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Water Availability Analysis



November 16, 2016

Mark Grassi
Grassi Winery
1044 Soda Canyon Road
Napa, CA 94558

RE: P15-00339
Grassi Winery Use Permit
Water Availability Analysis: No Net Increase

Mark,

Per your request, this letter is to provide an analysis on the existing and proposed water use on the subject property located at 1044 Soda Canyon Road, Napa, CA with an emphasis on accounting for a 'no-net increase' relative to groundwater use for the proposed winery project.

It is our understanding the subject parcel currently has a two bedroom main residence, one bedroom guest cottage, sheds, barns, residential landscaping and garden including an orchard, a 0.96 acre vineyard, 9 acre-foot reservoir, and a well that serves the parcel. The project proposes to add a 25,000 gallon per year winery use to the parcel including a new winery building and winery landscaping. You propose to convert the source of all current irrigation (residential landscape, garden, orchard, and vineyard) from groundwater use to the reservoir and propose to irrigate the proposed winery landscape with the reservoir as well. The existing well will only serve the residence and the proposed winery domestic uses.

I. EXISTING BASELINE WATER USAGE

A. Residential

As noted above, the parcel has a two bedroom main residence and a one bedroom guest cottage for a total of three bedrooms. Per the water-usage values identified in Appendix B of the Water Availability Analysis (WAA)¹, herein after called 'Appendix B', the estimated annual water use for a primary residence ranges from 0.50 to 0.75 acre-feet per year. For your residence, we estimate the water use to be 0.50 acre-feet per year. This lower value from Appendix B is used for two reasons: first, this volume does not include any water use for residential irrigation, which is detailed in the next section, and second, there are 3 total bedrooms which is a limiting factor to amount of water that can be used.

The residential water usage for the property is estimated at 0.50 acre-feet per year.

B. Landscape Irrigation

As we understand it, the existing landscape irrigation on the property consists of a garden, fruit and olive trees, and a grass meadow. The garden, trees, and meadow are irrigated every other day from April to October. This calculates to 105 days of watering per year. Following is a detailed description of the watering practices for each irrigated area.

¹ Water Availability Analysis Adopted May 12, 2015, by Napa County. See attachment for the WAA Appendix B Table



1. Garden

The garden is approximately one-half acre and is irrigated by a drip system for 1 hour per day for 105 days of watering per year. The drip laterals are spaced 4 feet apart, the emitters are spaced every 3 feet, and the emitters provide a flow rate of 1 gallon per hour. This calculates to 1,815 gallons per day and 190,575 gallons per year or 0.58 acre-feet per year.

2. Fruit and Olive Trees

There are 15 fruit trees and 30 olive trees. The trees are irrigated by a drip system for 1 hour a day for 105 days of watering per year. There are 4 drip emitters at each fruit tree that provide a flow rate of 0.5 gallon per hour or 2 gallons per day per tree. In addition, there are 7 drip emitters at each olive tree that provide a flow rate of 0.5 gallons per hour or 3.5 gallons per day per tree. Summing all the tree irrigation flows, the total water use for fruit and olive orchard is estimated to be 135 gallons per day or 14,175 gallons per year (0.04 acre-feet per year).

3. Grass Meadow

The grass meadow is approximately 1,600 square feet and is irrigated by an underground automated sprinkler system in the summer months between May to September. The grass is watered several times a week. Based on the information found in "A Guide to Estimating Irrigation Water Needs of Landscape Plantings in California dated August 2000", the grass meadow is classified as turf grass. Based on historical data (Yountville area), the evapotranspiration over the summer months is estimated at 29 inches (2.42 feet) per year². This translates to an estimated volume of 161 gallons per day or 28,963 gallons per year (0.09 acre feet per year) based on the 1,600 square feet of turf grass.

See the table below for a summary of the existing landscaping water uses:

Landscaping Watering Requirements							
	Garden April - October (105 watering days)		Fruit and Olive Trees April - October (105 watering days)		Grass Meadow* May to September		
Irrigation Days/Wk	3.5		3.5		N/A		
Hours/Irrigation Day	1		1		N/A		
Irrigation hours/month	15		15		N/A		
Irrigation hours (annual total)	105	Hours	105	Hours	N/A		
Emitter Spacing	3	Feet	N/A		N/A		
Emmitter Lateral spacing	4	Feet	N/A		N/A		
Area per Emitter	7.07	Square Feet	N/A		N/A		
Emitter Flow Rate (gph)	1	Gallons per Ho	0.5		N/A		

Calculations - Landscaping Area	Area (sf)	Area with Drip Irrigation (sf)	Number of Drip Emitters	Irrigation Hours (annual total)	Total Daily Flow (gpd)	Total Annual Flow (gal)	Total Annual Flow (Acre-Feet)
Garden	21,780	21,780	1,815	105	1,815	190,575	0.58
Fruit and Olive Trees	5 Fruit Trees, 30 Olive Tree	N/A	270	105	135	14,175	0.04
Grass Meadow*	1600	1600	N/A	N/A	161	28,963	0.09
Total Water Use					2,111	233,713	0.72

*Calculated utilizing historical data found on evapotranspiration as noted in footnote 2

Based on the above noted information, the total existing landscape water use is 0.72 acre-feet per year.

