

Cleath-Harris Geologists, Inc.  
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San Luis Obispo, California 93405  
(805) 543-1413



July 27, 2009

Mr. Todd Johnson  
Resource Land Holdings  
619 No. Cascade Avenue, Suite 200  
Colorado Springs, CO 80903

**SUBJECT: Water Adequacy Assessment for the proposed Estrella River Vineyard Agricultural Cluster, Estella Road, Paso Robles, San Luis Obispo County.**

Dear Mr. Johnson:

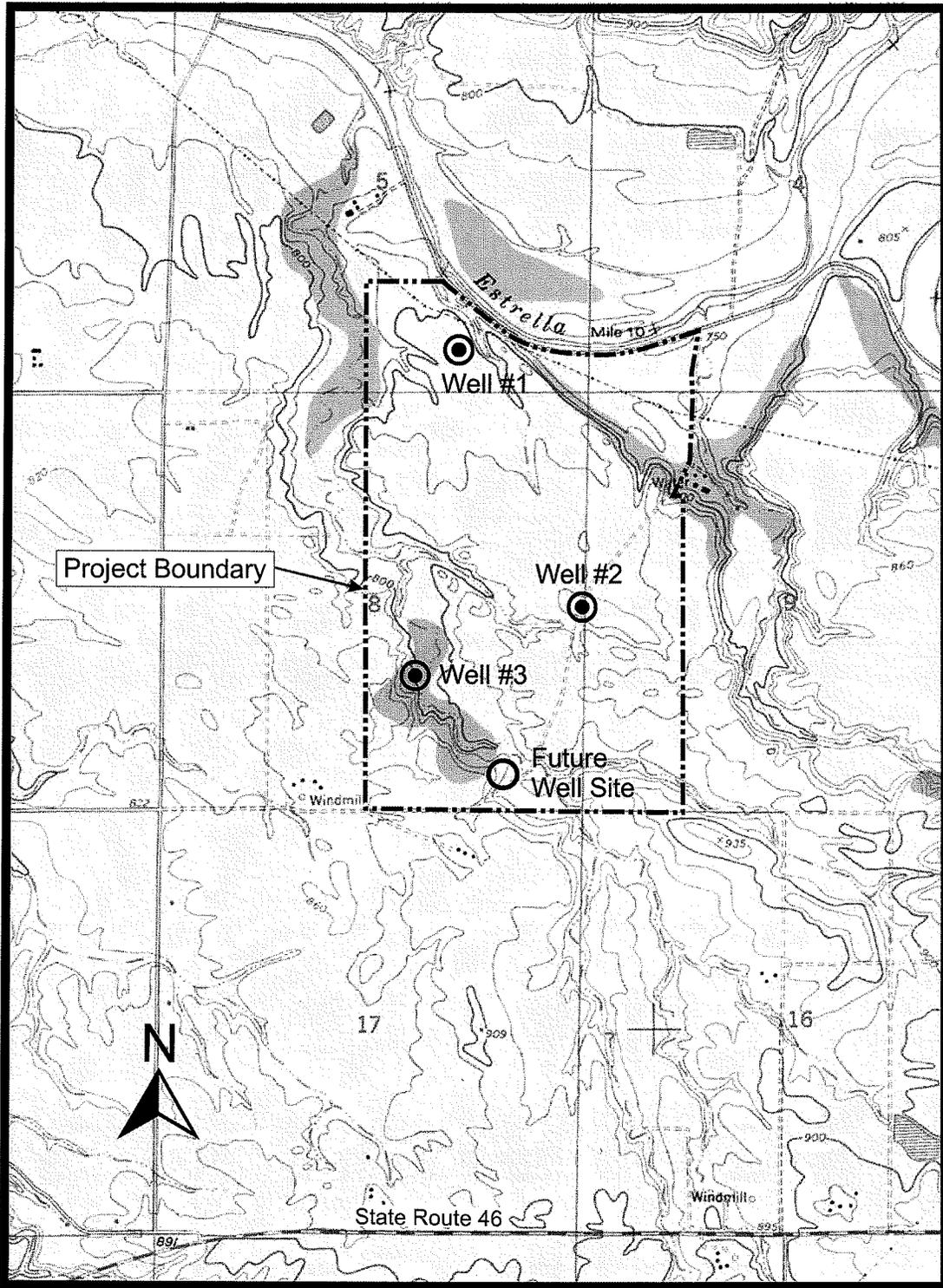
Cleath-Harris Geologists has completed a water adequacy assessment at the Estrella River Vineyard property. The purpose of the assessment was to evaluate the adequacy of the water supply for both agricultural irrigation and the residential component of a proposed agricultural cluster. This report summarizes the findings of the assessment.

### **Site Description**

The subject site consists of five existing parcels encompassing approximately 562 acres northeast of the Paso Robles Regional Airport (Figure 1). There are currently 229.2 gross acres in vineyard (212 planted acres), 41.3 gross acres in blueberries (39 planted acres), with past seasonal planting of up to 80 acres in organic spinach. Topography is relatively flat over most of the property, except for near the drainages, including a 50-foot high bluff along the Estrella River Valley that defines the limits of the flood plain. Ground surface elevations range from approximately 750 feet above sea level in the river valley to approximately 890 feet above sea level at the southeast corner of the property. Average annual precipitation is estimated at 14 inches (San Luis Obispo County Isohyetal Map for the 42-year period from 1955-56 through 1997-98). Site drainage is to the northwest toward the Estrella River.

### **Hydrogeologic Setting**

Estrella River Vineyard overlies the Paso Robles Groundwater Basin. The basin includes confined and unconfined aquifer zones underlying an area of approximately 790 square miles in the Upper Salinas Valley. Groundwater wells in the basin, including those at the subject site, draw primarily from sands and gravels within the Paso Robles Formation. Other sources of water include younger alluvial deposits along active stream channels and older alluvium/stream terrace deposits. Surface geology is shown in Figure 2. The effective base of basin sediments in the site vicinity is estimated at 200 feet below sea



Base map: Terrain Navigator, Maptech, Inc.,  
 USGS 7.5 minute series, topographic,  
 Estrella Quadrangle, 1979

Scale: 1 inch = 2,000 feet

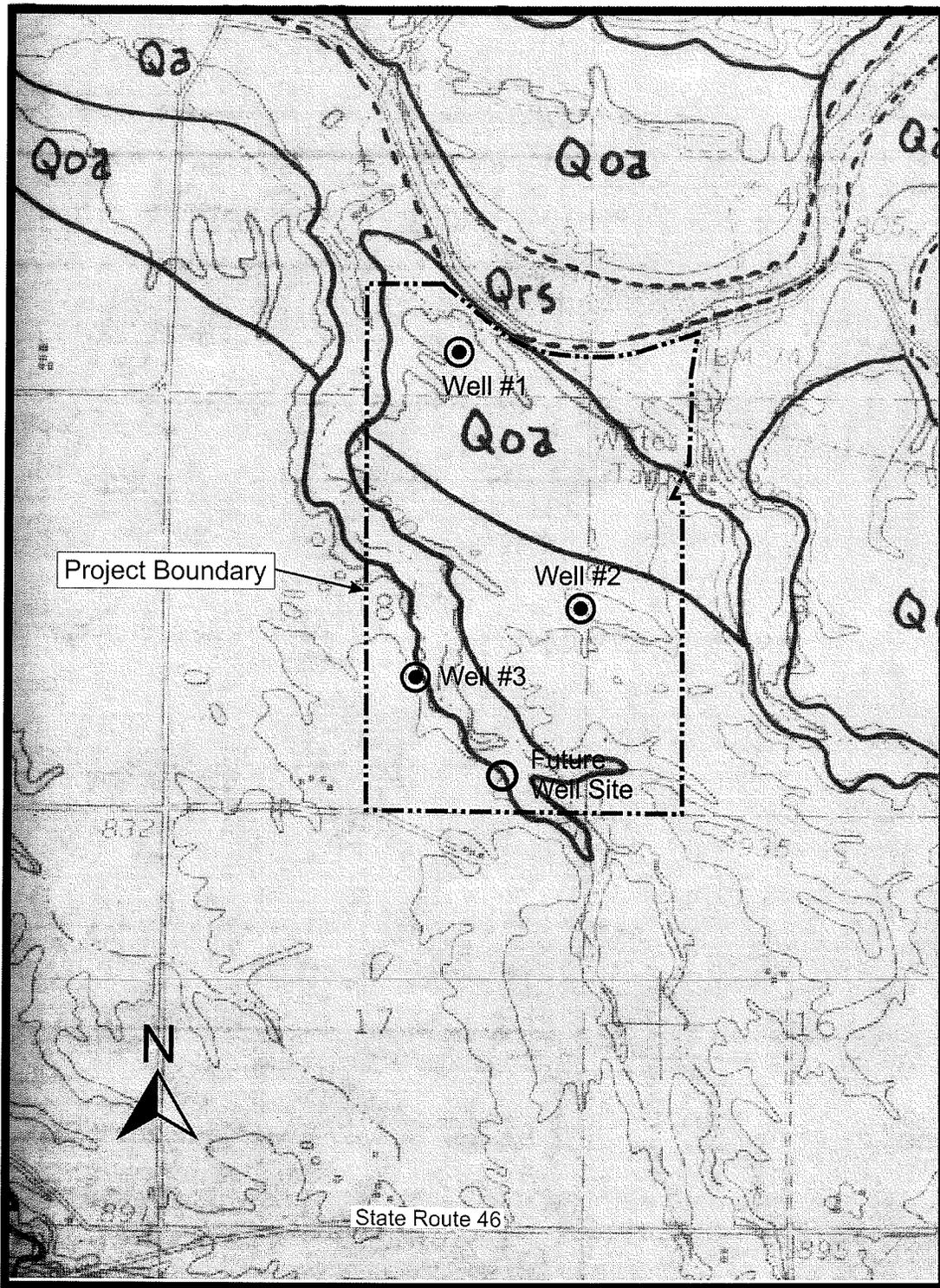
Explanation

● Well Location

Figure 1

Site Map  
 Estrella River Vineyard

Cleath-Harris Geologists, Inc.



Base map: Geologic Map of the Paso Robles Quadrangle, California, by T.W. Dibblee 1969, U.S. Geological Survey Open File Map 71-87

Scale: 1 inch = 2,000 feet

Explanation

- Well Location
- Qrs River sand
- Qa Alluvium
- Qoa Older or dissected alluvium
- QTp Paso Robles Formation

Figure 2

Site Geology  
Estrella River Vineyard

Cleath-Harris Geologists, Inc.



level, based on a geologic cross-section along the Highway 46 corridor a mile south of the property (2002 Paso Robles Groundwater Basin Study; cross-section attached).

### Paso Robles Formation

The reported lithology of the Paso Robles Formation beneath the property consists of mostly clay and sandy clay beds up to approximately 70 feet thick interbedded with sand and gravel stringers typically less than 20 feet thick. The regional cross-section identifies a few shallow but disconnected aquifer zones which are likely tapped by private domestic wells up to 600 feet deep, with one laterally extensive deep aquifer zone beneath the Highway 46 corridor which is tapped by large capacity irrigation wells that are typically 800+ feet in depth.

