximity of the project site is an unnamed intermittent drainage. This drainage runs through the project site from the west to east and has a small streamside conservation area, per the Sonoma County Riparian Corridor Combining Zone, along the eastern property line. There is a 50-foot riparian corridor setback from top of bank for this drainage in the streamside conservation area. The proposed tasting room and associated improvements are located over 200 feet from the drainage at its nearest point and are approximately 750 feet from the streamside conservation area. WELL-1321 is located approximately 625 feet at its nearest point from the streamside conservation area and 50-foot riparian corridor setback. Given the distance from WELL-1321 to the streamside conservation area (approximately 625 feet), as well as the relatively limited pumping rate associated with WELL-1321 (18 GPM), it is unlikely that pumping would influence surface water flow or aquatic habitat in this location.

## **7.0 CONCLUSIONS**

Based on the proposed water use and the estimates presented herein, it appears that the proposed project will not have a significant impact on current and future groundwater availability at the project site, nor within the CIA under existing or foreseeable future use conditions. This conclusion is based on the following:

- The projected estimated annual water supply requirement for the hypothetical future development and existing uses (16.31 AF/yr) for the entire CIA equates to approximately seven percent of the groundwater in storage within the Sonoma Volcanics (8.25 AC) within the CIA and approximately 50 percent of the amount of potential annual groundwater recharge (32 AF/yr). It is important to note that off-site future additional usage is based on hypothetical development of vineyards within the CIA. This estimate should be considered extremely conservative since it assumes that water supply for any future off-site vineyards would be from a well located within the CIA and within the same formation as the project site well (Sonoma Volcanics).



- A water yield test was performed October 3, 2019 on WELL-1321 demonstrating a discharge, drawdown, and specific capacity of 18 GPM, 123 feet, and 0.1463, respectively. The yield characteristics of WELL-1321 appear to be sufficient to accommodate the proposed project site water demand.
- Based on the analysis presented herein, it does not appear that pumping in WELL-1321 will be able to substantially influence any existing neighboring wells or surface water habitats. The potential for influence on surface water habitats near the streamside conservation area (approximately 625 feet) from pumping in WELL-1321, is unlikely.
- In regard to drought considerations, the total water use for the project site (0.21 AF/yr) equates to approximately one percent of the annual groundwater recharge during drought conditions. While the assumed drought scenario calculations do provide some context to evaluate recharge under periods of extremely limited rainfall, years exhibiting above average rainfall would provide an excess of water being available for recharge.
- A comparison of groundwater levels in water wells in the vicinity of the project site was conducted. EBA compared historical groundwater level values recorded in wells from the *Geology & Groundwater Potential* (Boudreau, 2005) report to the groundwater levels measured during EBA's recent site visit in May 2021. All attempts made by EBA to contact owners of neighboring wells failed. However, EBA personnel were able to measure two of the existing wells from the Boudreau report. The two wells measured were located at 1399 Spring Hill Road in Petaluma. Current groundwater levels were found to have mildly decreased in both wells from the historical groundwater levels in the Boudreau report. It should be noted that during the time of the site visit by EBA to measure groundwater levels in water wells in the vicinity of the project site, Sonoma County was experiencing a drought. This prolonged dry period may have lowered the groundwater levels in these wells below their average values. As such, it is reasonable to assume that groundwater levels will increase under a normal year or average precipitation.

It is important to note that some influences in the groundwater elevation immediately adjacent to WELL-1321 should be expected, although such influences may be temporal in nature. The amount of influence can be minimized through the employment of water management practices.

## 8.0 LIMITATIONS

This report was prepared in accordance with generally accepted standards of professional hydrogeologic consulting principles and practices at the place and time this study was performed. This warranty is in lieu of all other warranties, either expressed or

implied. The conclusions presented herein are based solely on information made available to us by others, and includes professional interpretations based on limited research and data. Based on these circumstances, the decision to conduct additional investigative work to substantiate the findings and conclusions presented herein is the sole responsibility of the client. This report has been prepared solely for the client and any reliance on this report by third parties shall be at such party's sole risk.

## 9.0 CLOSING

EBA appreciates the opportunity to be of service to you on this project. If you should have any questions regarding the information contained herein, please do not hesitate to contact our office at (707) 544-0784.

Sincerely,  
**EBA ENGINEERING**



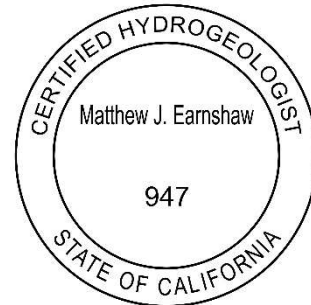
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Ian Penn  
Staff Geologist



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Matthew J. Earnshaw, P.G., C.E.G., C.Hg., QSD  
Senior Geologist



Appendices: Appendix A: Figures  
Appendix B: WELL-1321- Water Well Drillers Report  
Appendix C: Nearby Wells - Water Well Drillers Report  
Appendix D: CASGEM Hydrograph  
Appendix E: Well Yield Certification Test  
Appendix F: BC Engineering Group Water Use Estimate  
Appendix G: Landscape Architect Use Estimate

## 10.0 REFERENCES

Bezore, S., Randolph-Loar, C.E., Witter, R.C., *Geologic Map of the Petaluma 7.5' Quadrangle, Sonoma and Marin Counties, California: a Digital Database*, 2002.

Boudreau, E.H., *Geology & Groundwater Potential: Azari Property*, November 16, 2005. 1399 Spring Hill Road, Petaluma, CA.

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Helvey, J.D. and Patric, J.H., 1965, *Canopy and Litter Interception of Rainfall by Hardwoods of Eastern United States*; Water Resources Research, Volume 1, Number 2, Second Quarter, p. 193-205.

Metzger et al, 2006, *Geohydrology and Water Chemistry of the Alexander Valley, Sonoma County, California*, United States Geological Survey. Scientific Investigations Report 2006-5115.

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Sonoma County Water Agency, *County Wide Rainfall, Sonoma County, California*, January 10, 2005.

State of California, September 10, 2009, *California Code of Regulations, Title 23, Division 2, Chapter 2.7 – Model Water Efficient Landscape Ordinance, Appendix A – Reference Evapotranspiration (ET<sub>o</sub>) Table*.

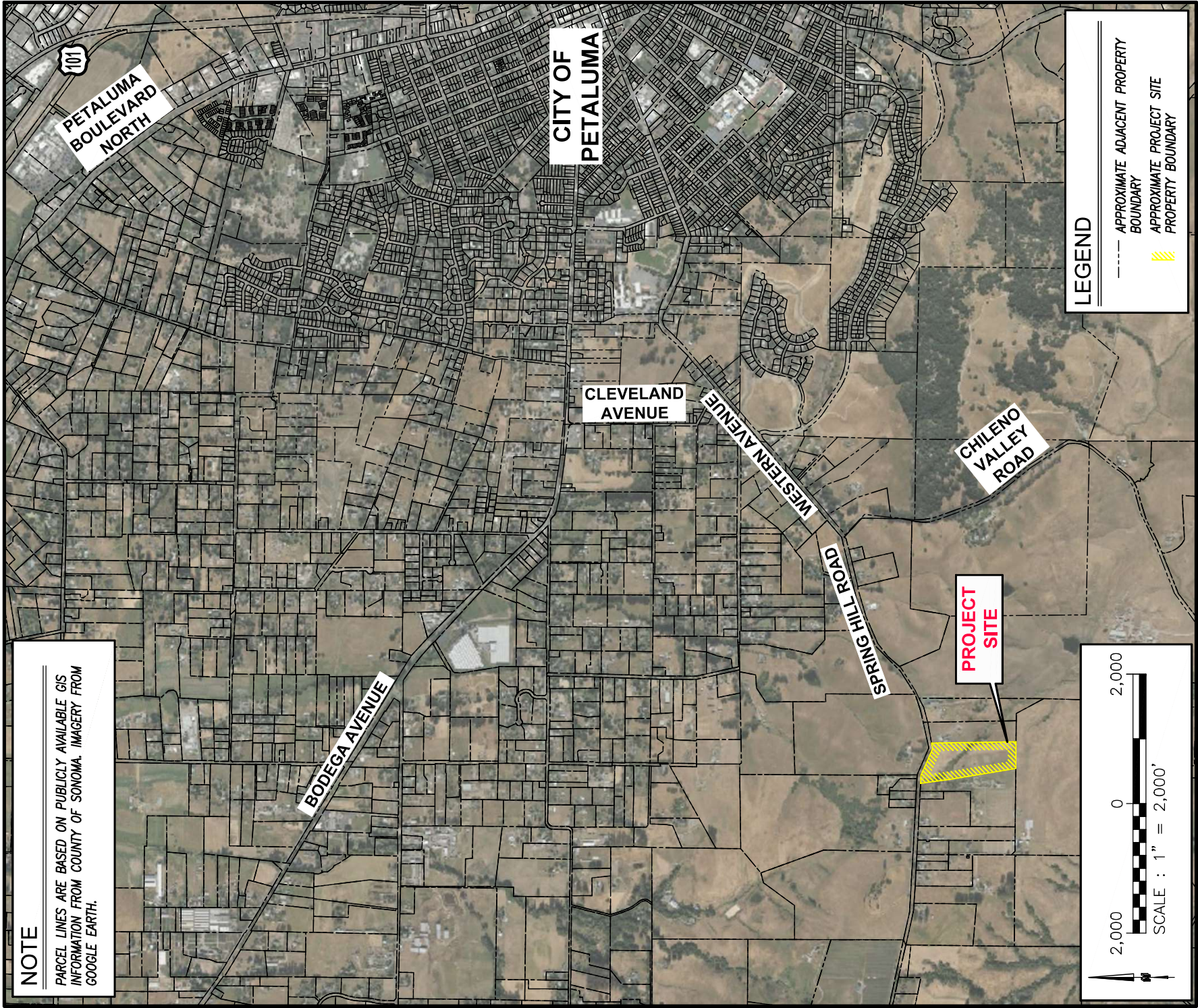
Theis, C.V., 1935, *The Relation between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground Water Storage: transactions*, Am. Geophysical Union, Washington, D.C. p. 518-524.