² Data found from 'Climate Data for Various Locations in Sonoma, Napa, Mendocino, Lake and Marin Counties, California compiled 1993 with a source information updated in April 2000'



C. Vineyard

Based on the information you provided in the Water Availability Analysis dated February 23, 2016, the 0.96 acres of vineyard is estimated to use 0.28 acre-feet per year and its water source is supplied by the existing well.

D. Reservoir

Based on the information you provided, the following is our understanding of the reservoir. In September 2009, the reservoir was drained, excavated to 15 feet in depth, and lined with a blue clay liner to prevent seepage into or out of it.

As you have lived on the parcel since 2009, you have stated that the reservoir has remained full throughout each year (including the current drought), that the reservoir's water source is surface runoff from its watershed, and that imported water has never been used to fill the reservoir. Furthermore, based on your observations, during the rainy season, the reservoir has overflowed every year since the liner has been installed including the drought years of 2013, 2014, and 2015 (see the figures below for reference).

In order to verify adequate reservoir refill capacity is available to meet the proposed demands of the vineyard and landscape irrigation, the following section is an analysis of the theoretical annual stormwater run-on to the reservoir.



Figure 1: Reservoir on December 6, 2014



Figure 2: Reservoir on January 5, 2015



Figure 3: Reservoir on January 15, 2016



1. Estimated Reservoir Stormwater Fill Potential

As a cross reference to the reservoir volume, based on the survey provided by Terra Firma Surveys, St. Helena, CA dated May 2015, the reservoir's surface area is estimated to be 24,950 ft². With a depth of 15 feet and a freeboard of two feet, the reservoir's capacity is approximated to be 9 acre-feet per year. This correlates with your recollection of the reconstructed volume.

We completed basic hydrology calculations in order to determine the theoretical annual stormwater fill capacity of the reservoir during a 'typical' rainy season. In order to estimate the theoretical volume of stormwater flows to the reservoir, we determined the approximate contributing watershed and applied a typical two-year/one-hour rain event intensity to the watershed. Using the Rational Method for runoff from a watershed yielded an estimated runoff in cubic feet per second. Subsequently, we correlated this flow rate to an estimated annual stormwater volume of run-on to the reservoir.

The contributing watershed to the reservoir is estimated to be 17 acres based a topographic analysis on Google Earth Pro (see image below for reference).

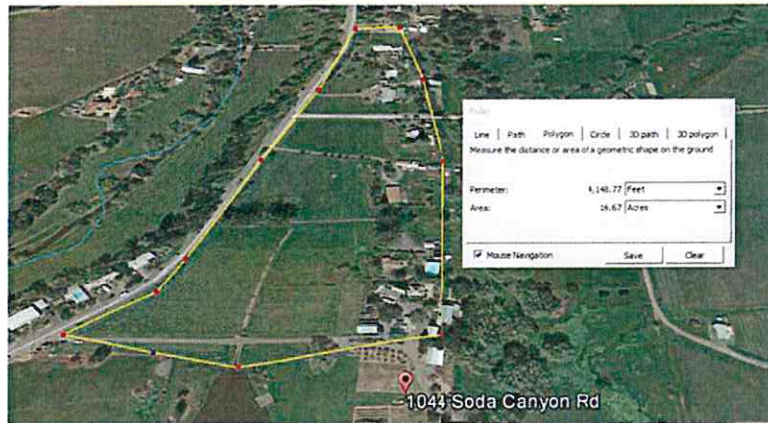


Figure 4: Reservoir's Contributing Watershed

The reservoir is estimated to receive 19 acre-feet of runoff per year from its contributing watershed. This was determined by utilizing the rational method, a two-year, one-hour storm (intensity of 0.55 inches per hour), and a runoff coefficient of 0.59, the runoff flow rate is estimated at 5.6 ft³/s for the associated storm event.

To convert this runoff to an estimated annual runoff, we conservatively assumed each storm has a duration of five hours for a total storm rainfall of 2.8 inches of rainfall. Given the historical average annual rainfall for the area is 23 inches and the above noted estimated average per storm rainfall, we estimated the approximate number of annual rain storms is 8. Using the estimated storm duration, the runoff flow rate, and the annual rain storm events, we extrapolated approximately 19 ac-ft/year flows to the reservoir.