### Water Levels

Groundwater level hydrographs for wells tapping the Paso Robles Formation show declining water levels trends east of the City of Paso Robles along the Highway 46 corridor. A San Luis Obispo County-monitored well less than a mile northwest of the site (26S/13E-5D1) has reported a decline in spring water levels of close to 70 feet between the early 1990's and 2007 (hydrograph attached). Similar declines are reported in a County-monitored well (26S/13E-7Q1) less than a mile west of the property (hydrograph attached). The regional groundwater flow direction is to the west, toward the City of Paso Robles, with a local pumping depression in the vicinity of the Paso Robles Airport (Todd Engineers, 2007, Update for the Paso Robles Groundwater Basin).

Static water levels reported in on-site wells have also declined. Well #1 (North Reservoir Well) reported static water levels of 123 feet depth in February 1998, 186 feet depth in November 2006, and 210 feet depth in June 2009. Well #3 (Domestic Well) reported static water levels of 165 feet depth in October 1997, 181 feet depth in December 2006, and 231 feet depth in June 2009. The June 2009 on-site groundwater elevations were approximately 590 feet above sea level at Well #1 and approximately 573 feet above sea level at Well #3.

### **Long-Term Groundwater Availability**

Long-term constraints on groundwater availability in the site vicinity would be associated with basin overdraft or regional overpumping, either of which may result in continued water level declines with decreasing groundwater storage. A trend of declining water levels in the Estrella area over the last hydrologic base period indicates this part of the basin has exceeded equilibrium.

The dynamic response of the basin to increased groundwater use is to capture more perennial recharge, if available. In the project area, this capture historically would involve increasing local seepage from



the Estrella River during wet years, or inducing greater subsurface inflow from other areas of the basin, thereby lowering water levels beneath other streams to induce more seepage.

The seepage capacity of the rivers and streams have limits, however. There is a point where further water levels declines (in the Paso Robles Formation) beneath stream channel deposits will not increase stream seepage, and no additional capture of perennial recharge can be achieved. There are also practical limits on the amount of subsurface inflow that can be induced from other areas.

It could be difficult to separate the effects of the current drought from the overall trend in water level declines, but available information indicates a new basin equilibrium has not yet been reached. One recent basin study identified a 30,000 acre-foot loss of groundwater in storage in the Estrella area between the hydrologic base period from 1997 to 2006, averaging 4,500 acre-feet of loss per year (Todd, 2007, Update for the Paso Robles Groundwater Basin).

The existing demands of water users in the Estrella area do not appear sustainable under current basin conditions. There will need to be regional improvements to the basin water supply before a surplus condition returns. Some of these improvements are underway, including Nacimiento Water and water conservation programs.

### **Water Supply Facilities**

There are currently five wells on the property; two active irrigation wells (Well #1 and Well #2), one inactive domestic well (Well #3), and two abandoned wells. Other water supply facilities include two reservoirs and the vineyard irrigation systems (information summary sheet attached). Reservoir A (clay lined) has a reported capacity of 31.75 acre-feet, and Reservoir 2 (unlined) has a reported capacity of 49.5 acre-feet. These reservoirs are not currently in use. The two irrigation wells are equipped with deep well turbine pumps that are mechanically driven using propane-powered engines.

#### Well #1

Well #1 was constructed in February 1998 by Filipponi & Thompson Drilling (Atascadero). The well was constructed using 12-inch diameter PVC, with 0.040-inch perforated slots between 320-480 feet, 520-540 feet, and 600-840 feet depth. A sanitary seal is present to a depth of 50 feet. The well completion report is attached.

A pumping test was performed at Well #1 in February 1998 (tables and graph attached). The well was pumped at 1,000 gallons per minute (gpm) for 24 hours. The initial static water level was 123.2 feet depth, with a pumping water level of 268.4 feet at the conclusion of the test. Water level drawdown during the test was approximately 23 feet per log cycle of time, for an estimated aquifer transmissivity of 11,500 gallons per day per foot (gpd/ft). The one-day specific capacity of Well #1 at 1,000 gpm was



approximately 7.3 gallons per minute per foot of water level drawdown (gpm/ft). Recovery was not monitored.

### Well #2

Well #2 was constructed in 2000 by Floyd V. Wells (formerly of Santa Maria). The well was constructed using 16-inch diameter steel to a total depth of 1,130 feet. No well completion report is currently available.

A pumping test was performed at Well #2 in October 2000 (limited information available). The well was pumped at 850 gpm for 24 hours. The pumping water level was 371 feet at the conclusion of the test. A well efficiency test was performed at the well in November 2004 (attached). The static water level was reported at 258 feet, corresponding to approximately 584 feet elevation.

### Well #3

Well #3 was constructed in October 1997 by Filipponi & Thompson Drilling. The well was constructed using 5-inch diameter PVC, with 0.040-inch perforated slots between 300 and 720 feet depth. A sanitary seal is present to a depth of 51 feet. The well completion report is attached.

A pumping test was performed at Well #3 in October 2008 (tables and graph attached). The well was pumped at 31 gpm for 24 hours. The initial static water level was 180.9 feet depth, with a pumping water level of 195.7 feet at the conclusion of the test. Water level drawdown over the final 12 hours of pumping was approximately 3.5 feet per log cycle of time, for an estimated aquifer transmissivity of 2,300 gpd/ft. The one-day specific capacity of Well #3 at an average 31 gpm is approximately 2.1 gallons per minute per foot of water level drawdown (gpm/ft). Water levels in Well #3 had recovered to 185.2 feet depth two hours after pump shut-down.

## **Historical Groundwater Production**

The vineyard irrigation system uses two emitters per plant, with each emitter operating at 0.5 gallons per hour (i.e. one gallon per hour per plant). The irrigation schedule for each month has been recorded by the vineyard operator and used to calculate water use on a per plant basis. Total water use for the vineyard is estimated based on 212 planted acres of grapes with an average 907.5 vines per acre. A similar methodology was used to estimate monthly water use for blueberry irrigation beginning in April 2007 (39 planted acres at 1,320 plants per acre). Organic spinach was also grown in the summer of 2007. Historical water use estimates beginning in 2006 are summarized in Tables 1 and 2 below.



**Table 1  
Vineyard Water Use  
Estrella River Vineyard**

Month	Vineyard Water Use (AFY)		
	2006	2007	2008
January	5.9	17.7	11.8
February	0	23.6	5.9
March	5.9	11.8	17.7
April	8.9	26.6	22.4
May	16.5	27.2	30.7
June	26.6	34.2	38.4
July	38.4	48.4	44.3
August	50.2	56.7	52
September	38.4	32.5	30.7
October	24.8	20.7	26.6
November	5.9	11.8	11.8
December	5.9	11.8	0
<b>TOTAL</b>	<b>227.4</b>	<b>323.0</b>	<b>292.3</b>

Water use for the vineyard averaged 280.9 acre-feet per year between 2006 (a wet year), 2007 (a dry year), and 2008 (a normal precipitation year), equivalent to 1.23 acre-feet per acre of gross vineyard area per year. This level of water use is within the range of projected gross irrigation requirements (1.1-1.7 acre-feet per acre) for vineyards in the Salinas Planing Area (EDAW, 1998 County Master Water Plan Update). No frost protection water has been used on the vineyard to date. Precipitation data for CDF - Paso Robles #101 (Fire Station 30 at Ramada Drive and Highway 101) is attached.



**Table 2  
Blueberry and Organic Spinach Water Use  
Estrella River Vineyard**

Month	Blueberry Water Use (AFY)		Organic Spinach Water Use (AFY)
	2007	2008	2007
January		0	
February		0	
March		1.9	
April	5.1	3.8	
May	5.5	5.1	
June	6.6	5.1	12.2
July	7.1	8.7	24.3
August	8.7	9.5	12.2
September	6.6	5.5	
October	5.1	3.8	
November	1.6	1.6	
December	1.6	0	
<b>TOTAL</b>	<b>47.9</b>	<b>45.0</b>	<b>48.7</b>

Water use for the blueberries averaged 46.5 acre-feet per year for 2007 and 2008. A total of 10.4 acre-feet of frost protection water was used for blueberries in March and April 2009 (not included in Table 2). Water use for the organic spinach was approximately 48.7 acre-feet for 2007. The total average annual water use for the site is approximately 386.5 acre-feet per year.

### **Water Quality**

A water quality analysis is available for irrigation Well #1 from February 1998, and for both Well #1 and Well #2 from June 2009 (attached). The constituents analyzed included general minerals and some general physical parameters. The water from the wells is suitable for vineyard irrigation without



restriction, although amendments are recommended to prevent micro irrigation system plugging. The groundwater is also suitable for domestic use, based on the constituents analyzed. A total dissolved solids (TDS) concentration of 742 milligrams per liter (mg/l) was reported in 1998, with sodium magnesium-bicarbonate character. Overall groundwater salinity (based on electrical conductivity) was lower in the recent analyses. The vineyard operator reports that on-site wells do not produce warm water or sulfur odor.

### **Agricultural Cluster Project Description**

The project consists of subdividing five existing parcels to create 18 residential lots between 1 acre and 2.24 acres in size, with the remainder of the property placed into an approximate 537-acre agricultural conservation easement. The residential parcel development would allow one home per lot, with restricted landscape irrigation and water conserving fixtures and appliances. There would also be a 2.5-acre ranch headquarters site and a 2.5 acre winery site.

San Luis Obispo County Department of Planning and Building staff has indicated that the project water demand analysis must include the residential component and 360 acres of irrigated agriculture. Property within the agricultural conservation easement is currently planted with 270.5 acres of permanent vineyard and blueberries, therefore, the water supply for an additional 89.5 additional acres of vineyard must be analyzed under the project.

### **Project Water Demand**

The average annual water demand for the 18 new residences, using the average water duty factor of 1.7 acre-feet per dwelling unit for rural residential land use in the Salinas Planning Area from the 1998 County Master Water Plan Update (also used in the 2002 Paso Robles Groundwater Basin Study) would be 30.6 acre-feet per year.

The ranch headquarters would have a nominal 3,000 square feet of floor space and 4,000 square feet of low water use landscaping. Water demand is estimated to be 0.55 acre-feet per year (calculations attached).

A winery facility may be constructed on the site in the future that will have a nominal production capacity of 50,000 cases per year. Water demand is estimated at 2.2 acre-feet per year, assuming 14 gallons of process water per case and 1,000 square feet of office space.

The average annual water demand for the agricultural component of the project, before any new water conservation practices, would be based on the existing record of water use detailed above. The average water demand for 318.7 acres of vineyard, at 1.23 acre-feet per acre (gross), would be 392 acre-feet per year. An additional 56.9 acre-feet of water use would be expected for the existing blueberries (including



frost protection), for a total agricultural water demand of 448.9 acre-feet per year. Before water conservation, the combined water demand for both residential and agricultural components of the project is estimated to average 482.3 acre-feet per year.

The difference between current and project water demand, before water conservation, is estimated to average 95.8 acre-feet per year. The Estrella River Vineyards agricultural cluster could implement water conservation mitigation measures to offset this difference and reduce the estimated total average project water demand so as not to exceed the current usage.

Residential landscaping could be limited to no more than 5000 square feet of low-water use plants with 500 square feet of turf. This would reduce the projected residential water use from 1.7 acre-feet per home to 0.63 acre-feet per home (water demand calculations are attached). If these water conservation measures were implemented, the total residential water demand for 18 homes would be estimated at 11.3 acre-feet per year, a savings of 19.3 acre-feet.

