

“G”

Water System Feasibility Report  
And  
Wastewater Feasibility Study

# WATER SYSTEM FEASIBILITY

## Bella Union Winery

1695 St. Helena Highway

St. Helena, California

APN 027-470-007

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**SYSTEM DESCRIPTION**

Bella Union Winery (previously Provenance Winery), located at 1695 St. Helena Highway in St. Helena (APN 027-470-007), is applying for a use permit modification to increase the number of employees, tasting visitation, marketing event visitation, and wine production. Bella Union Winery’s (Facility) use permit modifications are proposed to occur in two phases. Phase I includes the increase in tasting visitation and employees. Phase II will include the increase in wine production along with the addition of a new barrel building and canopy. Wine production is proposed to increase from 180,000 to 300,000 gallons per year. Employees are proposed to increase from the existing 12 full-time to 38 full-time and 7 part-time. Tasting visitation is proposed to increase from 366 visitors per week to 1,375 visitors per week (175 visitors per day for Monday through Thursday and 225 visitors per for Friday to Sunday). Public tasting visitation will remain at 43 visitors per day and is included in the proposed total tasting visitation of 1,375 visitors per week. Marketing events are proposed to change to a schedule of weekly, monthly, and annual events. The site is a 60.65-acre parcel in an agricultural area on St. Helena Highway (Enclosure A). The Facility is currently listed as a transient, non-community Public Water System (PWS ID CA-28-01073) and is capable of meeting the existing facility demands but may need improvements to meet the proposed water demands. Consolidation with another existing water system is not feasible as this is an existing public water system. A change in ownership amendment application has already been submitted to the Napa County Planning, Building, and Environmental Services Consumer Protection department. An amendment application to reclassify the PWS as a non-transient, non-community system will be required in Phase I due to the increase in employees.

The existing winery parcel consists of a winery/hospitality building, onsite vineyards, a 3-bedroom residence, landscaping, a water treatment and pump shed, a process wastewater management system, and a sanitary sewage management system. There are two existing operational wells onsite (Table 1). Well 03 is connected to the public water system and supplies the potable water demand for the winery property. The second well (“Ag Well”) provides vineyard and landscape irrigation water supply. Well logs are provided in Enclosure B.

Table 1. Summary of existing well information.

Source Name	Primary Use	Year Drilled	Status	Capacity (gpm)	Annular Seal Depth (ft)
Well 03	Domestic/Process	2003	Active	27 <sup>1</sup>	53
Ag Well	Irrigation	1991	Active	100 <sup>1</sup>	22

1. Capacity estimates from both wells are from well tests conducted in 2021 (Enclosure B).

Water quality results from Well 03 meets the primary drinking water standards but has historically had an exceedance for manganese (secondary standard). Treatment is provided for iron and manganese removal in the potable water source. Initial treatment consists of three calcite sediment filters and a Kinetico water softener system. There are two 11,500-gallon water storage tanks which store treated water. A pressure system delivers water from the two 11,500-gallon water storage tanks through 3-40 gpm ultraviolet disinfection units in parallel (Sanitron S2400B), prior to distribution to the winery and other ancillary buildings. See Enclosure C for a water system schematic.

With the proposed Use Permit modifications, the facility has an estimated average water demand of 7,400 gpd and a peak water demand of 19,860 gpd for all process and domestic needs (Enclosure D). Well 03 is expected to be capable of meeting the peak demand over the course of a day. A 19,860 gpd peak flow corresponds to a 44,700 gpd maximum daily demand (MDD). The existing 23,000-gallons of onsite storage does not currently meet this MDD. The facility will begin measuring water use to determine their current peak flow so that an updated MDD can be estimated prior to Phase I. Storage requirements will be reviewed after data collection.

**WATER DEMAND**

The proposed use permit modifications include an increase to the wine production volume, number of employees, private tasting visitors, and marketing events. The water demand increase is expected to correlate to the estimated wastewater flows for both process wastewater and sanitary sewage.

**Proposed Water Uses**

Peak water use at the facility will be based on the following needs:

- Process needs for production capacity of 300,000 gallons of wine per year,
- Full Time Employees = 38 per day,
- Part Time Employees = 7 per day,
- Tasting Visitors = 225 per day (16 visitors provided with prepared food, 110 visitors provided with pre-packaged food, 43 public tasting visitors, and 56 visitors that are not provided food with their tastings),
- Annual Marketing Event = 500 guests per event,
- A 3-bedroom residence located on the parcel

Daily flow changes depending on if there is a marketing event scheduled, but the above scenario represents the anticipated peak demand.

**Winery Process Water Demand**

Water demand for wine production is expected to correlate to the process wastewater (PW) generated at the facility. Based on typical flow data from wineries of similar size and characteristics, the projected process wastewater generation for wine production is 5.52 acre-ft per year (Table 1).

Table 2. Proposed winery process water demand.

Parameter	Value	Units
Existing Annual Production	300,000	gal wine / year
PW Generation Rate <sup>1</sup>	6.0	gal PW / gal wine
Annual PW Flow	1,800,000	gal PW
Total Annual Winery Process Water Demand	1,800,000	gal water / year
Average PW Flow/Process Water Demand (based on 365 days/year)	4,940	gal PW / day
Peak PW Flow/Process Water Demand <sup>2</sup>	9,900	gal PW / day
Annual Production Water Demand	5.52	acre-ft water/year

Notes:

1. Generation rate based on industry standard values.

2. The harvest month of September accounts for approximately 16.4% of the annual water demand in wineries of similar size.

The expected annual water use for the existing 300,000 gallons of wine per year production capacity is 1,800,000 gallons per year, with an average demand of 4,940 gpd and a peak demand of 9,900 GPD. Winery process water demand will continue to be provided by Well 03.

**Domestic Water Demand**

Domestic water use at the facility is determined based on the total number of employees, daily visitors (public and by-appointment), event guests, and the residential demand. Sanitary Sewage generation is expected to be equivalent to the water demand for domestic uses. Using Napa County standards, the proposed average and peak domestic water demands for the winery facility is estimated as follows:

<u>Average Day w/o Event - Non-harvest</u>						
Employee (full-time)	38	x	15	gpcd	=	570 gal/day
Employee (part-time)	7	x	15	gpcd	=	105 gal/day
Public Tasting Visitors	43	x	3	gpcd	=	129 gal/day
Private Tasting Visitors without Food	56	x	3	gpcd	=	138 gal/day
Tasting Visitors with Pre-Packaged Food	110	x	8	gpcd	=	880 gal/day
Tasting Visitors with Prepared Food	16	x	15	gpcd	=	240 gal/day
3 Bedroom Residence	3	x	120	gpd	=	360 gal/day
<b>Total</b>					=	2,452 gal/day
						<b><u>2,460 gal/day</u></b>
 <u>Peak Tasting Day Harvest w/Event</u>						
Employee (full-time)	38	x	15	gpcd	=	570 gal/day
Employee (part-time)	7	x	15	gpcd	=	105 gal/day
Public Tasting Visitors	43	x	3	gpcd	=	129 gal/day
Private Tasting Visitors without Food	56	x	3	gpcd	=	138 gal/day
Tasting Visitors with Pre-Packaged Food	110	x	8	gpcd	=	880 gal/day
Tasting Visitors with Prepared Food	16	x	15	gpcd	=	240 gal/day
3 Bedroom Residence	3	x	120	gpd	=	360 gal/day
Largest Marketing Event	500	x	15	gpcd	=	7,500 gal/day
<b>Total</b>					=	9,952 gal/day
						<b><u>9,960 gal/day</u></b>

The expected water use for the proposed increase in visitation and marketing events is 2,460 GPD for an average day and 9,960 GPD on a peak day. Domestic water demand will continue to be provided Well 03.

**MAXIMUM DAILY DEMAND (MDD)**

The calculated maximum daily demand (MDD) for this facility is estimated to be 44,700 gpd based on the peak demand of 19,860 gpd and a maximum peaking factor of 2.25 (Table 3). The existing storage tank capacity may need to be increased from 23,000 gallons to 44,700 gallons. Water use monitoring is proposed to occur immediately so that data can be reviewed before initiating Phase I of the facility upgrades. This data will then be used to update the MDD estimate to determine if additional storage is needed. Monthly flow data will help determine if the estimated values are correct and allow for the use a reduced peaking factor.

Table 3. Estimated MDD for the Facility.

Demand	Flow (gpd)	24-hr Demand(gpm)
Process Water	9,900	6.88
Domestic Water	9,960	6.92
<b>TOTAL</b>	<b>19,860</b>	<b>13.8</b>

**MAX DAY DEMAND**

Estimated MDD		
19,860 gpd X 2.25	=	44,700 Gallons
Existing Storage Onsite	=	23,000 Gallons

**MANAGEMENT**

Far Niente owns and operates Bella Union Winery and is responsible for all finances, operations, compliance requirements, and establishment of policies. The Facility’s domestic water system is currently classified as a transient, non-community system and is managed by employees of the winery. During Phase I improvements, the Facility will submit a PWS amendment application to reclassify as a non-transient, non-community system. Personnel at the winery are employed by Far Niente and are responsible for routine inspection and operations of the water system and treatment equipment. Major repairs, replacements and other engineering and professional services are contracted out.

**FINANCIAL**

Far Niente is not currently encumbered by any judgements, liens, or other financial liability that would prevent the operation of the Facility’s water system. The capital, operating, and maintenance costs of the system are covered by the income from retail wine sales.

Bella Union Winery  
Water System Feasibility  
Revised: April 12, 2022

**SUMMIT ENGINEERING, INC.**  
Project No. 2021307

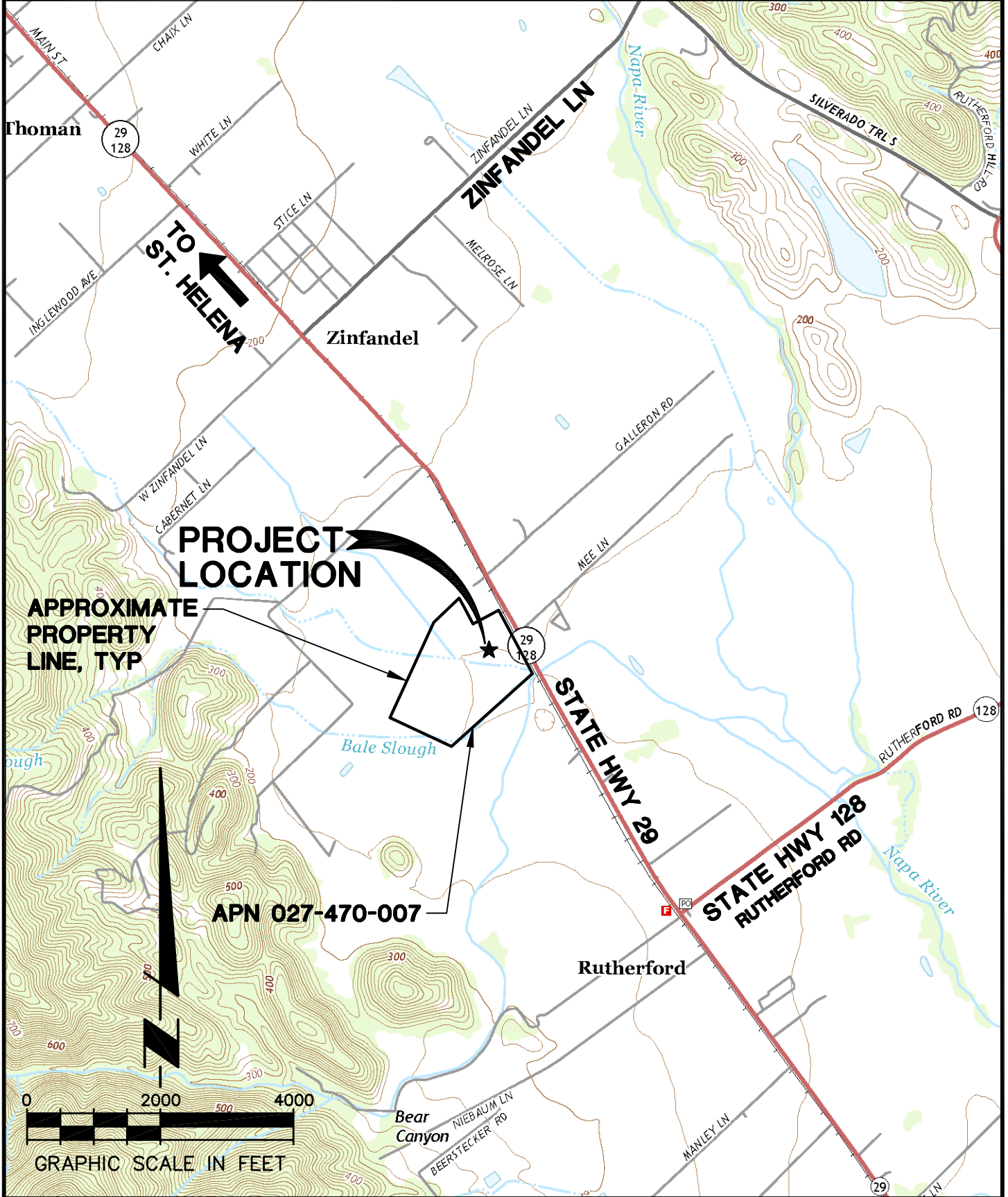
**ENCLOSURE A**  
**VICINITY MAP**  
**OVERALL SITE PLAN**



**BELLA UNION WINERY**  
**1695 ST. HELENA HIGHWAY**  
**ST. HELENA, CA 94574**  
**APN 027-470-007**

PROJECT NO. 2021307  
 DATE 2022-01-10  
 SHT NO 1 OF 1  
 BY JH CHK MS

**VICINITY MAP**



**PROJECT LOCATION**

**APPROXIMATE PROPERTY LINE, TYP**

**APN 027-470-007**

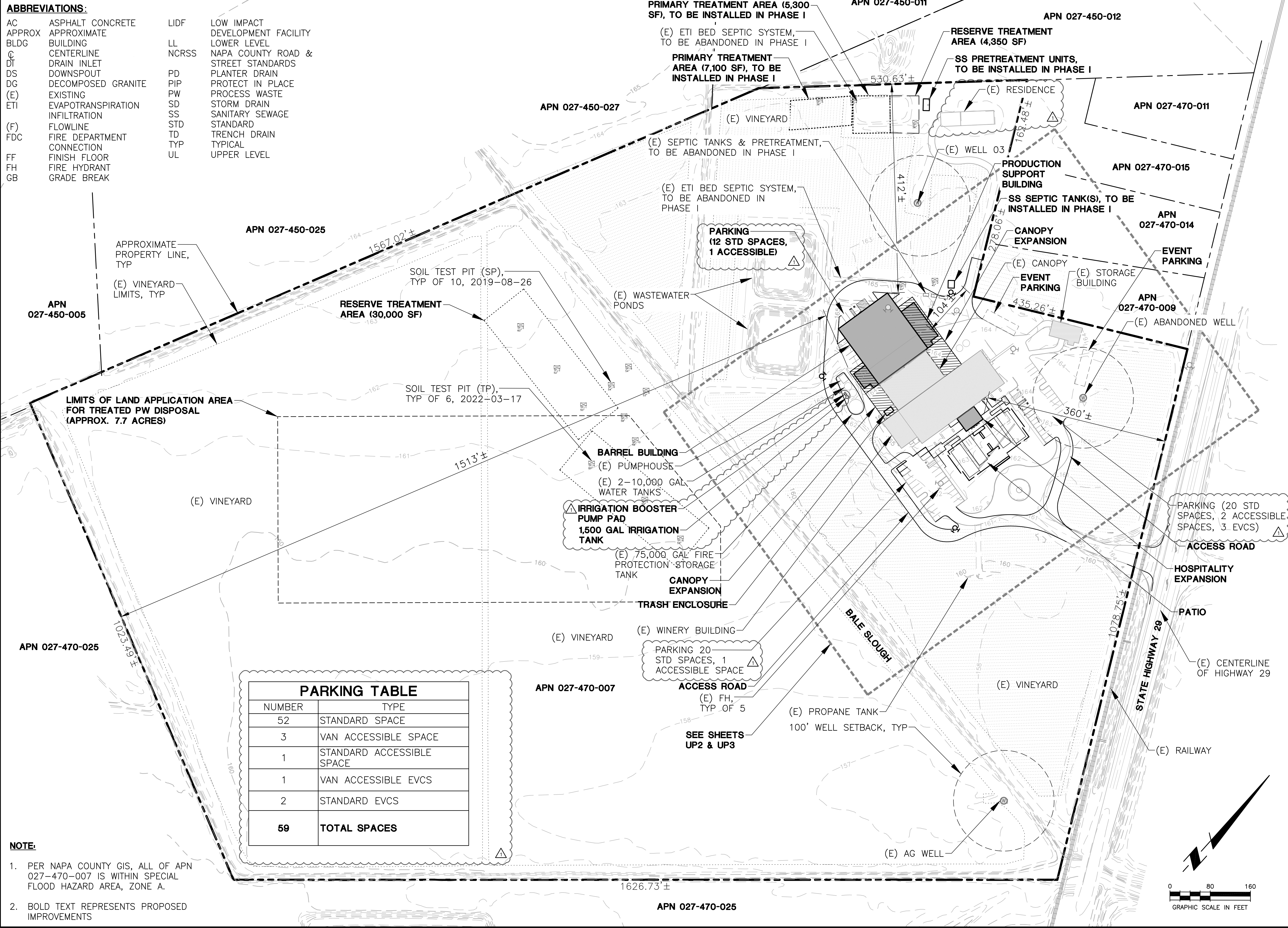


PLOTTED ON: 1/5/2022 3:29 PM  
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**ABBREVIATIONS:**