See Appendix A 'Contributing Watershed to Reservoir – 1044 Soda Canyon Road' for details on the watershed analysis.



E. Total Existing Water Use

Based on the residential, landscaping, and vineyard water use, the total existing water use from the well on the parcel is estimated to be 1.49 acre-feet per year. See the table below for a summary of the existing water uses on the parcel:

Existing Water Usage by Well

Residence	0.50	AF per Year
Landscape Irrigation	0.72	AF per Year
Vineyard	0.28	AF per Year
Total Water Usage	1.49	AF per Year

II. PROPOSED BASELINE WATER USAGE

Based on the pending Use Permit Application (P15-00339), the production marketing plan is as follows:

- Production Capacity: 25,000 Gallons Wine per Year
- Employees: 10 maximum per day for non-harvest and 10 maximum per day for harvest.
- Daily Visitors (By Appointment): 12 maximum per day, 70 average per week
- Marketing Events: Two per year with 40 guests, one per year with 75 Guests
- Auction Event: One per year with 125 guests

Based on the above noted uses, the following sections address the proposed estimated baseline water usage on the property if the winery is approved.

A. Proposed Water Usage

With the approval of the Winery Use Permit, the parcel will utilize the well water for the following purposes:

- Existing Residential Water Usage (remains at 0.50 acre-feet per year as noted above in the existing water use baseline)
- Proposed Winery Process Water Usage
- Proposed Winery Domestic Water Usage

Each of these categories is analyzed as follows:

B. Winery Process Water

The winery proposes to produce a maximum of 25,000 gallons of wine per year. Per Appendix B, the estimated proposed process water use for the winery is 0.0215 acre-feet per 1,000 gallon of wine produced per year which, in this case, totals to 0.54 acre-feet per year.

C. Winery Domestic Water

The winery domestic water use consists of the winery domestic water usage (employee water usage, and visitors and events water usage).

Winery Domestic Water Usage: Per Appendix B, the estimated proposed domestic water use for the winery is 0.005 acre-feet per 1,000 gallon of wine produced per year which totals to 0.13 acre-feet per year.



Employee Water Usage: There are two types of employees, permanent non-harvest and temporary harvest employees. There will be a maximum of 10 permanent employees who work 7 days a week for 44 weeks in a year for a total of 3,080 shifts per year. Similarly, there will be 10 temporary harvest employees who work 7 days a week for 8 weeks in a year for a total of 560 shifts per year. Per Appendix B, an employee is estimated to use 15 gallons of water per shift. Utilizing the above noted information, the total employee water use is estimated to be 0.17 acre-feet per year.

Visitors and Events: Based on the marketing plan, it is anticipated that there will be an average of 70 visitors per week for 52 weeks which totals to 3,640 visitors per year. Similarly, there will be a total of 280 event visitors per year. Per Appendix B, the daily and event visitors are estimated to use 3 gallons of water per visit. Utilizing the above noted information, the total visitor's water use is estimated to be 0.037 acre-feet per year.

The total domestic water use generated from the winery is estimated to be 0.329 acre-feet per year.

D. Total Winery Water Use

The total proposed water use for the winery will be supplied by the on-site well and is estimated to be 0.87 acre-feet per year. See the table below for the summary of the winery's water use:

Total Proposed Water Usage - Well

Winery		
Process Water	0.538	AF per Year
Domestic Water	0.125	AF per Year
Employees: Non-Harvest	0.142	AF per Year
Employees: Harvest	0.026	AF per Year
Visitors	0.034	AF per Year
Event Visitors	0.003	AF per Year
Total Winery Water Usage	0.866	AF per Year

As mentioned earlier in the report, the project also proposes winery landscaping. The water use from the winery landscaping will be supplied by the on-site reservoir. Additionally, the existing landscaping's water use will be disconnected from the well and will be supplied by the on-site reservoir in a similar fashion to the proposed landscaping. For the purpose of this letter, the associated water uses for winery landscaping will not be discussed as that does not affect the existing well's water use.

III. TOTAL PARCEL WATER USAGE

Accounting for all of the water uses on the parcel supplied by the well, the estimated proposed daily and annual water usage is noted in the table below:



Total Parcel Water Usage - Well

Winery		
Process Water	0.538	AF per Year
Domestic Water	0.125	AF per Year
Employees: Non-Harvest	0.142	AF per Year
Employees: Harvest	0.026	AF per Year
Visitors	0.034	AF per Year
Event Visitors	0.003	AF per Year
Total winery Water Usage	0.866	AF per Year
Residence	0.500	AF per Year
Total Water Use	1.366	AF per Year

The total proposed water demand for the parcel, including the winery, is estimated to be 1.37 acre-feet per year which is less than the existing water use of 1.49 acre-feet per year. See the table below for the proposed and existing water use comparison:

Well Water Use Comparison

Existing Water Use	1.493	AF per Year
Proposed Water Use	1.366	AF per Year
Water Use Difference	0.127	AF per Year

Based on the well completed report completed by Huckfeldt Well Drilling permitted in January 2003, the existing well yield is estimated to produce 120 gallons per minute (see attachments for reference). The total water demand on the parcel is estimated to be 1.37 acre-feet per year or 5.30 gallons per minute³ and equates to about 5% of the well yield. The proposed winery will not increase water-use flow on the property and meets the water neutral requirement.