Additional water conservation could be implemented to reduce the average water use for the agricultural project component. The vineyard operator has identified a number of ways to reduce vineyard and berry irrigation requirements, including:

1. Buffering irrigation water pH
2. Using irrigation water amendments to improve soil drainage.
3. Ripping between rows during the winter to help promote winter rain penetration and new root growth for more efficient water utilization.
4. Fertilizer applications to improve soil fertility and root growth.
5. Weather stations on site to measure actual evapotranspiration potential for more accurate soil moisture deficit calculations.
6. The use of pressure bomb readings of leaflets to optimize water stress on vines.
7. The use of onsite soil moisture measurements to minimize over irrigation.
8. Using wood shavings underneath drip emitters to minimize evaporation.

Given the current constraints on long-term groundwater availability in the Estrella area, a condition of approval that requires the implementation of best management practices that would provide the maximum practical irrigation water savings at Estrella River Vineyard would be appropriate. Reducing the gross irrigation requirement by 76.5 acre-feet per year over 360 acres of irrigated grapes and



blueberries would require a water savings of approximately 0.22 acre-feet per acre in average annual demand.

According to the Paso Robles Wine Country Alliance, vineyard water use on a per acre basis has been reduced over the last 10 years from over 2 acre-feet per acre to, in some cases, less than 1 acre-foot per acre (June 11, 2009 San Luis Obispo County staff report for the Resources Capacity Study of the Paso Robles groundwater basin). Therefore, it is anticipated that a significant reduction in water use can be achieved using one or more of the above conservation strategies. To ensure that appropriate water savings are achieved, the Estrella River Vineyards agricultural cluster should be required to implement best management practices that are known to reduce irrigation demands.

### **Source Capacity Requirements**

The residential component of the project, including the ranch headquarters and winery, would be served by a community water system (public) operating under permit from the County of San Luis Obispo Environmental Health Division. A minimum of two supply wells are required for the residential component of the project. Each well must be capable of supplying the minimum required flows.

Guidelines for source capacity (well yield) can be found in the San Luis Obispo County Public Improvements Standards (2008), Chapter 6 and in the California Code of Regulations (CCR), Title 22, Division 4, Chapter 16. Calculations performed herein based on the above regulations are for planning purposes only. Water system permit applications should be prepared by a Civil Engineer with appropriate expertise in water system operation and design.

County specifications state that the average daily residential flow for the maximum demand month shall be equal to one-third of the peak hourly residential flow and shall be maintained continuously from the pumping wells only. The average daily residential flow for the maximum demand month is calculated to be 50 gallons per minute (gpm) for the Estrella River Vineyard project, based on the following County formula:

$N$  = number of service connections (20)

$c$  = 5 gpm for metered service

$f$  = 1.5 (interpolated value from table)

Peak hourly residential demand =  $Ncf$  = 150 gpm

Average daily residential flow =  $1/3$  peak hourly residential demand = 50 gpm



The CCR Title 22 requirements specify that the needed source capacity shall not be less than the maximum day demand, which is 1.5 times the average day demand in the maximum demand month. This is approximately 15 gpm (calculation attached).

The estimated source capacity requirement for the agricultural irrigation wells is based on the need to meet the maximum month demand, which would be estimated at 83 acre-feet during August, equivalent to 626 gpm continuous flow. Greater peak flows could be available from the reservoirs, if utilized.

### **Existing Source Capacity**

There is one existing domestic supply well (Well #3) that would become part of the proposed new community water system. As discussed earlier, the well was tested at 31 gpm for three days. Results of the pumping test indicate the well could sustain a continuous pumping rate of 50 gpm over a one-month period, while maintaining pumping water levels above the top of the producing aquifer zones (above 300 feet depth). Provided water quality is suitable for domestic use, Well #3 has sufficient capacity to serve as a backup well to the proposed project.

A new domestic supply well would be drilled as the primary domestic supply well. The water quality and capacity of the new well would need to be documented. Existing information from on-site wells indicates that a new well could be constructed that meets the source capacity requirements for the system.

The vineyard irrigation wells have combined pumping capacities (open discharge to reservoirs) of approximately 1,800 gpm. Currently, one well operating under system pressures is reportedly sufficient to handle the irrigation needs of the vineyard and blueberries. If the reservoir system is used for vineyard irrigation, one well may still be sufficient to meet the maximum demand month. Otherwise, both wells operating under system pressures will be needed.

### **Water Level Interference**

Interference relates to overlapping of cones of depression at two or more wells. The impacts of new water level interference by project domestic wells on existing wells would be estimated at less than 5 feet, as compared to existing seasonal fluctuations in water levels, which is closer to 40 feet, based on the hydrograph for well 26S/13E-05D1 (attached).



## Project Alternatives

Vineyard expansion is not contingent on the agricultural cluster project. Absent the project, there would also be the option for development of up to ten residences on the existing five parcels that comprise the property, with no limitation on outdoor water use. The water demand for alternative site development under the existing allowable land uses, as provided by the applicant, are compared to the agricultural cluster project water demand estimate (before and after water conservation) and to the current condition below:

Alternative site development: (per applicant)	393.6 AFY for vineyards (320 gross acres)
	152.2 AFY spinach, double cropped (100 gross acres)
	56.9 AFY for blueberries (existing 41.3 gross acres)
	<u>17.0</u> AFY for 10 homes ( up to two per existing parcel)
	619.7 AFY total water use potential
Ag Cluster project: (before water conservation)	392.0 AFY for vineyards (318.7 gross acres)
	56.9 AFY for blueberries (41.3 gross acres)
	30.6 AFY for 18 homes
	0.6 AFY for Ranch Headquarters
	<u>2.2</u> AFY for winery
	482.3 AFY total
Ag Cluster project: (after water conservation)	321.9 AFY for vineyards (318.7 gross acres)
	47.3 AFY for blueberries (41.3 gross acres)
	11.3 AFY for 18 homes
	0.6 AFY for Ranch Headquarters
	<u>2.2</u> AFY for winery
	383.3 AFY total
Current Condition:	280.9 AFY for vineyards (229.2 gross acres)
	56.9 AFY for blueberries (41.3 gross acres)
	<u>48.7</u> AFY for organic spinach
	386.5 AFY total



## **Cumulative Impacts**

Given the long-term trend of groundwater storage loss in the Estrella area, any new development that increases water use will potentially increase the cumulative impacts to groundwater resources. The Estrella River Vineyard agricultural cluster project's average annual water demand would not exceed current on-site water uses (pending the actual water conservation savings), and as a result would not contribute to the cumulative impacts.

## **Conclusions**

Estrella River Vineyard proposes to develop a subdivision while placing most of the property in an agricultural conservation easement. There are two irrigation wells that currently have sufficient capacity and suitable water quality for future irrigation needs. There is one existing domestic supply well which, together with a proposed new supply well, would be expected to have sufficient capacity and suitable water quality for meeting the requirements of a proposed community water system.

Water conservation measures would be appropriate for both the residential and agricultural project components. The estimated project water demand would not exceed existing site water use (pending the actual water conservation savings), and would be significantly less than the potential water use of the site under current land use zoning.

In order to ensure that water use for the project would not increase, a mitigation measure should be implemented that requires the preparation of a water conservation management plan addressing both agricultural and residential water use. The agricultural water use portion should be developed in consultation with a vineyard management professional outlining appropriate best management practices to minimize the water use on the vineyards. Finally, the management plan should include a phasing plan in which the water reduction requirements are adjusted as the project water demands are increased through construction of homes and/or additional plantings.

In the long-term, the existing demands of water users in the Estrella area do not appear sustainable. Water level declines and groundwater storage losses have continued over the last calculated hydrologic base period (1997-2006). There will need to be regional changes to the basin water supply before a surplus condition returns, either through imported water or reduced pumpage. However, the Estrella River Vineyards agricultural cluster project, with appropriate water conservation mitigation measures, would have no increased adverse impact on the groundwater basin, compared to the current condition.



Estrella River Vineyard could participate in solutions to offset the regional water supply deficit. For example, information gained from implementing agricultural irrigation water conservation measures on-site could be shared with other interested growers and implemented on other vineyards overlying the Paso Robles groundwater basin.

Please call our office if you have questions regarding this report.

Sincerely,

CLEATH-HARRIS GEOLOGISTS, INC.

Spencer J. Harris, CHG 633  
Associate Hydrogeologist

Timothy S. Cleath, CHG 81  
Principal Hydrogeologist

attachments



## ATTACHMENTS

Hydrogeological Cross-Section E-E' (2002 Paso Basin Study)

Well 26S/13E-5D1 Hydrograph

Well 26S/13E-7Q1 Hydrograph

Water System Information Summary (from 2004)

Well Completion Report (Well #1)

Pumping Test Data (Well #1)

Pumping Test Data (Well #2)

Well Completion Report (Well #3)

Pumping Test Data (Well #3)

Precipitation Data (CDF Station 30)

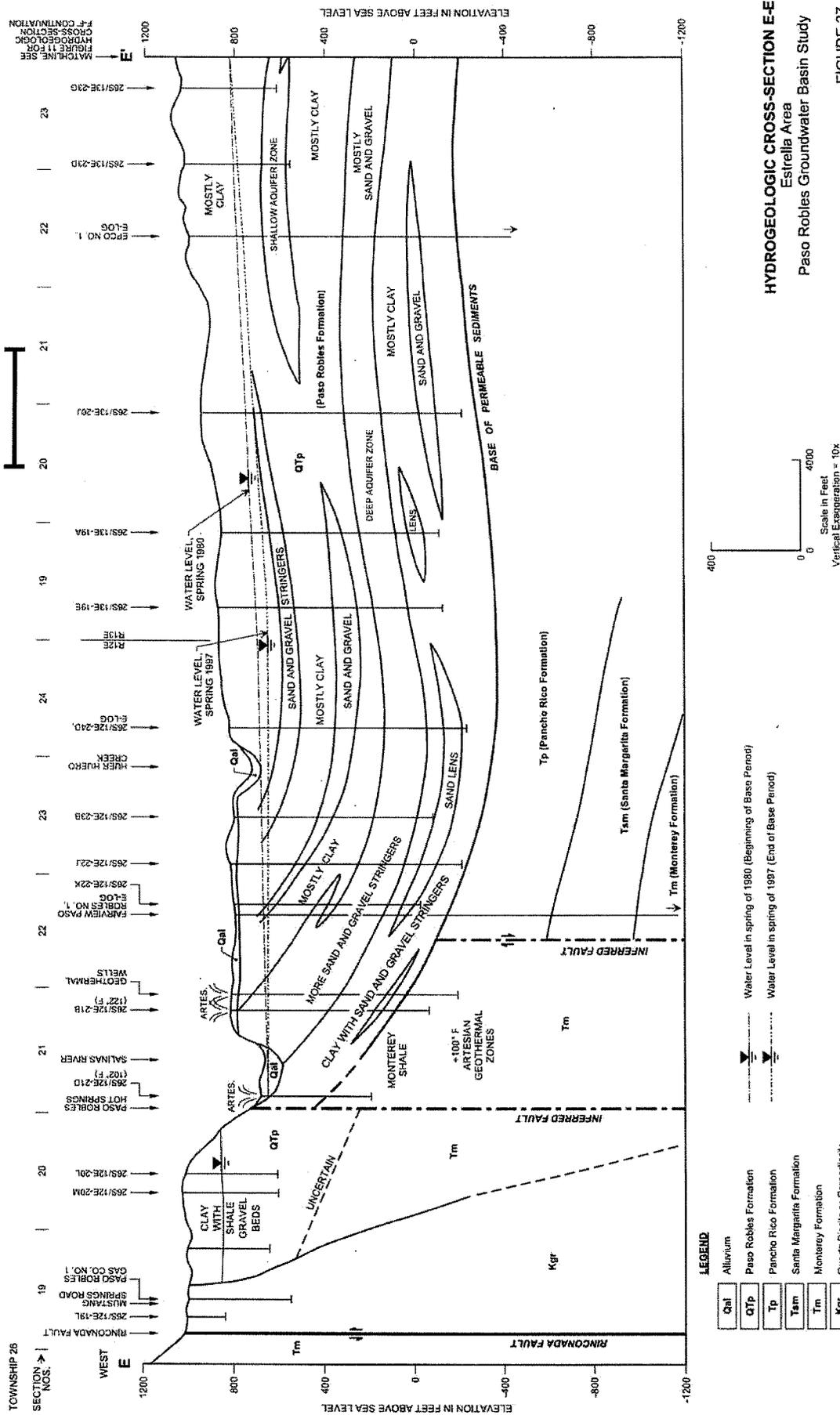
Water Quality Data

Water Demand Calculations

Title 22 Source Capacity Requirement Calculation

Source: Fugro West and Cleath & Associates, 2002  
 Paso Robles Groundwater Basin Study

