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## Water Availability Analysis



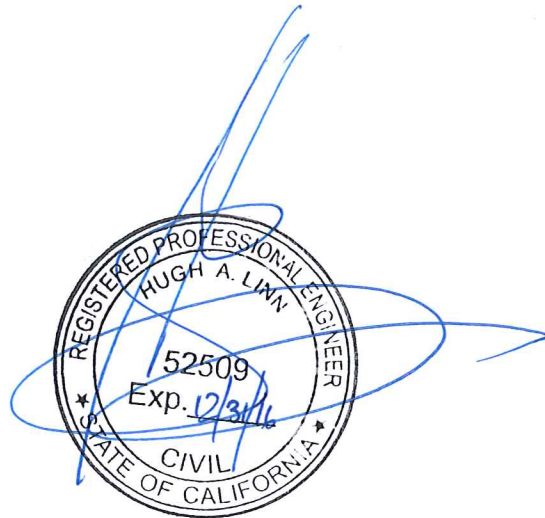
# WATER AVAILABILITY ANALYSIS

FORTUNATI VINEYARDS  
986 SALVADOR AVENUE  
NAPA, CA 94558

APN 036-180-004

PROPERTY OWNER:

Gary Luchtel  
986 Salvador Avenue  
Napa, CA 94558



Project# 4115080.0  
February 8, 2016



**I. Executive Summary**

Fortunati Vineyards proposes to build a winery with 12,000 gallons wine production each year. Below is a summary of the existing and proposed water use. Detailed calculations can be found on the next page. A Groundwater recharge rate of 1.0 af/yr/acre for valley floor was adopted for the 10.28 acre parcel to give a total groundwater recharge of 10.28 af/yr for the project parcel.

Usage Type	Existing Usage [af/yr]	Proposed Usage [af/yr]
Residence	0.75	0.75
Vineyard Irrigation	4.20	4.16
Winery		
Process Water	0.00	0.18
Landscaping	0.00	0.06
Domestic Water	0.00	0.08
<b>Totals (Acre-ft per Year)</b>	<b>4.95</b>	<b>5.23</b>
<b>Estimated Ground Water Recharge (Acre-ft per Year)</b>	<b>10.28</b>	<b>10.28</b>

The proposed water use for Fortunati Vineyards project will result in an increase of 0.28 af/yr. The resultant proposed water use of 5.23 af/yr is less than the estimated groundwater recharge rate of 10.28 af/yr.

In the case that process wastewater is recycled on-site and used for vineyard irrigation, the annual water use will decrease by 0.18 af/yr. The resultant proposed water use would be 5.05 af/yr.



## II. Water Use Calculation

### Existing Vineyard and Residence Water Demand

Residence – (0.75 af/yr/residence x	1	residence) =	0.75 af/yr
Vineyard – Irrigation only – (0.5 af/ac-yr x	8.4	acres vineyard) =	4.20 af/yr
		<b>Total =</b>	<b>4.95 af/yr</b>

### Proposed Vineyard, Residence and Winery Water Demand

Residence – (0.75 af/yr/residence x	1	residence) =	0.75 af/yr
Vineyard – Irrigation only – (0.5 af/ac-yr x	8.4	acres vineyard) =	4.20 af/yr
Existing Vineyard to be Removed – (0.5 af/ac-yr x	0.08	acres vineyard) =	-0.04 af/yr
Process Water – (5 gal water / 1 gallon wine x	12,000	gal wine/year) =	0.18 af/yr
Landscape – (0.5 af / 100,000 gallon wine x	12,000	gal wine/year) =	0.06 af/yr
		<b>Total =</b>	<b>5.15 af/yr</b>

### Proposed Winery Domestic Water Demand

FT Employees – (15 gal/person/day x 365 days/yr x	1	employees/day) =	0.02 af/yr
PT Employees – (15 gal/person/day x 300 days/yr x	1	employees/day) =	0.01 af/yr
Weekday Visitors – (3 gal/person/day x 260 days/yr x	10	visitors/day) =	0.02 af/yr
Weekend Visitors – (3 gal/person/day x 100 days/yr x	5	visitors/day) =	0.01 af/yr
Crush Saturday Visitors – (3 gal/person/day x 4 days/yr x	3	visitors/day) =	0.00 af/yr
Marketing Events (Off-Site Catered) – (30 visitors @ 10 gpd x	10	days/yr) =	0.01 af/yr
Napa Valley Charity Wine Auction (Off-Site Catered) – (100 visitors + 5 event staff @ 10 gpd x	1	days/yr) =	0.01 af/yr
		<b>Total =</b>	<b>0.08 af/yr</b>

### Option Process Wastewater Re-Use

Process Wastewater Reclaimed for Vineyard Irrigation*	60,000	gal wine/year =	-0.18 af/yr
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\*see attached Irrigation Water Balance for calculation

# FORTUNATI VINEYARDS TOTAL VINEYARD AREA



SCALE: 1" = 2000'  
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**FORTUNATI VINEYARDS**  
**Reclaimed Process Wastewater**  
**Water Balance for Irrigation and Storage**