Please let me know if you have any additional questions or need any more information on the existing and proposed water use for the Grassi Winery located at 1044 Soda Canyon Road in Napa.

Sincerely,

Kevin Zhang
Project Engineer
kzhang@deltacivil.com

Attachments

- Contributing Watershed to Reservoir – 1044 Soda Canyon Road
- WAA Appendix B Table
- Well Completed Report completed by Huckfeldt Well Drilling permitted in January 2003

³ The calculation is based on 350 days per year with a maximum peak constant usage of 4 hours per day.

Appendix B: Estimated Water Use for Specified Land Use

Each project applicant is responsible for determining estimated water usage for their proposed project. While some guidelines are provided below, other industry standards exist, PBES may be able to provide data based on previous applications, and each project has its own unique characteristics. The most appropriate data should be used by the applicant to estimate water use for their specific project.

Guidelines for Estimating Residential Water Use:

The typical water use associated with residential buildings is as follows:

Primary Residence	0.5 to 0.75 acre-feet per year (includes minor to moderate landscaping)
Secondary Residence or Farm Labor Dwelling	0.20 to 0.50 acre-feet per year

Additional Usage to Be Added

1. Add an additional 0.1 acre-feet of water for each additional 1000 square feet of drought tolerant lawn or 2000 square feet of non-xeriscape landscaping above the first 1000 square feet.
2. Add an additional 0.05 acre-feet of water for a pool with a pool cover.
3. Add an additional 0.1 acre-feet of water for a pool without a cover.

Residential water use can be estimated using the typical water uses above. All typical uses are dependent on the type of fixtures and appliances, the amount and type of landscaping, and the number of people living onsite. If a residence uses low-flow fixtures and has appliances installed, is using xeriscape landscaping, and is occupied by two people, the water use estimates will be on the low side of the ranges listed above.

Examples of Residential Water Usage:

Residential water use can vary dramatically from house to house depending on the number of occupants, the number and type of appliances and water fixtures, the amount and types of lawn and landscaping. Two homes sitting side by side on the same block can consume dramatically different quantities of water.

Example 1:

Home #1 is 2500 square feet. Outside the house there is an extensive bluegrass lawn, a lot of water loving landscaping, and a swimming pool with no pool cover. Inside the house all the

appliances and fixtures, including toilets and shower-heads, are old and have not been upgraded or replaced by water saving types. The owners wash their cars weekly but they don't have nozzles or sprayers on the hose. They do not shut off the water while they are soaping up the vehicles, allowing the water to run across the ground instead. Water is commonly used as a broom to wash off the driveways, walkways, patio, and other areas. The estimated water usage for Home #1 is 1.2 acre-feet of water per year

Example 2:

Home #2 is also 2500 square feet. Outside of the house there is a small lawn of drought tolerant turf, extensive usage of xeriscape landscaping, and no swimming pool. Inside the house all of the appliances and fixtures, including toilets and showerheads, are of the low flow water saving types. The owners wash their cars weekly, but have nozzles or sprayers on the hose to shut off the water while they are soaping up the vehicles. Driveways, walkways, patios, and other areas are swept with brooms instead of washed down with water. Estimated water usage for Home #2 is 0.5 acre-feet of water per year.

The above are only examples of unique situations. The estimated water use for each project will vary depending on existing parcel conditions.

Guidelines For Estimating Non-Residential Water Usage:

Agricultural:

Vineyards	
Irrigation Only	0.2 to 0.5 acre-feet per acre per year
Heat Protection	0.25 acre-feet per acre per year
Frost Protection	0.25 acre-feet per acre per year
Irrigated Pastures	4.0 acre-feet per acre per year
Orchards	4.0 acre-feet per acre per year
Livestock (sheep or cows)	0.01 acre-feet per acre per year

Winery:

Process Water	2.15 acre-feet per 100,000 gal. of wine
Domestic and Landscaping	0.50 acre-feet per 100,000 gal. of wine
Employees	15 gallons per shift
Tasting Room Visitation	3 gallons per visitor
Events and Marketing, with on-site catering	15 gallons per visitor

Industrial:

Food Processing	31.0 acre-feet per employee per year
Printing/Publishing	0.60 acre-feet per employee per year

Commercial:

Office Space	0.01 acre-feet per employee per year
Warehouse	0.05 acre-feet per employee per year

Estimates of water use for other categories are available in the technical literature from sources such as the American Water Works Association’s Water Distribution Systems Handbook (Mays, 2000).