Estrella River Vineyard (1.5 miles north of section)



**HYDROGEOLOGIC CROSS-SECTION E-E'**  
 Estrella Area  
 Paso Robles Groundwater Basin Study

FIGURE 27

Scale in Feet  
 Vertical Exaggeration = 10x

**LEGEND**

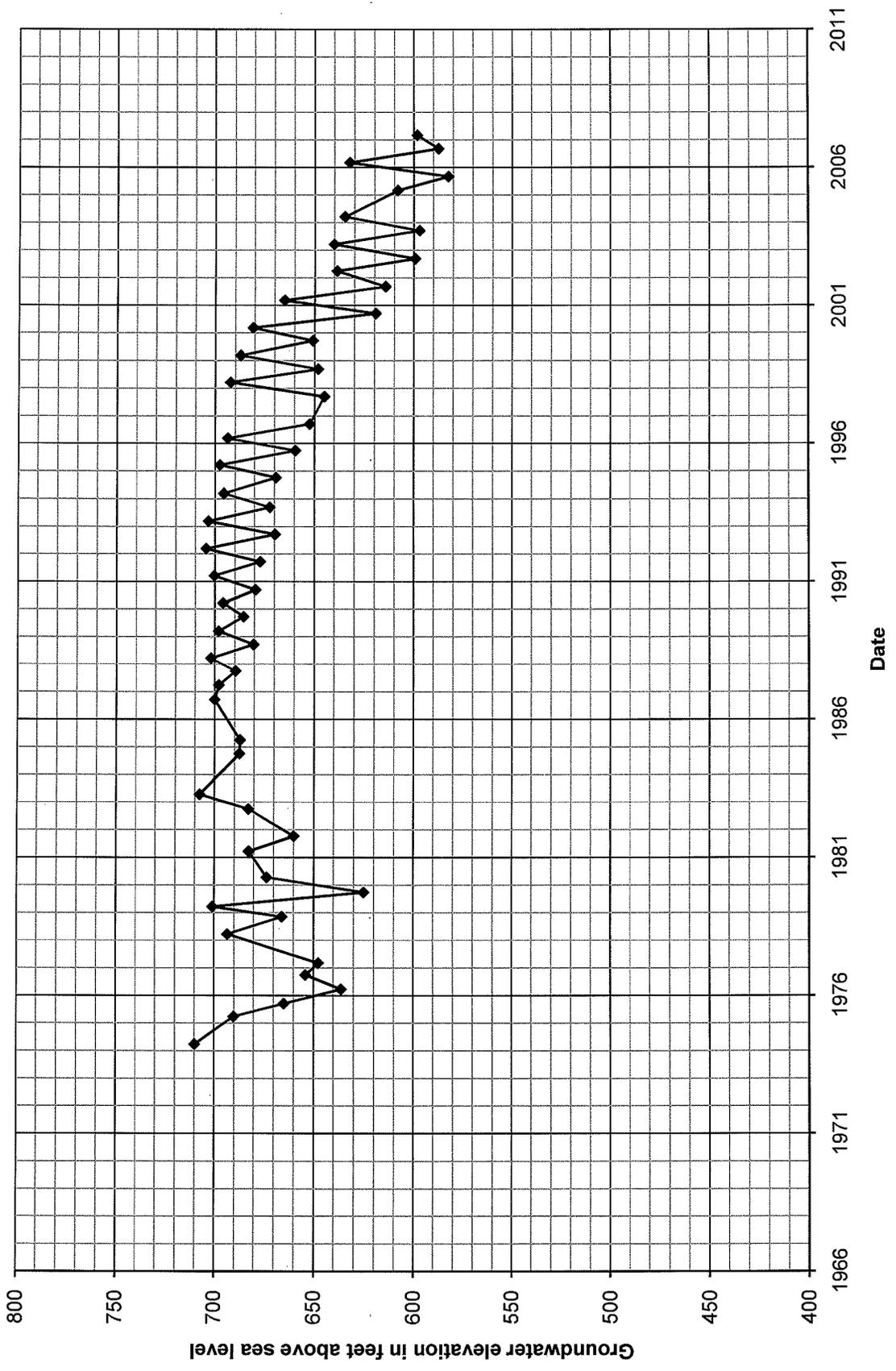
Qal	Alluvium
QTp	Paso Robles Formation
Tp	Pancho Rico Formation
Tsm	Santa Margarita Formation
Tm	Monterey Formation
Kgr	Quartz Diorite or Granodiorite

Water Level in spring of 1980 (Beginning of Base Period)  
 Water Level in spring of 1997 (End of Base Period)

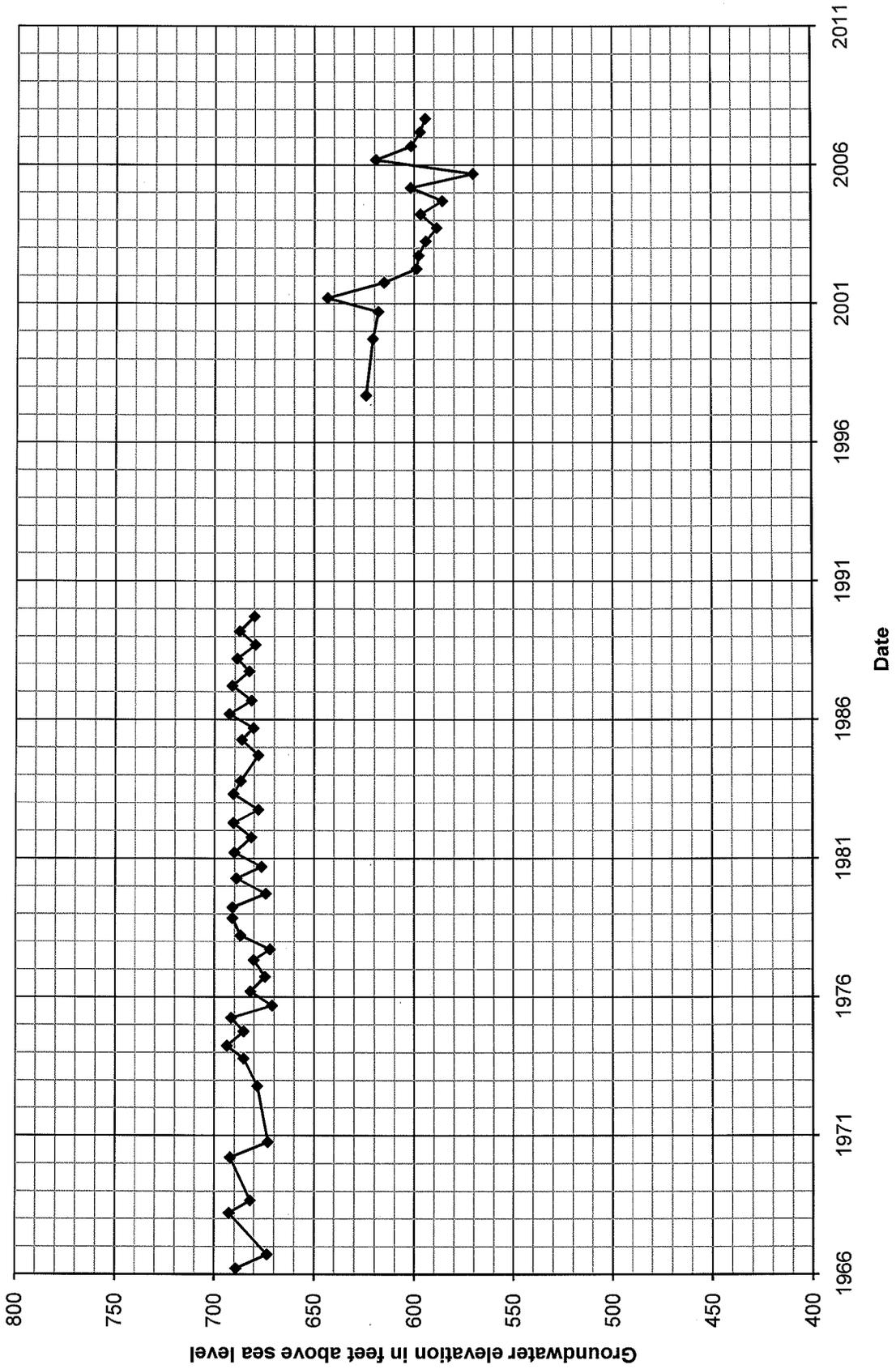
Project No. 98-71-1137  
 TOWNSHIP 26  
 SECTION NOS. 19 WEST E

FIGURE 11 FOR  
 HYDROGEOLOGIC  
 CROSS-SECTION  
 F-F CONTINUATION

**Hydrograph  
Well T26S/R13E-5D1**



**Hydrograph  
Well T26S/R13E-7Q1**



**Equipment List, provided by John Crossland, Vineyard Professional Services.**

September 1, 2004

**Estrella River Vineyard Irrigation system information.****Wells/Pumps****Well # 1:** Located near North reservoir

- Drilled by Filipponi & Thompson Drilling, completed 2/23/98
- Total Depth 1000 Feet drilled, casing depth 870'
- Casing 12" PVC
- Production 24 hour test on 2/27/98 resulted in 1000 gallons per minute from 268.4 feet
- Powered by Cummins GTA 5.9 Liter propane gas powered engine with 150 hp Deran gear-head
- 17 stage Ingersoll 10NKL bowls set at 340 feet

**Well # 2:** Located near South reservoir

- Drilled by Floyd V. Wells, Inc.
- Total Depth 1250 Feet drilled, casing depth 1130
- Casing 16" Steel
- Production 24 hour test on 10/24/00 resulted in 850 gallons per minute from 371 feet
- Powered by Cummins propane gas powered engine with 235 hp Deran gear-head
- 10 stage Ingersoll 12M90 bowls set at 590 feet

**Well # 3:**

- This well was drilled by Filipponi & Thompson in October 1997. The well is 750 feet deep, 720 feet of 5" PVC. The well has not been used by current ownership.
- Another well is located adjacent to Well #3 -- this old well was apparently vandalized and was determined to be unusable to current ownership

**Reservoirs**

- Reservoir "A", 31.75 Ac. Ft. Clay lined
- Reservoir "B", 49.50 Ac. Ft. capacity. Not lined

**Irrigation System****Drip System**

- 20MM RAM tubing, in-line Drip Emitters - .53 GPH, 36" spacing
- Flow Guard 848H Stainless Steel Sand Media, Auto flush media filter

**Sprinkler System - Overhead**

- Rainbird 14VH-DC Sprinklers with 2.5 GPM RFN
- 5 GM 454 Propane Paco Booster Pumps - 1800 GPM
- Morrill Industries series 1000 Horizontal Screen Filter

**Deer Fencing**

DUPLICATE

Driller's Copy

Page 1 of 2

Owner's Well No. #2

WELL #1 (NORTH)

No.