**APPENDIX A**

**FIGURES**

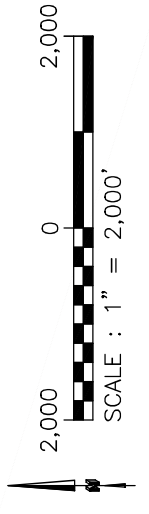
**NOTE**

PARCEL LINES ARE BASED ON PUBLICLY AVAILABLE GIS INFORMATION FROM COUNTY OF SONOMA. IMAGERY FROM GOOGLE EARTH.



**LEGEND**

- APPROXIMATE ADJACENT PROPERTY BOUNDARY
- APPROXIMATE PROJECT SITE PROPERTY BOUNDARY



**LOCATION MAP**

1321 SPRING HILL ROAD  
PETALUMA, CA 94952

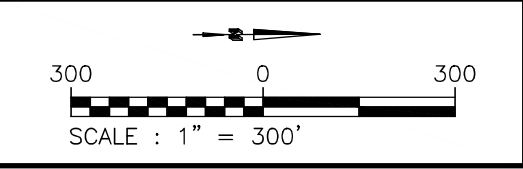
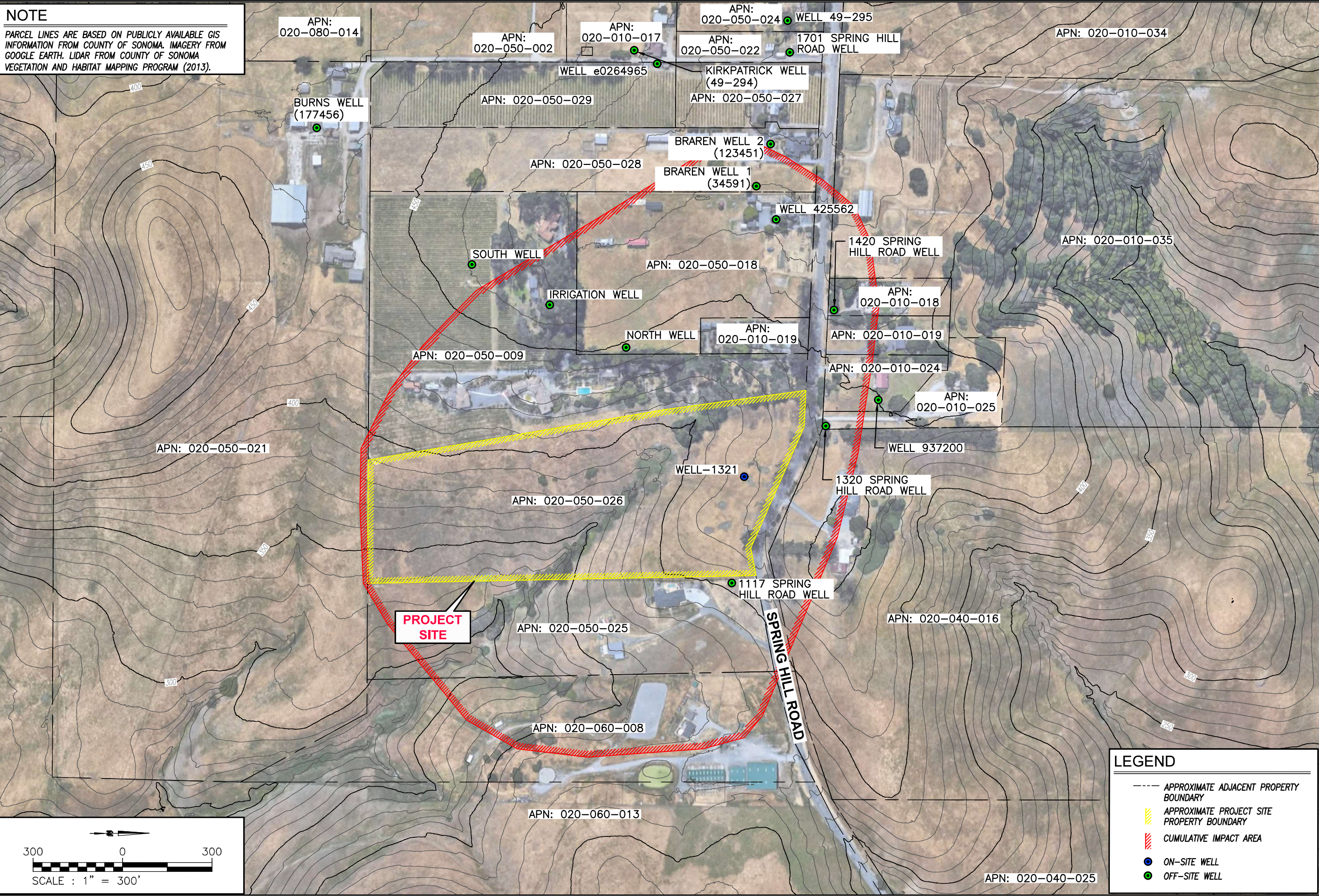
FIGURE

**1**

21-2983

**EBA**  
ENGINEERING  
825 SONOMA AVENUE  
SUITE C  
SANTA ROSA, CA 95404  
TEL: (707) 544-0784

**NOTE**  
 PARCEL LINES ARE BASED ON PUBLICLY AVAILABLE GIS INFORMATION FROM COUNTY OF SONOMA. IMAGERY FROM GOOGLE EARTH. LIDAR FROM COUNTY OF SONOMA VEGETATION AND HABITAT MAPPING PROGRAM (2013).



**LEGEND**

- APPROXIMATE ADJACENT PROPERTY BOUNDARY
- APPROXIMATE PROJECT SITE PROPERTY BOUNDARY
- CUMULATIVE IMPACT AREA
- ON-SITE WELL
- OFF-SITE WELL

FIGURE  
**2**  
 21-2983

**SITE PLAN**  
 1321 SPRING HILL ROAD  
 PETALUMA, CA 94952

**EBA**  
 ENGINEERING  
 825 SONOMA AVENUE  
 SUITE C  
 SANTA ROSA, CA 95404  
 TEL: (707) 544-0784

**NOTE**  
 PROJECTED BOUNDARY BASED ON PUBLICLY AVAILABLE GIS INFORMATION FROM COUNTY OF SONOMA. GEOLOGIC MAP USED: GEOLOGIC MAP OF THE PETALUMA 7.5' QUADRANGLE - SONOMA AND MARIN COUNTIES, CALIFORNIA: A DIGITAL DATABASE, PREPARED BY BEZORE ET AL, DATED 2002. CALIFORNIA GEOLOGICAL SURVEY.

EXPLANATION	
af	ARTIFICIAL FILL
Qha	HOLOCENE ALLUVIUM, UNDIFFERENTIATED.
Qls	LANDSLIDE DEPOSITS.
Twg	WILSON GROVE FORMATION (MIOCENE). LIGHT GRAY TO LIGHT YELLOW-BROWN MARINE SANDSTONE.
tp	PETALUMA FORMATION (MIOCENE). NONMARINE CONGLOMERATE ALONG SPRING HILL ROAD.
tv	VOLCANIC ROCKS (MIOCENE). BASALT FLOWS, ANDESITE BRECCAS, AND RYOLITE
KJfm	FRANCISCAN MELANGE (JURASSIC-CRETACEOUS)