AC	ASPHALT CONCRETE	LIDF	LOW IMPACT DEVELOPMENT FACILITY
APPROX	APPROXIMATE	LL	LOWER LEVEL
BLDG	BUILDING	LL	LOWER LEVEL
C	CENTERLINE	NCRSS	NAPA COUNTY ROAD & STREET STANDARDS
DI	DRAIN INLET	PD	PLANTER DRAIN
DS	DOWNSPOUT	PIP	PROTECT IN PLACE
DG	DECOMPOSED GRANITE	PW	PROCESS WASTE
(E)	EXISTING	SD	STORM DRAIN
ETI	EVAPOTRANSPIRATION INFILTRATION	SS	SANITARY SEWAGE
(F)	FLOWLINE	STD	STANDARD
FDC	FIRE DEPARTMENT CONNECTION	TD	TRENCH DRAIN
FF	FINISH FLOOR	TYP	TYPICAL
FH	FIRE HYDRANT	UL	UPPER LEVEL
GB	GRADE BREAK		

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PARKING TABLE	
NUMBER	TYPE
52	STANDARD SPACE
3	VAN ACCESSIBLE SPACE
1	STANDARD ACCESSIBLE SPACE
1	VAN ACCESSIBLE EVCS
2	STANDARD EVCS
<b>59</b>	<b>TOTAL SPACES</b>

- NOTE:**
- PER NAPA COUNTY GIS, ALL OF APN 027-470-007 IS WITHIN SPECIAL FLOOD HAZARD AREA, ZONE A.
  - BOLD TEXT REPRESENTS PROPOSED IMPROVEMENTS

2022-01-10	PERMIT SUBMITTAL
2022-02-28	PARKING UPDATE
2022-04-15	PLAN CHECK RESPONSE

Bella Union Winery  
Water System Feasibility  
Revised: April 12, 2022

**SUMMIT ENGINEERING, INC.**  
Project No. 2021307

**ENCLOSURE B**  
**WELL COMPLETION REPORTS**  
**WELL YIELD TESTS**

TRIPPLICATE  
 Owner's Copy  
 Page \_\_\_ of \_\_\_  
 Owner's Well No. \_\_\_\_\_  
 Date Work Began 3-27-03 Ended 4-02-03  
 Local Permit Agency \_\_\_\_\_  
 Permit No. 7891 Permit Date 03/26/03

well #3

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

No. **796918**

DWR USE ONLY - DO NOT FILL IN

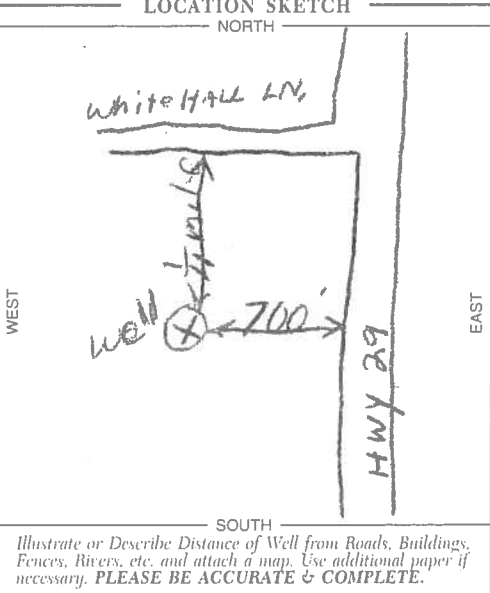
STATE WELL NO.		STATION NO.	
LATITUDE		LONGITUDE	
APN/TRS/OTHER			

DEPTH FROM SURFACE			DESCRIPTION
Ft.	to	Ft.	
0	25		BWN. clay with gravel
25	40		Blue clay with gravel
40	90		BWN. clay with gravel
90	95		gravel
95	200		BWN. clay & gravel
200	210		gravel
210	270		Sandy BWN. clay
270	310		HARD gravel 95%
310	330		sandy BWN. clay

TOTAL DEPTH OF BORING 330 (Feet)  
 TOTAL DEPTH OF COMPLETED WELL 330 (Feet)

**WELL OWNER**  
 Name Provenance Vineyards  
 Mailing Address 1695 St. Helena Hwy  
Rutherford CA 94574  
 CITY STATE ZIP

**WELL LOCATION**  
 Address 1695 Saint Helena Hwy  
 City Rutherford  
 County Napa  
 APN Book 27 Page 470 Parcel 07  
 Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_  
 Latitude \_\_\_\_\_ North \_\_\_\_\_ West \_\_\_\_\_  
 Longitude \_\_\_\_\_ North \_\_\_\_\_ West \_\_\_\_\_



**ACTIVITY ( )**  
 NEW WELL  
 MODIFICATION/REPAIR  
 \_\_\_\_\_ Deepen  
 \_\_\_\_\_ Other (Specify) \_\_\_\_\_

**DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")**  
 \_\_\_\_\_

**PLANNED USES ( )**  
 WATER SUPPLY  
 Domestic  Public  
 Irrigation  Industrial

MONITORING \_\_\_\_\_  
 TEST WELL \_\_\_\_\_  
 CATHODIC PROTECTION \_\_\_\_\_  
 HEAT EXCHANGE \_\_\_\_\_  
 DIRECT PUSH \_\_\_\_\_  
 INJECTION \_\_\_\_\_  
 VAPOR EXTRACTION \_\_\_\_\_  
 SPARGING \_\_\_\_\_  
 REMEDIATION \_\_\_\_\_  
 OTHER (SPECIFY) \_\_\_\_\_

**WATER LEVEL & YIELD OF COMPLETED WELL**

DEPTH TO FIRST WATER 11 (Ft.) BELOW SURFACE  
 DEPTH OF STATIC WATER LEVEL 10 (Ft.) & DATE MEASURED 4-02-03  
 ESTIMATED YIELD 60 (GPM) & TEST TYPE air lift  
 TEST LENGTH 6 (Hrs.) TOTAL DRAWDOWN 310 (Ft.)  
 \* May not be representative of a well's long-term yield.

DEPTH FROM SURFACE	BORE-HOLE DIA (Inches)	CASING (S)							
		TYPE ( )				MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
Ft.	to	Ft.	BLANK	SCREEN	CON. DUCTOR				
0	53	11	✓				Plastic	5	200
53	90	8 3/4	✓				"	"	"
90	330	8 3/4	✓				"	"	Factory 1/32

DEPTH FROM SURFACE	ANNULAR MATERIAL					
	TYPE					
Ft.	to	Ft.	CE-MENT ( )	BEN-TONITE ( )	FILL ( )	FILTER PACK (TYPE/SIZE)
0	53		✓	✓		
53	330					Perforated

**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 Provenance Well Exptation  
 (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS 510 Hwy 29 CITY Napa STATE CA ZIP 94556

Signed Tom Pullman WELL-DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED 4-5-03 C-57 LICENSE NUMBER \_\_\_\_\_



027-470-007

STATE OF CALIFORNIA  
THE RESOURCES AGENCY

Do not fill in

ORIGINAL  
File with DWR

DEPARTMENT OF WATER RESOURCES  
WATER WELL DRILLERS REPORT

No. 384903

Notice of Intent No. \_\_\_\_\_  
Local Permit No. or Date 48520

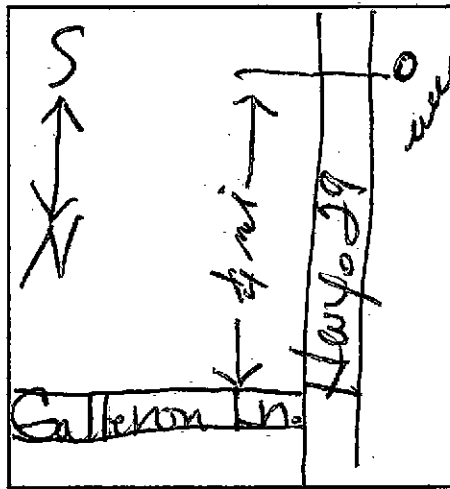
State Well No. 027 05W08  
Other Well No. \_\_\_\_\_

(1) Addr \_\_\_\_\_  
City \_\_\_\_\_

(12) WELL LOG: Total depth 250 ft. Completed depth 250 ft.  
from ft. to ft. Formation (Describe by color, character, size or material)

(2) LOCATION OF WELL (See instructions):  
County 28 Owner's Well Number \_\_\_\_\_  
Well address if different from above Same  
Township 027 Range 470 Section 007  
Distance from cities, roads, railroads, fences, etc. 1/4 mi. SW of Gallegos Lane on Hwy. 29

0 - 10' Clay  
10 - 18' Sandy clay & gravel  
18 - 40' clay  
40 - 45' sandy clay & gravel  
45 - 65' clay  
65 - 72' sandy clay & gravel  
72 - 75' clay  
75 - 123' sandy clay & gravel  
123 - 170' clay  
170 - 250' boulders, streaks of clay



(3) TYPE OF WORK:  
New Well  Deepening   
Reconstruction   
Reconditioning   
Horizontal Well   
Destruction  (Describe destruction materials and procedures in Item 12)

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

(5) EQUIPMENT:  
Rotary  Reverse   
Cable  Air   
Other  Bucket

(6) GRAVEL PACK:  
Yes  No  Size 20-40  
Diameter of bore 10 1/2  
Packed from 22 to 250

(7) CASING INSTALLED:  
Steel  Plastic  Concrete

(8) PERFORATIONS:  
Type of perforation or size of screen

From ft.	To ft.	Dia. in.	Gage or Wall
0	250	6	200

From ft.	To ft.	Slot size
80	250	SCREEN

(9) WELL SEAL:  
Was surface sanitary seal provided? Yes  No  If yes, to depth 22 ft.  
Were strata sealed against pollution? Yes  No  Interval 10-18 ft.  
Method of sealing cement

(10) WATER LEVELS:  
Depth of first water, if known \_\_\_\_\_ ft.  
Standing level after well completion 20' ft.

(11) WELL TESTS:  
Was well test made? Yes  No  If yes, by whom? Driller  
Type of test Pump  Bailer  Air lift   
Depth to water at start of test 20 ft. At end of test 200 ft.  
Discharge 150 gal/min after 4 hours Water temperature \_\_\_\_\_  
Chemical analysis made? Yes  No  If yes, by whom? \_\_\_\_\_  
Was electric log made Yes  No  If yes, attach copy to this report

Work started 5-3-91 Completed 5-10-91  
WELL DRILLER'S STATEMENT:

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

Signed Paul Puller (Well Driller)

NAME \_\_\_\_\_ (Person, firm, or corporation) (Typed or printed)

Address \_\_\_\_\_

City \_\_\_\_\_ ZIP \_\_\_\_\_

License No. 248677 Date of this report 5-28-91





# BRELJE AND RACE LABORATORIES, INC.

Providing quality laboratory analysis since 1967

## BACTERIOLOGICAL EXAMINATION OF WATER

REPORTED TO:  
PumpMan NorCal  
4000 South Moorland Avenue  
Santa Rosa, CA 95407

DATE REPORTED: October 14, 2021  
COLLECTED BY : KS

### FN Cellars

Log Number	Date Collected	Date Set	Date Completed	Sample Source	Total Coliform MPN/100mL	E.coli MPN/100mL
1021-20621	10/6/21	10/6/21	10/7/21	Ag Well	<1.0	<1.0
1021-20622	10/6/21	10/6/21	10/7/21	Winery Well	<1.0	<1.0

Std. Mthds. 9223B Colilert

**COPY SENT TO: e-mail**

Called \_\_\_\_\_

Date \_\_\_\_\_

BRELJE AND RACE LABORATORIES, INC.

  
 \_\_\_\_\_  
 KATIE MAY, LABORATORY SUPERVISOR  
 KM:bdm



**BRELJE AND RACE LABORATORIES, INC.**

Providing quality laboratory analysis since 1967

October 14, 2021

Sample Collected: 10/06/21  
Sample Received: 10/06/21  
Collected By : KS/PumpMan  
Cc : e-mail

PumpMan NorCal  
4000 South Moorland Avenue  
Santa Rosa, CA. 95401

**FN Cellars**

<b>LOG NUMBER:</b>	<b>1021-20633</b>	<b>1021-20644</b>
Sample Description:	Ag Well	Winery Well

**ANALYSIS**

Asbestos MFL (EPA Mthd. 100.2)	ND	ND
-----------------------------------	----	----

Note: ND means "none detected" at the reporting limit.

Analyses performed by an approved outside laboratory.

**BRELJE AND RACE LABORATORIES, INC.**

SARA McCALLUM, LABORATORY DIRECTOR  
SM:lja



**BRELJE AND RACE LABORATORIES, INC.**

Providing quality laboratory analysis since 1967

October 14, 2021

Sample Collected: 10/06/21  
Sample Received: 10/06/21  
Collected By : KS/PumpMan  
Cc : e-mail

PumpMan NorCal  
4000 South Moorland Avenue  
Santa Rosa, CA. 95401

**FN Cellars**

<b>LOG NUMBER:</b>	<b>1021-20623,5,9</b>	<b>1021-20634,6,41</b>
Sample Description:	Ag Well	Winery Well

**ANALYSIS**

Boron mg/L (EPA Mthd. 200.8)	0.14	<0.10
Silica mg/L (EPA Mthd. 200.7)	43.	34.
Salinity PSU	0.25	0.25

Boron: Within the recommended limit of 1.0 mg/L for irrigation waters.  
Silica: Above 75 mg/L could cause etching or staining.

**BRELJE AND RACE LABORATORIES, INC.**

SARA McCALLUM, LABORATORY DIRECTOR  
SM:lja



**BRELJE AND RACE LABORATORIES, INC.**

Providing quality laboratory analysis since 1967

October 15, 2021

Sample Collected: 10/06/21  
Sample Received: 10/06/21  
Collected By : KS/PumpMan  
Cc : e-mail

PumpMan NorCal  
4000 South Moorland Avenue  
Santa Rosa, CA. 95401

**FN Cellars**

<b>LOG NUMBER:</b>	<b>1021-20631-2</b>	<b>1021-20642-3</b>
Sample Description:	Ag Well	Winery Well

**ANALYSIS**

Chlorite mg/L (EPA Mthd. 300.1)	ND	ND
Cyanide mg/L (Lachat Mthd.: Cyanide 10-204-001X)	ND	ND

Note: ND means "none detected" at the reporting limit.

Analyses performed by an approved outside laboratory.

**BRELJE AND RACE LABORATORIES, INC.**

  
\_\_\_\_\_

SARA McCALLUM, LABORATORY DIRECTOR  
SM:lja



**BRELJE AND RACE LABORATORIES, INC.**

Providing quality laboratory analysis since 1967

October 14, 2021

Sample Collected: 10/06/21  
Sample Received: 10/06/21  
Collected By : KS/PumpMan  
Cc : e-mail

PumpMan NorCal  
4000 South Moorland Avenue  
Santa Rosa, CA. 95401

**FN Cellars**

<b>LOG NUMBER:</b>	<b>1021-20630</b>	<b>1021-20641</b>
Sample Description:	Ag Well	Winery Well

**ANALYSIS**

Methyl tert-Butyl Ether (MtBE) $\mu\text{g/L}$ (EPA Mthd. 524.2)	ND	ND
---	----	----

Note: ND means "none detected" at the reporting limit.

Analyses performed by an approved outside laboratory.

**BRELJE AND RACE LABORATORIES, INC.**

SARA McCALLUM, LABORATORY DIRECTOR  
SM:lja



# BRELJE AND RACE LABORATORIES, INC.

Providing quality laboratory analysis since 1967

## Analytical Report

October 15, 2021

Client: PumpMan NorCal  
Address: 4000 South Moorland Avenue  
Santa Rosa, CA. 95407

Sample Collected: 10/06/21  
Sample Received: 10/06/21  
Collected By: KS/PumpMan  
CC: e-mail

### FN Cellars

Log #: 1021-20623-8  
Sample Description: Ag Well

Analysis	Method	Results	Units	MCL	DLR
TDS	SM 2540C-2011	310	mg/L	500	10
pH	SM 4500H/+B-2011	7.3	SU	6.8-8.2	
Total Alkalinity as CaCO3	SM 2320B-2011	230	mg/L	600	20
Hydroxide (OH)		<1.0	mg/L		1
Carbonate (CO3)		<1.0	mg/L		1
Bicarbonate (HCO3)		280	mg/L		1
Specific Conductance	SM 2510B-2011	440	µmhos/cm @25°C	900	10
Nitrate as N	EPA 300.0	<0.40	mg/L	10	0.4
Nitrite as N	EPA 300.0	<0.40	mg/L	1	0.4
Nitrate + Nitrite N	EPA 300.0	<0.40	mg/L		0.4
Fluoride (F)	EPA 300.0	0.13	mg/L	2	0.1
Chloride (Cl)	EPA 300.0	9.7	mg/L	500	0.5
Sulfate (SO4)	EPA 300.0	20	mg/L	500	0.5
Calculated Hardness	SM 2340B-2011	200	mg/L	60-120	2
Calcium (Ca)	EPA 200.7	22	mg/L		1
Magnesium (Mg)	EPA 200.7	35	mg/L		1
Sodium (Na)	EPA 200.7	36	mg/L		1
Apparent Color	SM 2120B-2011	10	CU	15	5
Odor @ 60oC	SM 2150B	1.4	TON	3	1
Turbidity	SM 2130B-2011	3.4	NTU	5	0.1
MBAS as LAS	SM 5540C-2011	<0.05	mg/L	0.5	0.05



# BRELJE AND RACE LABORATORIES, INC.

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## Analytical Report

Log #: 1021-20623-8  
Sample Description: Ag Well

Analysis	Method	Results	Units	MCL	DLR
Aluminum (Al)	EPA 200.8	<50	µg/L	1000	50
Antimony (Sb)	EPA 200.8	<6.0	µg/L	6	6
Arsenic (As)	EPA 200.8	2.6	µg/L	10	2
Barium (Ba)	EPA 200.8	110	µg/L	1000	100
Beryllium (Be)	EPA 200.8	<1.0	µg/L	4	1.0
Cadmium (Cd)	EPA 200.8	<1.0	µg/L	5	1
Chromium (Cr)	EPA 200.8	1.8	µg/L	50	1
Copper (Cu)	EPA 200.8	<50	µg/L	1000	50
Iron (Fe)	EPA 200.7	650	µg/L	300	100
Lead (Pb)	EPA 200.8	<5.0	µg/L	15	5
Manganese (Mn)	EPA 200.8	470	µg/L	20	20
Mercury (Hg)	EPA 200.8	<1.0	µg/L	2	1
Nickel (Ni)	EPA 200.8	<10	µg/L	100	10
Selenium (Se)	EPA 200.8	<5.0	µg/L	50	5
Silver (Ag)	EPA 200.8	<10	µg/L	100	10
Thallium (Tl)	EPA 200.8	<1.0	µg/L	2	1
Zinc (Zn)	EPA 200.8	60	µg/L	5000	50

BRELJE AND RACE LABORATORIES, INC.

