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Water Availability Analysis & Water System Feasibility Study



WATER AVAILABILITY ANALYSIS

For:

VINEYARD 29
2929 ST. HELENA HWY.
ST. HELENA, CA 94574

APN 022-200-027

Prepared for:

Vineyard 29, LLC
P.O. Box 93
St. Helena, CA 94574

Project# 4115029.0
November 21, 2022





TABLE OF CONTENTS

I. EXECUTIVE SUMMARY	1
II. WATER USE SUMMARY	1

ATTACHMENTS

1. Vineyard Irrigation Exhibit
Reclaimed Process Wastewater-Water Balance for Irrigation and Storage



I. EXECUTIVE SUMMARY

This report is provided to support the Use Permit Determination. Vineyard 29 (APN 022-200-027) proposes to increase production from 48,500 gallons of wine per year to 75,000 gallons and requests recognition and authorization of employees, visitors, and marketing events.

A groundwater recharge rate of 0.3 ac-ft/yr has been adopted for the areas within the Groundwater Sustainability Agency (GSA). This provides an annual allowable water allotment of 7.39 ac-ft/yr for the 24.64-acre parcel. Because the project does not increase water use, Tier 2 and Tier 3 Water Availability Analysis are not required.

The project proposes to drill a public water system replacement well in the vicinity of the existing well, as shown on the Vineyard Irrigation Exhibit in Attachment 1. This is required because the existing well does not have the depth of seal required for a Public Water System. Due to drilling the public water system replacement well in the vicinity of the existing well and the project having no net increase in water use, a Tier 2 and Tier 3 Water Availability Analysis are not required.

II. WATER USE SUMMARY

Beneficial reuse of treated winery process wastewater for vineyard irrigation is proposed so that the program proposed by the winery use permit modification does not increase water use. Irrigation will occur on vineyard blocks on both the winery and adjoining parcel, as shown in attached exhibit.

Usage Type	Existing Usage [af/yr]	Proposed Usage [af/yr]
Vineyard		
Irrigation	2.23	2.23
<i>Irrigation with Treated PWW</i>	0.00	-0.93
Landscaping	0.24	0.24
Winery		
Process Water	1.04	1.61
Domestic Water	0.35	0.49
Totals (Acre-ft per year)	3.86	3.64
Totals per Acre (Acre-ft/acre per year)	0.16	0.15
Estimated Ground Water Recharge (Acre-ft per year)	7.39	7.39
Adopted GSA Groundwater Recharge Rate (Acre-ft/acre per year)	0.30	0.30

The proposed modifications to the Vineyard 29 water use methodology results in a net decrease in water use for the Winery Parcel. The projected water use for the winery parcel decreases from 3.86 to 3.64 acft/yr under this scenario and remains under 0.3 ac-ft/ac.



Existing Vineyard Irrigation and Landscaping Water Demand

Vineyard – Irrigation only – (0.5 af/ac-yr x	4.45	acres vineyard) =	2.23	af/yr
Landscape – (0.5 af / 100,000-gallon wine x	48,500	gal wine/year) =	0.24	af/yr

Existing Winery Process Water Demand

Process Water – (7-gal water / 1 gallon wine x	48,500	gal wine/year) =	1.04	af/yr
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Existing Winery Domestic Water Demand

FT Employees – (15 gal/person/day x 260 days/yr x	13	employees/day) =	0.16	af/yr
PT Employees – (15 gal/person/day x 156 days/yr x	2	employees/day) =	0.01	af/yr
Harvest Employees – (15 gal/person/day x 45 days/yr x	3	employees/day) =	0.01	af/yr
Visitors – (3 gal/person x 52 weeks/yr x	280	visitors/week) =	0.13	af/yr
Marketing Events – (15 visitors @ 15 gal/guest x	10	days/yr) =	0.00	af/yr
Marketing Events – (25 visitors @ 15 gal/guest x	10	days/yr) =	0.01	af/yr
Marketing Events – (50 visitors @ 15 gal/guest x	5	days/yr) =	0.01	af/yr
Marketing Events – (110 visitors @ 15 gal/guest x	2	days/yr) =	0.01	af/yr
Marketing Events – (165 visitors @ 10 gal/guest x	1	days/yr) =	0.01	af/yr
		Total =	0.35	af/yr
Total Existing Water Demand			Total =	3.86 af/yr