Parcel Location Factors:

The water use screening criterion for each parcel is based on the location of the parcel. There are three different location classifications: Napa Valley Floor, MST Groundwater Deficient Area, and All Other Areas. Napa Valley Floor areas include all locations that are within the Napa Valley excluding areas designated as groundwater deficient areas. Groundwater deficient areas are areas determined by the Department of Public Works as having a history of insufficient or declining groundwater availability or quality. At present the only designated groundwater deficient area in Napa County is the MST Subarea. Areas of the County not within the Napa Valley Floor and MST Groundwater Deficient Area are classified as All Other Areas. Public Works can assist applicants in determining the appropriate classification for project parcel(s).

Project Parcel Location	Water Use Criteria
Napa Valley Floor	1.0 acre feet per acre per year
MST Groundwater Deficient Area	0.3 acre feet per acre per year or no net increase, whichever is less*
All Other Areas	Parcel Specific
* Does not apply to the Ministerial Exemption as outlined in the Groundwater Conservation Ordinance	

The criterion for the Napa Valley Floor Area was agreed to 1991 by the Board of Supervisors. The criterion of 0.3 acre feet per acre per year for the MST Groundwater Deficient Area was determined using data from the 1977 USGS report on the Hydrology of the MST Subarea (Johnson, 1977). The value is calculated by dividing the “safe annual yield,” as determined by the USGS (Johnson, 1977), by the total acreage of the affected area (10,000 acres). The addition of the “no net increase” standard reflects the County’s obligation to assess potential cumulative impacts under CEQA. In a groundwater deficient area, any discretionary project that increases groundwater use may contribute to the declining groundwater levels in the aquifer.

No single criterion can be established for “All Other Areas” due to the uncertainty of the geology, and the increased complexity of the fractured rock aquifer systems in the mountainous and non-Napa Valley areas, including Carneros, Pope Valley, Wooden Valley, and Capell Valley. The project applicant will need to estimate the average annual recharge occurring in the project area and consider the amount of recharge relative to the estimation of project water use (e.g., all current and projected water demands for the property on which the planned project is located). The estimated project water use shall include estimates for normal and dry water years for both current and proposed water uses. If an alternative water source will be used for dry years (e.g.

trucked-in water for non-potable uses), that information shall be provided by the applicant including the source and estimated water volume.

The criteria above were reviewed by the County's groundwater consultants in 2011-2013 and are considered to be reasonable indicators on a watershed scale of the levels below which significant environmental impacts would be unlikely to occur. The review was based on existing monitoring data and an updated hydrogeologic conceptualization of the Napa Valley aquifer system (LSCE and MBK, 2013) and is consistent with the County's experience since establishment of the water use criteria in 1991. In addition, these criteria have been successfully applied as part of the WAA procedure since their establishment.

ORIGINAL
File with DWR

Page 1 of 1

Owner's Well No. _____

Date Work Began 1-24-03 Ended 1-28-03

Local Permit Agency Napa County Environmental Mgmt.

Permit No. 96-12300 Permit Date 1-21-03

STATE OF CALIFORNIA
WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. 792323

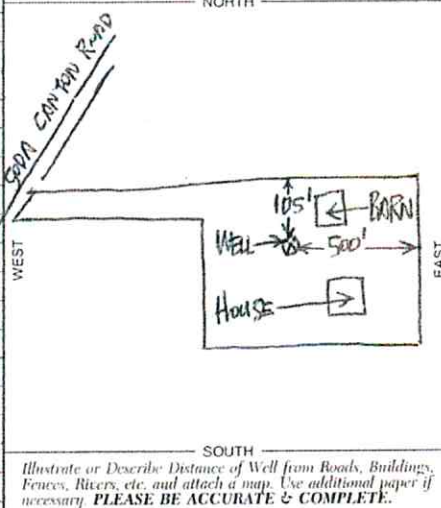
DWR USE ONLY — DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