SARA McCALLUM, LABORATORY DIRECTOR  
SM:lja



# BRELJE AND RACE LABORATORIES, INC.

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## Analytical Report

October 15, 2021

Client: PumpMan NorCal  
Address: 4000 South Moorland Avenue  
Santa Rosa, CA. 95407

Sample Collected: 10/06/21  
Sample Received: 10/06/21  
Collected By: KS/PumpMan  
CC: e-mail

### FN Cellars

Log #: 1021-20634-  
Sample Description: Winery Well

Analysis	Method	Results	Units	MCL	DLR
TDS	SM 2540C-2011	300	mg/L	500	10
pH	SM 4500H/+B-2011	7.4	SU	6.8-8.2	
Total Alkalinity as CaCO3	SM 2320B-2011	200	mg/L	600	20
Hydroxide (OH)		<1.0	mg/L		1
Carbonate (CO3)		<1.0	mg/L		1
Bicarbonate (HCO3)		240	mg/L		1
Specific Conductance	SM 2510B-2011	430	µmhos/cm @25°C	900	10
Nitrate as N	EPA 300.0	<0.40	mg/L	10	0.4
Nitrite as N	EPA 300.0	<0.40	mg/L	1	0.4
Nitrate + Nitrite N	EPA 300.0	<0.40	mg/L		0.4
Fluoride (F)	EPA 300.0	0.17	mg/L	2	0.1
Chloride (Cl)	EPA 300.0	13	mg/L	500	0.5
Sulfate (SO4)	EPA 300.0	32	mg/L	500	0.5
Calculated Hardness	SM 2340B-2011	190	mg/L	60-120	2
Calcium (Ca)	EPA 200.7	21	mg/L		1
Magnesium (Mg)	EPA 200.7	33	mg/L		1
Sodium (Na)	EPA 200.7	33	mg/L		1
Apparent Color	SM 2120B-2011	<5.0	CU	15	5
Odor @ 60oC	SM 2150B	<1.0	TON	3	1
Turbidity	SM 2130B-2011	0.7	NTU	5	0.1
MBAS as LAS	SM 5540C-2011	<0.05	mg/L	0.5	0.05



# BRELJE AND RACE LABORATORIES, INC.

Providing quality laboratory analysis since 1967

## Analytical Report

Log #: 1021-20634-  
Sample Description: Winery Well

Analysis	Method	Results	Units	MCL	DLR
Aluminum (Al)	EPA 200.8	<50	µg/L	1000	50
Antimony (Sb)	EPA 200.8	<6.0	µg/L	6	6
Arsenic (As)	EPA 200.8	<2.0	µg/L	10	2
Barium (Ba)	EPA 200.8	<100	µg/L	1000	100
Beryllium (Be)	EPA 200.8	<1.0	µg/L	4	1.0
Cadmium (Cd)	EPA 200.8	<1.0	µg/L	5	1
Chromium (Cr)	EPA 200.8	1.2	µg/L	50	1
Copper (Cu)	EPA 200.8	<50	µg/L	1000	50
Iron (Fe)	EPA 200.7	<100	µg/L	300	100
Lead (Pb)	EPA 200.8	<5.0	µg/L	15	5
Manganese (Mn)	EPA 200.8	400	µg/L	20	20
Mercury (Hg)	EPA 200.8	<1.0	µg/L	2	1
Nickel (Ni)	EPA 200.8	<10.	µg/L	100	10
Selenium (Se)	EPA 200.8	<5.0	µg/L	50	5
Silver (Ag)	EPA 200.8	<10	µg/L	100	10
Thallium (Tl)	EPA 200.8	<1.0	µg/L	2	1
Zinc (Zn)	EPA 200.8	<50	µg/L	5000	50

BRELJE AND RACE LABORATORIES, INC.

SARA McCALLUM, LABORATORY DIRECTOR  
SM:ija

Bella Union Winery  
Water System Feasibility  
Revised: April 12, 2022

**SUMMIT ENGINEERING, INC.**  
Project No. 2021307

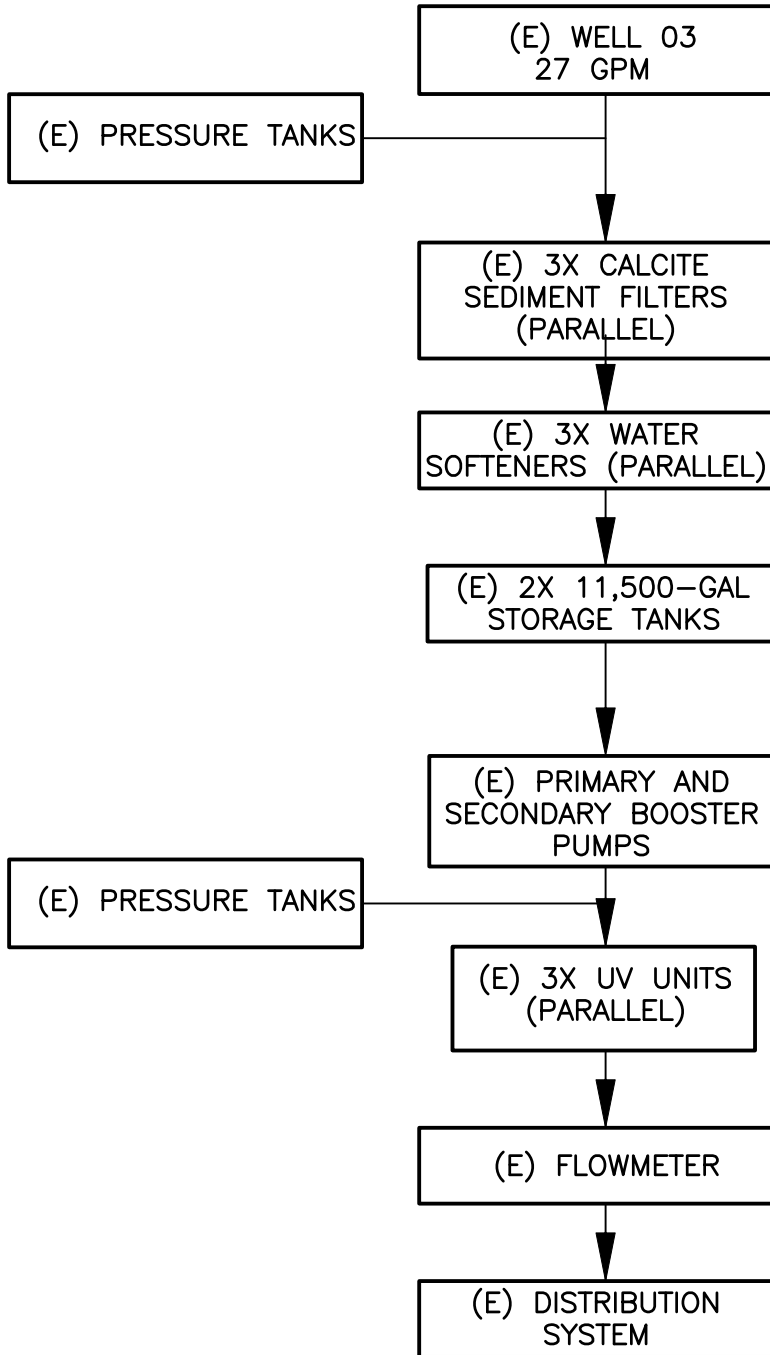
**ENCLOSURE C**  
**WATER SYSTEM SCHEMATIC**



**BELLA UNION WINERY**  
**1695 ST. HELENA HWY**  
**ST. HELENA, CA**  
**APN 027-470-007**

PROJECT NO. 2021307  
DATE 2021-12-30  
SHT NO 1 OF 1  
BY JM CHK GG

**(P) WATER SYSTEM FLOW SCHEMATIC**



PLOTTED ON: 1/5/2022 5:31 PM  
\\SE11.SUMMITA.LOCAL\P\2021\2021307 BELLA UNION WINERY UP ASSISTANCE\CAD\WWW\18177-W FLOW SCHEMATICS.DWG

Bella Union Winery  
Water System Feasibility  
Revised: April 12, 2022

**SUMMIT ENGINEERING, INC.**  
Project No. 2021307

**ENCLOSURE D**  
**WATER DEMAND CALCULATIONS**

SUMMIT ENGINEERING, INC.	Bella Union Winery Water Availability Analysis Existing Water Demand	PROJECT NO. 2021307 BY: JM CHK: GG
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**DOMESTIC WATER DEMAND**

Average Day w/o Event - Non-harvest

Employee (full-time)	12	x	15	gpcd	=	180 gal/day
Public Tasting Visitors	43	x	3	gpcd	=	129 gal/day
Private Tasting	65	x	3	gpcd	=	195 gal/day
3-Bedroom Residence	3	x	120 <sup>1</sup>	gpd	=	360 gal/day
<b>Total</b>					=	864 gal/day
						<b><u>870 gal/day</u></b>

**Peak Tasting Day Harvest w/Event**

Employee (full-time)	12	x	15	gpcd	=	180 gal/day
Public Tasting Visitors	43	x	3	gpcd	=	129 gal/day
Private Tasting	65	x	3	gpcd	=	195 gal/day
3-Bedroom Residence	3	x	120	gpd	=	360 gal/day
Private Promo Meal & Tasting	50	x	15	gpcd	=	750 gal/day
Wine Auction Release Event	200	x	15 <sup>1</sup>	gpcd	=	3000 gal/day
<b>Total</b>					=	4,614 gal/day
						<b><u>4,620 gal/day</u></b>

**PROCESS WATER DEMAND**

Average Day Flow	=	2,960 gal/day
Average, Day Peak Harvest Month Flow	=	6,000 gal/day

**TOTAL WATER DEMAND**

	<u>Average</u>		<u>Peak</u>	
	gal/day	gal/min <sup>1</sup>	gal/day	gal/min <sup>1</sup>
Domestic Water	870	0.6	4,620	3.2
Process Water	2,960	2.1	6,000	4.2
<b>Total</b>	<b>3,830</b>	<b>2.7</b>	<b>10,620</b>	<b>7.4</b>
Peaking Factor	=	2.25		
<b>MDD (based on peak demand)</b>	=	<b>23,895 gal/day</b>		

1. Gallon per minute flow assumes 24 hours per day.

SUMMIT ENGINEERING, INC.	Bella Union Winery Water Availability Analysis Proposed Water Demand	PROJECT NO. 2021307 BY: JM CHK: GG
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**DOMESTIC WATER DEMAND**

Average Day w/o Event - Non-harvest

Employee (full-time)	38	x	15	gpcd	=	570 gal/day
Employee (part-time)	7	x	15	gpcd	=	105 gal/day
Public Visitors w/o Food	43	x	3	gpcd	=	129 gal/day
Private Tasting Visitors w/o Food	56	x	3	gpcd	=	168 gal/day
Tasting Visitors w/ Pre-Packaged Food	110	x	8	gpcd	=	880 gal/day
Tasting Visitors w/ Prepared Food	16	x	15	gpcd	=	240 gal/day
3 Bedroom Residence	3	x	120	gpd	=	360 gal/day
<b>Total</b>					=	<b>2,452 gal/day</b> <b><u>2,460 gal/day</u></b>

Peak Tasting Day Harvest w/Event

Employee (full-time)	38	x	15	gpcd	=	570 gal/day
Employee (part-time)	7	x	15	gpcd	=	105 gal/day
Public Visitors w/o Food	43	x	3	gpcd	=	129 gal/day
Private Tasting Visitors w/o Food	56	x	3	gpcd	=	168 gal/day
Tasting Visitors w/ Pre-Packaged Food	110	x	8	gpcd	=	880 gal/day
Tasting Visitors w/ Prepared Food	16	x	15	gpcd	=	240 gal/day
3 Bedroom Residence	3	x	120	gpd	=	360 gal/day
Largest Marketing Event	500	x	15	gpcd	=	7500 gal/day
<b>Total</b>					=	<b>9,952 gal/day</b> <b><u>9,960 gal/day</u></b>

**PROCESS WATER DEMAND**

Average Day Flow	=	4,940 gal/day
Average, Day Peak Harvest Month Flow	=	9,900 gal/day

**TOTAL WATER DEMAND**

	<u>Average</u>		<u>Peak</u>	
	gal/day	gal/min <sup>1</sup>	gal/day	gal/min <sup>1</sup>
Domestic Water	2,460	1.7	9,960	6.92
Process Water	4,940	3.4	9,900	6.88
<b>Total</b>	<b>7,400</b>	<b>5.1</b>	<b>19,860</b>	<b>13.79</b>
Peaking Factor	=	2.25		
<b>MDD (based on peak demand)</b>	=	<b>44,685 gal/day</b>		

1. Gallon per minute flow assumes 24 hours per day.

Bella Union Winery  
Water System Feasibility  
Revised: April 12, 2022

**SUMMIT ENGINEERING, INC.**  
Project No. 2021307

**SUMMIT** 

**SUMMIT ENGINEERING, INC.**

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# WASTEWATER FEASIBILITY STUDY

## Bella Union Winery

1695 St. Helena Highway

St. Helena, California

APN 027-470-007

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## LIST OF ENCLOSURES

Enclosure A:	Vicinity Map Overall Site Plan
Enclosure B:	Process Wastewater Schematic Sanitary Sewage Schematic
Enclosure C:	Process Wastewater Pond Water Balance Sanitary Sewage Flow Calculations
Enclosure D:	Site Evaluation Reports

## **PROJECT OVERVIEW AND SITE DESCRIPTION**

Bella Union Winery (previously Provenance Winery), located at 1695 St. Helena Highway in St. Helena (APN 027-470-007), is applying for a use permit modification to increase the number of employees, tasting visitation, marketing event visitation, and wine production. Bella Union Winery's (Facility) use permit modifications are proposed to occur in two phases. Phase I includes the increase in tasting visitation and employees. Phase II will include the increase in wine production along with the addition of a new barrel building and canopy. Wine production is proposed to increase from 180,000 to 300,000 gallons per year. Employees are proposed to increase from the existing 12 full-time to 38 full-time and 7 part-time. Tasting visitation is proposed to increase from 366 visitors per week to 1,375 visitors per week (175 visitors per day for Monday through Thursday and 225 visitors per for Friday to Sunday). Public tasting visitation will remain at 43 visitors per day and is included in the proposed total tasting visitation of 1,375 visitors per week. Marketing events are proposed to change to a schedule of weekly, monthly, and annual events. The site is a 60.65-acre parcel in an agricultural area on St. Helena Highway (Enclosure A). The topography consists of gently sloping vineyards.

The process wastewater (PW) and sanitary sewage (SS) treatment and disposal systems will be improved to accommodate additional PW and SS flows from the proposed increases in facility use. Summit Engineering has prepared the following Wastewater Feasibility Study outlining the proposed PW and SS flows, and associated treatment and disposal systems.

## **WINERY PROCESS WASTEWATER MANAGEMENT SYSTEM**

The existing two-pond PW treatment system (Enclosure B) is capable of treating the PW associated with the existing annual production limit of 180,000 gallons of wine. While the existing ponds can hydraulically handle the proposed 300,000 gallons of wine production limit, upgrades will be needed to meet the treatment demands of the increased PW flows (Enclosure C). The new PW management system will include the existing gravity collection system within the winery, existing screened floor drains for solids removal, an existing pump station, an existing rotary screen, the existing ponds (with new aeration and liners), and a new irrigation disposal pump.

## **PROCESS WASTEWATER CHARACTERISTICS**

Process wastewater will consist primarily of wastewater collected at floor drains and trenches within the winery, receiving, crush, tank, and wash down areas. A new barrel building will be constructed during Phase II. Any new PW collection and conveyance systems in this building will conform to all required standards. Should any part of the existing system or proposed additions result in stormwater coming into contact with PW, then that portion of stormwater will be routed to the PW treatment system. This includes stormwater collected on the existing outdoor crush area. Typical winery wastewater characteristics are summarized on the following page (Table 1).

Table 1. Typical winery process wastewater characteristics.