511094

Date Work Began 02/17/98, Ended 02/23/98

Local Permit Agency San Luis Obispo

Permit No. 98-020

Permit Date 02/18/98

DWR USE ONLY - DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

STATE OF CALIFORNIA WELL COMPLETION REPORT

Refer to Instruction Pamphlet

GEOLOGIC LOG

WELL OWNER

Name Villa Mt. Eden Winery

Mailing Address 8711 Silverado Trail

St. Helena CA 94574

CITY STATE ZIP

WELL LOCATION

Address Estrella Road

City Paso Robles

County San Luis Obispo

APN Book 015 Page 013 Parcel 023,042,045

Township 26S Range 13E Section 9

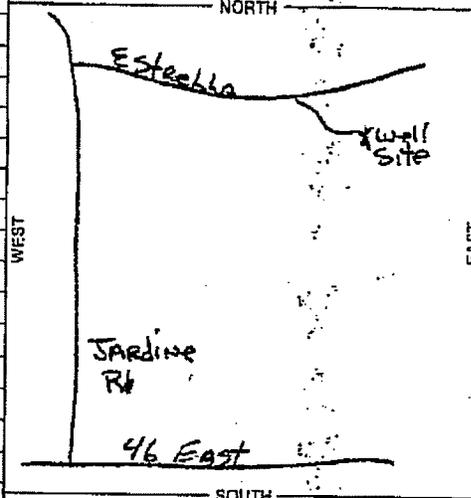
Latitude Longitude

ORIENTATION (Z)		DEPTH TO FIRST WATER (Ft.) BELOW SURFACE		DESCRIPTION <i>Describe material, grain size, color, etc.</i>
VERTICAL	HORIZONTAL	ANGLE	(SPECIFY)	
DEPTH FROM SURFACE	FL.	TO	FL.	
0	3			TOP SOIL
3	48			SAND & GRAVEL
48	60			BROWN CLAY
60	85			SAND & GRAVEL
85	165			BLUE GREEN CLAY
165	173			BROWN CLAY & GRAVEL MIX
173	245			STICKY GREEN CLAY
245	308			BROWN CLAY
308	326			SAND & GRAVEL
326	330			LT. BROWN CLAY
330	353			BROWN CLAY & GRAVEL MIX
353	389			LT. BROWN CLAY
389	393			SAND & GRAVEL
393	403			BROWN CLAY
403	413			SAND & SHALE GRAVEL
413	437			BROWN CLAY
437	444			SHALE GRAVEL
444	450			BROWN CLAY
450	458			SAND & SHALE GRAVEL
458	520			LT. BROWN CLAY
520	532			SAND & GRAVEL
532	548			LT. BROWN CLAY
548	612			BLUE CLAY
612	633			SANDY BLUE CLAY
633	677			BLUE CLAY
677	690			SANDY BLUE CLAY
690	709			BLUE CLAY
709	715			SANDY BLUE CLAY
715	736			BLUE CLAY
736	748			SANDY BLUE CLAY

TOTAL DEPTH OF BORING 1000 (Feet)

TOTAL DEPTH OF COMPLETED WELL 870 (Feet)

LOCATION SKETCH



ACTIVITY (Z)

- NEW WELL
- MODIFICATION/REPAIR
  - Deepen
  - Other (Specify)
- DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")
- PLANNED USE(S) (Z)
  - MONITORING
  - WATER SUPPLY
    - Domestic
    - Public
    - Irrigation
    - Industrial
  - "TEST WELL"
  - CATHODIC PROTECTION
  - OTHER (Specify)

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

DRILLING METHOD Rotary Table FLUID Bentonite

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF STATIC WATER LEVEL 123 (Ft.) & DATE MEASURED

ESTIMATED YIELD 500+ (GPM) & TEST TYPE air Jet

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

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

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING(S)					DEPTH FROM SURFACE	ANNULAR MATERIAL				
		TYPE (Z)	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)		TYPE				
Fl. to Fl.		BLANK	SCREEN	CON. DUCTOR	FILL PIPE		Fl. to Fl.	CE-MENT (Z)	BEN-TONITE (Z)	FILL (Z)	FILTER PACK (TYPE/SIZE)	
0 to 320	20	Blank				PVC	12	SDR 21				
320 to 480	20	Screen				PVC	12	SDR 21	.040			
480 to 520	20	Blank				PVC	12	SDR 21				
520 to 540	20	Perf				PVC	12	SDR 21	.040			
540 to 600	20	Blank				PVC	12	SDR 21				
600 to 840	20	Perf				PVC	12	SDR 21	.040			

ATTACHMENTS (Z)

- Geologic Log
- Well Construction Diagram
- Geophysical Log(s)
- Soil/Water Chemical Analysis
- 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 Filipponi & Thompson Drilling, Inc.

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

P.O. Box 845 Atascadero CA 93423

ADDRESS CITY STATE ZIP

Signed *D. O. Thompson*

WELL DRILLER/AUTHORIZED REPRESENTATIVE

DATE 3-2-98

43268

DUPLICATE

Driller's Copy

Page 2 of 2

Owner's Well No. #2 WELL #1 (NORTH)

Date Work Began \_\_\_\_\_, Ended \_\_\_\_\_

Local Permit Agency \_\_\_\_\_

Permit No. 98-020

Permit Date 02/18/98

# STATE OF CALIFORNIA WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. 511095

DWR USE ONLY - DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

## GEOLOGIC LOG

ORIENTATION (∠)		VERTICAL	HORIZONTAL	ANGLE	(SPECIFY)
DEPTH FROM SURFACE		DEPTH TO FIRST WATER (Ft.) BELOW SURFACE			
Ft.	to Ft.	DESCRIPTION			
Describe material, grain size, color, etc.					
748	767	BLUE CLAY			
767	780	SANDY BLUE CLAY			
780	829	BLUE CLAY			
829	838	SANDY BLUE CLAY			
838	899	BLUE CLAY			
899	904	BLUE SAND			
904	908	BLUE CLAY			
908	932	SAND & GRAVEL			
932	1000	BLUE CLAY			
gm/wp/mt/rb					

## WELL OWNER

Name Villa Mt. Eden Winery

Mailing Address \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

WELL LOCATION \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

County \_\_\_\_\_

APN Book \_\_\_\_\_ Page \_\_\_\_\_ Parcel \_\_\_\_\_

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

Latitude \_\_\_\_\_ Longitude \_\_\_\_\_

DEG. MIN. SEC. NORTH DEG. MIN. SEC. WEST

LOCATION SKETCH

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 SOUTH EAST NORTH

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

DRILLING METHOD \_\_\_\_\_ FLUID \_\_\_\_\_

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF STATIC WATER LEVEL \_\_\_\_\_ (Ft.) & DATE MEASURED \_\_\_\_\_

ESTIMATED YIELD \* \_\_\_\_\_ (GPM) & TEST TYPE \_\_\_\_\_

TEST LENGTH \_\_\_\_\_ (Hrs.) TOTAL DRAWDOWN \_\_\_\_\_ (Ft.)

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

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING(S)						DEPTH FROM SURFACE	ANNULAR MATERIAL				
		TYPE (∠)				MATERIAL / GRADE	INTERNAL DIAMETER (Inches)		GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	TYPE		
Ft.	to Ft.	BLANK	SCREEN	CONDUIT	FILL PIPE								
840	860	20	Screen			PVC	12	SDR 21	.040				
860	870	20	Perf			PVC	12	SDR 21	.040				

### 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 \_\_\_\_\_ (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS \_\_\_\_\_ CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

Signed \_\_\_\_\_ WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED \_\_\_\_\_ C-57 LICENSE NUMBER \_\_\_\_\_

February 27, 1998

Villa Mt. Eden Winery  
8711 Silverado Trail  
St. Helena CA 94574

Re: 24 Hour Test Pump  
Estrella Road Paso Robles #2 WELL #1 (NORTH)

TEST PUMP DATA			
Time	Water Level	GPM	
02/25/98 9:50 A.M.	123.2	1000	
9:52	204.0	1000	
9:55	215.6	1000	
10:05	223.0	1000	
10:50	238.6	1000	
11:50	246.6	1000	
5:50 P.M.	260.2	1000	
9:50	262.6	1000	
02/26/98 1:50 A.M.	264.6	1000	
4:50	266.2	1000	
7:50	267.8	1000	
8:50	268.2	1000	
9:50	268.4	1000	