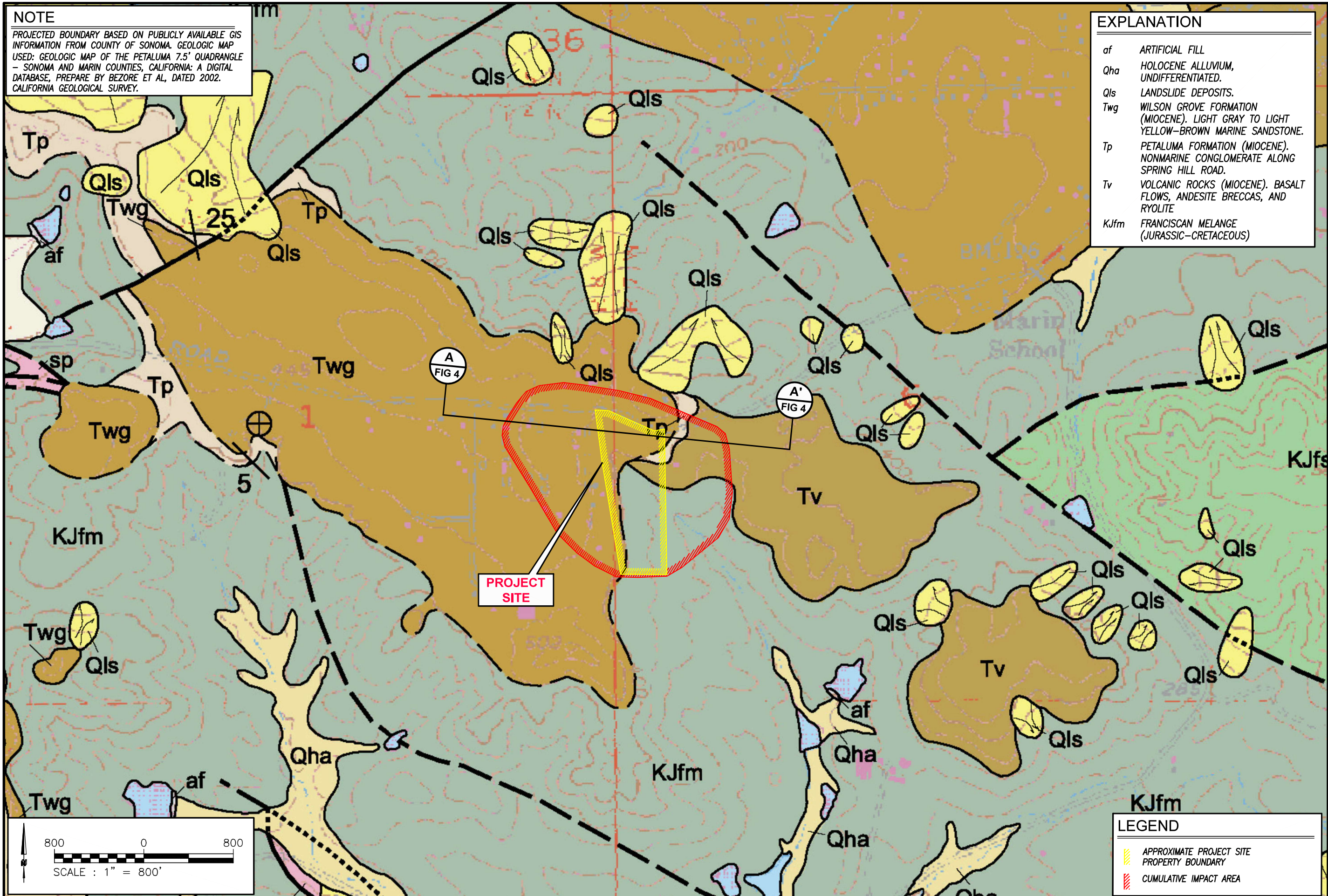


FIGURE  
**3**  
 21-2983

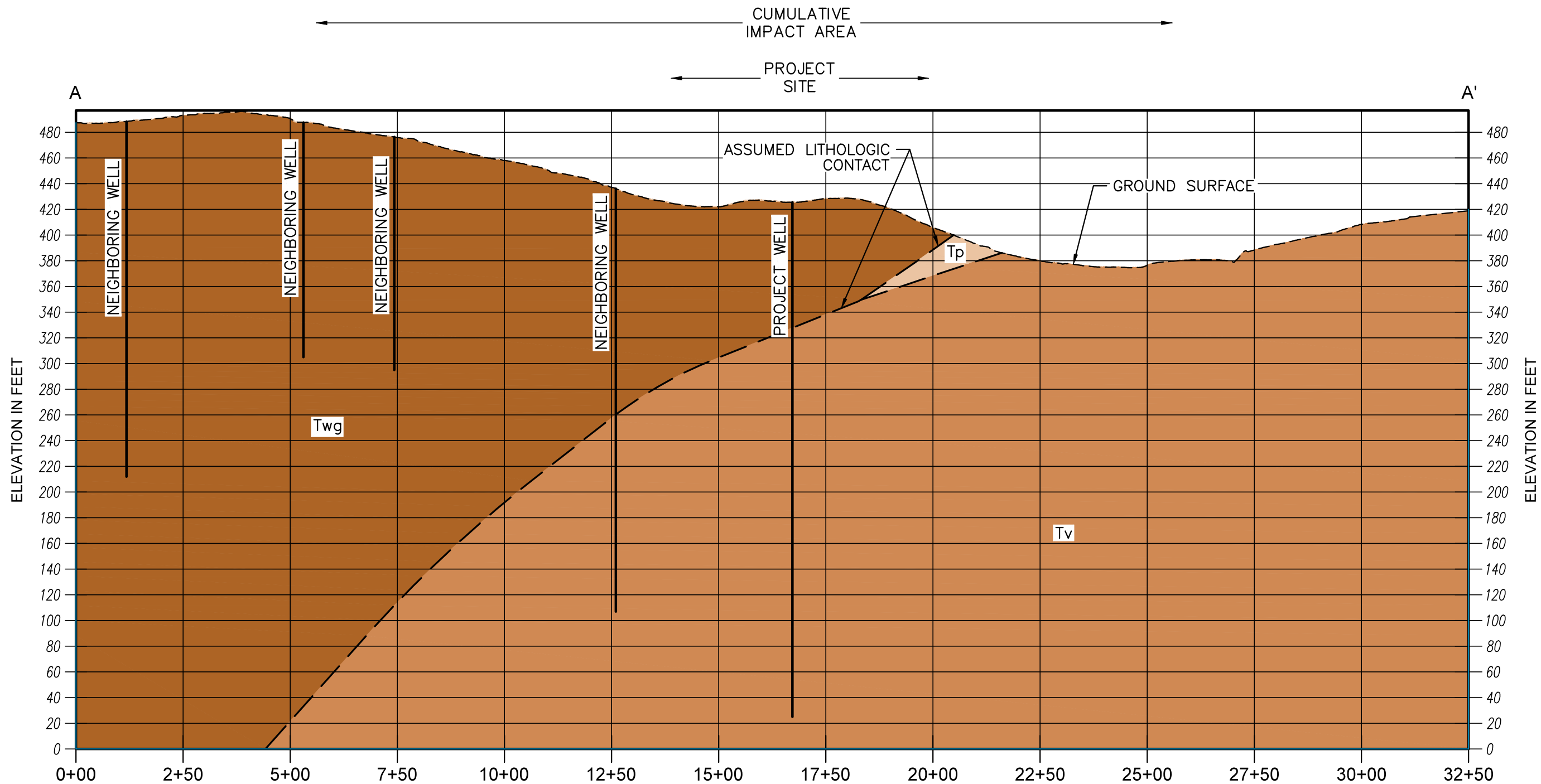
**GEOLOGIC MAP**  
 1321 SPRING HILL ROAD  
 PETALUMA, CA 94952

**EBA**  
 ENGINEERING  
 825 SONOMA AVENUE  
 SUITE C, 95404  
 SANTA ROSA, CA  
 TEL: (707) 544-0784

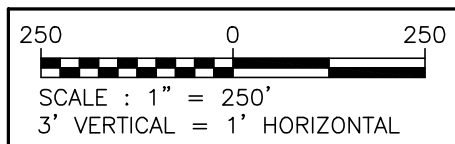
LEGEND	
	APPROXIMATE PROJECT SITE
	PROPERTY BOUNDARY
	CUMULATIVE IMPACT AREA

**NOTE**

GROUND SURFACE PROFILE BASED ON LIDAR FROM COUNTY OF SONOMA VEGETATION AND HABITAT MAPPING PROGRAM (2013). SEE FIGURE 3 - GEOLOGIC MAP FOR FORMATION DESCRIPTIONS.



**CROSS SECTION A-A'**



FIGURE

**4**

21-2983

**GEOLOGIC CROSS SECTION**

1321 SPRING HILL ROAD  
 PETALUMA, CA 94952





**APPENDIX B**

**WELL-1321  
WATER WELL DRILLERS REPORT**

STATE OF CALIFORNIA  
**WELL COMPLETION REPORT**  
Refer to Instruction Pamphlet

DWR USE ONLY -- DO NOT FILL IN

04W 01 SW 011

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

Page 1 of 1

Owner's Well No. 01 No. 779003

Date Work Began 7-8-04, Ended 7-19-04

Local Permit Agency Sonoma Co. PRMA

Permit No. WEL04-0100 Permit Date 3-5-04

ORIENTATION ( )			DRILLING METHOD		DESCRIPTION
VERTICAL <input checked="" type="checkbox"/> HORIZONTAL <input type="checkbox"/> ANGLE <input type="checkbox"/> (SPECIFY)			Rotary FLUID Mud		
DEPTH FROM SURFACE			Describe material, grain size, color, etc.		
Ft.	to	Ft.			
0	20		Top Soil, clay, & rock		
20	45		Blue clay		
45	120		Hard Black Fractured Rock		
120	125		Blue volcanic's		
125	140		Hard Black Rock		
140	145		Blue volcanic's		
145	155		Hard Black Rock		
155	170		Blue volcanic's		
170	400		Fracture Black Rock & shale		

**WELL OWNER**

**WELL LOCATION**

Address 1321 Spring Hill Rd.

City Petaluma

County Sonoma

APN Book 020 Page 050 Parcel 01 Lot 2

Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_

Latitude \_\_\_\_\_ NORTH Longitude \_\_\_\_\_ WEST

DEG. MIN. SEC. DEG. MIN. SEC.

**LOCATION SKETCH**

WEST EAST

Spring Hill Rd.

well

**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 \_\_\_\_\_

REMIEDIATION \_\_\_\_\_

OTHER (SPECIFY) \_\_\_\_\_

**WATER LEVEL & YIELD OF COMPLETED WELL**

DEPTH TO FIRST WATER 90 (Ft.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL 200 (Ft.) & DATE MEASURED 7-19-04

ESTIMATED YIELD 5 (GPM) & TEST TYPE Airlift

TEST LENGTH 8 (Hrs.) TOTAL DRAWDOWN 378 (Ft.)