<b>Characteristic</b>	<b>Units</b>	<b>Crushing Season Range</b>	<b>Non-crushing Season Range</b>
pH	--	2.5 - 9.5	3.5 - 11.0
Dissolved Oxygen	mg/L	0.5 - 8.5	1.0 - 10.0
BOD <sub>5</sub>	mg/L	500 – 12,000	300 – 3,500
COD	mg/L	800 – 15,000	500 – 6,000
Grease	mg/L	5 - 30	5 - 50
Settleable Solids	mg/L	25 - 100	2 - 100
Nonfilterable Residue	mg/L	40 - 800	10 - 400
Volatile Suspended Solids	mg/L	150 - 700	80 - 350
Total Dissolved Solids	mg/L	80 – 2,900	80 – 2,900
Nitrogen	mg/L	1 - 40	1 - 40
Nitrate	mg/L	0.5 - 4.8	-
Phosphorous	mg/L	1 - 10	1 - 40
Sodium	mg/L	35 - 200	35 - 200
Alkalinity (CaCO <sub>3</sub> )	mg/L	40 - 730	10 - 730
Chloride	mg/L	3 - 250	3 - 250
Sulfate	mg/L	10 - 75	20 - 75

### **PROCESS WASTEWATER DESIGN FLOWS**

Based on typical flow data from wineries of similar size, characteristics, and corresponding process wastewater (PW) generation rates, projected flows are calculated as follows (Enclosure C):

#### **Annual Volume**

Annual Production	=	300,000	gal wine/year
Process Wastewater (PW) Generation Rate <sup>1</sup>	=	6.00	gal PW/gal wine
Annual PW Flow	=	<u>1,800,000</u>	<u>gal PW/year</u>

**Average Day Flow** = **4,940 gal PW/day**

#### **Napa County Peak Day Flow**

Peaking Factor <sup>2</sup>	=	1.5	
Harvest Length	=	60	Days
Peak Harvest Day Flow	=	<b><u>7,500</u></b>	<b><u>gal PW/day</u></b>

#### **Average Day Peak Harvest Month Flow**

Peak Month Flow Percentage <sup>3</sup>	=	16.4	%
Number of Days in Peak Month	=	30	Days
Average Day Peak Harvest Flow	=	<b><u>9,900</u></b>	<b><u>gal PW/day</u></b>

Notes:

1. Industry standard generation rate.
2. Peaking factor from Napa County OWTS (Final Draft 2013). Peaking factor applied to wine production not PW production.
3. Based on distribution of similar sized wineries.

The PW design flow accounts for the most conservative approach; therefore 9,900 gallons per day (gpd) will be used to design the new PW treatment system.

### **PROCESS WASTEWATER CONVEYANCE, TREATMENT, AND DISPOSAL**

The owner intends to continue using the existing facultative pond system to treat and store the Facility's PW prior to irrigation disposal. Upgrades to the pond aeration and liners are planned as a maintenance improvement item, but any upgrade will be designed to accommodate the proposed production increase. The installed upgrades will be in accordance with all necessary Napa County Planning, Building, and Environmental Services (PBES) criteria and permits, and will conform to the upcoming State Water Resources Control Board General Winery Order (General Order).

The proposed process wastewater systems will consist of the components listed below. Refer to Enclosure B for the PW management system schematic.

#### **Existing Gravity Collection**

The existing gravity collection system will continue to provide low maintenance and low infiltration or

exfiltration. Piping will continue to be compatible with PW and satisfy Uniform Plumbing Code and local requirements. Screening will continue to be provided by screened baskets and strainers installed on the trench drains and floor drains within the winery. Screen opening sizes should be approximately 1/8 inch for interior and exterior drains. Any new additions to the gravity collection system associated with the Phase II barrel building and canopy installation will meet these requirements. Water softener backwash from any existing water treatment system will not be disposed of through the PW system per the requirements of the recently adopted Winery General Order (upon enrollment). Softener backwash discharge will be evaluated further at the time of enrollment in the General Order. Disposal options may include hold and haul or discharge to the onsite septic system.

#### Existing Collection Sump and Pump Station

The existing 6-foot collection sump will continue to receive the gravity PW flow from the Facility. The existing pump system will also continue convey PW to an existing rotary screen for solids removal prior to reaching the pond system. Pumped PW passes through an existing flowmeter prior to reaching the rotary screen.

#### Existing Rotary Screen

Pumped PW will continue to flow to an existing rotary screen for solids removal. Discharge from the rotary screen will then gravity flow to the existing pond system.

#### Existing Facultative Pond System

The existing pond treatment system includes two 10-foot deep facultative ponds. Each pond has a 2-foot freeboard for a maximum operating depth of 8 feet. Both ponds are clay lined, however as part of the upgrade process a new liner is being proposed. The total operating volume for the pond system is approximately 1.14 million gallons. Pond 1 was originally installed with a 15-HP surface aerator while Pond 2 originally had two 3-HP aerators. New aeration is proposed for both ponds, with both mechanical and diffused aerations systems being evaluated. The hydraulic residence time within the pond system is still estimated to be greater than 100 days during peak harvest.

#### Flow Measurement

An additional flowmeter will be provided to measure the discharge flows to the irrigation system.

#### Irrigation Disposal Area

Effluent is proposed to be disposed via spray irrigation of 7.7 acres of onsite pasture (Enclosure A). The existing agricultural well will supplement any remaining irrigation demand for the facility.

### **SOLID WASTES**

Solid wastes from the winery primarily include pomace, seeds, and stems. The estimated quantities of these wastes (at peak capacity) are as follows:

$$\text{Peak annual production} = 300,000 \text{ gal wine} \times \frac{1 \text{ ton}}{165 \text{ gal}} = 1,818 \text{ tons}$$

$$\text{Ultimate Annual Total} = 35\% \times 1,818 \text{ tons} = 636 \text{ tons}$$

Based on a unit weight of 38 pounds per cubic foot, the annual volume of solids wastes would be:

$$636 \text{ tons} \times \frac{2,000 \text{ lb}}{1 \text{ ton}} = 1,272,727 \text{ lb}$$
$$1,272,727 \text{ lbs} \times \frac{1 \text{ ft}^3}{38 \text{ lb}} \times \frac{1 \text{ yd}^3}{27 \text{ ft}^3} = 1,240 \text{ yd}^3$$

These organic solids will be hauled to an off-site composting location or can be composted, and land applied to the existing vineyards. Application of solids to land will comply with regulatory requirements set by the Winery General Order.

## **WINERY SANITARY SEWAGE TREATMENT AND DISPOSAL SYSTEM**

### **OVERVIEW**

Separate systems are used for sanitary sewage and process wastewater treatment. The existing SS treatment system at the site was approved via permit E05-0289 with a design flow of 1,000 gallons per day. Domestic wastewater from the winery flows via gravity into a 3,000-gallon septic tank prior to the Orenco Advantex pretreatment system, which consists of two AX-20 filter units. Following pretreatment, the effluent is disposed of in two separate evapotranspiration (ETI) bed systems.

To accommodate the increased daily visitation and events associated with the proposed use permit modification, additional septic tankage, pretreatment, and a subsurface drip disposal system will be required (Enclosure B). The proposed SS system improvements will be sized for a peak daily flow of up to 3,200 gallons per day.

The expanded SS pretreatment system will be designed to produce an effluent containing less than 30 mg/L of biochemical oxygen demand (BOD) and less than 30 mg/L of total suspended solids (TSS). The existing system and proposed upgrades are discussed in greater detail in the subsequent sections of this wastewater feasibility study.

### **SANITARY SEWAGE CHARACTERISTICS**

SS will consist primarily of wastewater generated from restrooms and tasting room facilities. Typical SS characteristics are as summarized on the following page (Table 2):

Table 2. Typical domestic wastewater characteristics

<u>Characteristic</u>	<u>Units</u>	<u>Raw Wastewater Range</u> <sup>1</sup>
BOD <sub>5</sub>	mg/L	133 - 400
Oil and Grease	mg/L	51 - 153
Total Suspended Solids (TSS)	mg/L	130 - 389
Volatile Suspended Solids	mg/L	101 - 304
Total Dissolved Solids (TDS)	mg/L	374 – 1121
Nitrogen	mg/L	23 - 69
Nitrate	mg/L	0
Phosphorous	mg/L	3.7 - 11
Chlorides	mg/L	39 - 118
Sulfate	mg/L	24 - 72
BOD <sub>5</sub>	mg/L	133 - 400

<sup>1</sup>Typical composition of untreated domestic wastewater, Metcalf & Eddy, “Wastewater Engineering, Fifth Edition”, 2014.

**SANITARY SEWAGE DESIGN FLOWS**

Sanitary sewage at the Facility will consist of typical wastewater generated from restrooms, tasting room, and hospitality functions. No changes to SS flows are proposed until Phase I is implemented, so the existing system will continue to be used until changes in employees and visitation numbers occur. The estimated peak day flows associated with the proposed Phase I increase in employees, visitation, and events are provided below. Total tasting visitors vary depending on the day. Up to 175 visitors are proposed for Monday through Thursday and up to 225 visitors are proposed for Friday through Sunday. Meals are prepared onsite for up to 16 visitors per day. Pre-packaged food is served for up to 50% of the remaining visitors. Up to 43 of the remaining visitors are allocated to public visitation. There are no proposed changes to public visitation. Two different peak day events are included to show estimated flows for days without events and for days that include marketing events. SS flows associated with the 100-person monthly events and the 500-person annual events are not included because portable toilets and catering services will be used to reduce the amount of water sent to the SS system.

**Peak Day w/o Event**

Employee (full-time)	38	x	15	gpcd	=	570	gal/day
Employee (part-time)	7	x	15	gpcd	=	105	gal/day
Public Visitors without Food	43	x	3	gpcd	=	129	gal/day
Private Visitors without Food	56	x	3	gpcd	=	138	gal/day
Tasting Visitors with Pre-Packaged Food	110	x	8	gpcd	=	880	gal/day
Tasting Visitors with Prepared Food	16	x	15	gpcd	=	240	gal/day
3 Bedroom Residence	3	x	120	gpd	=	360	gal/day
<b>Total</b>					=	<b>2,452</b>	<b>gal/day</b>

**Peak Tasting Day Harvest w/ Weekly Event**

Employee (full-time)	38	x	15	gpcd	=	570	gal/day
Employee (part-time)	7	x	15	gpcd	=	105	gal/day
Public Visitors without Food	43	x	3	gpcd	=	129	
Private Visitors without Food	56	x	3	gpcd	=	138	gal/day
Tasting Visitors with Pre-Packaged Food	110	x	8	gpcd	=	880	gal/day
Tasting Visitors with Prepared Food	16	x	15	gpcd	=	240	gal/day
3 Bedroom Residence	3	x	120	gpd	=	360	gal/day
Weekly Marketing Event	50	x	15	gpcd	=	750	gal/day
Monthly Marketing Event	0	x	15	gpcd	=	0	gal/day
Largest Marketing Event	0	x	15	gpcd	=	0	gal/day
<b>Total</b>					=	<b>3,202</b>	<b>gal/day</b>

Notes:

1. Portable toilets and catering services will be used for annual and monthly marketing events

The SS system will be designed to handle a peak daily SS flow of up to 3,200 gallons per day associated with weekly marketing events.

**KITCHEN SS DESIGN FLOWS**

For events where some of the food is prepared onsite (100 guests maximum), a generation rate of 5 gallons per meal is assumed. Therefore, the maximum flow associated with meal preparation is calculated as follows:

$$100 \text{ meals} \times \frac{5 \text{ gal WW}}{1 \text{ meal}} = 500 \text{ gallons}$$

An SS flow of 500 gallons will be used to size the kitchen grease interceptor.

**SITE EVALUATION RESULTS**

The original ETI bed disposal system sizing was based on a site evaluation performed on April 29, 1987 by Montelli Construction and Napa County PBES (Enclosure D). During the evaluation, a total of five soil test pits were excavated and recorded at the winery site, and percolation testing at 6 test holes was completed.

Shallow groundwater was encountered at approximately 30 inches below grade, with silty clay and loamy clay soils of varying color observed.

Two additional soils site evaluation were conducted by Summit Engineering and Napa County PBES on August 26, 2019, and March 17, 2022 (Enclosure D). For the 2019 site evaluation, eleven test pits were excavated and evaluated with acceptable soil depths ranging from 36 to 58 inches below grade with clay texture. For the 2022 site evaluation, six test pits were excavated and evaluated with acceptable soil depths ranging from 50 to 60 inches below grade with sandy clay texture.

Between the three site evaluations, over 50,000 square feet of approved soils are identified. This corresponds to over 4,000 gallons per day of disposal capacity when assuming:

- A 0.25 gallon per square foot per day application for clay soils, per the Napa County Alternative Sewage Treatment Systems (ASTS), and
- A 200% reserve area for subsurface drip disposal.

The above description is meant to serve as a preliminary, conservative estimate. The limits of the available disposal area will be further defined once the 2019 and 2022 site evaluation reports are approved by the Napa County PBES.

### **SANITARY SEWAGE CONVEYANCE, TREATMENT, AND DISPOSAL**

#### **Pretreatment and Subsurface Soil Disposal**

The existing ETI beds are proposed to be replaced with a new subsurface drip disposal system. SS treatment and disposal system improvements will have the components described below. Refer to Enclosures A and B for the Overall Site Plan and proposed SS system schematic.

- 1) **Gravity Collection System** – The existing gravity collection system is assumed to provide low maintenance and no infiltration or exfiltration. Piping is assumed to be compatible with sanitary sewage and satisfy Uniform Plumbing Code and local requirements.
- 2) **Grease Interceptor** – The maximum flow generated by the kitchen is projected to be 500 gpd. The grease interceptor shall be sized based on Napa County PBES requirements. A 1,500-gallon grease interceptor is proposed per Napa County requirements.

$$\begin{aligned} \text{Grease Interceptor Capacity} &= \text{Wastewater Flow} \times \text{Retention Time} \times \text{Storage Factor} \\ &= 500 \text{ gpd} \times 2.5 \times 1 \\ &= 1,250 \text{ gallons} \\ &= 1,500 \text{ gallon available tank size} \end{aligned}$$

- 3) **Septic Tanks with Effluent Filter** – The required septic tank size for the increased winery SS flows is determined by evaluating sizing recommendations based on the Uniform Plumbing Code (UPC) formula as shown below:

Uniform Plumbing Code Method:

$$Volume = 1,125 + 0.75 \times Flow\ Rate$$

$$Volume = 1,125 + 0.75 \times 3,100\ gpd$$

$$Volume = 3,525\ gallons$$

The existing 3,000-gallon septic tank will be abandoned as part of the Phase I upgrades. A new 4,000-gallon septic tank will be installed to receive the flows associated with increased use. Removal of solids in the septic tank will help to reduce BOD loads on the system and minimize the frequency of sludge removal in aerobic systems. An effluent filter will also be provided on the outlet of the final septic tank to remove additional suspended solids which do not settle out in the tank.

- 4) AdvanTex Textile Filter Pretreatment System – Orenco System’s AdvanTex Treatment system is a packed bed textile filter that supports attached growth biological treatment. Package treatment systems have been widely utilized for sanitary sewage treatment and have been successful in providing consistent reliable treatment when properly designed and operated. The existing dual AX-20 treatment pods will not be adequate for the increased design flow and will be removed from service. The facility will replace the dual AX-20 pods with one AdvanTex AX-MAX125 recirculation and treatment system to accommodate the increased SS design flow. Recirculation and dosing will be included in the AX-MAX125 treatment system.
- 5) Flow measurement – New flowmeters will be utilized to measure flows from the dosing tank compartment to the drip field, and to measure return flush flow from the drip field back to the septic tank inlet.
- 6) Subsurface Drip Disposal – A subsurface drip disposal field is proposed to replace the existing ETI beds to provide for effluent disposal. The site has two existing ETI beds covering approximately 12,000 SF. A minimum of 36” of approved soil was identified during the 2019 site evaluation. This will allow for the installation of Geoflow drip tubing at existing grade with 6 inches of native backfill being used as cover. Approved disposal areas with depths greater than 42 inches can have the Geoflow lines installed 6 inches below native grade and still meeting the 3-feet of vertical separation required by Napa County PBES.

Table 2 of the Napa County ASTS allows for an application rate of 0.25 gallons per square foot per day for clay soils with moderate structure. The minimum size of disposal field required for the 3,200-gpd design flow is calculated as follows:

$$Disposal\ Area = \frac{Design\ flow\ (gpd)}{Application\ rate\ \left(\frac{gal}{SF*day}\right)} = \frac{3,200\ gpd}{0.25\ \frac{gal}{SF*day}} = 12,800\ SF$$

Therefore, up to an approximate 12,800 square feet of dripfield will be required along with an additional 200% reserve area (25,600 square feet) for a total of 38,400 square feet.

## OTHER CONSIDERATIONS

### ODOR CONTROL

There should be no noxious odors from a properly designed and operated treatment system. See Alternative Courses of Action for operation alternatives.

### **GROUNDWATER CONTAMINATION**

The nearest existing or proposed water well to the SS treatment and disposal systems is approximately 100 feet. No disposal of wastewater effluent (either PW or SS) will occur within 100 feet of any existing or proposed wells.

### **PROTECTION**

Exposed wastewater treatment facilities should be posted with appropriate warning signs. The treatment areas will be protected to restrict access and potential damage to the system.

### **ALTERNATIVE COURSES OF ACTION**

Although no operational difficulties are foreseen, the following additional courses of action would be available if necessary for the wastewater systems:

- Add additional stages of PW and SS treatment to increase effluent quality
- Identify and use additional disposal area for the PW system and disposal area for the SS system.