GEOLOGIC LOG			WELL OWNER		
ORIENTATION (°)	<input checked="" type="checkbox"/> VERTICAL	<input type="checkbox"/> HORIZONTAL	ANGLE	Name Bob & Nancy Hodgson	
DEPTH FROM SURFACE	DRILLING METHOD rotary	FLUID	Mailing Address 1044 Soda Canyon Rd.		
FL to Ft.	DESCRIPTION <i>Describe material, grain size, color, etc.</i>		CITY	STATE ZIP	
0 5	brown clay		Napa, CA 94558		
5 60	brown clay with embedded rock		WELL LOCATION		
60 80	mixed volcanics		Address same		
80 110	gray volcanic ash		City Napa		
110 260	sandy mixed volcanics		County Napa		
260 300	brown sandy volcanics		APN Book 39 Page 140 Parcel 06		
300 360	volcanic mix		Township _____ Range _____ Section _____		
			Latitude _____ Longitude _____		
			DEG. MIN. SEC. NORTH WEST		
			DEG. MIN. SEC. WEST		
			LOCATION SKETCH		
			NORTH		
			SOUTH		
			WEST		
			EAST		
			ACTIVITY (°)		
			<input checked="" type="checkbox"/> NEW WELL		
			MODIFICATION/REPAIR		
			— Deepen		
			— Other (Specify)		
			DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")		
			PLANNED USES (°)		
			WATER SUPPLY		
			<input checked="" type="checkbox"/> Domestic <input type="checkbox"/> Public		
			<input type="checkbox"/> Irrigation <input type="checkbox"/> Industrial		
			MONITORING		
			TEST WELL		
			CATHODIC PROTECTION		
			HEAT EXCHANGE		
			DIRECT PUSH		
			INJECTION		
			VAPOR EXTRACTION		
			SPARGING		
			REMEDICATION		
			OTHER (SPECIFY)		
			WATER LEVEL & YIELD OF COMPLETED WELL		
			DEPTH TO FIRST WATER 110 (Ft.) BELOW SURFACE		
			DEPTH OF STATIC WATER LEVEL 67 (Ft.) & DATE MEASURED 1-28-03		
			ESTIMATED YIELD 120 (GPM) & TEST TYPE air lift		
			TEST LENGTH 2 (Hrs.) TOTAL DRAWDOWN N/A (Ft.)		
			* May not be representative of a well's long-term yield.		
			CONT. CASING LAYOUT		
190 290	screen	PVC 6" .032 slot			
290 310	blank	PVC 6"			
310 330	screen	PVC 6" .032 slot			
TOTAL DEPTH OF BORING 360 (Feet)					
TOTAL DEPTH OF COMPLETED WELL 330 (Feet)					



DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING (S)					ANNULAR MATERIAL			
		TYPE (°)	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	CE-MENT (°)	BEN-TONITE (°)	FILL (°)	FILTER PACK (TYPE/SIZE)
0 25	12									concrete
25 360	9									chips
0 90		X	PVC F480	6	SDR-21					#6 sand
90 170		X	PVC F480	6	SDR-21	.032				cuttings
170 190		X	PVC F480	6	SDR-21					

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 **HUCKFELDT WELL DRILLING**

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

2110 Penny Lane Napa CA 94559

ADDRESS CITY STATE ZIP

Signed *[Signature]* 1-29-03 439-746

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

←—————→
DELTA CONSULTING & ENGINEERING
OF ST. HELENA



WATER AVAILABILITY ANALYSIS

FOR THE

GRASSI WINERY USE PERMIT

PROJECT LOCATED AT

1044 SODA CANYON ROAD
NAPA, CA 94558

COUNTY: NAPA
APN: 039-140-006

SEPTEMBER 23, 2015
REVISION 1: JANUARY 20, 2016

PREPARED FOR REVIEW BY:

NAPA COUNTY PLANNING, BUILDING, AND ENVIRONMENTAL SERVICES
1195 THIRD STREET
NAPA, CA 94559



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The subject parcel is located in 'Napa Valley Floor' with respect to The Tier 1 Parcel Location. The Water Use Criteria allows 1 acre-foot of per acre per year for parcel located in the Napa Valley Floor. The subject parcel is 10 acres in size, therefore the parcel is allowed the use of 10 acre-feet of water per year.

This analysis will identify the existing and proposed water uses on the parcel, estimate the total annual water usage, and then confirm that the proposed water use for the project is less than the allowed water use.

A. Existing Water Usage

The existing water uses for the property consist of a residential development which consists of a two (2) bedroom Main Residence, a one (1) bedroom Guest Cottage, sheds, barns, garden, fruit orchard, olive orchard and grass meadow. There is a single well on the parcel which is the only water source. Please see the Overall Site Plan located in the Appendix. Per the water-usage values identified in Appendix B of the WAA, the estimated existing water use for parcel is 0.75 acre-feet per year. All existing water uses for the property shall remain with the proposed development.