\* 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	SLOT SIZE IF ANY (Inches)
Ft.	to	BLANK	SCREEN	CONDUCTOR	FILL PIPE				
0	100	12 1/4	X			PVC	5	200	Blank
100	400	8 3/4	X			11	11	11	.032

DEPTH FROM SURFACE	ANNULAR MATERIAL					
	TYPE					
Ft.	to	Ft.	CE-MENT ( )	BEN-TONITE ( )	FILL ( )	FILTER PACK (TYPE/SIZE)
0	100		✓			Cement
100	400				✓	Gravel

- ATTACHMENTS ( )**
- 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 Koenig Enterprises

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

ADDRESS 7882 Bernice Ct. R.P. Ca. 94928

CITY Petaluma STATE CA ZIP 94928

Signed [Signature] DATE SIGNED 7-19-04 C-57 LICENSE NUMBER 786191

WELL DRILLER/AUTHORIZED REPRESENTATIVE

**APPENDIX C**

**NEARBY WELLS**  
**WATER WELL DRILLERS REPORT**

STATE OF CALIFORNIA

**WELL COMPLETION REPORT**

No. **e0264965**

DWR USE ONLY -- DO NOT FILL IN

04N08W01  
38 13 06N 122 41 14W  
020-050-029

OWNER'S WELL No. 9095

Date Work Began 6/22/15 Ended 6/22/15

Local Permit Agency SONOMA

R.06/25/15

Permit No. WEL15-0134 Permit Date 04-29-2015

APN / TRS / OTHER

**GEOLOGIC LOG**

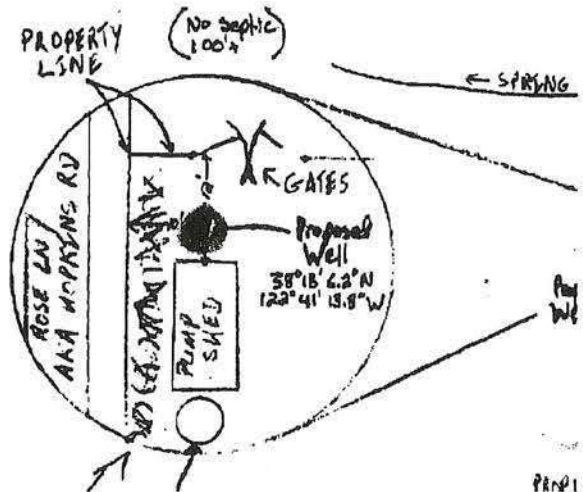
ORIENTATION		Vertical	Degree of Angle
DEPTH FROM SURFACE	DEPTH TO FIRST WATER	(ft.) BELOW SURFACE	
Ft.	Ft.	DESCRIPTION	
0	1	topsoil	
1	10	yellow sandy clay	
10	65	yellow sandy clay with yellow sandstone	
65	260	blue sandy clay with sandstone	

**WELL OWNER**



**WELL LOCATION**

Address 1617 SPRING HILL ROAD  
 City PETALUMA County SONOMA  
 Apn Book 020 Page 050 Parcel 029  
 or Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_ 1/4 \_\_\_\_\_ 1/4  
 or Latitude \_\_\_\_\_ NORTH Longitude \_\_\_\_\_ WEST  
 Deg. Min. Sec. \_\_\_\_\_ LOCATION SKETCH \_\_\_\_\_ Deg. Min. Sec. \_\_\_\_\_



ACTIVITY NEW WELL PLANNED USE(S) DOMESTIC WATER  
 DRILLING METHOD ROTARY AIR FLUID  
 DEPTH OF STATIC WATER LEVEL 80 (Ft.) & DATE MEASURED Jun 22, 2015  
 ESTIMATED YIELD \* 12 (G.P.M.) & TEST TYPE Airlift  
 TEST LENGTH. 2 (Hrs.) TOTAL DRAWDOWN \_\_\_\_\_ (FT.)  
 \*May not be representative of a well's long-term yield.

TOTAL DEPTH OF BORING 260 (Feet)

TOTAL DEPTH OF COMPLETED WELL 260 (Feet)

set pump at 220' for 10 gpm

DEPTH FROM SURFACE		BORE-HOLE DIA.		CASING				DEPTH FROM SURFACE		ANNULAR MATERIAL	
Ft.	To Ft.			Material / Grade	Dia.	Gauge	Slot size	Ft.	To Ft.	Seal Material	Filter Pack (Type / Size)
0	60	10		BLANK	E480 PVC	5	200	0	20	BENTONITE	
60	260	8 3/4		PERF	E480 PVC	5	200	20	260		SAND 8 X 16 2 YDS

- Attachments**
- no Geologic Log
  - no Well Construction Diagram
  - no Geophysical Logs
  - no Soil Water Chemical Analyses
  - no Other

**CERTIFICATION STATEMENT**  
 I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.  
 NAME JERRY AND DONS YAGER PUMP  
 (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)  
P.O. BOX 2689 PETALUMA CA 94952  
 Signed Scot Unterseher 062315 424778  
 WELL DRILLER / AUTHORIZED REPRESENTATIVE DATE SIGNED C- 57 LICENSE NUMBER

**WELL COMPLETION REPORT - STATE OF CALIFORNIA**

*04N08W01*

Page 1 of 1 No# 937200  
 Owner's Well No. 1  
 Permit Date: 03/10/06 Permit # WEL06-0053  
 Date Work Began 03/13/06 Ended 03/16/06  
 Permit Agency Dept of Permits & Resource Management

State Well No./Station No. \_\_\_\_\_

APN/TRS/Other \_\_\_\_\_

**GEOLOGIC LOG**

ORIENTATION: Vertical  
 DRILLING METHOD: Rotary  
 FLUID: Mud

**WELL OWNER**

Name: \_\_\_\_\_  
 Mailing Address: \_\_\_\_\_

Ft	to	Ft	DESCRIPTION
0	:	4	Top soil
4	:	10	Sandy clay
10	:	12	Hard ledge sandstone
12	:	17	Clay sandy
17	:	19	Gray sandy sandstone
19	:	20	Hard ledge
20	:	30	Sandstone sandy
30	:	35	Sandstone clay
35	:	37	Ledge
37	:	42	Sandy clay tan
42	:	44	Ledge with shells
44	:	50	Sandy clay
50	:	62	Ledge
62	:	69	Clay sandy
69	:	74	Ledge and shells
74	:	77	Sandy clay
77	:	79	Gravel
79	:	80	Clay sandstone
80	:	81	Hard ledge
81	:	82	Gravel
82	:	84	Hard ledge
84	:	95	Gravel and sandy clay mix
95	:	108	Gravel and clay mix
108	:	122	Clay and gravel layers
122	:	130	Sandy clay
130	:	132	Ledge
132	:	134	Gray clay
134	:	142	Ledge with fractured rock and sandy clay with gravel mix
142	:	156	Fractured rock and gravel
156	:	162	Clay
162	:	164	Hard ledge fractured rock
164	:	165	Clay
165	:	170	Gravel and sandy clay mix
170	:	182	Sandy clay
182	:	202	Clay with hard ledges
202	:	208	blue clay and rock mix
208	:	210	Gray clay
210	:	224	Hard clay and gray clay layers

**WELL LOCATION**

Address: 1412 Spring Hill Road  
 City: Petaluma  
 County: Sonoma  
 APN Book 020 - 010 - 024  
 Latitude \_\_\_\_\_ Longitude \_\_\_\_\_

**LOCATION SKETCH**

**ACTIVITY**

New Well  
 Modification/Repair  
 Deepen  
 Other (Specify) \_\_\_\_\_

DESTROY (Describe) \_\_\_\_\_  
 Procedures and Materials Under "Geologic Log") \_\_\_\_\_

**PLANNED USES:**

Monitoring  
 Test well  
 Cathodic Protection  
 Heat Exchange  
 Direct Push  
 Injection  
 Vapor Extraction  
 Sparging  
 Remediation  
 Other (specify) \_\_\_\_\_

**PLANNED USES**

Water Supply  
 Domestic  Public  
 Irrigation  Industrial

**WATER LEVEL & YIELD OF COMPLETED WELL**

Depth to First Water (ft.) BELOW SURFACE \_\_\_\_\_  
 Depth of Static \_\_\_\_\_ Date Measured: 03/16/06  
 Water Level (Ft) 60 Test Length/Test type: 2 hour Air lift  
 Estimate Yield (GPM)\* 2/5.7/5 Total draw 110-210-200  
 \*May not be representative of a well's long-term yield

TOTAL DEPTH OF BORING (FT): 224  
 TOTAL DEPTH OF COMPLETED WELL (FT): 220

Depth from surface	Bore-hole diameter	Type		Material Grade	Diameter	Gauge	Slot Size	Depth		Annular Material Seal Material
		Blank	Screen					From Surface	Ft to Ft	
0	110	11	XX	PVC	5	200		0	25	Bentonite
110	210		XX	PVC	5	200	0.032	25	220	8x16 and 12x20

**ATTACHMENTS**

No Geologic Log  
 No Well Construct Diagram  
 No Geophysical Log(s)  
 No Soil/Water Chemical Analyses  
 No Other

**CERTIFICATION STATEMENT**

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

NAME: LES PETERSEN DRILLING AND PUMP, INC  
 ADDRESS: 5434 OLD REDWOOD HWY, SANTA ROSA, CA 95403  
 SIGNED: Ray Petersen *Ray Petersen* 03/16/06 261084  
 Well Driller/Authorized Representative (Rogers) *RP* Date C-57 License #

DWR Driller Owner Local

STATE OF CALIFORNIA  
**WELL COMPLETION REPORT**  
Refer to Instruction Pamphlet

No. 425562

Owner's Well No. 1  
Date Work Began 4/15/93, Ended 4/16/93  
Local Permit Agency SONOMA COUNTY HEALTH DEPARTMENT  
Permit No. 92-3348 Permit Date 12/7/92

DWR USE ONLY - DO NOT FILL IN

04W08W01

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

**GEOLOGIC LOG**

ORIENTATION (∠)  VERTICAL  HORIZONTAL  ANGLE (SPECIFY)

DEPTH TO FIRST WATER (FL) BELOW SURFACE

DEPTH FROM SURFACE		DESCRIPTION <i>Describe material, grain size, color, etc.</i>
Ft.	to Ft.	
0	3	TOP SOIL
3	10	BROWN SAND
10	60	SANDY BROWN CLAY
60	68	BRN. SANDSTONE/HARD LEDGES
68	310	SOFT BLUE SANDSTONE/HARD LEDGES/ SHELLS

WELL OWNER

WELL LOCATION

Address SAME

City

County

APN Book 020 Page 050 Parcel 18-3

Township Range Section

Latitude Longitude

DEG. MIN. SEC. NORTH WEST

LOCATION SKETCH NORTH SOUTH

ACTIVITY (∠)

NEW WELL

MODIFICATION/REPAIR

— Deepen

— Other (Specify)

— DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

PLANNED USE(S) (∠)

— MONITORING

WATER SUPPLY

Domestic

— Public

— Irrigation

— Industrial

— "TEST WELL"

— CATHODIC PROTECTION

— OTHER (Specify)

WEST EAST

Illustrate or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc. PLEASE BE ACCURATE & COMPLETE.