Bella Union Winery  
Wastewater Feasibility Study  
Revised: July 13, 2022

**SUMMIT ENGINEERING, INC.**  
Project No. 2021307

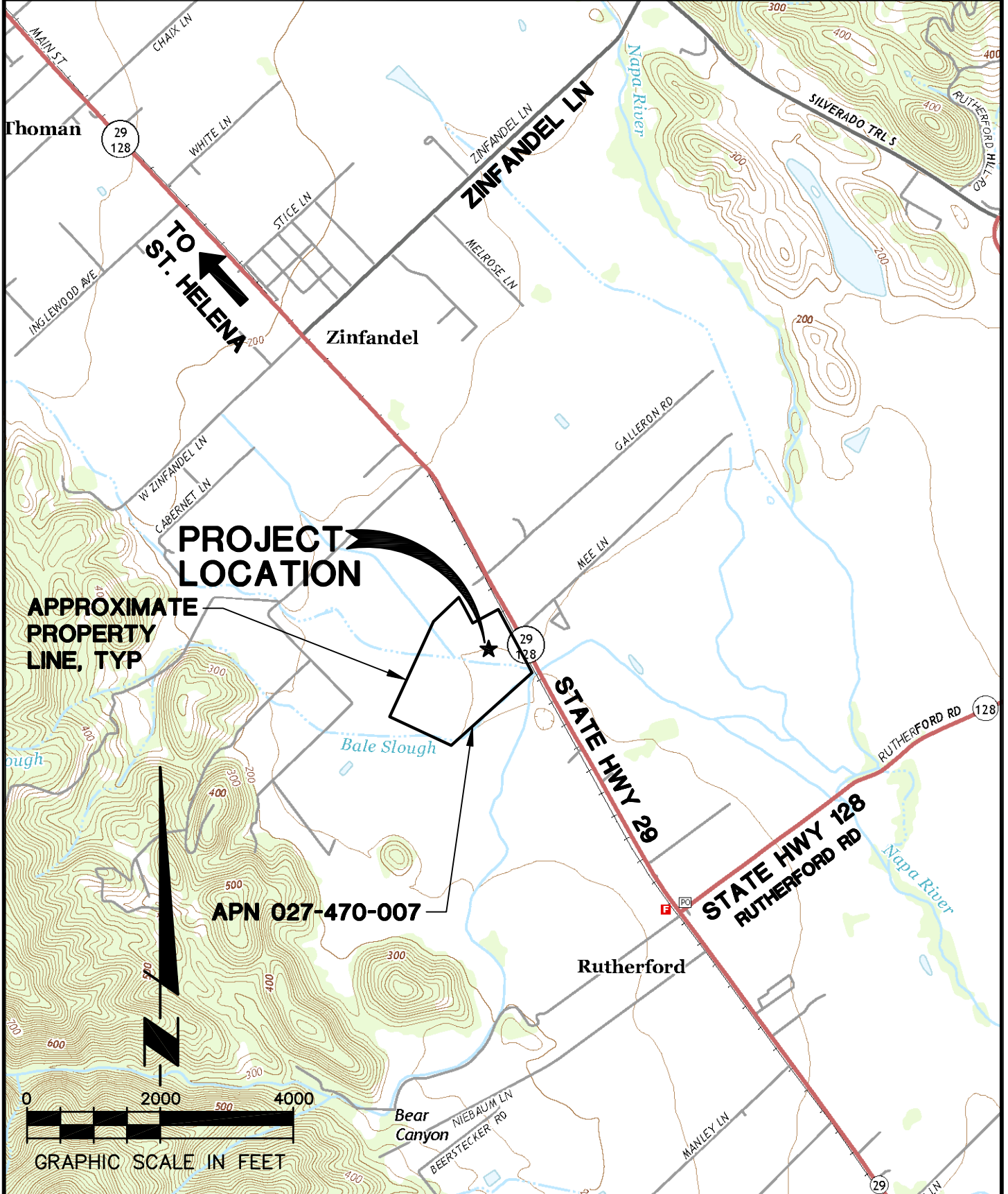
**ENCLOSURE A**  
**VICINITY MAP**  
**OVERALL SITE PLAN**



**BELLA UNION WINERY**  
**1695 ST. HELENA HIGHWAY**  
**ST. HELENA, CA 94574**  
**APN 027-470-007**

PROJECT NO. 2021307  
 DATE 2022-01-10  
 SHT NO 1 OF 1  
 BY JH CHK MS

**VICINITY MAP**

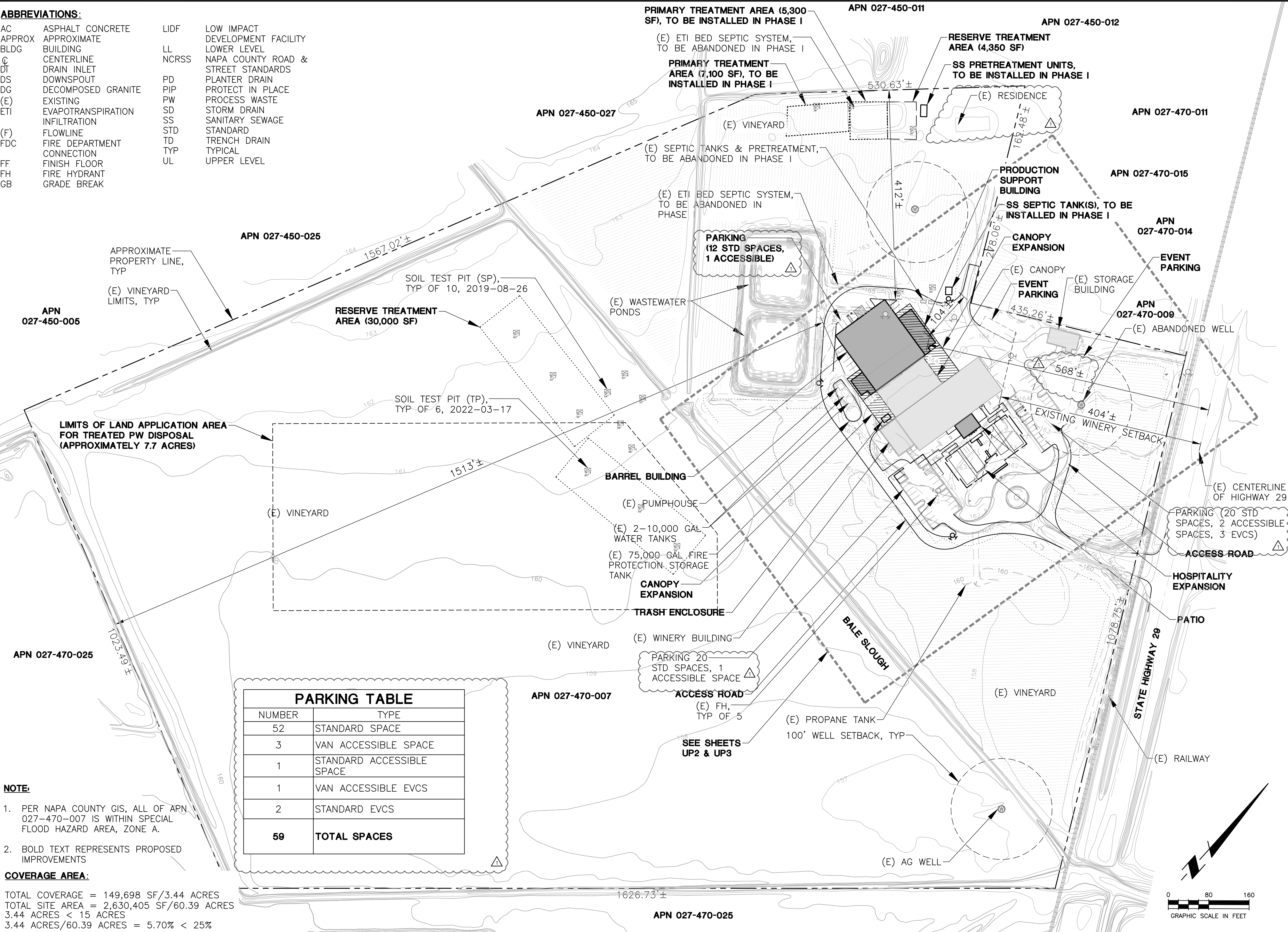


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**ABBREVIATIONS:**

AC	ASPHALT CONCRETE	LIDF	LOW IMPACT DEVELOPMENT FACILITY
APPROX	APPROXIMATE	LL	LOWER LEVEL
BLDG	BUILDING	NCRSS	NAPA COUNTY ROAD & STREET STANDARDS
C	CENTERLINE	PD	PLANTER DRAIN
DI	DRAIN INLET	PIP	PROTECT IN PLACE
DS	DOWNSPOUT	PW	PROCESS WASTE
DG	DECOMPOSED GRANITE	SD	STORM DRAIN
(E)	EXISTING	SS	SANITARY SEWAGE INFILTRATION
ETI	EVAPOTRANSPIRATION	STD	STANDARD
(F)	FLOWLINE	TD	TRENCH DRAIN
FDC	FIRE DEPARTMENT CONNECTION	TYP	TYPICAL
FF	FINISH FLOOR	UL	UPPER LEVEL
FH	FIRE HYDRANT		
GB	GRADE BREAK		

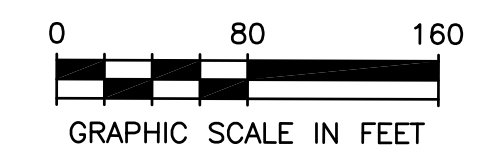
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PARKING TABLE	
NUMBER	TYPE
52	STANDARD SPACE
3	VAN ACCESSIBLE SPACE
1	STANDARD ACCESSIBLE SPACE
1	VAN ACCESSIBLE EVCS
2	STANDARD EVCS
<b>59</b>	<b>TOTAL SPACES</b>

- NOTE:**
- PER NAPA COUNTY GIS, ALL OF APN 027-470-007 IS WITHIN SPECIAL FLOOD HAZARD AREA, ZONE A.
  - BOLD TEXT REPRESENTS PROPOSED IMPROVEMENTS

**COVERAGE AREA:**  
 TOTAL COVERAGE = 149,698 SF/3.44 ACRES  
 TOTAL SITE AREA = 2,630,405 SF/60.39 ACRES  
 3.44 ACRES < 15 ACRES  
 3.44 ACRES/60.39 ACRES = 5.70% < 25%



Bella Union Winery  
Wastewater Feasibility Study  
Revised: July 13, 2022

SUMMIT ENGINEERING, INC.  
Project No. 2021307

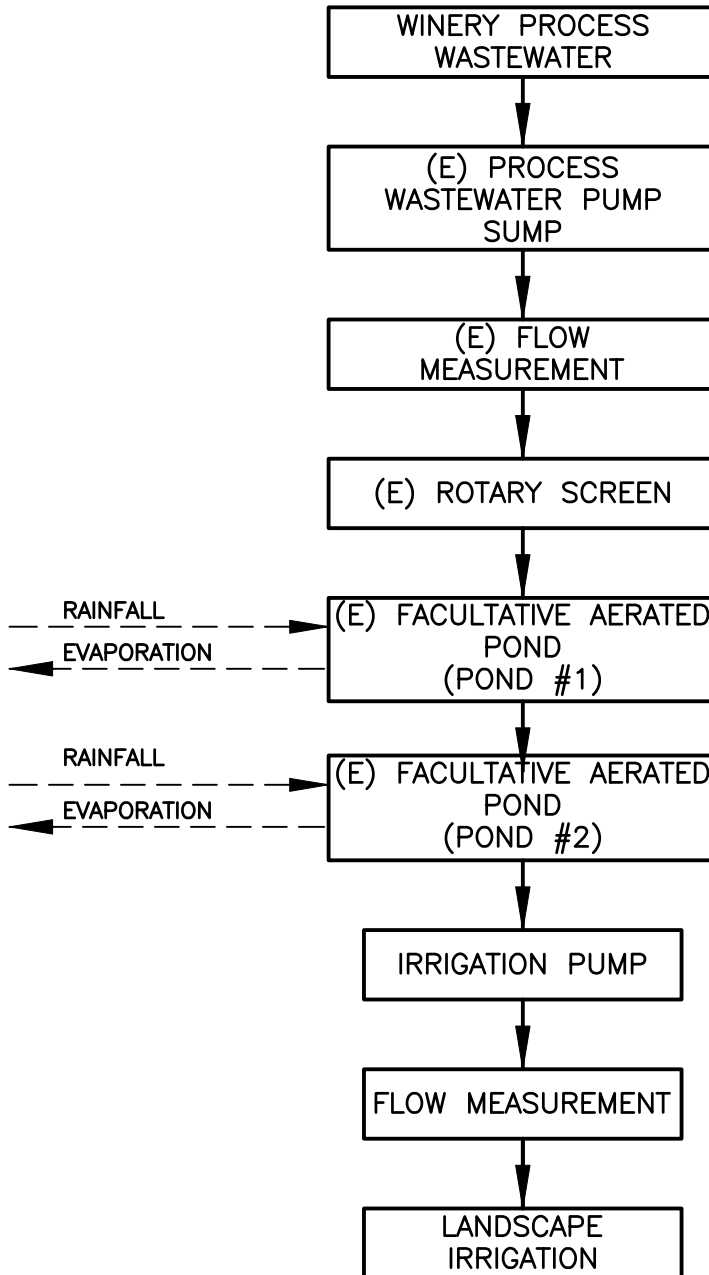
**ENCLOSURE B**  
PROPOSED PROCESS WASTEWATER SCHEMATIC  
PROPOSED SANITARY SEWAGE SCHEMATIC



**BELLA UNION WINERY**  
**1695 ST. HELENA HWY**  
**ST. HELENA, CA**  
**APN 027-470-007**

PROJECT NO. 2021307  
DATE 2022-01-05  
SHT NO 1 OF 1  
BY JM CHK GG

**(P) PROCESS WASTEWATER FLOW SCHEMATIC**



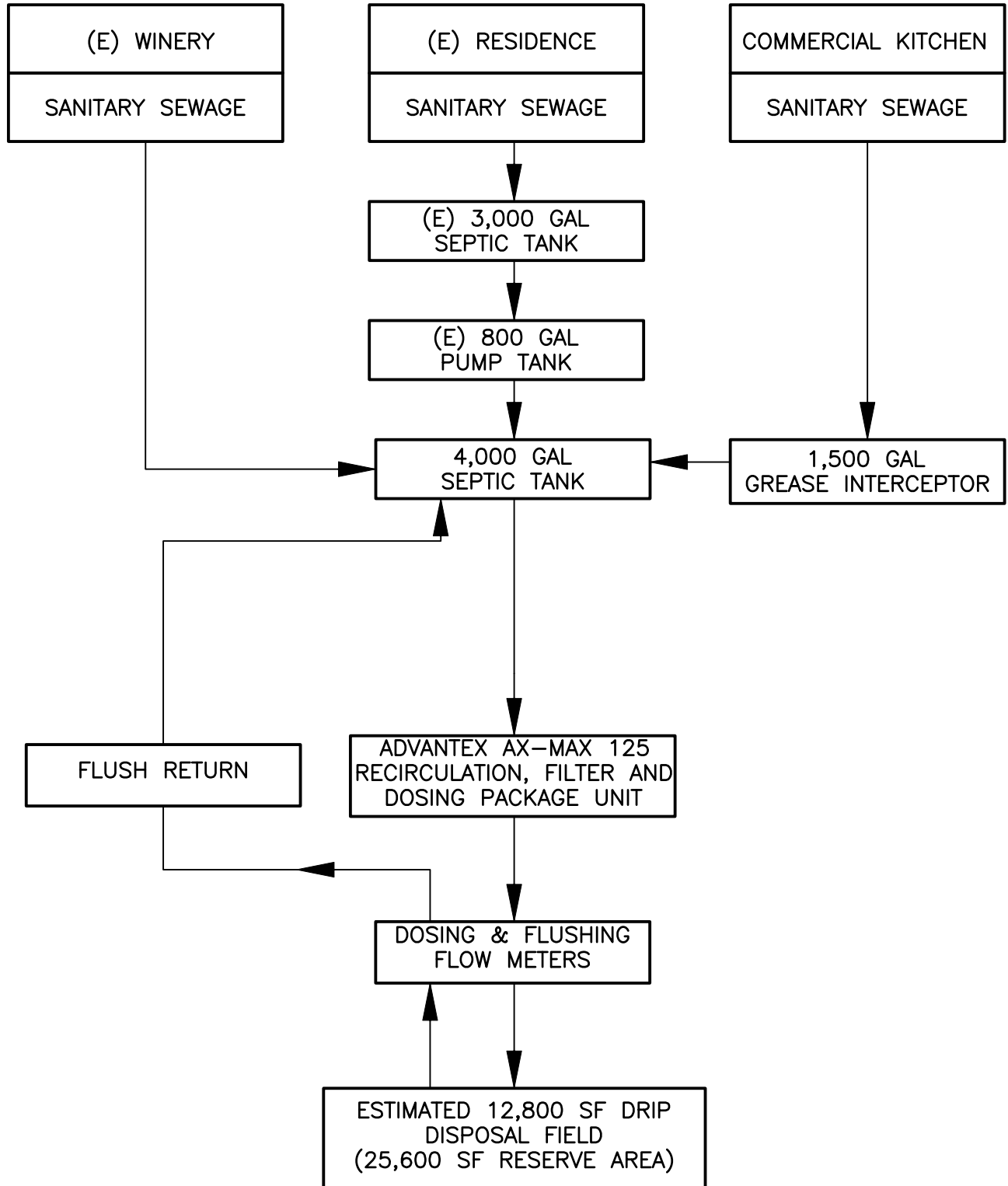
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**BELLA UNION WINERY**  
**1695 ST. HELENA HWY**  
**ST. HELENA, CA**  
**APN 027-470-007**

PROJECT NO. 2021307  
DATE 2022-01-05  
SHT NO 1 OF 1  
BY JM CHK GG

**(P) SANITARY SEWAGE FLOW SCHEMATIC**



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**ENCLOSURE C**  
**PROCESS WASTEWATER POND WATER BALANCE**  
**SANITARY SEWAGE FLOW CALCULATIONS**

<b>SUMMIT ENGINEERING, INC.</b> Consulting Civil Engineers	<b>Bella Union Winery</b>	<b>PROJECT NO.</b>	<b>2021307</b>
	<b>Pond Water Balance</b>	<b>BY:</b>	<b>JM</b>
	<b>Pond Water Balance (300k)</b>	<b>CHK:</b>	<b>GG</b>

**DESIGN CRITERIA**

**FULL PRODUCTION**

Annual Harvest	1,818	ton/year
Wine Generation Rate	165	gal wine/ton
Annual Production	300,000	gal wine/year
PW Generation Rate	6.0	gal PW/gal wine
Annual PW Flow (Crush)	1,800,000	gal PW/year
Bulk Wine Bottled onsite (Cases)	0	
Bulk Wine bottled onsite (gallons)	0	
Generation Rate	0.6	
Annual PW Flow (Bottled)	0	
Total Annual PW Volume	1,800,000	
Annual Average PW Flow	4,940	
Months of Harvest	Aug-Oct	
Average Day Harvest Flow	7,780	gal PW/day
Average Day Peak Harvest Month Flow	9,840	gal PW/day
Maximum daily crush rate		tons/day
Peak day generation rate		gal PW/gal wine
Maximum daily PW flow		gal PW/day
Pond No. 1 Volume	0.558	Mgal
Pond No. 2 Volume	0.580	Mgal
Total Pond Volume	1.138	Mgal
Pond No. 1 HRT	56.7	days
Pond No. 2 HRT	59.0	days
Total HRT	115.7	days

**DESIGN PROCESS WASTEWATER FLOWS**

Month	Monthly		
	Percentage of Annual Flow <sup>a</sup> (%)	Monthly Flow (Mgal)	Monthly Flow (gal)
August	10.5%	0.188	188,142
September	16.4%	0.295	295,281
October	12.9%	0.232	231,976
November	7.4%	0.133	133,404
December	6.4%	0.115	115,482
January	6.6%	0.118	118,154
February	7.2%	0.130	130,005
March	7.6%	0.137	137,331
April	6.8%	0.122	121,925
May	6.4%	0.116	116,083
June	5.6%	0.101	100,705
July	6.2%	0.112	111,514
<b>Total</b>	<b>100%</b>	<b>1.800</b>	<b>1,800,000</b>

<sup>a</sup> Monthly percentage of annual flow based on average of PW flow data from similar wineries.