B. Proposed Water Usage

The proposed winery development will increase the parcel overall water usage. The existing water use, as described above, will remain unchanged. The proposed marketing plan as requested with in the Use Permit is as follows:

- *Production Capacity:* 25,000 Gallons Wine per Year
- *Employees:* 10 maximum per day (includes permanent and temporary)
- *Daily Visitors (By Appointment):* 12 maximum per day, 70 average per week
- *Marketing Events:* 2 per year with 40 guests, 1 per year with 75 guests
- *Wine Auction Event:* 1 per year with 125 guests

To limit the amount of water used with the proposed marketing plan, the following limitations must be placed:

1. Marketing and Wine Auction events will be catered off-site.
2. Marketing and Wine Auction events with greater than 40 guests will use portable toilets.

Winery Domestic Water Usage

The estimated winery domestic water usage is determined from the number of daily employees, visitors, and event guests. Napa County Environmental Health Division 'Regulations for Design, Construction, and Installation of Alternative Sewage Treatment Systems', estimates the wastewater generated by employees, visitors, and event guests. For the purposes of the report, it is assumed that the wastewater generated equals the water used. Table 4, in the above note report, estimates the water use by visitors as 3 gallons per day per person and 15 gallons per day per employee. The daily and annual water usage for visitors, employees, and event guests is estimated as:



Use	Maximum Persons	Water Demand	Gallons/year	Acre-feet/year
Employees	2250 Shifts per Year*	15 g/d	33,750	0.10
Visitors	3640 Visitors Per Year**	3 g/d	10,380	0.03
Event Visitors	280 Visitors Per Year	3 g/d	840	0.002
Total		306 g/d peak	44,970	0.132

* Assumes 10 employees 7 days per week for 3 months and 5 employees 7 days per week for 9 months.

** Estimate based on average of 70 visitors per week

Winery Process Water Usage

The winery proposes to produce a maximum of 25,000 gallons of wine per year. Based on industry standard information, a typical winery uses between 4-12 gallons of water per gallon of wine produced. For the purpose of this analysis, an estimation of 8 gallons water required per gallon wine produced will be used. Therefore, it is estimated that the winery production process will consume approximately 200,000 gallons of water per year. This equates to an estimated 0.62 acre-feet per year.

Winery Irrigation Use

The winery proposes to irrigate its landscaping every other day during the summer months only, from May through September. This calculates to 75 days of watering per year. See below for a more detailed description of the watering practices for each irrigated area.

Landscaping: The proposed winery landscaped area is approximately 2,500 square feet and is irrigated by a drip system for 1 hour for 75 days during the summer. The drip laterals shall be spaced 2 feet apart, the emitters shall be spaced every 2 feet, and the emitters provide a flow rate of 1 gallon per hour. This equates to an estimated 625 gallons per day and 46,875 gallons per year or 0.14 acre-feet per year.

Trees: 5 trees at the winery are proposed. The trees shall be irrigated by a drip system for 1 hour for 75 days during the summer. There shall be 7 drip emitters at each tree that provides a flow rate of 0.5 gallon per hour. This equates to an estimated 17.5 gallons per day and 1,312.5 gallons per year or 0.004 acre-feet per year.

The total estimated irrigation water use is 0.144 acre-feet per year.

Vineyard Irrigation Use

A new 0.96 acre vineyard is proposed to be planted. The resulting fruit from this vineyard shall be processed at the winery. The vineyard is proposed to be irrigated from May through August. The annual water use is estimated to be 90,000 gallons or 0.27 acre-feet per year.

C. Water Usage Summary

Accounting for all of the water uses on the parcel, existing which shall remain unchanged and proposed as related to the winery and vineyard, the estimated proposed daily and annual water usage is noted in the table below:



Use	Gallons/year	Acre-feet/year
Winery Domestic Water	44,970	0.132
Winery Process Water	200,000	0.62
Winery Irrigation	48,187.50	0.144
Vineyard	90,000	0.27
Residential Water Use and Irrigation	244,388	0.75
Total	627,545.50	1.92

The total estimated annual water use for the parcel, including both existing and proposed, is 1.92 acre-feet. The total allowed annual water use for the parcel is 10 acre-feet.