Proposed Vineyard Irrigation and Landscaping Water Demand

Vineyard – Irrigation from well – (0.5 af/ac-yr x	4.45	acres vineyard) =	2.23	af/yr
Vineyard – Irrigation PWW effluent – From Wastewater Feasibility Report			-0.93	af/yr
Landscape – (No change from existing) =			0.24	af/yr

Proposed Winery Process Water Demand

Process Water – (7-gal water / 1 gallon wine x	75,000	gal wine/year) =	1.61	af/yr
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Proposed Winery Domestic Water Demand

FT Employees – (15 gal/person/day x 260 days/yr x	15	employees/day) =	0.18	af/yr
PT Employees – (15 gal/person/day x 156 days/yr x	6	employees/day) =	0.04	af/yr
Harvest Employees – (15 gal/person/day x 45 days/yr x	5	employees/day) =	0.01	af/yr
Visitors – (3 gal/person x 52 weeks/yr x	370	visitors/week) =	0.18	af/yr
Marketing Events – (15 visitors @ 15 gal/guest x	10	days/yr) =	0.01	af/yr
Marketing Events – (25 visitors @ 15 gal/guest x	10	days/yr) =	0.01	af/yr
Marketing Events – (50 visitors @ 15 gal/guest x	10	days/yr) =	0.02	af/yr
Marketing Events – (110 visitors @ 15 gal/guest x	5	days/yr) =	0.03	af/yr
Marketing Events – (165 visitors @ 10 gal/guest x	2	days/yr) =	0.01	af/yr
		Total =	0.49	af/yr
Total Proposed Water Demand			Total =	3.64 af/yr