Project Description		Annual Process Waste Flow Volume	
Project Number:	4115080.0	Wine Production:	12,000 gal/year
Project Name:	Fortunati Vineyards		
Prepared By:	Maggie Schneider	Annual Process Waste per Gallon Wine:	5 gal/year
Date:	January 12, 2016	Total Annual Process Waste Generated:	60,000 gal/year

Vineyard Irrigation Parameters		Landscape Irrigation Parameters	
Acres of irrigated vineyard:	7.80 acres	Crop type / name:	Native grass and trees
Row spacing:	7.0 feet	Total irrigated acres of crop:	0.00 acres
Vine spacing:	7.0 feet		
Total number of vines:	6,934 vines		
Water use per vine per month (peak):	26 gal		
Total peak monthly irrigation demand:	180,285 gal		

Monthly Process Wastewater Generation												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly process wastewater generated as % of annual total:	4%	6%	6%	5%	6%	7%	9%	10%	14%	14%	11%	8%
Monthly process wastewater generated [gallons]:	2,400	3,600	3,600	3,000	3,600	4,200	5,400	6,000	8,400	8,400	6,600	4,800

Monthly Vineyard Irrigation Water Use												
(Based on per-vine water use)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Beginning of month reclaimed water in storage [gallons] (This number brought forward from end of previous month)	0	0	0	0	0	0	0	0	0	0	0	0
Vineyard irrigation as % of peak month irrigation demand:	6%	6%	10%	100%	100%	100%	100%	100%	100%	100%	10%	10%
Irrigation per month per vine (gallons):	2	2	3	26	26	26	26	26	26	26	3	3
Total vineyard irrigation demand [gallons]:	10,817	10,817	18,029	180,285	180,285	180,285	180,285	180,285	180,285	180,285	18,029	18,029
Will vineyard be irrigated with reclaimed water this month?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Process wastewater generated this month, reclaimed for vineyard irrigation [gallons]	2,400	3,600	3,600	3,000	3,600	4,200	5,400	6,000	8,400	8,400	6,600	4,800
Remaining vineyard irrigation demand after using this month's process water [gallons]	8,417	7,217	14,429	177,285	176,685	176,085	174,885	174,285	171,885	171,885	11,429	13,229
Drawdown from storage for remaining vineyard irrigation [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
Well water required to satisfy remaining vineyard irrigation demand	8,417	7,217	14,429	177,285	176,685	176,085	174,885	174,285	171,885	171,885	11,429	13,229
Net storage after vineyard irrigation drawdown [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
This month's process wastewater, remaining after vineyard irrigation, available for landscape irrigation [gallons]	0	0	0	0	0	0	0	0	0	0	0	0

*Water balance continues on next page for cover crop irrigation.*

Monthly Landscape Irrigation Water Use												
(Based on evapotranspiration crop demand and irrigated area)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
This month's process wastewater, remaining after vineyard irrigation, available for landscape irrigation [gallons] (From sheet 1)	0	0	0	0	0	0	0	0	0	0	0	0
Reference ET (ET <sub>o</sub> ) (in/month) (see note 1)	1.03	1.53	2.93	4.71	5.82	6.85	7.21	6.44	4.87	3.53	1.64	1.17
Crop Coefficient (K <sub>c</sub> ) (see note 2)	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Crop water demand per acre [inches]	0.82	1.22	2.34	3.77	4.66	5.48	5.77	5.15	3.90	2.82	1.31	0.94
Crop water demand per acre [gallons]	22,374	33,235	63,645	102,310	126,422	148,795	156,615	139,889	105,786	76,678	35,624	25,415
Total crop water demand for irrigated area [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
Will landscape be irrigated with reclaimed water this month?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Process wastewater remaining after vineyard irrigation, reclaimed for landscape irrigation [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
Landscape irrigation water required from storage or other source [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
Drawdown from storage for landscape irrigation [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
Process wastewater generated this month, unused for irrigation, to be reclaimed and stored [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
Net end-of-month reclaimed water storage after all irrigation [gallons]	0	0	0	0	0	0	0	0	0	0	0	0

*End of Water Balance*

**Peak Monthly Storage = 10,000 gallons      Total Process Wastewater Reclaimed for Vineyard Irrigation = 60,000 gallons**

Notes:

- Reference ET<sub>o</sub> from California Irrigation Management Information System
- Crop Coefficient from Table 1 of "Estimating Irrigation Water Needs of Landscape Plantings in California", University of California Cooperative Extension, August 2000.

# FORTUNATI VINEYARDS TREATED PROCESS WASTEWATER IRRIGATION AREA



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## WATER AVAILABILITY ANALYSIS - PHASE ONE STUDY

### Attachment A: Estimated Water Use Guidelines

#### Typical Water Use Guidelines:

Primary Residence	0.5 to 0.75 acre-feet per year (includes some landscaping)
Secondary Residence	0.20 to 0.30 acre-feet per year
Farm Labor Dwelling	0.06 to 0.10 acre-feet per person per year

#### Non-Residential Guidelines:

##### 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
Farm Labor Dwelling	0.06 to 0.10 acre-feet per person per year
Irrigated Pasture	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

##### 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