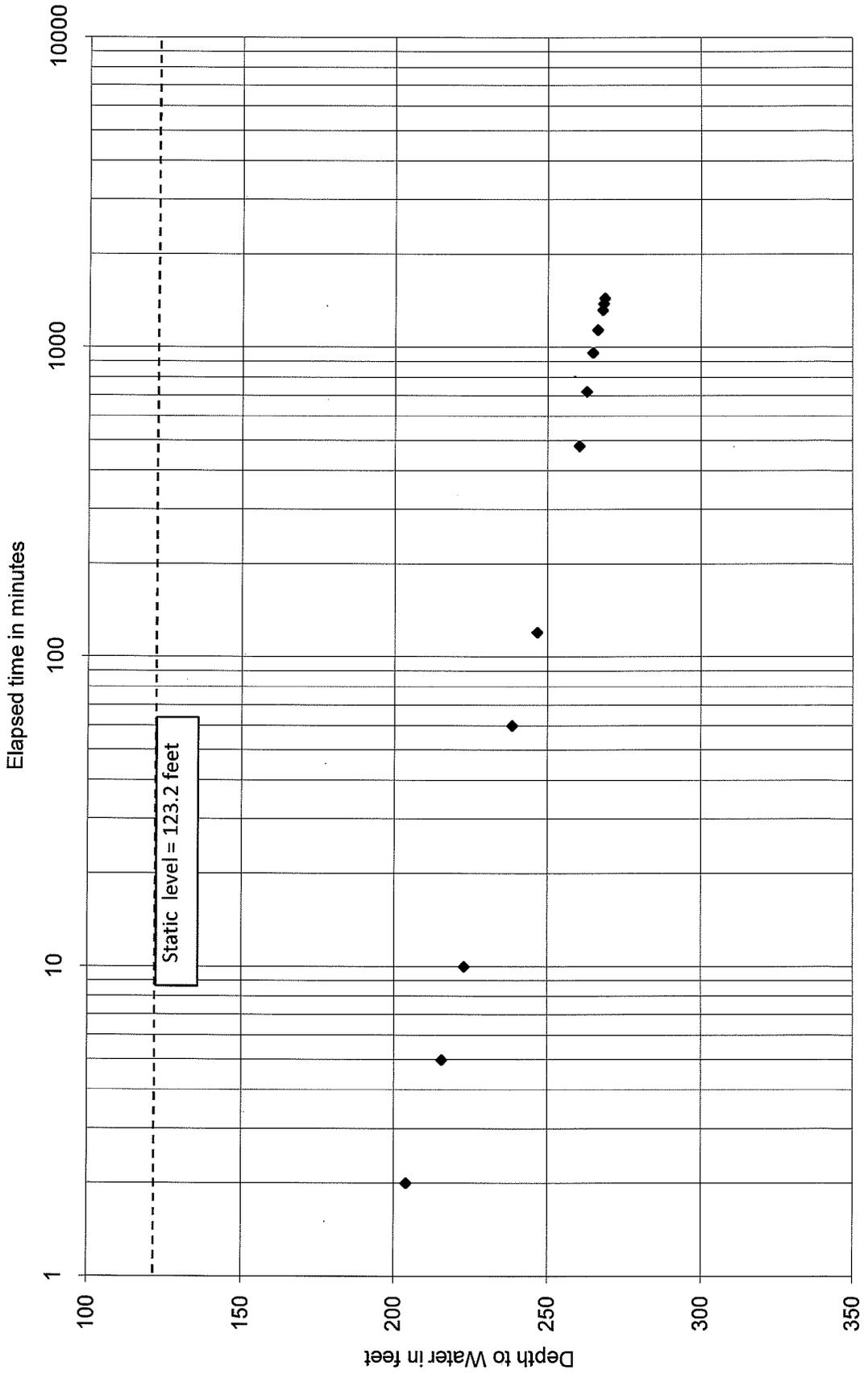
END TEST

Thank You,

Doug Filipponi  
DF/scs

**Pumping Test  
Estrella River Vineyard Well #1 - North Reservoir Well  
February 25-26, 2007**

Static Water Level = 123.2 feet  
Flow rate = 1000 gpm



# PUMP TEST RESULTS

Pump Tester: Wayne Cooper (805) 459-0236

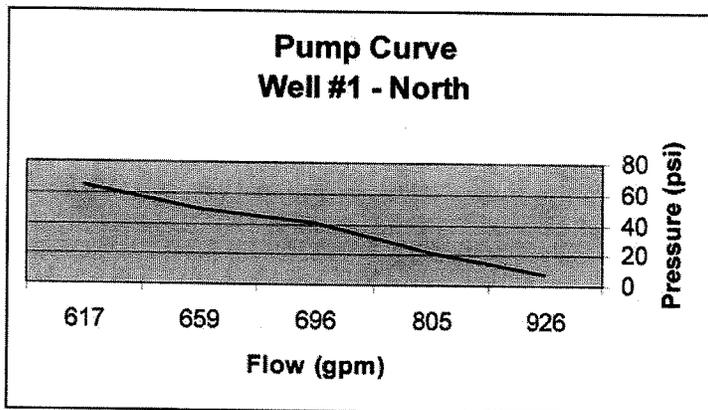
**#1 Well Pump – North**    Static Water Level 186' 11/18/04

Test #	Drip Set #	Pressure (psi)	Flow (gpm)
1	7	50	538
2	5	45	564
3	3	85	413
4	1	41	586

Test #	Pressure (psi)	Flow (gpm)	Water Level - Standing (ft)	Water Level - Pumping (ft)	RPM's
1	7	926	186	225	1545
2	21	805	186	214	1649
3	41	696	186	198	1590
4	50	659	186	188	1605
5	65	617	186	186	1582

Water levels taken with an electronic sounder.

Overall Pumping Efficiency (OPE) was not calculated due to inability to measure fuel consumption.



Discharge Pressure vs. Flow Curve

# PUMP TEST RESULTS

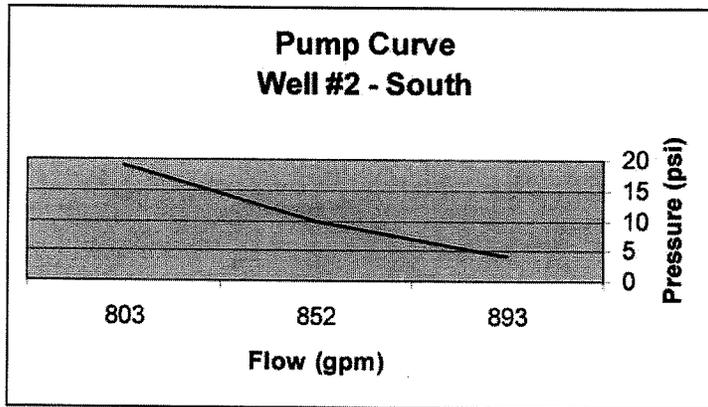
Pump Tester: Wayne Cooper (805) 459-0236

#2 Well Pump – South Static Water Level 258' 11/18/04

Test #	Pressure (psi)	Flow (gpm)	Water Level - Standing (ft)	Water Level – Pumping (ft)	RPM's
1	4	893	258	368	1685
2	10	852	258	359	1667
3	19	803	258	346	1650

Water levels taken with an electronic sounder.

Overall Pumping Efficiency (OPE) was not calculated due to inability to measure fuel consumption.



Discharge Pressure vs. Flow Curve

ORIGINAL File with DWR

Page 1 of 2

Owner's Well No. #1 WELL #3 (DOMESTIC)

No. 511063

Date Work Began 10/16/97, Ended 10/20/97

Local Permit Agency San Luis Obispo

Permit No. 97-283

Permit Date 10/15/97

STATE OF CALIFORNIA WELL COMPLETION REPORT

Refer to Instruction Pamphlet

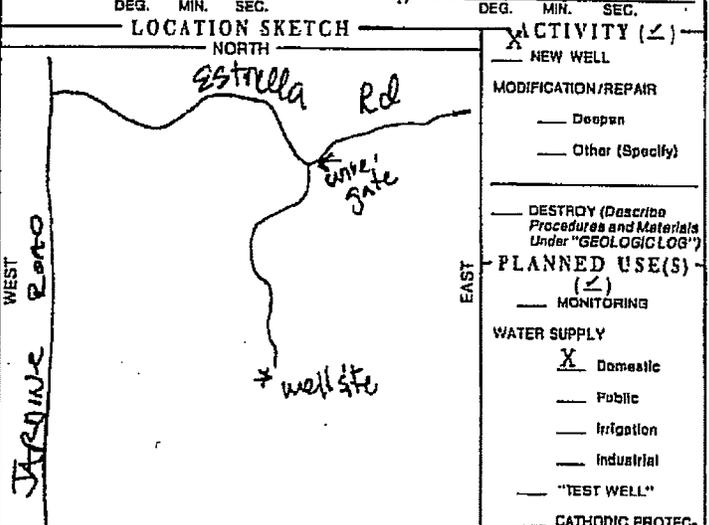
DWR USE ONLY - DO NOT FILL IN. STATE WELL NO./STATION NO., LATITUDE, LONGITUDE, APN/TRS/OTHER

GEOLOGIC LOG

WELL OWNER

Table with columns: ORIENTATION, DEPTH FROM SURFACE, DEPTH TO FIRST WATER, DESCRIPTION. Rows 0-505 feet.

Name Villa Mt. Eden Winery, Mailing Address 8711 Silverado Trail, St. Helena CA 94574, WELL LOCATION Address Estrella Road, Paso Robles, San Luis Obispo



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

DRILLING METHOD Rotary Table, FLUID Bentonite, WATER LEVEL & YIELD OF COMPLETED WELL, DEPTH OF STATIC WATER LEVEL 165 (Ft.) & DATE MEASURED 10/20/97

TOTAL DEPTH OF BORING 750 (Feet), TOTAL DEPTH OF COMPLETED WELL 720 (Feet)

Table with columns: DEPTH FROM SURFACE, BORE-HOLE DIA., CASING(S), ANNULAR MATERIAL. Rows 0-720 feet.

- ATTACHMENTS ( ) - Geologic Log, Well Construction Diagram, Geophysical Logs, Soil/Water Chemical Analyses, Other

CERTIFICATION STATEMENT: I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief. NAME Filipponi & Thompson Drilling, Inc. ADDRESS P.O. Box 845, Atascadero CA 93423. Signed [Signature] DATE SIGNED 10/21/97 432680

ORIGINAL  
File with DWR

STATE OF CALIFORNIA  
**WELL COMPLETION REPORT**

Page 2 of 2

Refer to Instruction Pamphlet

Owner's Well No. #1 WELL #3 (DOMESTIC)

No. 511066

Date Work Began \_\_\_\_\_, Ended \_\_\_\_\_

Local Permit Agency \_\_\_\_\_

Permit No. 97-283 Permit Date \_\_\_\_\_

DWR USE ONLY - DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

**GEOLOGIC LOG**

ORIENTATION (∠) — VERTICAL — HORIZONTAL — ANGLE — (SPECIFY)		DEPTH TO FIRST WATER (Ft.) BELOW SURFACE	DESCRIPTION
DEPTH FROM SURFACE		Describe material, grain size, color, etc.	
Fl.	to Fl.		
505	514		BROWN CLAY
514	521		SAND & GRAVEL
521	546		BROWN CLAY
546	550		SAND & GRAVEL
550	554		BROWN CLAY
554	569		SAND & GRAVEL
569	622		BLUE CLAY
622	630		BLUE SAND
630	648		BLUE CLAY
648	657		BLUE SAND
657	664		BLUE CLAY
664	671		BLUE SAND
671	680		BLUE CLAY
680	687		BLUE SAND
687	694		BLUE CLAY
694	712		SAND & MINOR GRAVEL
712	736		BROWN CLAY
736	750		CHATTERING BROWN CLAY

MT

**WELL OWNER**

Name Villa Mt. Eden Winery  
Mailing Address \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

County \_\_\_\_\_

APN Book \_\_\_\_\_ Page \_\_\_\_\_ Parcel \_\_\_\_\_

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

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

**LOCATION SKETCH**

WEST

NORTH

SOUTH

EAST

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

**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) \_\_\_\_\_

DRILLING METHOD \_\_\_\_\_ FLUID \_\_\_\_\_

WATER LEVEL & YIELD OF COMPLETED WELL \_\_\_\_\_

DEPTH OF STATIC WATER LEVEL \_\_\_\_\_ (Ft.) & DATE MEASURED \_\_\_\_\_

ESTIMATED YIELD\* \_\_\_\_\_ (GPM) & TEST TYPE \_\_\_\_\_

TEST LENGTH \_\_\_\_\_ (Hrs.) TOTAL DRAWDOWN \_\_\_\_\_ (Ft.)