Max weekday = 50
 Max weekend = 60
 Max weekly total – 5x50 + 2x60 = 370

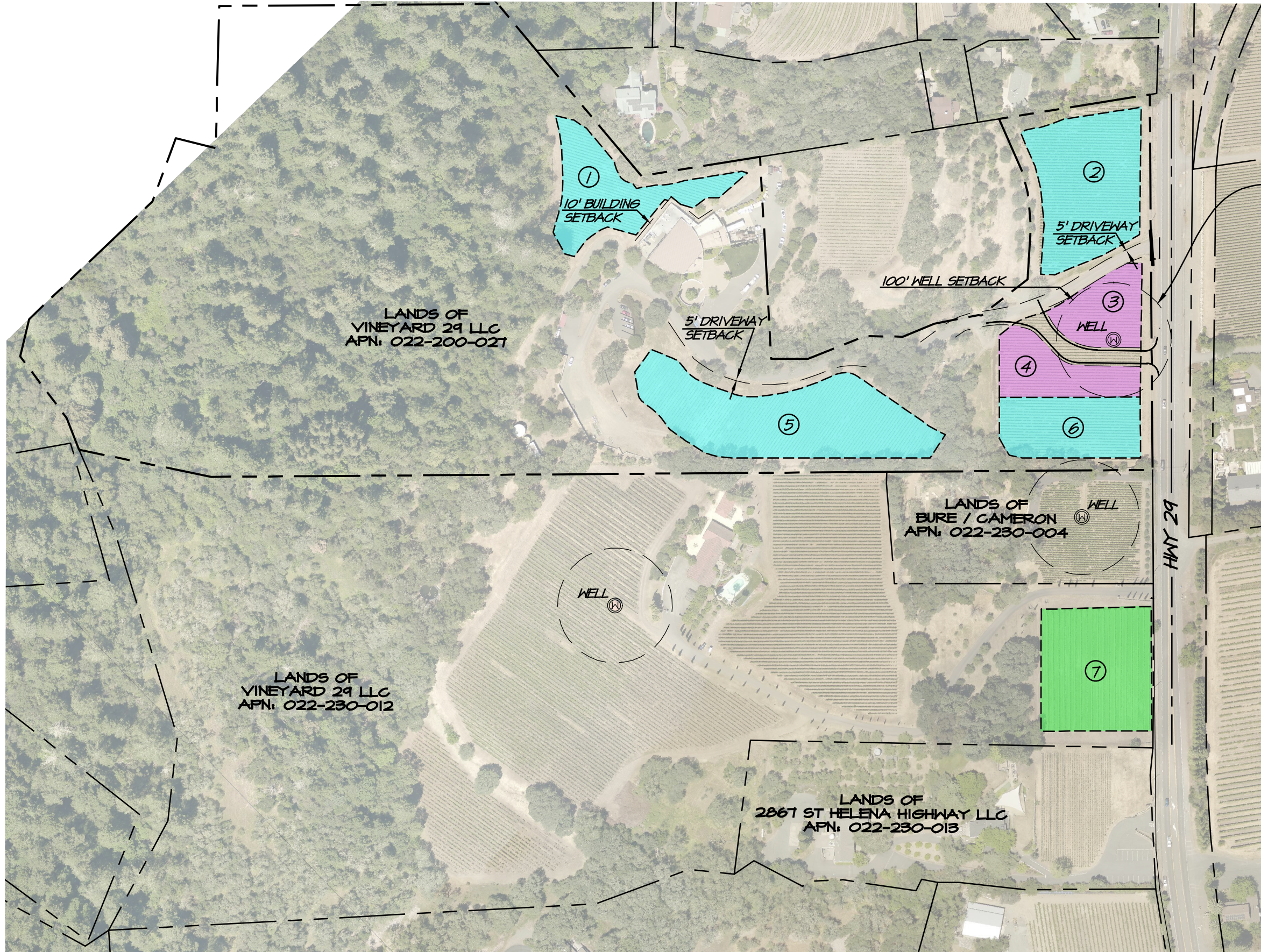


ATTACHMENT 1

Vineyard Irrigation Exhibit

Reclaimed Process Wastewater Water Balance for Irrigation and Storage







VINEYARD 29 VINEYARD IRRIGATION EXHIBIT



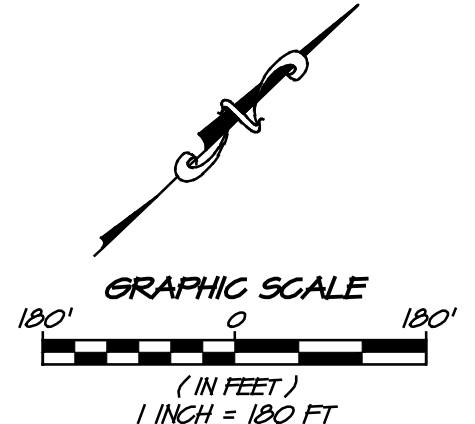
VINEYARD BLOCK AREAS

①	0.66 Acres
②	1.02 Acres
③	0.39 Acres
④	0.44 Acres
⑤	1.35 Acres
⑥	0.59 Acres
⑦	0.95 Acres
Total 5.40 Acres	

PUBLIC WATER SYSTEM REPLACEMENT WELL TO BE DRILLED IN VICINITY OF EXISTING PROJECT WELL

	+		TOTAL WINERY PARCEL VINEYARD IRRIGATION = 4.45 ACRES
			TOTAL WINERY PARCEL VINEYARD TO BE IRRIGATED WITH PROCESS WASTEWATER = 3.62 ACRES
			TOTAL NEIGHBORING PARCEL VINEYARD TO BE IRRIGATED WITH PROCESS WASTEWATER = 0.95 ACRES
	+		TOTAL VINEYARD TO BE IRRIGATED WITH PROCESS WASTEWATER = 4.57 ACRES

COVER CROP TO BE IRRIGATED IN AREA OF BLOCK 5



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Reclaimed Process Wastewater Water Balance for Irrigation and Storage

Project Description		Annual Process Waste Flow Volume	
Project Number:	4115029.0	Wine Production:	75,000 gal/year
Project Name:	Vineyard 29		
Prepared By:	MSS	Annual Process Waste per Gallon Wine:	7 gal/year
Date:	September 13, 2022	Total Annual Process Waste Generated:	525,000 gal/year

Vineyard Irrigation Parameters		Cover Crop Irrigation Parameters	
Acres of irrigated vineyard:	4.57 acres	Crop type / name:	
Row spacing:	7.0 feet	Total irrigated acres of crop:	1.35 acres
Vine spacing:	8.0 feet		
Total number of vines:	3,555 vines		
Water use per vine per month (peak):	28 gal		
Total peak monthly irrigation demand:	100,246 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]:	21,000	31,500	31,500	26,250	31,500	36,750	47,250	52,500	73,500	73,500	57,750	42,000