<b>SUMMIT ENGINEERING, INC.</b> Consulting Civil Engineers	<b>Bella Union Winery</b> Pond Water Balance Climate Data	<b>PROJECT NO.</b> <b>BY:</b> <b>CHK:</b>	<b>2021307</b> <b>JM</b> <b>GG</b>
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Month	Days	Average	Reference	Pan Evaporation <sup>c</sup> (in)	Lake Evaporation <sup>d</sup> (in)	Average Precipitation <sup>e</sup> (in)	10-Year Precipitation <sup>f</sup> (in)	100-Year Precipitation <sup>f</sup> (in)
		Temp <sup>a</sup> (F)	Evapotranspiration <sup>b</sup> (in)					
August	31	72.3	6.5	12.1	9.3	0.0	0.1	0.1
September	30	70.2	5.1	8.7	6.7	0.1	0.1	0.1
October	31	63.7	3.4	5.7	4.4	1.7	2.7	4.0
November	30	54.7	1.8	2.5	1.9	3.2	5.3	7.9
December	31	48.9	0.9	1.7	1.3	7.2	11.6	17.4
January	31	49.5	1.2	1.5	1.2	6.5	10.5	15.7
February	28	52.2	1.7	2.2	1.7	6.7	10.9	16.3
March	31	55.4	3.4	3.8	2.9	5.0	8.1	12.1
April	30	59	4.8	5.8	4.5	2.0	3.2	4.8
May	31	64.3	6.2	8.9	6.9	1.3	2.1	3.2
June	30	69.8	6.9	11.0	8.5	0.4	0.6	0.8
July	31	72.4	7.4	13.2	10.2	0.0	0.0	0.0
<b>Total</b>	<b>365</b>		<b>49.4</b>	<b>77.0</b>	<b>59.3</b>	<b>34.0</b>	<b>55.1</b>	<b>82.4</b>

<sup>a</sup> Average monthly temperature observed between 1991-2020 for St. Helena, CA (NOAA 2021)

<sup>b</sup> Average monthly reference evaporation rates for Zone 4, CIMIS, DWR, 1999.

<sup>c</sup> Average monthly pan evaporation rates observed in Lake Berryessa, CA between 1957 and 1970.

<sup>d</sup> Pan evaporation rates adjusted by a factor of 0.77 to determine lake evaporation.

<sup>e</sup> Monthly precipitation normals between 1991-2020 for St. Helena, CA (NOAA 2021)

<sup>f</sup> Average monthly rainfall adjusted by the ratio of 10-yr and 100-yr wet year return storm identified by Pearsons Log III Distribution.

<b>SUMMIT ENGINEERING, INC.</b> Consulting Civil Engineers	<b>Bella Union Winery</b> Pond Water Balance Stormwater	<b>PROJECT NO.</b> <b>BY:</b> <b>CHK:</b>	<b>2021307</b> <b>JM</b> <b>GG</b>
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**STORM WATER CONTRIBUTION FROM WINERY**

Month	Days in Month	Runoff Coefficient <sup>a</sup>	Surface Area <sup>b</sup> (SF)	10-Year Precipitation <sup>c</sup> (in)	100-Year Precipitation <sup>c</sup> (in)	10-Year Contribution <sup>d</sup> (Mgal)	100-Year Contribution <sup>d</sup> (Mgal)
August	31	0.95	3,800	0.1	0.1	0.000	0.000
September	30	0.95	3,800	0.1	0.1	0.000	0.000
October	31	0.95	3,800	2.7	4.0	0.006	0.009
November	30	0.95	3,800	5.3	7.9	0.012	0.018
December	31	0.95	3,800	11.6	17.4	0.026	0.039
January	31	0.95	3,800	10.5	15.7	0.024	0.035
February	28	0.95	3,800	10.9	16.3	0.024	0.037
March	31	0.95	3,800	8.1	12.1	0.018	0.027
April	30	0.95	3,800	3.2	4.8	0.007	0.011
May	31	0.95	3,800	2.1	3.2	0.005	0.007
June	30	0.95	3,800	0.6	0.8	0.001	0.002
July	31	0.95	3,800	0.0	0.0	0.000	0.000
<b>Total</b>	<b>365</b>			<b>55.1</b>	<b>82.4</b>	<b>0.124</b>	<b>0.185</b>

<sup>a</sup> Runoff coefficient for concrete

<sup>b</sup> Surface area only includes surfaces that divert stormwater to the ponds. See attached Site Plan.

<sup>c</sup> See Climate Data worksheet for precipitation.

<sup>d</sup> Stormwater contributions are estimated using the Rational Method (Flow = Drainage Area \* Rainfall \* Runoff Coefficient)

<b>SUMMIT ENGINEERING, INC.</b> Consulting Civil Engineers	<b>Bella Union Winery</b> <b>Pond Water Balance</b> <b>Pond Worksheet</b>	<b>PROJECT NO.</b> <b>BY:</b> <b>CHK:</b>	<b>2021307</b> <b>JM</b> <b>GG</b>
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**Pond No. 1**

Bottom Width	95.0'	Bottom Radius	-	Start Month	August
Bottom Length	81.0'	Top Radius	-	Min. Depth	3.0'
Interior Side Slope (x:1)	2.0	Total Depth	10.0'	Annual PW	1.80 Mgal
Length:Width	-	Freeboard	2.0'	Initial Depth	8.0'

Depth (ft)	Surface Area (ft <sup>2</sup> )	Total Volume (Mgal)
0	6,500	0.000
1	7,100	0.051
2	7,800	0.107
3	8,500	0.168
4	9,200	0.234
5	10,000	0.306
6	11,000	0.384
7	11,500	0.468
8	12,500	0.558
9	13,184	0.654
10	14,127	0.756

**Pond No. 2**

Bottom Width	96.0'	Bottom Radius	-	Start Month	August
Bottom Length	83.0'	Top Radius	-	Min. Depth	3.0'
Interior Side Slope (x:1)	2.0	Total Depth	10.0'	Divert Volume	2.2 Mgal
Length:Width	-	Freeboard	2.0'	Initial Depth	8.0'

Depth (ft)	Surface Area (ft <sup>2</sup> )	Total Volume (Mgal)
0	6,860	0.000
1	7,510	0.054
2	8,190	0.112
3	8,900	0.176
4	9,600	0.246
5	10,390	0.320
6	11,170	0.401
7	11,980	0.488
8	12,810	0.580
9	13,560	0.679
10	14,440	0.784

<b>SUMMIT ENGINEERING, INC.</b> Consulting Civil Engineers	<b>Bella Union Winery</b> Pond Water Balance 100-Year Design Storm	<b>PROJECT NO.</b>	<b>2021307</b>
		<b>BY:</b>	<b>JM</b>
		<b>CHK:</b>	<b>GG</b>

**Pond No. 1**

Month	Initial Volume <sup>a</sup>	Pond Evaporation <sup>b</sup>	PW Inflow <sup>c,1</sup>	100-Year Precipitation	Volume Change <sup>d</sup>	Total Volume <sup>e</sup>	Divert Volume <sup>f</sup>	Final Volume <sup>g</sup>	Final Pond Depth <sup>h</sup>	Volume Check <sup>i</sup>	Surface Area
	(Mgal)	(Mgal)	(Mgal)	(Mgal)	(Mgal)	(Mgal)	(Mgal)	(Mgal)	(ft)	(Mgal)	(ft <sup>2</sup> )
August	0.558	-0.072	0.188	0.001	0.117	0.675	0.117	0.558	8.0	0.117	12,500
September	0.558	-0.052	0.296	0.001	0.245	0.803	0.245	0.558	8.0	0.245	12,500
October	0.558	-0.034	0.241	0.033	0.240	0.798	0.240	0.558	8.0	0.240	12,500
November	0.558	-0.015	0.151	0.065	0.201	0.759	0.201	0.558	8.0	0.201	12,500
December	0.558	-0.010	0.155	0.143	0.288	0.846	0.288	0.558	8.0	0.288	12,500
January	0.558	-0.009	0.153	0.129	0.273	0.831	0.273	0.558	8.0	0.273	12,500
February	0.558	-0.013	0.167	0.134	0.287	0.846	0.287	0.558	8.0	0.287	12,500
March	0.558	-0.023	0.165	0.099	0.241	0.799	0.241	0.558	8.0	0.241	12,500
April	0.558	-0.035	0.133	0.039	0.137	0.695	0.137	0.558	8.0	0.137	12,500
May	0.558	-0.053	0.123	0.026	0.096	0.654	0.096	0.558	8.0	0.096	12,500
June	0.558	-0.066	0.103	0.007	0.044	0.602	0.044	0.558	8.0	0.044	12,500
July	0.558	-0.079	0.112	0.000	0.032	0.590	0.032	0.558	8.0	0.032	12,500
<b>Total</b>		<b>-0.462</b>	<b>1.985</b>	<b>0.677</b>	<b>2.201</b>		<b>2.201</b>			<b>2.201</b>	

**Pond No. 2**

Month	Initial Volume <sup>a</sup>	Pond Evaporation <sup>b</sup>	PW Inflow <sup>c,2</sup>	100-Year Precipitation	Volume Change <sup>d</sup>	Total Volume <sup>e</sup>	Divert Volume <sup>f</sup>	Final Volume <sup>g</sup>	Final Pond Depth <sup>h</sup>	Volume Check <sup>i</sup>	Surface Area
	(Mgal)	(Mgal)	(Mgal)	(Mgal)	(Mgal)	(Mgal)	(Mgal)	(Mgal)	(ft)	(Mgal)	(ft <sup>2</sup> )
August	0.580	-0.074	0.117	0.001	0.043	0.624	0.043	0.580	8.0	0.043	12,810
September	0.580	-0.053	0.245	0.001	0.193	0.773	0.193	0.580	8.0	0.193	12,810
October	0.580	-0.035	0.240	0.034	0.238	0.819	0.238	0.580	8.0	0.238	12,810
November	0.580	-0.015	0.201	0.066	0.252	0.832	0.252	0.580	8.0	0.252	12,810
December	0.580	-0.010	0.288	0.147	0.425	1.005	0.425	0.580	8.0	0.425	12,810
January	0.580	-0.009	0.273	0.133	0.396	0.977	0.396	0.580	8.0	0.396	12,810
February	0.580	-0.013	0.287	0.138	0.412	0.992	0.412	0.580	8.0	0.412	12,810
March	0.580	-0.023	0.241	0.102	0.320	0.900	0.320	0.580	8.0	0.320	12,810
April	0.580	-0.036	0.137	0.040	0.142	0.722	0.142	0.580	8.0	0.142	12,810
May	0.580	-0.055	0.096	0.027	0.068	0.648	0.068	0.580	8.0	0.068	12,810
June	0.580	-0.068	0.044	0.007	-0.017	0.563	0.022	0.541	7.5	0.000	12,810
July	0.541	-0.079	0.032	0.000	-0.046	0.495	0.022	0.474	6.8	0.000	12,395
<b>Total</b>		<b>-0.471</b>	<b>2.201</b>	<b>0.696</b>	<b>2.426</b>		<b>2.53</b>			<b>2.489</b>	

<sup>a</sup> Volume of each pond at the beginning of each month.

<sup>b</sup> Estimated pond evaporation by month based on starting volume.

<sup>c,1</sup> Process wastewater inflow to Pond 1.

<sup>c,2</sup> Inflow to Pond 2 is set to the Pond 1 divert volume.

<sup>d</sup> Volume change is equal to the sum of pond evaporation, PW inflow, and precipitation.

<sup>e</sup> Total volume is equal to initial volume plus the volume change.

<sup>f</sup> Divert volume is the amount of PW that exceeds a set pond volume (related to maximum pond height; Total dep

<sup>g</sup> Final volume is equal to the total volume minus the divert volume.

<sup>h</sup> Pond depth associated with final volume.

<sup>i</sup> Determines difference between total volume and volume associated with the pond height to help determine dive

<b>SUMMIT ENGINEERING, INC.</b> Consulting Civil Engineers	<b>Bella Union Winery</b> <b>Pond Water Balance</b> <b>Irrigation &amp; Effluent Application Rates</b>	<b>PROJECT NO.</b> <b>BY:</b> <b>CHK:</b>	<b>2021307</b> <b>JM</b> <b>GG</b>
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<b>Applied Irrigation Area</b>	Vineyard	7.7	acres
	Pasture	0.0	acres
<b>Total Area Available for Irrigation</b>	Vineyard	7.7	acres
	Pasture	0.0	acres

Month	Reference ET <sup>a</sup>	Pasture Coefficient <sup>b</sup>	Vineyard Crop Coefficient <sup>c</sup>	Pasture ET <sup>d</sup>	Vineyard ET <sup>d</sup>	Precipitation <sup>e</sup>	Irrigation Demand <sup>f</sup>		Operating Days per Month <sup>g</sup>	Percolation Capacity <sup>h</sup>		Assimilative Capacity <sup>i</sup>		Effluent Applied		Excess Capacity	Remaining effluent to "perc" <sup>j</sup>
	(in)			(in)	(in)	(in)	(in)	(Mgal)	(d)	(in)	(Mgal)	(in)	(Mgal)	(Mgal)	(in)	(Mgal)	(Mgal)
August	6.5	0.9	0.5	5.9	2.9	0.1	2.8	0.593	22	5.49	1.149	8.3	1.741	0.043	0.21	1.70	0.00
September	5.1	0.9	0.3	4.6	1.3	0.1	1.2	0.247	17	4.24	0.888	5.4	1.135	0.193	0.92	0.94	0.00
October	3.4	0.9	0.1	3.1	0.2	4.0	0.0	0.000	19	4.74	0.992	4.7	0.992	0.238	1.14	0.75	0.24
November	1.8	0.8	0.0	1.4	0.0	7.9	0.0	0.000	12	3.00	0.627	3.0	0.627	0.252	1.21	0.37	0.25
December	0.9	0.8	0.0	0.7	0.0	17.4	0.0	0.000	9	2.25	0.470	2.2	0.470	0.425	2.03	0.05	0.42
January	1.2	0.8	0.0	1.0	0.0	15.7	0.0	0.000	10	2.50	0.522	2.5	0.522	0.396	1.90	0.13	0.40
February	1.7	0.8	0.0	1.3	0.0	16.3	0.0	0.000	9	2.25	0.470	2.2	0.470	0.412	1.97	0.06	0.41
March	3.4	0.8	0.0	2.7	0.0	12.1	0.0	0.000	10	2.50	0.522	2.5	0.522	0.320	1.53	0.20	0.32
April	4.8	0.9	0.2	4.3	0.8	4.8	0.0	0.000	13	3.24	0.679	3.2	0.679	0.142	0.68	0.54	0.14
May	6.2	0.9	0.6	5.6	3.6	3.2	0.4	0.088	18	4.49	0.940	4.9	1.028	0.068	0.33	0.96	0.00
June	6.9	0.9	0.7	6.2	4.9	0.8	4.1	0.847	21	5.24	1.097	9.3	1.944	0.022	0.11	1.92	0.00
July	7.4	0.9	0.6	6.7	4.8	0.0	4.7	0.991	22	5.49	1.149	10.2	2.140	0.022	0.10	2.12	0.00
<b>Total</b>	<b>49.4</b>			<b>43.6</b>	<b>18.5</b>	<b>82.4</b>	<b>13.2</b>	<b>2.8</b>	<b>182.0</b>	<b>45.4</b>	<b>9.5</b>	<b>58.6</b>	<b>12.3</b>	<b>2.53</b>	<b>12.1</b>	<b>9.74</b>	<b>2.184770</b>

- (a) Average monthly reference evapotranspiration rates, see Climate Data Worksheet.
- (b) Kc coefficients for pasture from Table 5-1, "Irrigation with Reclaimed Municipal Wastewater-A Guidance Manual"- California State Water Resources Control Board, July 1984 (San Joaquin Valley).
- (c) Kc coefficients for vineyards from Table 5-12, "Irrigation with Reclaimed Municipal Wastewater-A Guidance Manual"- California State Water Resources Control Board, July 1984 (San Joaquin Valley).
- (d) ET=ET<sub>o</sub> x Kc. A weighted value is determined on the basis of the available irrigated acreage of vineyard and pasture.
- (e) Precipitation, 10-year rainfall event, see Climate Data Worksheet.
- (f) Irrigation Demand = ET-Precipitation, inches. A weighted value is determined on the basis of the available irrigated acreage of vineyard and pasture.
- (g) Number of operating days per month based on estimated irrigation days available for XX, CA. Precipitation data from NOAA between XXXX-YYYY.
- (h) Design percolation rate is a maximum of 0.25 inches per day for the number of operating day per month. Design perc rate based on estimated hydraulic conductivity for soils in the area (USGS Websoil Survey) adjusted by a 0.04 safety factor to account for typical slow rate land application design methodology.
- (i) Assimilative capacity is the sum of irrigation demand and percolation applied.
- (j) Effluent applied is the monthly divert volume from Pond 2 (Sheet 5 of 6). This volume is also represented as a depth spread over the total irrigation area. The target application rate is to be less than one inch per month.
- (k) Excess capacity is the difference between the Assimilative Capacity (note i) and the Effluent Applied (note j). This is the estimated remaining disposal capacity of the soil.