DRILLING METHOD **ROTARY- AIR** FLUID

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF STATIC 60' (Fl.) & DATE MEASURED 4/16/93

WATER LEVEL (Fl.)

ESTIMATED YIELD\* 10 (GPM) & TEST TYPE AIR LIFT

TEST LENGTH 4 (Frs.) TOTAL DRAWDOWN 200 (Fl.)

\* May not be representative of a well's long-term yield. 15 GPM @ 300'

TOTAL DEPTH OF BORING 310 (Feet)

TOTAL DEPTH OF COMPLETED WELL 305 (Feet)

DEPTH FROM SURFACE Ft. to Ft.	BORE-HOLE DIA. (Inches)	CASING(S)						DEPTH FROM SURFACE Ft. to Ft.	ANNULAR MATERIAL TYPE									
		TYPE (∠)				MATERIAL / GRADE	INTERNAL DIAMETER (Inches)		GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	CE-MENT (∠)	BEN-TONITE (∠)	FILL (∠)	FILTER PACK (TYPE/SIZE)				
		BLANK	SCREEN	CON-DUCTOR	FILL PIPE													
0	135	8 1/2	X				F480	5"	#200									
135	155	"		X			"	"	"									
155	175	"		X			"	"	"									
175	215	"		X			"	"	"									
215	235	"		X			"	"	"									
235	305	"		X			"	"	"									1/4 x 1/8

ATTACHMENTS (∠)

— 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 **LES PETERSEN DRILLING & PUMP, INC.**  
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS **5434 OLD REDWOOD HIGHWAY SANTA ROSA CA.**  
CITY STATE ZIP

Signed **ROD PARLETT** 4/20/93 261084  
WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED C-57 LICENSE NUMBER

ORIGINAL

File with DWR

STATE OF CALIFORNIA THE RESOURCES AGENCY DEPARTMENT OF WATER RESOURCES WATER WELL DRILLERS REPORT

Do not fill in No. 177456

No. of Intent No. Permit No. or Date 377-84

State Well No. Other Well No. 04N08W01

(1) Address City (2) LOCATION OF WELL (See instructions): County Sonoma Owner's Well Number 020-050-05 Well address if different from above 1707 Springhill Road Township Petaluma Range Section Distance from cities, roads, railroads, fences, etc.

(12) WELL LOG: Total depth 319 ft. Depth of completed well 319 ft. from ft. to ft. Formation (Describe by color, character, size or material) 0-2 Topsoil 2-32 Brown sandstone 32-33 Ledge of blue sandstone 33-48 Brown sandstone 48-66 Blue sand and sandstone 66-204 Blue sandstone with streaks of clayey blue sand 204-319 Blue sandstone with streaks of blue sand

(3) TYPE OF WORK: New Well [X] Deepening [ ] Reconstruction [ ] Reconditioning [ ] Horizontal Well [ ] Destruction [ ] (Describe destruction materials and procedures in Item 12) (4) PROPOSED USE: Domestic [X] Irrigation [ ] Industrial [ ] Test Well [ ] Stock [ ] Municipal [ ] Other [ ]

WELL LOCATION SKETCH (5) EQUIPMENT: Rotary [X] Reverse [ ] Cable [ ] Air [ ] Other [ ] Bucket [ ] (6) GRAVEL PACK: Yes [X] No [ ] Size Fine Pea Diameter of bore 12 1/2 - 9 1/8 Packed from 25 to 319 ft. (7) CASING INSTALLED: Steel [ ] Plastic [X] Concrete [ ] (8) PERFORATIONS: Saw Cut Type of perforation or size of screen From ft. To ft. Dia. in. Gage or Wall Slot size 0 319 65/8 CL200 60-80 100-120 1/8 x 3 140-160 180-200 1/8 x 3 220-240 260-280 1/8 x 3 300-320

(9) WELL SEAL: Was surface sanitary seal provided? Yes [X] No [ ] If yes, to depth 25 ft. Were strata sealed against pollution? Yes [ ] No [ ] Interval ft. Method of sealing Concrete on pack

(10) WATER LEVELS: Depth of first water, if known ft. Standing level after well completion 40' ft.

(11) WELL TESTS: Was well test made? Yes [X] No [ ] If yes, by whom? Weeks Type of test Pump [ ] Bailer [X] Air lift [ ] Depth to water at start of test 40 ft. At end of test 200 ft. Discharge 20 gal/min after 3 hours Water temperature cool

Work started 10/11 19 84 Completed 10/17 19 84 WELL DRILLER'S STATEMENT: This well was drilled under my jurisdiction and this is true to the best of my knowledge and belief. SIGNED Gerald G. Thompson, By Ward Thompson (Well Driller) NAME WEEKS DRILLING AND PUMP COMPANY (Person, firm, or corporation) (Typed or printed) Address P. O. Box 176 City Sebastopol, CA Zip 95472 License No. C57-177681 Date of this report Oct. 22, 1984

**ORIGINAL**  
File with DWR

STATE OF CALIFORNIA  
THE RESOURCES AGENCY  
DEPARTMENT OF WATER RESOURCES  
WATER WELL DRILLERS REPORT

Do not fill in  
No. 066157

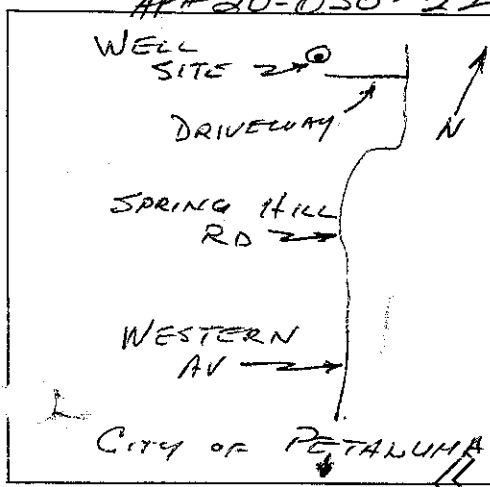
of Intent No. \_\_\_\_\_  
Local Permit No. or Date \_\_\_\_\_

State Well No. \_\_\_\_\_  
Other Well No. 04U08W01

(1) Address \_\_\_\_\_  
City \_\_\_\_\_  
(2) LOCATION OF WELL (See instructions):  
County Sonoma Owner's Well Number 1  
Well address if different from above Same  
Township 4N Range 8W Section 6  
Distance from cities, roads, railroads, fences, etc. 2 miles west of city of Petaluma off Spring Hill Rd.  
Well is 300' south of road  
AP# 20-050-22

(12) WELL LOG: Total depth 284 ft. Depth of completed well 278 ft.

from ft.	to ft.	Formation (Describe by color, character, size or material)
<u>3</u>	<u>3</u>	<u>Brown sandy soil</u>
<u>3</u>	<u>32</u>	<u>Brown sandy clay</u>
<u>32</u>	<u>83</u>	<u>Brown sand stone</u>
<u>83</u>	<u>280</u>	<u>Blue sand stone, medium hard</u>



(3) TYPE OF WORK:  
New Well  Deepening   
Reconstruction   
Reconditioning   
Horizontal Well   
Destruction  (Describe destruction materials and procedures in Item 12)  
(4) PROPOSED USE:  
Domestic   
Irrigation   
Industrial   
Test Well   
Stock   
Municipal   
Other

(5) EQUIPMENT:  
Rotary  Reverse   
Cable  Air   
Other  Bucket

(6) GRAVEL PACK:  
Yes  No  Size 3/8"  
Diameter of bore 9"  
Packed from 24 to 278

(7) CASING INSTALLED:  
Steel  Plastic  Concrete

(8) PERFORATIONS:  
Type of perforation or size of screen 2" SW

From ft.	To ft.	Dia. in.	Gage or Wall	From ft.	To ft.	Slot size
<u>0</u>	<u>278</u>	<u>5</u>	<u>160</u>	<u>60</u>	<u>278</u>	<u>1" 16x3"</u>

(9) WELL SEAL:  
Was surface sanitary seal provided? Yes  No  If yes, to depth 24 ft.  
Were strata sealed against pollution? Yes  No  Interval \_\_\_\_\_ ft.  
Method of sealing Concrete

(10) WATER LEVELS:  
Depth of first water, if known 58 ft.  
Standing level after well completion -- ft.