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)	13,061	0	0	0	0	0	0	0	0	0	0	9,457
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	28	28	28	28	28	28	28	3	3
Total vineyard irrigation demand [gallons]:	6,015	6,015	10,025	100,246	100,246	100,246	100,246	100,246	100,246	100,246	10,025	10,025
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]	6,015	6,015	10,025	26,250	31,500	36,750	47,250	52,500	73,500	73,500	10,025	10,025
Remaining vineyard irrigation demand after using this month's process water [gallons]	0	0	0	73,996	68,746	63,496	52,996	47,746	26,746	26,746	0	0
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	0	0	0	73,996	68,746	63,496	52,996	47,746	26,746	26,746	0	0
Net storage after vineyard irrigation drawdown [gallons]	13,061	0	0	0	0	0	0	0	0	0	0	9,457
This month's process wastewater, remaining after vineyard irrigation, available for cover crop irrigation [gallons]	14,985	25,485	21,475	0	0	0	0	0	0	0	47,725	31,975
<i>Water balance continues on next page for cover crop irrigation.</i>												

Total = 1.18 ac-ft
Winery Parcel = 0.93 ac-ft
Adjoining Parcel = 0.25 ac-ft

Monthly Cover Crop 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 cover crop irrigation [gallons] (From sheet 1)	14,985	25,485	21,475	0	0	0	0	0	0	0	47,725	31,975
Reference ET (ET _o) (in/month) (see note 1)	1.32	1.8	3.32	4.78	6.11	6.84	7.07	6.3	4.9	3.45	1.74	1.29
Crop Coefficient (k _c) (see note 2)	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Crop water demand per acre [inches]	0.79	1.08	1.99	2.87	3.67	4.10	4.24	3.78	2.94	2.07	1.04	0.77
Crop water demand per acre [gallons]	21,505	29,325	54,088	77,873	99,541	111,433	115,180	102,636	79,828	56,205	28,347	21,016
Total crop water demand for irrigated area [gallons]	29,031	39,588	73,018	105,129	134,380	150,435	155,494	138,559	107,768	75,877	38,269	28,372
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 cover crop irrigation [gallons]	14,985	25,485	21,475	0	0	0	0	0	0	0	38,269	28,372
Cover crop irrigation water required from storage or other source [gallons]	14,046	14,103	51,543	105,129	134,380	150,435	155,494	138,559	107,768	75,877	0	0
Drawdown from storage for cover crop irrigation [gallons]	13,061	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	9,457	3,604
Net end-of-month reclaimed water storage after all irrigation [gallons]	0	0	0	0	0	0	0	0	0	0	9,457	13,061
<i>End of Water Balance</i>												

Peak Monthly Storage = 13,061 gallons

- Notes:
- Reference ET_o 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.



WATER SYSTEM FEASIBILITY STUDY FOR A REGULATED SYSTEM

For

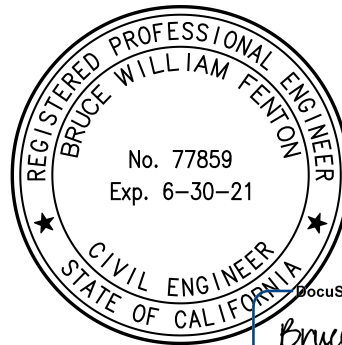
VINEYARD 29
2929 ST. HELENA HWY
ST. HELENA, CA

APN: 022-200-027

Prepared for:

Vineyard 29, LLC
PO Box 93
Saint Helena, CA 94574

January 29, 2021
Project #4115029.0



DocuSigned by:

Bruce Fenton

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Table of Contents

TECHNICAL CAPACITY	1
System Description	1
Twenty-Year Evaluation of Projected Water Demand	1
Twenty-Year Evaluation of Water Supply Capacity	2
Source Adequacy	2
Water Quality.....	2
CONSOLIDATION	2
MANAGERIAL	2
General.....	2
Operation and Maintenance	3
Monitoring and Testing	3
FINANCIAL.....	3



TECHNICAL CAPACITY

System Description

This report is provided to support the Use Permit Determination. Vineyard 29 (APN 022-200-027) proposes to increase production from 48,500 gallons of wine per year to 75,000 gallons and requests recognition and authorization of employees, visitors, and marketing events.

The winery has an existing Domestic Water Supply Permit via the Calcode system with state ID# 28-00038. With the increase in employees and visitors, the winery will need to establish that the Transient-Noncommunity Water System is served by a code compliant well. This report will demonstrate that a new well with a code compliant seal will be drilled to serve the public water system.