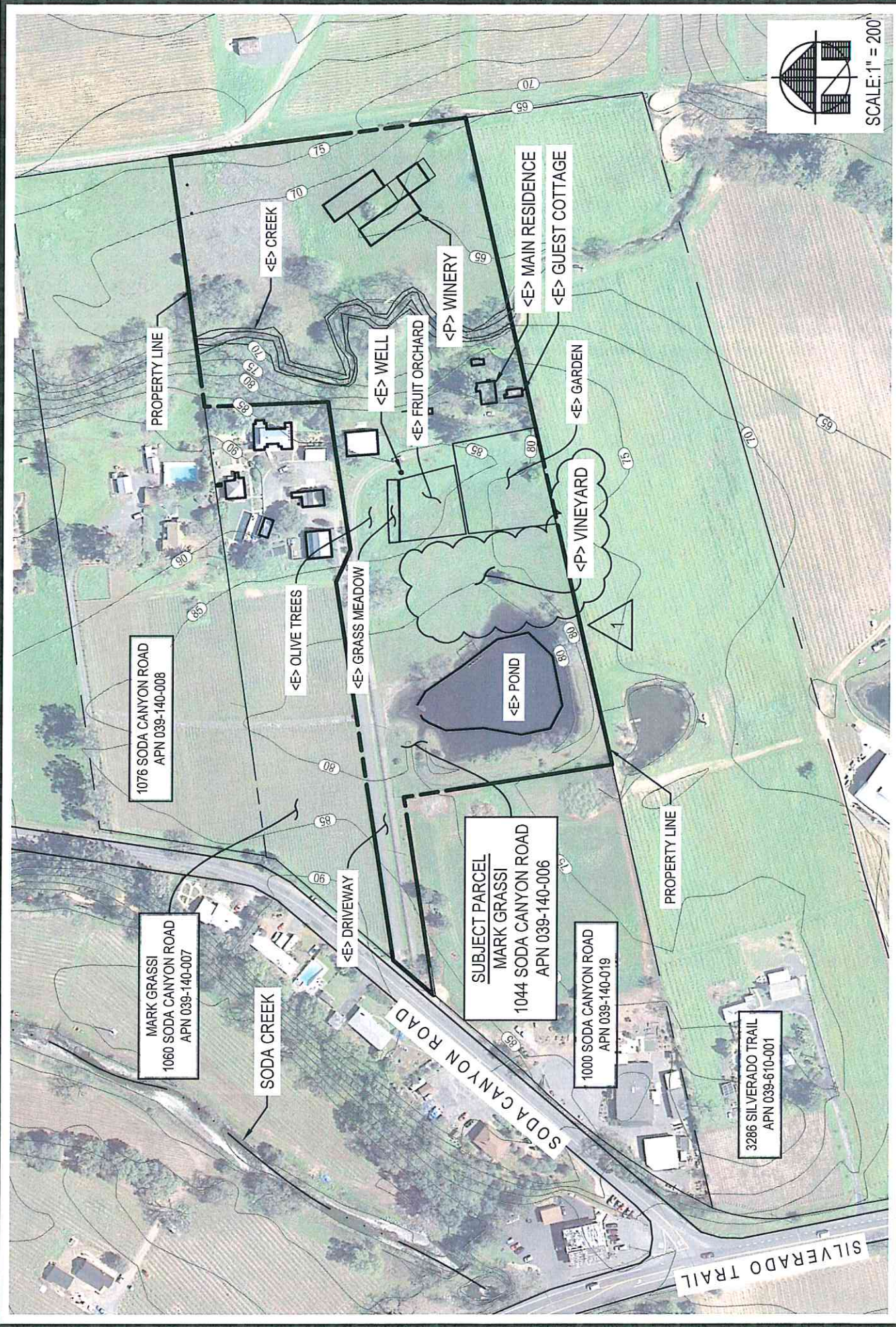
The estimated water use on this parcel is less than the applicable water use criteria of Napa Valley Floor and therefore the Tier 1 Water Criterion is met.

III. REPORT CONCLUSION

Based on the analysis completed in this report, the proposed winery development meets Tier 1 Criterion as the estimated water use on this parcel is less than the applicable water use criteria of Napa Valley Floor. Tier 2 and Tier 3 are not expected to be required.

IV. APPENDIX

Overall Site Map



SHEET 1 OF 1

DELTA CONSULTING & ENGINEERING
 1104 ADAMS STREET, SUITE 203 - ST. HELENA, CALIFORNIA 94574
 707-963-8456 + 707-963-8528 FAX

DATE: 01/20/16 REV1 JOB # 0123
 SCALE: AS NOTED APN: 039-140-006

GRASSI WINERY OVERALL SITE PLAN

1076 SODA CANYON ROAD
 APN 039-140-008

MARK GRASSI
 1060 SODA CANYON ROAD
 APN 039-140-007

SUBJECT PARCEL
 MARK GRASSI
 1044 SODA CANYON ROAD
 APN 039-140-006

1000 SODA CANYON ROAD
 APN 039-140-019

3286 SILVERADO TRAIL
 APN 039-610-001

<E> CREEK

<E> WELL

<E> FRUIT ORCHARD

<P> WINERY

<E> MAIN RESIDENCE

<E> GUEST COTTAGE

<E> OLIVE TREES

<E> GRASS MEADOW

<E> POND

<E> GARDEN

<P> VINEYARD

<E> DRIVEWAY

PROPERTY LINE

PROPERTY LINE

SODA CREEK

SODA CANYON ROAD

SILVERADO TRAIL