(11) WELL TESTS:  
Was well test made? Yes  No  If yes, by whom? A&K Drilling  
Type of test Pump  Bailer  Air lift   
Depth to water at start of test -- ft. At end of test -- ft.  
Flow rate 20 gal/min after 4 hours Water temperature \_\_\_\_\_  
Chemical analysis made? Yes  No  If yes, by whom? \_\_\_\_\_  
Was electric log made? Yes  No  If yes, attach copy to this report

Work started 10 Sep 19 79 Completed 18 Sep 19 79

WELL DRILLER'S STATEMENT:  
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.  
SIGNED David L Anderson (Well Driller)  
NAME A & K Drilling  
(Person, firm, or corporation) (Typed or printed)  
Address 1708 Putnam Way  
City Petaluma CA Zip 94952  
License No. 307800 Date of this report 6 Nov 79



ORIGINAL  
File with DWR

STATE OF CALIFORNIA  
THE RESOURCES AGENCY  
DEPARTMENT OF WATER RESOURCES  
WATER WELL DRILLERS REPORT

Do not fill in  
No. 34591

Notice of Intent No. \_\_\_\_\_  
Local Permit No. or Date \_\_\_\_\_

State Well No. \_\_\_\_\_  
Other Well No. 4N/SW-1

(1) DOWN

Address \_\_\_\_\_  
City \_\_\_\_\_

(2) LOCATION OF WELL (See instructions):

County Sonoma Owner's Well Number \_\_\_\_\_

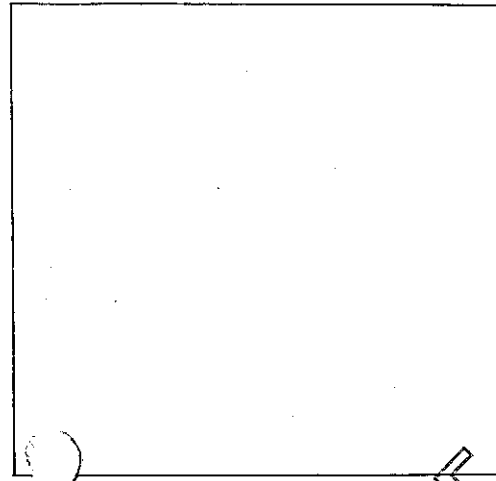
Well address if different from above same

Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_

Distance from cities, roads, railroads, fences, etc. \_\_\_\_\_

12) WELL LOG: Total depth 190 ft. Depth of completed well \_\_\_\_\_ ft.  
\_\_\_\_\_ ft. to \_\_\_\_\_ ft. Formation (Describe by color, character, size or material)

15	yellow sandstone
100	blue sandstone/shells/gravel
100	115 " " " "
115	145 blue clay
145	190 blue clay/shale



WELL LOCATION SKETCH

(3) TYPE OF WORK:

- New Well  Deepening
- Reconstruction
- Reconditioning
- Horizontal Well
- Destruction  (Describe destruction materials and procedures in Item 12)
- (4) PROPOSED USE:
- Domestic
- Irrigation
- Industrial
- Test Well
- Stock
- Municipal
- Other

(5) EQUIPMENT:

- Rotary  Reverse
- Cable  Air
- Other  Bucket

(6) GRAVEL PACK:-

- Yes  No  Size 1/8
- Diameter of bore \_\_\_\_\_
- Packed from 1 to 24 ft.

(7) CASING INSTALLED:

- Steel  Plastic  Concrete

(8) PERFORATIONS:

Type of perforation or size of screen \_\_\_\_\_

From ft.	To ft.	Dia. in.	Cage or Wall	From ft.	To ft.	Slot size
1	182	6 1/2		162	182	
				82	142	

(9) WELL SEAL:

- Was surface sanitary seal provided? Yes  No  If yes, to depth 24 ft.
- Were strata sealed against pollution? Yes  No  Interval \_\_\_\_\_ ft.
- Method of sealing ready mix

(10) WATER LEVELS:

Depth of first water, if known \_\_\_\_\_ ft.  
Standing level after well completion 20 ft.

(11) WELL TESTS:

- Was well test made?  No  If yes, by whom? \_\_\_\_\_
- Type of test Pump  Bailer  Air lift
- Depth to water at start of test \_\_\_\_\_ ft. At end of test 100 ft.
- Discharge 20 gal/min after 4 hours Water temperature \_\_\_\_\_
- Chemical analysis made? Yes  No  If yes, by whom? \_\_\_\_\_
- Electric log made? Yes  No  If yes, attach copy to this report

Work started 12/30 19 76 Completed 1/4/77 19 \_\_\_\_\_

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

SIGNED Kim Koenig  
(Well Driller)

NAME LES PETERSEN DRILLING & PUMP, INC.  
(Person, firm, or corporation) (Typed or printed)

Address 5434 Old Redwood Highway

City Santa Rosa, California Zip \_\_\_\_\_

License No. 261084 Date of this report 1/11/77

**CONFIDENTIAL LOG**  
 Water Code Sec. 13752  
**ORIGINAL**  
 File with DWR

STATE OF CALIFORNIA  
 THE RESOURCES AGENCY  
**DEPARTMENT OF WATER RESOURCES**  
**WATER WELL DRILLERS REPORT**

Do Not Fill In  
**No 123451**

State Well No. \_\_\_\_\_  
 Other Well No. 4/8-1545

(1) OWNER:  
 N: \_\_\_\_\_  
 Ac \_\_\_\_\_

(11) WELL LOG:  
 Total depth 190 ft. Depth of completed well \_\_\_\_\_ ft.  
 Formation: Describe by color, character, size of material, and structure  
 \_\_\_\_\_ ft. to \_\_\_\_\_ ft.

(2) LOCATION OF WELL:  
 County Sonoma Owner's number, if any \_\_\_\_\_  
 Township, Range, and Section \_\_\_\_\_  
 Distance from cities, roads, railroads, etc. \_\_\_\_\_

0 - 1 top soil  
1 - 95 yellow sandstone  
95 - 190 blue sandstone

(3) TYPE OF WORK (check):  
 New Well  Deepening  Reconditioning  Destroying   
 If destruction, describe material and procedure in Item 11.

(4) PROPOSED USE (check):  
 Domestic  Industrial  Municipal   
 Irrigation  Test Well  Other

(5) EQUIPMENT:  
 Rotary   
 Cable   
 Other

(6) CASING INSTALLED:

STEEL:				OTHER:				If gravel packed		
From ft.	To ft.	Diam.	Gage or Wall	Diameter of Bore	From ft.	To ft.				
<u>1</u>	<u>100</u>	<u>6"</u>								

Size of shoe or well ring: 6" Size of gravel: \_\_\_\_\_

**APN 020-650-007-6**

Describe joint weld

(7) PERFORATIONS OR SCREEN:  
 Type of perforation or name of screen

From ft.	To ft.	Perf. per row	Rows per ft.	Size in. x in.
		<u>None</u>		

(8) CONSTRUCTION:  
 Was a surface sanitary seal provided? Yes  No  To what depth 20 ft.  
 Were any strata sealed against pollution? Yes  No  If yes, note depth of strata \_\_\_\_\_

From \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
 From \_\_\_\_\_ ft. to \_\_\_\_\_ ft.

Method of sealing ready mix

(9) WATER LEVELS:  
 Depth at which water was first found, if known \_\_\_\_\_ ft.  
 Standing level before perforating, if known \_\_\_\_\_ ft.  
 Standing level after perforating and developing 60' ft.

(10) WELL TESTS: bail  
 Was pump test made? Yes  No  If yes, by whom?  
 Yield: 20 gal./min. with 100 ft. drawdown after 2 hrs.  
 Temperature of water \_\_\_\_\_ Was a chemical analysis made? Yes  No   
 Was electric log made of well? Yes  No  If yes, attach copy

Work started 11/27 73 Completed \_\_\_\_\_ 19

WELL DRILLER'S STATEMENT:  
 This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Les Petersen Drilling & Pump, Inc.  
 (Person, firm, or corporation) (Typed or printed)

Address 5434 Old Redwood Highway  
Santa Rosa, California

[SIGNED] Lawrence Petersen  
 (Well Driller)

License No. 261084 Dated 12/18/73, 19\_\_\_\_

SKETCH LOCATION OF WELL ON REVERSE SIDE

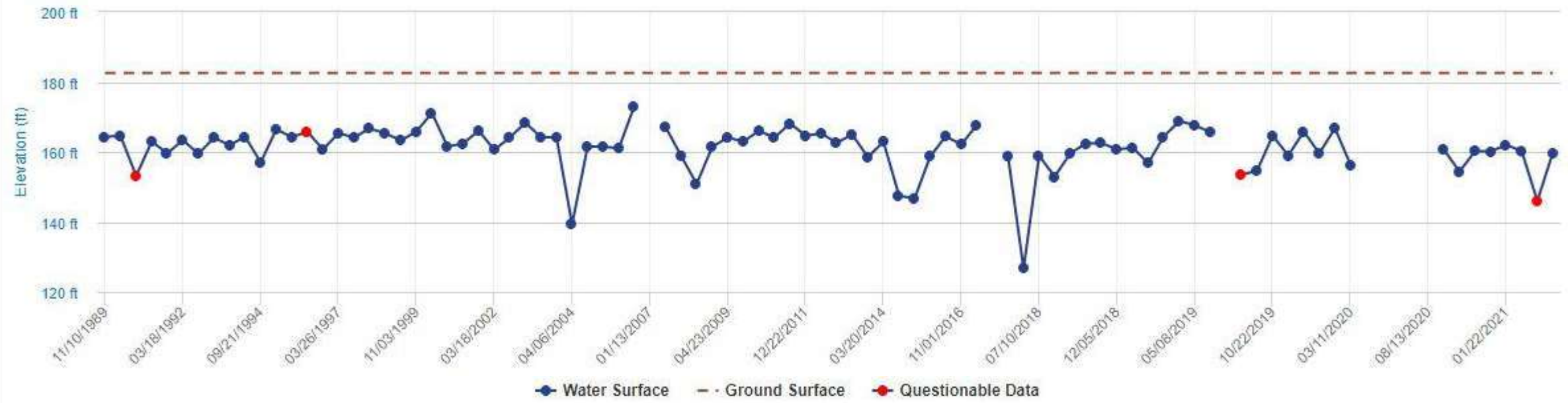




**APPENDIX D**

**CASGEM HYDROGRAPH  
WELL ID: 382277N1226740W001**

## Groundwater Levels for Well 382277N1226740W001



**APPENDIX E**

**WELL YIELD CERTIFICATION TEST**



COUNTY OF SONOMA  
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT

2550 Ventura Avenue, Santa Rosa, CA 95403-2829  
(707) 565-1900 FAX (707) 565-1103

CERTIFICATION OF WATER YIELD IN WATER SCARCE AREAS  
The Permit and Resource Management Department shall be notified 24 hours in advance of this test