The current well on the property has a 21.5’ seal. This well will remain on the property and be used for irrigation purposes. A new well will be drilled with a minimum seal of 50’ to provide water for the public water system, and will be used for the public water system, winery process water, and landscape and vineyard irrigation. No chemical or biological treatment will be performed on the well water unless quarterly testing results deem further treatment is necessary. Water for the Public Water System is stored in a ± 10,800-gallon tank. Separate pumps will supply the domestic water, irrigation water, and fire water.

Twenty-Year Evaluation of Projected Water Demand

Based on the Tier 1 Water Use Calculations, the annual domestic water demand for the winery (employees, visitors, and events) is 0.49 acre-feet per year (160,00 gallons per year).

Source	Number of People/Day	Water Demand [af/yr]
Full-Time Employees	15	0.18
Part-Time Employees	6	0.04
Harvest Employees	5	0.01
Visitors	60	0.18
Marketing Events (10 days/year)	15	0.01
Marketing Events (10 days/year)	25	0.01
Marketing Events (10 days/year)	50	0.02
Marketing Events (5 days/year)	110	0.03
Marketing Events (2 days/year)	165	0.01
Total		0.49

The daily average public water demand is 438 gallons per day. Peak daily public water demand is estimated at 876 gallons per day, being 200% of average daily demand.



If the winery seeks expansion in the future, thereby increasing the water demand on the public water system, the facility will need to acquire a use permit modification and prove that increased capacity is available. It will not be permissible for future developments in the vicinity of this project to join this public water system without first justifying that the water supply is available to meet the demand.

Twenty-Year Evaluation of Water Supply Capacity

Additional non-public water demand for both parcels includes winery process water, water for landscaping and vineyard irrigation. This water will be provided from a different well and will not be included in the public water system calculations. The total peak well water demand from the public water system is 876 gallons per day.

The proposed water source will be verified as capable of supporting the proposed peak daily groundwater demand of 876 gal/day when constructed. For comparison the existing well onsite has a capacity of 33 gpm. When pumped on a 50% operational basis (pumping 12 hours per day), the daily project well yield is 23,760 gallons per day. This exceeds the peak daily demand on the well.

$$33 \text{ gpm} * 720 \text{ min/day} = 23,760 \text{ gal/day}$$
$$23,760 \text{ gal/day} \geq 876 \text{ gallons (peak daily total demand)}$$

Source Adequacy

The proposed well will have a minimum seal depth of 50 ft to comply with Napa County Code 13.12.380 as Class IA wells for a Public Water System. The Application and Permit to Construct a Water Well document outlines the well construction and inspection by the Department of Environmental Management. Application and Permit are on file at Napa County.

Water Quality

Water sampling will be conducted prior to operation of the system. Water quality is expected to meet or exceed all requirements of Chapter 15 of Title 22, California Code of Regulations (CCR).

CONSOLIDATION

Vineyard 29 has an existing public water system so no consolidation is required.

MANAGERIAL

General

The owner of the water system will be the property owner of the winery parcel. The costs of operation will be covered in the winery operation costs. The owner will also hold the responsibility of water system manager for the property.



Operation and Maintenance

The following is a summary of the required Operations and Maintenance schedule:

Tasks	Frequency	Action
System Water Level	Daily	Visual Inspection
System Pressure and Conveyance	Daily	Visual Inspection
Water Tanks	Quarterly	Visual Inspection
Manually Operate Valves and Pumps	Quarterly	Operation
Water Quality Test & Reporting	Quarterly	Unit Samples Taken & Reported to Napa Co.

A certified distribution operator or treatment operator (T1 level or above) as specified by Chapter 13 of Title 22 CCR contracted by the owner will be responsible for system repairs.

Monitoring and Testing

Water quality testing will be conducted to comply with Chapter 15 of Title 22 of CCR. Samples will be taken to Caltest or an approved laboratory for testing.

FINANCIAL

Below is a brief summary of the system's annual estimated financial capacity based on winery revenue. Capital improvement costs including well installation and installation of the treatment and distribution systems, are estimated to be a one-time expense of \$70,000, amortized over 20 years.

Capital Improvements: \$3,500

Power: \$2,000

Maintenance: \$3,500

Water Quality Testing: \$5,000

Total: \$14,000

Projected Annual Gross Revenue: \$15,756,500 (Based on 31,513 cases at \$500/case)

Annual Operating Costs: \$3,151,300 (at 20% profit)

Percent of Total Operating Costs: 0.4%