SUMMIT ENGINEERING, INC.	<p style="text-align: center;">Bella Union Winery Wastewater Feasibility Study Existing SS Flows</p>	PROJ NO: <b>2021307</b> BY: <b>JM</b> CHK: <b>GG</b>
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**SANITARY SEWAGE - EXISTING**

Average Day w/o Event - Non-harvest

Employee (full-time)	12	x	15 gpcd	=	180 gal/day
Public Tasting Visitors	43	x	3 gpcd	=	129 gal/day
Private Tasting	65	x	3 gpcd	=	195 gal/day
3-Bedroom Residence	3	x	120 gpd	=	360 gal/day
<b>Total</b>				=	864 gal/day
				=	<b><u>870 gal/day</u></b>

Peak Tasting Day Harvest w/Event

Employee (full-time)	12	x	15 gpcd	=	180 gal/day
Public Tasting Visitors	43	x	3 gpcd	=	129 gal/day
Private Tasting	65	x	3 gpcd	=	195 gal/day
3-Bedroom Residence	3	x	120 gpd	=	360 gal/day
Private Promo Meal & Tasting	50	x	15 gpcd	=	750 gal/day
Wine Auction Release Event	200	x	15 gpcd	=	3,000 gal/day
<b>Total</b>				=	4,614 gal/day
				=	<b><u>4,620 gal/day</u></b>

Notes:

- 1) All marketing events are to be catered.

SUMMIT ENGINEERING, INC.	Bella Union Winery Wastewater Feasibility Study Proposed SS Flows	PROJ NO: 2021307 BY: JM CHK: GG
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**SANITARY SEWAGE - Proposed**

**Peak Day w/o Event**

Employee (full-time)	38	x	15 gpcd	=	570 gal/day
Employee (part-time)	7	x	15 gpcd	=	105 gal/day
Public Visitors w/o Food	43	x	3 gpcd	=	129 gal/day
Private Tasting Visitors w/o Food	56	x	3 gpcd	=	168 gal/day
Tasting Visitors w/ Pre-Packaged Food	110	x	8 gpcd	=	880 gal/day
Tasting Visitors w/ Prepared Food	16	x	15 gpcd	=	240 gal/day
3 Bedroom Residence	3	x	120 gpd	=	360 gal/day
<b>Total</b>				=	<b>2,452 gal/day</b>

**Peak Tasting Day Harvest w/ Annual Event**

Employee (full-time)	38	x	15 gpcd	=	570 gal/day
Employee (part-time)	7	x	15 gpcd	=	105 gal/day
Public Visitors w/o Food	43	x	3 gpcd	=	129 gal/day
Private Tasting Visitors w/o Food	56	x	3 gpcd	=	168 gal/day
Tasting Visitors w/ Pre-Packaged Food	110	x	8 gpcd	=	880 gal/day
Tasting Visitors w/ Prepared Food	16	x	15 gpcd	=	240 gal/day
3 Bedroom Residence	3	x	120 gpd	=	360 gal/day
Weekly Marketing Event	0	x	15 gpcd	=	0 gal/day
Monthly Marketing Event	0	x	15 gpcd	=	0 gal/day
Largest Marketing Event <sup>1</sup>	500	x	0 gpcd	=	0 gal/day
<b>Total</b>				=	<b>2,452 gal/day</b>

**Peak Tasting Day Harvest w/ Monthly Event**

Employee (full-time)	38	x	15 gpcd	=	570 gal/day
Employee (part-time)	7	x	15 gpcd	=	105 gal/day
Public Visitors w/o Food	43	x	3 gpcd	=	129 gal/day
Private Tasting Visitors w/o Food	56	x	3 gpcd	=	168 gal/day
Tasting Visitors w/ Pre-Packaged Food	110	x	8 gpcd	=	880 gal/day
Tasting Visitors w/ Prepared Food	16	x	15 gpcd	=	240 gal/day
3 Bedroom Residence	3	x	120 gpd	=	360 gal/day
Weekly Marketing Event	0	x	15 gpcd	=	0 gal/day
Monthly Marketing Event <sup>1</sup>	100	x	0 gpcd	=	0 gal/day
Largest Marketing Event	0	x	15 gpcd	=	0 gal/day
<b>Total</b>				=	<b>2,452 gal/day</b>

**Peak Tasting Day Harvest w/ Weekly Event**

Employee (full-time)	38	x	15 gpcd	=	570 gal/day
Employee (part-time)	7	x	15 gpcd	=	105 gal/day
Public Visitors w/o Food	43	x	3 gpcd	=	129 gal/day
Private Tasting Visitors w/o Food	56	x	3 gpcd	=	168 gal/day
Tasting Visitors w/ Pre-Packaged Food	110	x	8 gpcd	=	880 gal/day
Tasting Visitors w/ Prepared Food	16	x	15 gpcd	=	240 gal/day
3 Bedroom Residence	3	x	120 gpd	=	360 gal/day
Weekly Marketing Event	50	x	15 gpcd	=	750 gal/day
Monthly Marketing Event	0	x	15 gpcd	=	0 gal/day
Largest Marketing Event	0	x	15 gpcd	=	0 gal/day
<b>Total</b>				=	<b>3,202 gal/day</b>

1. Portable toilets will be used for annual and monthly marketing events.

SUMMIT ENGINEERING, INC.	Bella Union Winery Wastewater Feasibility Study Existing Process Wastewater Flows	PROJ NO: 2021307 BY: JM CHK: GG
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**PROCESS WASTEWATER GENERATION**

**Annual Volume**

	Value	Units
Annual Production (projected)	75,000	cases wine/year
Gallons of Wine Per Case	2.4	gal wine/case of wine
Annual Production	180,000	gal wine/year
Generation Rate (assumed) <sup>1</sup>	165	gal wine/ton grapes
Tons Crushed	1,091	tons grapes/year
Process Wastewater (PW) Generation Rate <sup>2</sup>	6.00	gal PW/gal wine
<i>Annual PW Flow</i>	<u>1,080,000</u>	<u>gal PW/year</u>

**Average Day Flow**

=	<u>2,959</u>	<u>gal PW/day</u>
	<u>2,960</u>	<u>gal PW/day</u>

**Napa County Peak Day Flow**

Peaking Factor <sup>3</sup>	=	1.5
Harvest Length	=	60 days
<b><u>Peak Harvest Day Flow</u></b>	=	<b><u>4,500 gal PW/day</u></b>

**Average, Day Peak Harvest Month Flow**

Assume 16.4% of annual PW flow is generated in September <sup>4</sup>	=	16.4 %
Monthly PW Generation	=	177,120 <u>gal PW</u>
<b><u>Peak Harvest Day Flow</u></b>		<b><u>5,904 gal PW/day</u></b>
		<b><u>6,000 gal PW/day</u></b>

1. Industry standard wine generation rate.

2. Industry standard PW generation rate.

3. Peaking factor from Napa County OWTS (Final Draft 2013). Peaking factor applied to wine production not PW production.

4. Based on distribution of flows from similar sized wineries.

SUMMIT ENGINEERING, INC.	Bella Union Winery Wastewater Feasibility Study Proposed Process Wastewater Flows	PROJ NO: 2021307 BY: JM CHK: GG
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**PROCESS WASTEWATER GENERATION**

**Annual Volume**

	Value	Units
Annual Production (projected)	125,000	cases wine/year
Gallons of Wine Per Case	2.4	gal wine/case of wine
Annual Production	300,000	gal wine/year
Generation Rate (assumed) <sup>1</sup>	165	gal wine/ton grapes
Tons Crushed	1,818	tons grapes/year
Process Wastewater (PW) Generation Rate <sup>2</sup>	6.00	gal PW/gal wine
<i>Annual PW Flow</i>	<u>1,800,000</u>	<u>gal PW/year</u>

**Average Day Flow**

=	<u>4,932</u>	<u>gal PW/day</u>
	<u>4,940</u>	<u>gal PW/day</u>

**Napa County Peak Day Flow**

Peaking Factor <sup>3</sup>	=	1.5
Harvest Length	=	60 days
<b><u>Peak Harvest Day Flow</u></b>	=	<u>7,500 gal PW/day</u>

**Average, Day Peak Harvest Month Flow**

Assume 16.4% of annual PW flow is generated in September <sup>4</sup>	=	16.4 %
Monthly PW Generation	=	295,200 <u>gal PW</u>
<b><u>Peak Harvest Day Flow</u></b>		<u>9,840 gal PW/day</u>
		<u>9,900 gal PW/day</u>

1. Industry standard wine generation rate.
2. Industry standard PW generation rate.
3. Peaking factor from Napa County OWTS (Final Draft 2013). Peaking factor applied to wine production not PW production.
4. Based on distribution of flows from similar sized wineries.

Bella Union Winery  
Wastewater Feasibility Study  
Revised: July 13, 2022

SUMMIT ENGINEERING, INC.  
Project No. 2021307

**ENCLOSURE D**  
**SITE EVALUATION REPORTS**



Acceptable Soil to \_\_\_\_\_ inches Top Soil Classification \_\_\_\_\_

Slope of Drainfield Area \_\_\_\_\_

Average slope of parcel \_\_\_\_\_ Stabilized Perc Rate \_\_\_\_\_ inches per hour

Surface drainage problems \_\_\_\_\_

Percolation Rate is estimated to be 1 inch per hour or more 36" below proposed trench bottom  
\_\_\_\_\_ Yes \_\_\_\_\_ No

Are there any size, slope or other constraints that would impact on the proposed use?  
\_\_\_\_\_ Yes \_\_\_\_\_ No Explain: \_\_\_\_\_

Recommendation: \_\_\_\_\_ Code System Depth of Trenches \_\_\_\_\_ inches

Square feet side wall area per bedroom \_\_\_\_\_ Special Design Sewage Disposal System \_\_\_\_\_  
(give precise reasons below)

\_\_\_\_\_ Low Perc Rate \_\_\_\_\_ Insufficient Soil Depth \_\_\_\_\_ Low Perc Rate 3 feet below trench

\_\_\_\_\_ Evidence of Seasonal Water \_\_\_\_\_ Steepness of Slope \_\_\_\_\_ Size Constraints

\_\_\_\_\_ Other \_\_\_\_\_

Percolation Test Inspected and Reviewed by: \_\_\_\_\_

Date: \_\_\_\_\_

Core Hole #3

- 0-12" - Dry Dark Brown Loamy clay
- 12"-36" - Damp-Dry Brown-Black Loamy Clay - Evidence of Grey Mottling
- 36" - Standing Water

Core Hole #4

- 0-6" Dry Brown Loamy Clay
  - 6"-30" - Dry DK. Black Loamy Clay -
  - 30" - + water level
- This hole has a different material that probably came from the bottom -  
A Tan Loamy Clay

Hole #5

- 0-10" - Dry Brown Loamy Clay
- 10"-38" - Damp-Dry - DK Brown-Black Loamy clay - Evidence Grey Mottling
- 38" - Standing Water

RH:wc  
NCDEH:4/85  
EH 257

REQUEST FOR PERCOLATION TEST INSPECTION

Rec#190

Perc Test

Core Hole only (No Fee)

38  
~~11/17/86~~

ENVIRONMENTAL HEALTH DEPARTMENT USE ONLY  
FEE: \$30.00  
DATE: 7/23/86  
RECEIPT NO. 17973  
BY: W. Costello

PARCEL NUMBER: 27-470-07  
JOB ADDRESS: 1695 St. Nevers Hwy  
OWNER: Monet Vineyards  
TEST CONDUCTED BY: Montelli

TO BE RUN ON Will Call ~~7/24/86~~ BEGINNING AT 12<sup>00</sup> PM AND ENDING AT 4<sup>00</sup> pm  
A.M./P.M.

INSPECTION RECORD

(This section to be completed by the Inspecting Sanitarian)

PRESOAK INSPECTION

Presoak Inspection Made  Yes  No Date: 7/29/86 Time: 2:45 pm  
Water in hole  Yes  No Presoak checked by: [Signature]  
Presoak Adequate  Yes  No standing water - 72" - in core hole

PERCOLATION TEST

Method Used: Diameter of Perc Holes 6-8 inches. Gravel and Pipe used  Yes  No  
Depth of Perc Holes 30 Deep Perc Holes (if included) \_\_\_\_\_  
(minimum of (2) required)  
Rate at time of Inspection: 1-2 inches with 60 <sup>MINUTES</sup> inches remaining.

Notes: FINAL PERC RATES → #1 - 2 1/2 #4 - 1"  
AS PER MONTELLI → #2 - 1/2 #5 - 0  
#3 - 2 #6 - 1"

CORE HOLE RECORD  
(inches from surface)

Hole #1 (LOTS OF CRACKS IN THE CORE HOLE) Hole #2  
0 to 72 SILTY CLAY 0 to \_\_\_\_\_  
to INCREASING IN CLAY to \_\_\_\_\_  
to AS YOU GO DEEPER to \_\_\_\_\_  
to BLACK, CLEAR LIKE CLAY to \_\_\_\_\_  
to \_\_\_\_\_ to \_\_\_\_\_

STANDING WATER AT 72"  
Depth to seasonal water \_\_\_\_\_ Depth to seasonal water \_\_\_\_\_  
RUST MOTTLING heavy from 42"  
Type of evidence of seasonal water \_\_\_\_\_

8/6/86  
CC: Contractor  
& Montelli  
TH

Acceptable Soil to 42 inches Top Soil Classification Maxwell Clay  
Slope of Drainfield Area 0-1%  
Average slope of parcel 0-1% Stabilized Perc Rate < 1 inches per hour  
Surface drainage problems See Note Below

Percolation Rate is estimated to be 1 inch per hour or more 36" below proposed trench bottom  
 Yes  No

Are there any size, slope or other constraints that would impact on the proposed use?  
 Yes  No Explain: \_\_\_\_\_

Recommendation: \_\_\_\_\_ Code System \_\_\_\_\_ Depth of Trenches \_\_\_\_\_ inches  
Square feet side wall area per bedroom \_\_\_\_\_ Special Design Sewage Disposal System   
(give precise reasons below)

Low Perc Rate  Insufficient Soil Depth  Low Perc Rate 3 feet below trench  
 Evidence of Seasonal Water  Steepness of Slope  Size Constraints  
Other \_\_\_\_\_

Percolation Test Inspected and Reviewed by: Jim Snellings Date: 7-30-86

I feel very strongly that the reason this soil perced was because of cracks in the clay. In the winter I doubt that this would perc > 1/2"/hr. This is definitely an area of high groundwater, 42 inches is giving the benefit of the doubt.

Jim

NOTE: The USGS Soil Survey defines Maxwell Clay as somewhat poorly drained soils on old alluvial fans, (p27). Permeability is defined as very slow (p28). The permeability is charted as 2.06 in/hr (p86) and the shrink-swell potential is high (p87).

27-470-07 PERCOLATION TEST RECORD

PARCEL NUMBER ~~27-470-07~~

TEST CONDUCTED BY MONTPELLI CONST

ADDRESS ST. HELENA HWY

WATER SUPPLY WELL

PARCEL OWNER MONET

DATE OF TEST 7-30-86

Reason for Perc test:  New Dwelling

Addition to dwelling

Parcel Map

Use Permit

Winery

Other:

Depth of proposed leach lines          inches.

Number of times holes presoaked 2

Length of time of presoak 24 hours.

Size of Parcel 0.7 acres.

Estimated perc test area slope 0 %

Estimated average slope of parcel 0 %

NO	DEPTH	TIME		Rate	TIME		Rate	TIME		Rate	TIME		Rate	Rate Inch/ Hr.
1	30	1:00	1:30		1:30	2:00		2:00	2:30		2:30	3:00		
		21	22 1/2	1 1/2	21	22 1/4	1 1/4	21	22 1/4	1 1/4	21	22 1/4	1 1/4	
		3:00	3:30	Rate	3:30	4:00	Rate			Rate			Rate	
2	30			Rate			Rate			Rate			Rate	
		21	22 1/2	1 1/2	21	21 1/2	1/2	21	21 1/2	1/2	21	21 1/4	1/4	
		21	21 3/8	3/8	21		1/4	21	21 1/4	1/4	21	21 1/4	1/4	1/2
3	30			Rate			Rate			Rate			Rate	
		21	22 1/2	1 1/2	21	22 1/4	1 1/4	21	22 1/4	1 1/4	21	22	1	
		21	22	1	21	22	1	21	22	1	21	22	1	2
4	30			Rate			Rate			Rate			Rate	
		21	21 3/4	3/4	21	21 1/2	1/2	21	21 1/2	1/2	21	21 1/4	1/4	
		21	21 1/2	1/8	21	21 1/4	3/4	21	21 1/2	1/2	21	21 1/2	1/2	1
5	30			Rate			Rate			Rate			Rate	
		21	22	1	21	21 1/4	1/4	21	21 1/4	1/4	21	21	0	
		21	21	0	21	21	0	21	21	0	21	21	0	0
6	30			Rate			Rate			Rate			Rate	
		21	22 1/2	1 1/4	21	22	1	21	21 3/4	3/4	21	21 1/2	1/2	
		21	21 1/2	1/2	21	21 1/2	1/2	21	21 1/2	1/2	21	21 1/2	1/2	1

NOTE: If more than 6 perc holes are used, use additional perc test forms.