Water Yield # WEL19-0483

Well Permit # UNKNOWN

- I. Individual performing test: VAL CARDONA / RICH RICHMOND
- II. Type of license/registration, number and expiration date: C57 # 261084 EXP 12-31-19
- III. Location of well:  
Address: 1321 SPRING HILL RD. A.P. #: 020-050-026
- IV. Type and model of test pump: 1 HP SUB MODEL UNKNOWN
- V. Test pump setting depth: 160'
- VI. Maximum reported yield for this pump type at this setting: UNKNOWN
- VII. Type of discharge measurement method: 5-GAL BUCKET & STOP WATCH
- VIII. Type and model of flow meter (or provide an accurate description of weir or orifice plate):

Geographic coordinates (Plane Coordinate Method or distance from fixed landmarks): 38°13'08.75" N

IX. Estimated elevation of well head: 427' 122° 40' 56.90" W

X. Initial static water level (include measuring points such as top of casing, surface seal, access port): 37' TO TOP OF CASING APPROX 1' ABOVE GRADE

XI. Date & time of initial static water level measurement: 9/30/19 9:00 (a.m.) p.m.

- A. Discharge Rate: 18-GPM
- B. Dynamic Water Level: 160'
- C. Specific Capacity: 0.1463
- D. Pump Test duration: 8-HRS

XII. Immediately after the test take the following measurements:

- A. Dynamic water level: 160'
- B. Final discharge rate: 18-GPM

XIII. Post - Test Measurement:

- A. Dynamic water level: 42'
- B. Static water level: 37'
- C. Percentage of recovery of final static level: 95.93%

Testing performed by (signature): [Signature]

Date: 10-3-19

Company: LES PETERSEN DRILLING & PUMP

Phone Number: 540-0246

Approved \_\_\_\_\_ Denied \_\_\_\_\_ Specialist \_\_\_\_\_ Date \_\_\_\_\_





# Test Pump Log

Drilling & Pump Inc.

<b>JOB:</b>	Kamal Azari	<b>PUMP SIZE:</b>	1-HP SUBMERSIBLE PUMP
<b>LOCATION:</b>	1321 Spring Hill Rd	<b>SETTING:</b>	160'
<b>WELL DEPTH:</b>	Unknown	<b>CASING SIZE:</b>	6"
		<b>STATIC LEVEL:</b>	37'
<b>DATE STARTED:</b>	9/30/2019	<b>DATE FINISHED:</b>	10/3/2019
		<b>JOB #</b>	WEL19-0483

DATE:	TIME	Interval	TEST DATA				COMMENTS
			LEVEL	G.P.M.			
9/30/19	9:30 AM	1 Min	37	32			
9/30/19	9:31 AM	1 Min	41	32			
9/30/19	9:32 AM	1 Min	45	32			
9/30/19	9:33 AM	1 Min	48	32			
9/30/19	9:34 AM	1 Min	52	32			
9/30/19	9:39 AM	5 Min	63	32			
9/30/19	9:44 AM	5 Min	75	31			
9/30/19	9:49 AM	5 Min	89	31			
9/30/19	9:54 AM	5 Min	102	31			
9/30/19	9:59 AM	5 Min	125	30			
9/30/19	10:04 AM	5 Min	136	30			
9/30/19	10:09 AM	5 Min	144	29			
9/30/19	10:14 AM	5 Min	150	29			
9/30/19	10:19 AM	5 Min	158	22			
9/30/19	10:24 AM	5 Min	160	20			
9/30/19	10:29 AM	5 Min	160	20			
9/30/19	10:34 AM	5 Min	160	19.5			
9/30/19	10:54 AM	20 Min	160	19.5			
9/30/19	11:14 AM	20 Min	160	19			
9/30/19	11:34 AM	20 Min	160	19			
9/30/19	12:04 PM	30 Min	160	18.5			
9/30/19	12:34 PM	30 Min	160	18.5			
9/30/19	1:04 PM	30 Min	160	18			
9/30/19	1:34 PM	30 Min	160	18			
9/30/19	2:04 PM	30 Min	160	18			
9/30/19	2:34 PM	30 Min	160	18			
9/30/19	3:04 PM	30 Min	160	18			
9/30/19	3:34 PM	30 Min	160	18			
9/30/19	4:04 PM	30 Min	160	18			
9/30/19	4:34 PM	30 Min	160	18			
9/30/19	5:04 PM	30 Min	160	18			
9/30/19	5:34 PM	30 Min	160	18			End of pump test
10/3/19	1:30 PM	68-Hrs	42	NA			Recovery = 95.93%

## WEL19-0483 Recovery Data

Initial Static Water Level	37 a
Post test water level	42 b
Time (Hours) of measurement	16 b-1
Stabilized pumping level	160 c
Draw Down	123 d
Recovery	118 e

**Percent of Recovery** **95.93%** f

## Specific Capacity

Discharge rate in GPM	18
Draw Down in feet	123

**Specific capacity** **0.1463**

COUNTY OF SONOMA  
 PERMIT & RESOURCE MANAGEMENT DEPARTMENT  
 WELL & SEPTIC SECTION  
 2550 VENTURA AVENUE  
 SANTA ROSA, 95403  
 (707) 565-1900

APPLICATION FOR PERMIT  
 WATER WELL

WELL ADDRESS 1321 Springhill Rd.  
 CITY Petaluma Ca. ZIP 94953  
 PROPERTY OWNER Vasco Medeiros  
 ADDRESS Po. Box 2808 Pet. Ca. 94953  
 DRILLING CONTRACTOR Koenig Ent.  
 ADDRESS 7882 Bernice Ct. R.P. Ca. 94928

APPLICATION No. WEL04-0100  
 ASSESSOR'S PARCEL No. 020-050-01 Lot 2  
 PHONE No. 778-0806  
 CONTRACTOR LICENSE No. 786191  
 PHONE No. 664-1102

TYPE OF WORK:  Class I Permit  Class II Permit  New Well  Reconstruct  Observation  Test well, Test hole  Destruct  Other: \_\_\_\_\_

PROPOSED USE:  Domestic, Single Family  Domestic, Public  Irrigation  Industrial  Other: \_\_\_\_\_

CONSTRUCTION PROPOSED:  
 Casing: Diameter: 5" Gauge: Std Material: PVC Conductor: No  Yes  Single  Double  Gravel Pack: Yes  No

Annular Space: Size: 1 1/4" Depth of Seat: 50' Concrete:  Grout: \_\_\_\_\_ Neat Cement: \_\_\_\_\_ Puddled Clay: \_\_\_\_\_

Method of Disinfection: Chlorine Pellets Method of Sealing Access Opening: Concrete Pumper Type of Joint: Slip

Well located within an existing public water system boundary: Yes  No  Name: \_\_\_\_\_

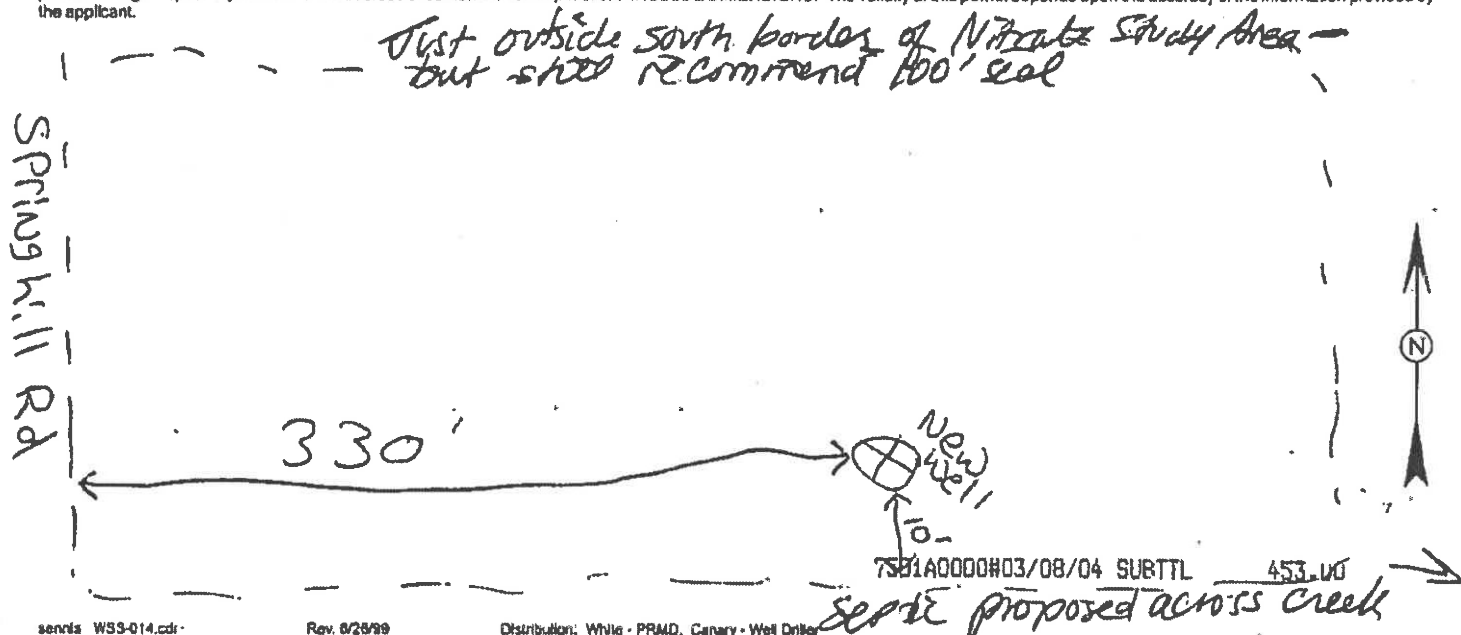
I hereby agree to comply with all laws and regulations of the County of Sonoma and State of California pertaining to water well construction. I will telephone (707) 565-1694 to notify the Environmental Health Specialist when I am commencing this work. I will furnish the Permit and Resource Management Department and the owner a copy of the State Water Well Driller's Report within 80 days in order to obtain final approval on this well. I acknowledge that the application will become a permit only after site approval and payment of fee. I understand that this permit is not transferrable and expires one year from date of issuance.