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

TOTAL DEPTH OF BORING \_\_\_\_\_ (Feet)

TOTAL DEPTH OF COMPLETED WELL \_\_\_\_\_ (Feet)

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING(S)						DEPTH FROM SURFACE	ANNULAR MATERIAL					
		TYPE (∠)				MATERIAL / GRADE	INTERNAL DIAMETER (Inches)		GALGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	TYPE			
Fl.	to Fl.	BLANK	SCREEN	CON. DUCTOR	FILL PIPE									CE- MENT (∠)

**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 \_\_\_\_\_  
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS \_\_\_\_\_ CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

Signed \_\_\_\_\_ WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED \_\_\_\_\_ C-57 LICENSE NUMBER \_\_\_\_\_

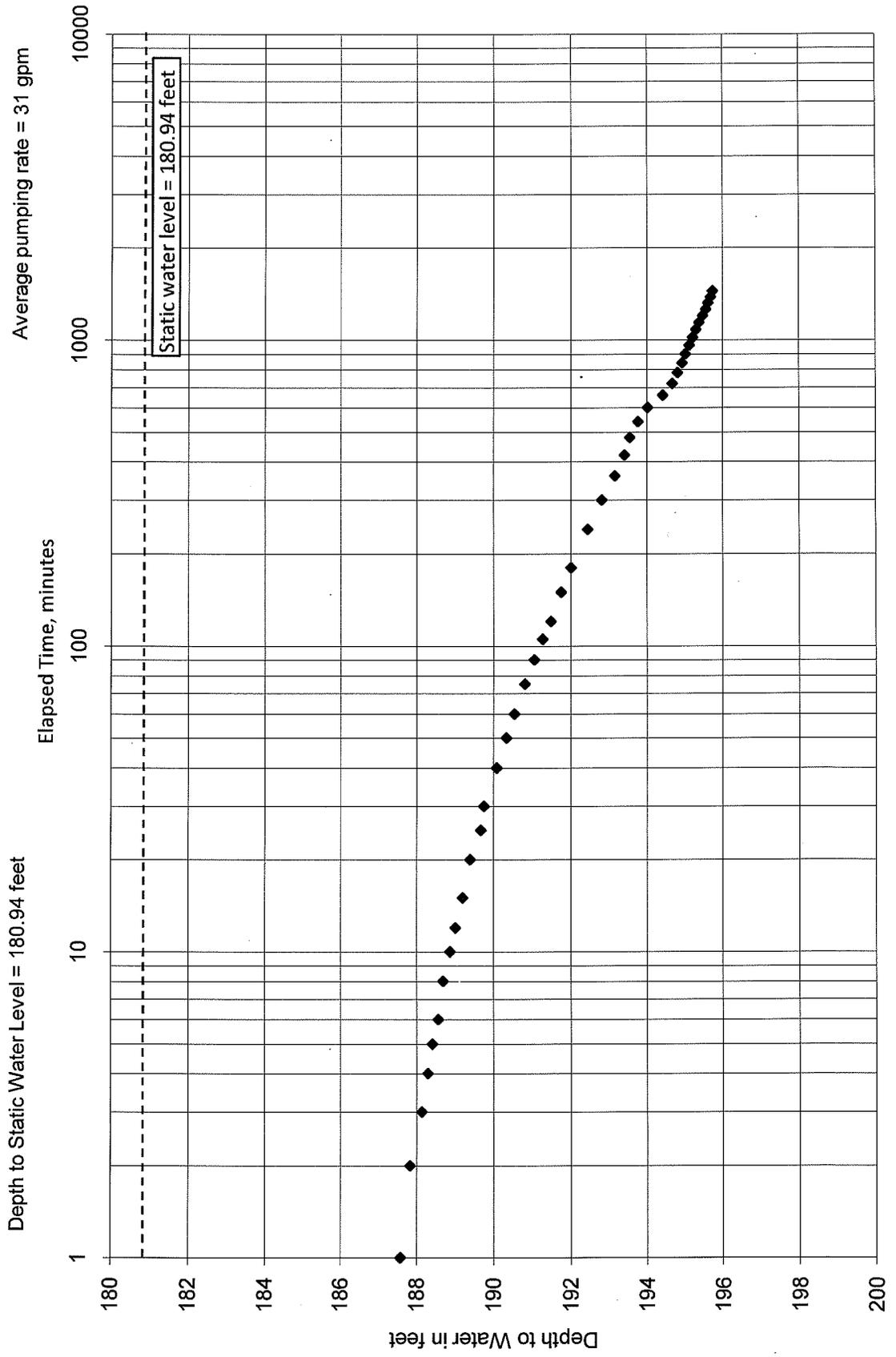
**Pumping Test (24-hour), ERV Well #3 - Domestic Well**

Day	Time	Elapsed Time	Depth to Water*	Drawdown	Recorded Pumping Rate
Mo./Day/Yr	hr:min	minutes	feet	feet	gallons per minute
12/7/06	7:30	0	180.94	0	Start
	7:31	1	187.56	6.62	32.4
	7:32	2	187.82	6.88	31.4
	7:33	3	188.13	7.19	31.8
	7:34	4	188.29	7.35	31.8
	7:35	5	188.40	7.46	31.7
	7:36	6	188.56	7.62	31.8
	7:38	8	188.68	7.74	31.7
	7:40	10	188.86	7.92	31.6
	7:42	12	189.00	8.06	31.6
	7:45	15	189.19	8.25	31.5
	7:50	20	189.39	8.45	31.5
	7:55	25	189.67	8.73	31.5
	8:00	30	189.74	8.80	31.6
	8:10	40	190.07	9.13	31.5
	8:20	50	190.33	9.39	31.5
	8:30	60	190.54	9.60	31.6
	8:45	75	190.80	9.86	31.5
	9:00	90	191.05	10.11	31.4
	9:15	105	191.26	10.32	31.5
	9:30	120	191.48	10.54	31.4
	10:00	150	191.75	10.81	31.3
	10:30	180	192.00	11.06	31.4
11:30	240	192.44	11.50	31.4	
12:30	300	192.81	11.87	31.4	
13:30	360	193.15	12.21	31.3	
14:30	420	193.40	12.46	31.2	
15:30	480	193.54	12.60	31.2	
16:30	540	193.76	12.82	31.1	
17:30	600	194.02	13.08	31.0	
18:30	660	194.41	13.47	31.1	
19:30	720	194.66	13.72	31.2	
20:30	780	194.80	13.86	31.1	
21:30	840	194.92	13.98	31.1	
22:30	900	195.01	14.07	31.0	
23:30	960	195.11	14.17	31.1	
12/8/06	0:30	1020	195.20	14.26	31.2
	1:30	1080	195.29	14.35	31.2
	2:30	1140	195.37	14.43	31.0
	3:30	1200	195.47	14.53	31.1
	4:30	1260	195.55	14.61	31.1
	5:30	1320	195.61	14.67	31.0
	6:30	1380	195.67	14.73	31.1
	7:30	1440	195.72	14.78	31.0

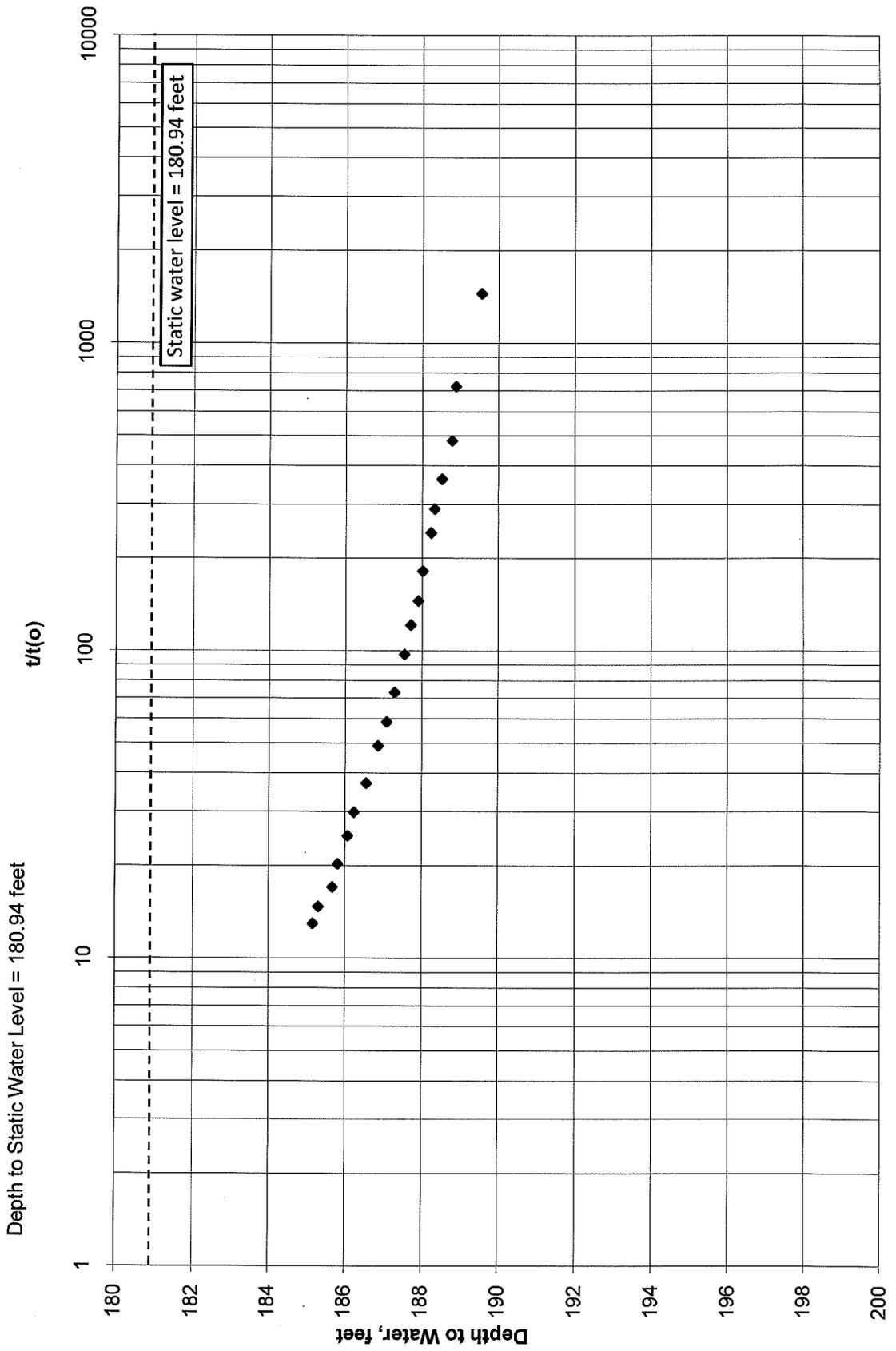
**Recovery Test, ERV Well #3 - Domestic Well**

Day	Time	Elapsed Time	Depth to Water	Elapsed Time	Recovery Time Ratio
Mo./Day/Yr	hr:min	minutes	feet	minutes	
Recovery		t	s	t(0)	t/t(0)
12/8/06	7:31	1441	189.55	1	1441.0
	7:32	1442	188.89	2	721.0
	7:33	1443	188.78	3	481.0
	7:34	1444	188.52	4	361.0
	7:35	1445	188.33	5	289.0
	7:36	1446	188.23	6	241.0
	7:38	1448	188.02	8	181.0
	7:40	1450	187.90	10	145.0
	7:42	1452	187.71	12	121.0
	7:45	1455	187.55	15	97.0
	7:50	1460	187.29	20	73.0
	7:55	1465	187.09	25	58.6
	8:00	1470	186.86	30	49.0
	8:10	1480	186.55	40	37.0
	8:20	1490	186.23	50	29.8
	8:30	1500	186.07	60	25.0
8:45	1515	185.82	75	20.2	
9:00	1530	185.68	90	17.0	
9:15	1545	185.31	105	14.7	
9:30	1560	185.17	120	13.0	

**Pumping Test  
Estrella River Vineyards Well #3 - Domestic Well  
December 7 to 8, 2006**



Recovery Test  
Estrella River Vineyards Well #3 - Domestic Well  
December 8, 2006





March 9, 1998

LAB No: SP 801384-1 Page 2

Filipponi & Thompson Drilling

Date Sampled : February 26, 1998

Sample Site: Estrella Road  
Description: Estrella Road

Sample type: Ground Water

**Micro Irrigation System Plugging Hazard**

Test Description	Result	Graphical Results Presentation		
		Slight	Moderate	Severe
<b>Chemical</b>				
Manganese	< 0.03 mg/L			
Iron	0.07 mg/L			
TDS by Summation	742 mg/L			
<b>No Amendments</b>				
pH	7.6 units			
Alkalinity	240 mg/L			
Langlier Index	0.2			
Total Hardness	290 mg/L			
<b>With Amendments</b>				
Alkalinity	50			
Langlier Index	-0.7			
Total Hardness	290 mg/L			

Good: :Problem

Note: Color coded bar graphs have been used to provide you with 'AT-A-GLANCE' interpretations.

**Water Amendments Application Notes:**

The amendments recommended on the previous pages include,

**Gypsum:** This should be applied at least once a year to the irrigated soil surface area. Gypsum can also be applied in smaller quantities in the irrigation water. Apply the smaller (bracketed) amount of gypsum when also applying the recommended amount of Urea Sulfuric Acid and the larger amount when applying only Gypsum.

**Urea Sulfuric Acid:** This should be applied continuously in the irrigation water. The Urea Sulfuric Acid requirement of 41 oz/1000 gallons of water is intended to remove approximately 80 % of the alkalinity. The final pH should range from 5.4 to 6.7. We recommend a field pH determination to confirm that the pH you designate is being achieved. This application of Urea Sulfuric Acid is based upon the use of a product that contains 15% Urea (1.89 lbs Nitrogen), 49% Sulfuric Acid and has a specific gravity of 1.52 at 68°F.

Guidelines for the above interpretations are sourced from USDA & U.C. Cooperative Extension Service publications. Please contact us if you have any questions.

FRUIT GROWERS LAB, INC.

Darrell H. Nelson, B.S.  
Laboratory Director

DHN:md

**Water Analysis**

**JMLord, Inc.**  
267 N. Fulton Street  
Fresno, CA 93701  
(559) 268-9755  
(559) 486-6504 (FAX)

Actagro LLC

Attn: Tom G./Jason/Tom Shannon

Project/PO: Cross Canyon Vineyard

Group: 49998 Date Received: 6/6/2009 Report Date 6/15/2009

pH	ECw dS/m	Ca	Mg	Na	HCO3 meq/L	SO4	Cl	SAR	SARadj	B ppm	NO3-N
----	-------------	----	----	----	---------------	-----	----	-----	--------	----------	-------

Sample ID: 49998-1 Description: ERV/NBF Northwell ERV  
\* 7.83 0.86 2.71 4.27 3.96 4.11 2.55 1.43 2.12 3.94 0.35 2.3

Sample ID: 49998-2 Description: ERV/SBF Southwell ERV  
\* 7.87 0.63 1.97 2.12 4.18 4.31 1.37 2.79 2.92 5.17 0.54 4.7

Sample ID: 49998-3 Description: ERV-NIF  
6.62 0.87 2.71 4.26 3.99 2.81 4.00 1.44 2.14 3.62 0.37 2.4

Sample ID: 49998-4 Description: ERV-SIF  
6.92 0.66 2.00 2.15 4.17 2.23 3.69 0.89 2.89 4.30 0.55 3.5

Sample ID: 49998-5 Description: CCF-IF  
6.76 0.54 1.34 2.38 3.28 3.08 1.88 0.87 2.41 3.53 0.42 3.1

Sample ID: 49998-6 Description: CCF-BF  
7.73 0.52 1.27 2.30 3.34 4.44 0.61 3.09 2.50 4.01 0.45 0.8

**San Luis Obispo County Public Works  
 Volunteer Precipitation Gauge Station  
 MONTHLY PRECIPITATION REPORT**

**Station Name -** CDF - Paso Robles # 101

**Station Location -**

**Latitude -** 35° 33' 28"

**Longitude -** 120° 45' 23"

**Description -** Paso Robles

**Water Years -**

**Beginning -** 1943-1944

**Ending -** 2007-2008

**Station Statistics -**

<b>Month</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>TOTAL</b>
<b>Average</b>	0.02	0.03	0.15	0.63	1.62	2.65	3.12	3.17	2.47	1.12	0.29	0.02	15.28
<b>Maximum</b>	0.51	0.96	2.58	5.50	6.45	8.75	14.46	10.75	12.41	5.96	1.85	0.32	33.92
<b>Minimum</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.29

**San Luis Obispo County Public Works**  
**Volunteer Precipitation Gauge Station**  
**MONTHLY PRECIPITATION REPORT**

Station Name and no. CDF - Paso Robles # 101

\*\*\* All units are in inches \*\*\*

Water Year	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	Total
2007-2008	0.00	0.00	0.00	0.91	0.00	2.50	9.11	2.40	0.00	0.40	0.00	0.00	15.32
2006-2007	0.00	0.00	0.00	0.30	0.10	1.75	1.20	2.96	0.21	0.55	0.00	0.00	7.07
2005-2006	0.00	0.00	0.00	0.00	0.50	1.95	8.85	1.35	5.98	3.15	1.60	0.00	23.38
2004-2005	0.00	0.00	0.00	5.50	1.70	8.52	4.65	5.25	4.30	0.85	1.80	0.00	32.57
2003-2004	0.00	0.00	0.00	0.00	1.75	2.89	1.12	4.80	0.35	0.00	0.00	0.00	10.91
2002-2003	0.00	0.00	0.00	0.00	3.20	5.45	0.20	1.95	2.50	0.45	0.00	0.00	13.75
1999-2000	0.00	0.00	0.00	0.00	0.00	1.50	3.80	7.30	1.50	0.70	0.02	0.10	14.92
1998-1999	0.00	0.00	0.10	0.25	0.69	0.65	2.50	1.35	3.45	1.50	0.00	0.00	10.49
1997-1998	0.00	0.00	0.00	0.00	4.50	3.95	3.90	10.55	2.90	3.15	1.85	0.00	30.80
1996-1997	0.00	0.00	0.00	2.20	2.00	6.20	8.00	0.00	0.00	0.00	0.00	0.00	18.40
1995-1996	0.00	0.00	0.00	0.00	0.10	2.10	3.00	7.35	2.38	0.70	0.00	0.00	15.63
1990-1991	0.00	0.00	0.60	0.00	0.00	0.20	0.06	1.92	12.41	0.02	0.00	0.19	15.40
1989-1990	0.00	0.00	1.45	1.08	0.40	0.00	3.23	2.24	0.32	0.22	0.56	0.00	9.50
1988-1989	0.00	0.00	0.00	0.00	1.29	4.30	0.97	1.83	1.24	0.41	0.30	0.00	10.34
1987-1988	0.00	0.00	0.00	1.81	3.08	3.75	2.10	2.24	0.72	2.78	0.16	0.32	16.96
1986-1987	0.00	0.00	0.73	0.00	0.13	0.90	2.51	2.68	3.27	0.11	0.00	0.03	10.36
1985-1986	0.00	0.04	0.02	0.60	3.34	1.64	2.34	10.75	6.42	0.24	0.00	0.00	25.39
1984-1985	0.00	0.02	0.00	0.85	3.00	3.42	0.58	1.60	2.75	0.33	0.00	0.00	12.55
1983-1984	0.00	0.58	0.00	1.68	2.94	5.96	0.24	0.71	1.23	0.58	0.00	0.00	13.92
1982-1983	0.00	0.00	1.26	1.22	4.70	2.87	6.83	4.98	6.88	3.30	0.11	0.00	32.15
1981-1982	0.00	0.00	0.00	1.78	1.31	0.81	4.10	1.12	5.43	3.99	0.00	0.03	18.57
1980-1981	0.17	0.00	0.00	0.01	0.01	0.57	4.53	1.38	5.56	0.41	0.00	0.00	12.64
1979-1980	0.00	0.00	0.08	0.74	1.08	2.18	4.47	8.61	2.52	1.14	0.36	0.00	21.18
1978-1979	0.00	0.00	1.01	0.00	1.70	0.84	4.00	3.90	2.52	0.02	0.00	0.00	13.99
1977-1978	0.00	0.00	0.00	0.13	0.23	5.66	6.15	6.38	5.89	2.66	0.00	0.00	27.10
1976-1977	0.00	0.96	2.58	0.88	1.64	1.65	2.22	0.06	2.17	0.00	1.56	0.00	13.72
1975-1976	0.00	0.00	0.00	2.37	0.00	0.06	0.00	2.89	1.13	0.60	0.00	0.12	7.17
1974-1975	0.00	0.00	0.00	0.85	0.48	2.32	0.05	4.16	2.62	1.03	0.00	0.00	11.51
1973-1974	0.00	0.00	0.00	0.67	3.37	1.95	6.48	0.05	4.77	0.79	0.00	0.00	18.08
1972-1973	0.00	0.00	0.02	1.35	4.96	1.13	7.34	5.70	2.89	0.00	0.00	0.00	23.39
1971-1972	0.00	0.00	0.08	0.26	0.73	4.28	1.35	0.30	0.00	0.48	0.02	0.00	7.50
1970-1971	0.00	0.00	0.00	0.06	3.88	4.46	1.42	0.22	0.79	0.76	0.19	0.00	11.78
1969-1970	0.29	0.00	0.00	0.24	0.56	0.80	4.30	1.77	1.86	0.07	0.00	0.00	9.89
1968-1969	0.00	0.00	0.00	1.99	0.71	2.63	14.46	10.62	0.81	2.60	0.10	0.00	33.92
1967-1968	0.00	0.00	0.29	0.00	2.10	1.24	1.20	0.63	1.93	1.05	0.00	0.00	8.44
1966-1967	0.00	0.00	0.00	0.10	2.37	8.75	2.02	0.39	4.03	3.40	0.09	0.04	21.19
1965-1966	0.01	0.04	0.00	0.00	6.45	2.74	1.25	0.81	0.00	0.09	0.00	0.00	11.39
1964-1965	0.00	0.09	0.04	1.03	2.62	3.39	2.14	0.63	1.33	2.65	0.02	0.00	13.94
1963-1964	0.00	0.00	0.19	1.16	3.61	0.03	2.02	0.07	1.65	0.81	0.77	0.00	10.31
1961-1962	0.00	0.00	0.00	0.00	2.29	1.84	2.37	9.46	0.52	0.00	0.00	0.00	16.48

ERV Water Use  
**VINYARD IRRIGATION**

907.5 plants/acre  
 212 planted acres  
 229.2 gross acres

	2006	2007	2008
	-----acre-feet-----		
Jan	10	30	20
Feb	0	40	10
Mar	10	20	30
Apr	15	45	38
May	28	46	52
Jun	45	58	65
Jul	65	82	75
Aug	85	96	88
Sep	65	55	52
Oct	42	35	45
Nov	10	20	20
Dec	10	20	0
<b>Total</b>	<b>385</b>	<b>547</b>	<b>495</b>

	Gross acres	
	229.2	318.17
	2006-08 Average projected	
Jan	11.8	16.4
Feb	5.9	13.6
Mar	17.7	16.4
Apr	22.4	26.8
May	30.7	34.4
Jun	38.4	45.9
Jul	44.3	60.7
Aug	52	73.6
Sep	30.7	47.1
Oct	26.6	33.3
Nov	11.8	13.6
Dec	0	8.2
<b>Total</b>	<b>292.3</b>	<b>390</b>

	2006	2007	2008
Jan	5.9	17.7	11.8
Feb	0	23.6	5.9
Mar	5.9	11.8	17.7
Apr	8.9	26.6	22.4
May	16.5	27.2	30.7
Jun	26.6	34.2	38.4
Jul	38.4	48.4	44.3
Aug	50.2	56.7	52
Sep	38.4	32.5	30.7
Oct	24.8	20.7	26.6
Nov	5.9	11.8	11.8
Dec	5.9	11.8	0
<b>Total</b>	<b>227.4</b>	<b>323</b>	<b>292.3</b>