CONSTRUCTION PROPOSED:  
 A currently effective certificate of Worker's Compensation Insurance is on file with the Sonoma County PRMD.  
 I certify that in the performance of the work for which this permit is issued I shall not employ any person in any manner so as to become subject to the Worker's Compensation laws of California.  
 Insurance Carrier Sst. Zurich Policy # 001  
 Signature of Applicant X [Signature] Date 2-5-04

Signature of Well Driller X [Signature] Date 3-5-04

FOR OFFICE USE ONLY - ENVIRONMENTAL HEALTH SERVICE  
 Site approved by: Pamela Benyde Date: 5/18/04 Water Scarce Area: Yes  No   
 Finaled by: FINAL BASED ON WELL REPORT Date: 2-16-5 Sealed to depth of \_\_\_\_\_  
 Seel Observed: Yes  No

Indicate below the exact location of well with respect to the following items: property lines, water bodies or water courses, drainage pattern, roads, existing wells, sewer main and laterals and private sewage disposal systems or other sources of contamination or pollution. INCLUDE DIMENSIONS. The validity of this permit depends upon the accuracy of the information provided by the applicant.






# Untitled Map

Write a description for your map.

**Legend**

-  Untitled Path
-  well



Spring Hill Rd

well

Access

1 hp 230V  
Sub



**APPENDIX F**

**BC ENGINEERING GROUP  
WATER USE ESTIMATE**

## Use Permit Proposal Statement

**1321 Spring Hill Road, Petaluma, CA 94952**  
**APN 020-050-026**

- A new 2,809 square foot tasting room building located at subject property in Petaluma is proposed. The building will contain an approximately 2,409 square foot tasting area and an approximately 400 square foot food preparation area. The food preparation area is proposed to be utilized to warm prepared food catered for the proposed special events. The proposed building has a maximum height of 34 feet. Restrooms are proposed in a separate 302 square foot building located approximately 8 feet from the proposed tasting room building.
- An approximate total of 4,973 square feet of patio/walkways are proposed around the perimeter of the proposed tasting room building and an approximately 2,000 square foot patio/terrace for viewing is proposed to the west of the proposed tasting room.
- The tasting room is proposed to accommodate 2 employees and 20 wine tasters a day.
- 10 special events (8 Agricultural Promotional Events, 2 Industry Wide Events) per year are proposed at the tasting room with 200 guests per special event and 3 employees, which include the 2 tasting room employees. The tasting room will participate in industry wide events. Portable toilets will be utilized for the special events and the events will utilize outdoor areas adjacent to the proposed tasting room, with possible visits to the vineyards. Special events will utilize music and amplified sound.
- A new parking lot is proposed adjacent to the new tasting room building and will contain 28 regular parking spaces and 2 handicap parking spaces. An overflow parking area is proposed to the east which consists of 53 regular parking spaces. Total combined proposed parking spaces are 83.
- Tasting room domestic wastewater shall be disposed of in a non-standard type septic system to the west and southwest of the proposed tasting room, in the area of the pre-perc site inspection performed under SEV07-0960 and the percolation test performed under SEV07-1062. The septic system shall be designed in accordance with the current OWTS Manual and be sized to accommodate the domestic wastewater generated by the proposed use, including domestic wastewater generated by employees, wine tasters, and special event guests.
- The water source for the subject parcel and the domestic and irrigation water for the proposed tasting room is an existing well located on the parcel. Estimated proposed annual water usage associated with the tasting room is 294,640 gallons for domestic water use and 238,336 for irrigation water use, totaling 532,976 gallons annually.
- Two new driveways are proposed to allow access to the proposed parking lot from Spring Hill Road. Driveways will conform to Sonoma County Transportation and Public Works standards and applicable Use Permit conditions.
- The Assessor's Parcel Number of the project site is 020-050-026 and the parcel has a total area of 16.60 acres. The parcel is zoned LEA B6 100, RC50/50.
- An existing drainage runs through the parcel from the west to east and has a small streamside conservation area, per the Sonoma County Riparian Corridor Combining



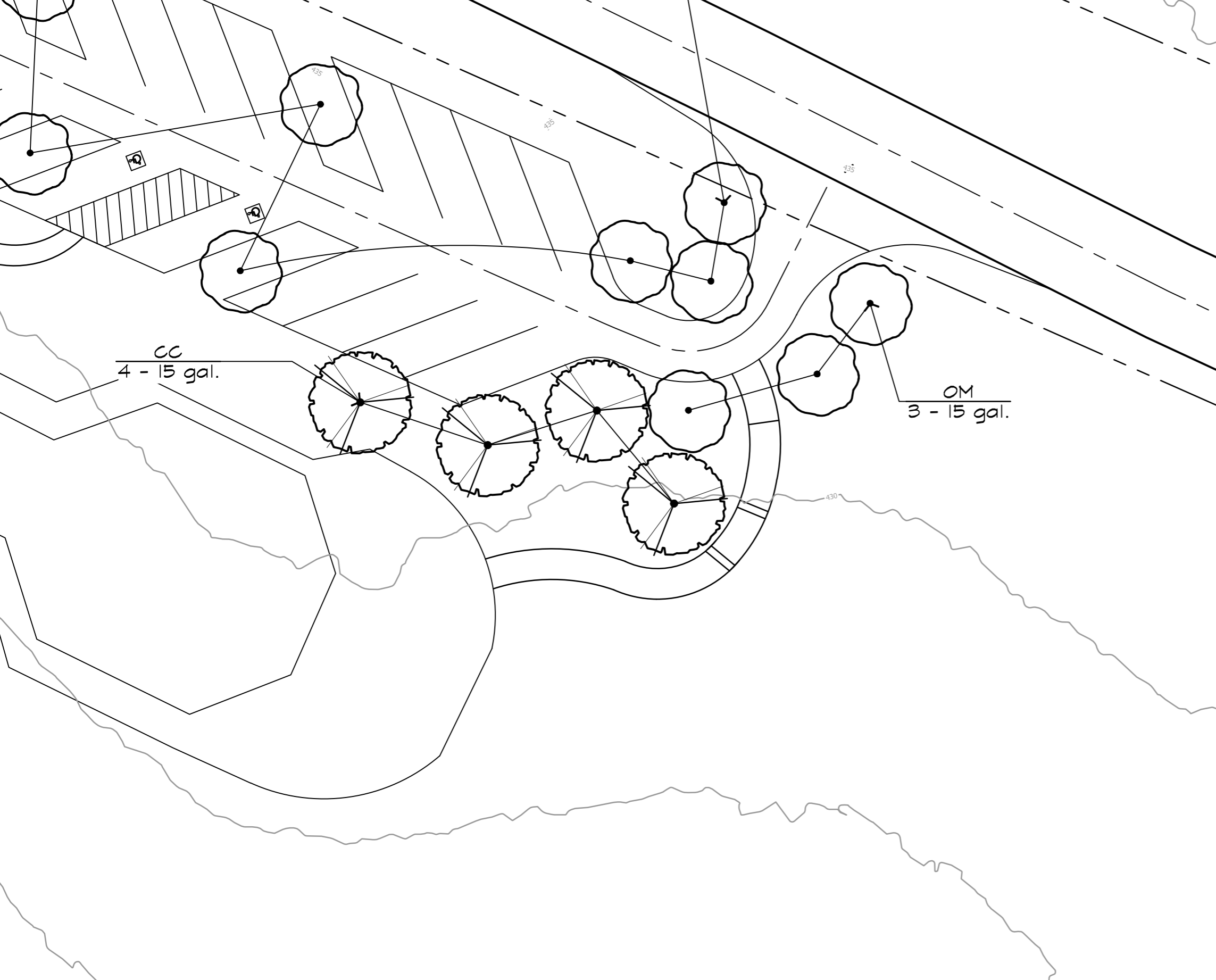
Zone, along the eastern property line. The proposed tasting room and associated improvements are located over 200' from the drainage at its nearest point and are approximately 750' from the streamside conservation area.

- The existing site slopes at approximately 10% from the northwest to the southeast and consists primarily of native grassland with trees and shrubs located along the property line. The site soils consist of Steinbeck Loam (SnC) and Los Osos Clay Loam (LoD) per the USDA NRCS Custom Soil Resource Report.
- Hours of Operation
  - Tasting Room: Thursday-Sunday, 11am-5pm
  - Special Events: 11am-5pm



**APPENDIX G**

**LANDSCAPE ARCHITECT  
WATER USE ESTIMATE**



<u>COMMON NAME</u>	<u>SIZE</u>	<u>QTY</u>
Royal Purple Smoke Tree	15 gal.	10
Olive Multi-Trunk	15 gal.	20