*Raced  
8-1-86  
Remy*

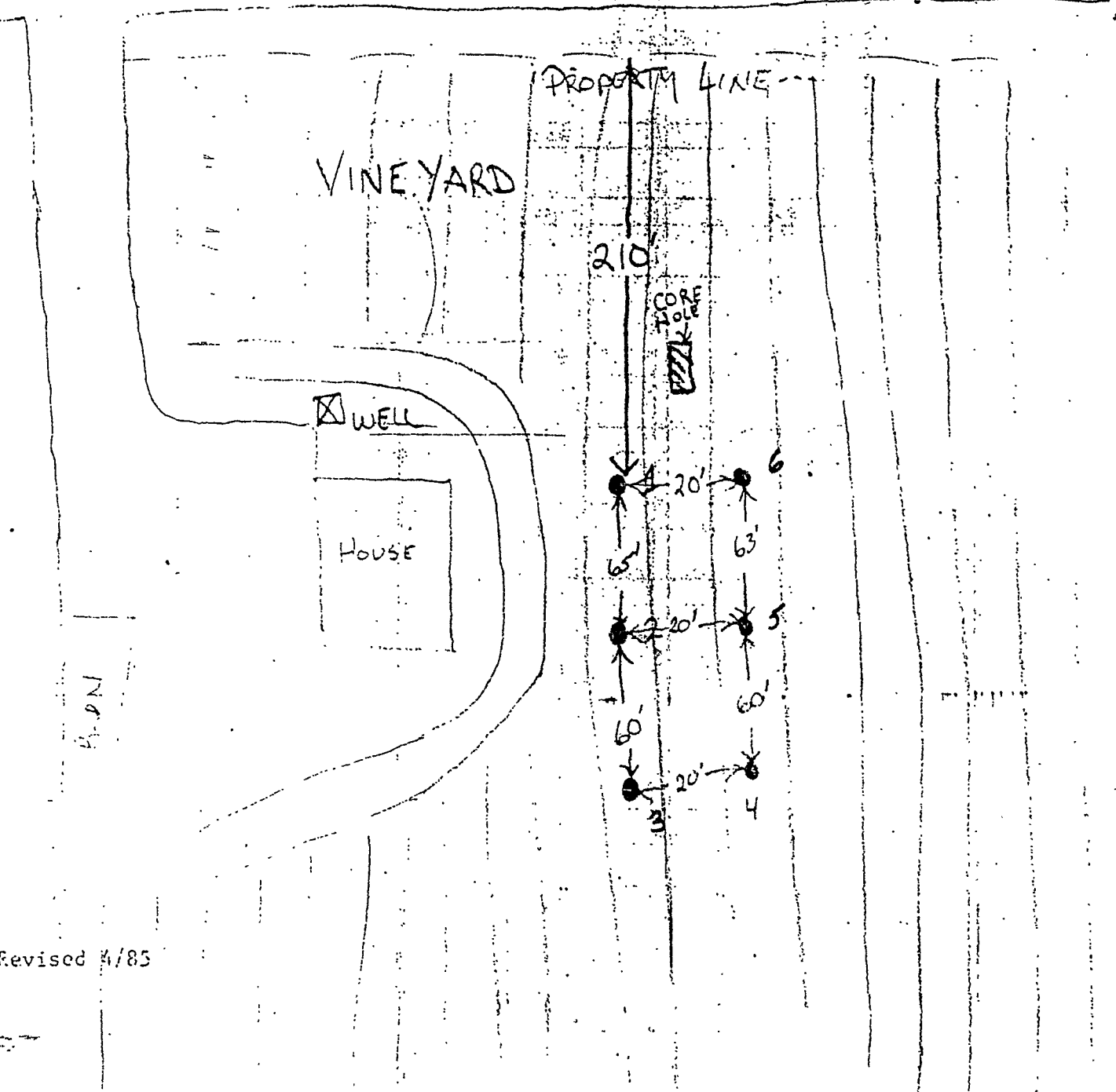
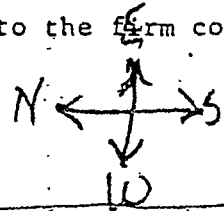
Name of Sanitarian who field checked perc test \_\_\_\_\_

Signature of licensed person responsible for test \_\_\_\_\_

*John H. Hottel*  
*John Hottel Const. Inc.*

All percolation tests must be submitted with complete accurate plot plans not larger than 8 x 11 sheets, showing approximate contours, location of perc holes, core holes, streams, ponds, wells and springs. All sites within the perc area where core holes were dug or attempted should be indicated. An accurate plot plan of the parcel must also be included showing precise location of test area. Copies of parcel pages may be used.

One completed copy of the reviewed percolation test will be returned to the firm conducting the perc test.



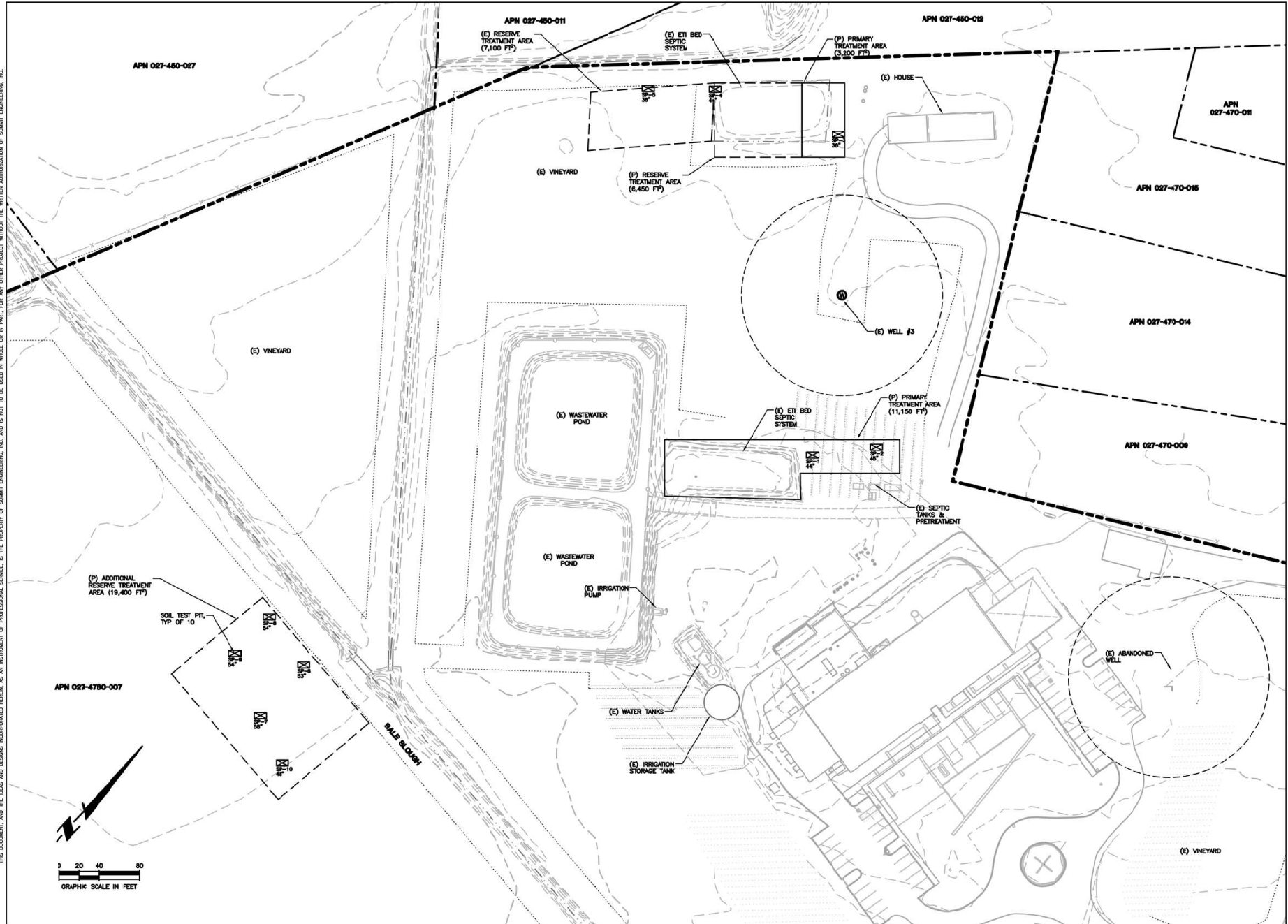


**Soil Profile Log**

Profile	Horizon (in)	Bndy (in)	% Rock	Munsell Color	Structure	Texture	Moisture/Consistency	Roots	Porosity	Mottling	Sample
P-1	0-10	G	0-10		2M-SB	C	D-FRB	2F	2M	N	
%	10-26	G	0-5		2M-SB	C	D-F	1F	2F	N	
	26-44	G	0-6		1M-SB	SC	D-F	0	2F	N	
P-2	0-16	G	0-10		2M-SB	C	D-FRB	2M	2M	N	
	16-27	G	0-5		2M-SB	C	D-F	1F	2F	N	
	27-45	G	0-5		1M-SB	SC	D-F	0	2F	N	
	45-51				Massive						
P-3	0-17	G	0-10		2M-SB	C	D-FRB	2F	2M	N	
	17-36	G	0-5		2M-SB	C	D-F	1F	2F	N	
	36 +				Massive						
P-4	0-13	G	0-10		2M-SB	C	D-FRB	2F	2M	N	
	13-28	G	0-5		2M-SB	C	D-F	1F	2F	N	
	28-44	G	0-6		1M-SB	SC	D-F	0	2F	N	
	44-48				Massive						
P-5	0-12	G	0-10		2M-SB	C	M-FRB	2M	2M	N	
	12-24	G	0-5		2M-SB	C	M-F	2F	2F	N	
	24-36	G	0-6		1M-SB	SC	M-F	0	2F	N	
P-6	0-30	G	0-10		2M-SB	C	D-FRB	2M	2M	N	
	30-53	G	0-6		1M-SB	SC	D-F	0	2F	N	
P-7	0-36	G	0-10		2M-SB	C	D-FRB	2M	2M	N	
	36-58	G	0-6		1M-SB	SC	D-F	0	2F	N	
<p><b>Structure</b>                      ▶ 1=Small Ped, 2=Med Ped, 3=Large Ped                      ▶ W=Weak, M=Moderate, S=Strong                      ▶ G=Granular, Pl=Platy, Pr=Prismatic, C=Columnar, AB=Angular Blocky, SB=Subangular Blocky, M=Massive, C=Cementitious</p> <p><b>Texture</b>                      ▶ S=Sand, LS=Loamy Sand, SL=Sandy Loam, SCL=Sandy Clay Loam, SC=Sandy Clay, SIL=Silt Loam, SICL=Silty Clay Loam, SIC=Silty Clay, L=Loam, CL=Clay Loam, C=Clay</p>						<p><b>Moisture/Consistency</b>                      ▶ M=Moist, D=Dry                      ▶ L=Loose, VFRB=Very Friable, FRB=Friable, F=Firm, Vf=Very Firm, XF=Extremely Firm</p> <p><b>Roots</b>                      ▶ 0=None, 1=Few, 2=Common, 3=Many                      ▶ F=Fine, M=Medium, C=Coarse, VC=Very Coarse</p>		<p><b>Porosity</b>                      ▶ 0=None, 1=Few, 2=Common, 3=Many                      ▶ VF=Very Fine, F=Fine, M=Medium, C=Coarse                      ▶ 0=None, P=Poor, F=Fair, G=Good, E=Excellent</p>		<p><b>Mottling</b>                      ▶ 0=None, 1=Few, 2=Common, 3=Many                      ▶ F=Faint, D=Distinct, P=Prominent                      ▶ O=Oxidation (Reddish), R=Reduction (Grayish), RO=Both</p>	



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**PROVENANCE VINEYARDS**  
1895 ST. HELENA HIGHWAY  
ST. HELENA, CA 94574  
APN 027-470-007

**USE PERMIT MODIFICATION**  
**SOIL EVALUATION**

2019-09-09  
PERMIT SUBMITTAL

DATE: 2019-09-09  
JOB NO: 2019040  
SCALE: AS SHOWN  
DRAWN: TF  
CHECKED: SW  
SHEET

Please attach an 8.5" x 11" plot map showing the locations of all test pits triangulated from permanent landmarks or known property corners. The map must be drawn to scale and include a North arrow, surrounding geographic and topographic features, direction and % slope, distance to drainages, water bodies, potential areas for flooding, unstable landforms, existing or proposed roads, structures, utilities, domestic water supplies, wells, ponds, existing wastewater treatment systems and facilities.

Permit #: <b>E22-00138</b>
APN: <b>027-470-007-000</b>
(County Use Only) Reviewed by: _____ Date: _____

**PLEASE PRINT OR TYPE ALL INFORMATION**

Property Owner <b>FN Land LLC</b>	<input type="checkbox"/> New Construction <input type="checkbox"/> Addition <input type="checkbox"/> Remodel <input type="checkbox"/> Relocation <input type="checkbox"/> Other: _____
Property Owner Mailing Address <b>PO Box 327</b>	<input type="checkbox"/> Residential - # of Bedrooms: _____ Design Flow : _____ gpd
City State Zip <b>Oakville CA 95462</b>	<input checked="" type="checkbox"/> Commercial – Type: Sanitary Waste: <b>3,200</b> gpd      Process Waste: _____ gpd
Site Address/Location <b>1695 St. Helena Highway St. Helena, CA 94574</b>	<input type="checkbox"/> Other: Sanitary Waste: _____ gpd      Process Waste: _____ gpd

**Evaluation Conducted By:**

Company Name <b>Summit Engineering, Inc.</b>	Evaluator's Name <b>Josh Martinez under direction of Gina Giacone</b>	Signature (Civil Engineer, R.E.H.S., Geologist, Soil Scientist) <i>Gina Giacone</i>
Mailing Address: <b>463 Aviation Blvd, Suite 200</b>		Telephone Number <b>707-527-0775</b>
City State Zip <b>Santa Rosa CA 95403</b>	Date Evaluation Conducted <b>March 17, 2022</b>	

<p><b><u>Primary Area</u></b></p> <p>Acceptable Soil Depth: 50-60 in. Test pit #'s: 2-3</p> <p>Soil Application Rate (gal. /sq. ft. /day): 0.3 (Geoflow)</p> <p>System Type(s) Recommended: Subsurface drip</p> <p>Slope: 1 % Distance to nearest water source: &gt;100 ft.</p> <p>Hydrometer test performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)</p> <p>Bulk Density test performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)</p> <p>Percolation test performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)</p> <p>Groundwater Monitoring Performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)</p>	<p><b><u>Expansion Area</u></b></p> <p>Acceptable Soil Depth: 59-60 in. Test pit #'s: 1, 4-6</p> <p>Soil Application Rate (gal. /sq. ft. /day): 0.3 (Geoflow)</p> <p>System Type(s) Recommended: Subsurface drip</p> <p>Slope: 1 % Distance to nearest water source: &gt;100 ft.</p> <p>Hydrometer test performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)</p> <p>Bulk Density test performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)</p> <p>Percolation test performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)</p> <p>Groundwater Monitoring Performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)</p>
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Site constraints/Recommendations:

A site evaluation was conducted with Napa County Environmental Health staff Kim Withrow to identify additional reserve area for a subsurface disposal system at APN 027-470-007. This evaluation is in addition to the site evaluation conducted in 2019 under permit number E19-00439. Six test pits (TP1-TP6) were excavated approximately 150 feet away from the blue line slough located on the parcel. Each test pit had suitable soils with moderate structure ranging from 36" to 59". TP 1 and 2 had massive clay at 50" and 52", respectively. TPs 4-6 has weak structure starting between 36" to 39". TP 5 and 6 both had groundwater at 59". Both Summit and Napa County agreed with a Sandy Clay field texture so hydrometer testing was not performed. The most restrictive soil application rate for sandy clay is 0.3 gal/SF/day from Geoflow. Mottling was not apparent in any of the test pits. The proposed primary area is proposed to be within areas observed in E19-00439, however enough area was found during the 3/17/2022 evaluation to contain both the primary and reserve area if needed.

Test Pit # 1

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling	Color
					Side Wall	Ped	Wet				
0-30		<5	SC	M/SB	SH	F	S	C/F	F/F	N	
30-50	G	<5	SC	M/SB	SH	F	S	C/F	N/A	N	
50-60	G	<5	SC	Massive							

Test Pit # 2

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling	Color
					Side Wall	Ped	Wet				
0-43		<5	SC	M/SB	SH	Frb	S	C/F	N/A	N	
43-52	G	<5	SC	M/SB	SH	Frb	S	C/F	N/A	N	
52-60	G	<5	SC	Massive							

Test Pit # 3

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling	Color
					Side Wall	Ped	Wet				
0-16		<5	SC	M/SB	SH	Frb	SS	C/F	N/A	N	
16-45	G	<5	SC	M/SB	SH	Frb	S	C/F	N/A	N	
45-60	G	10	SC	M/SB	SH	Frb	S	C/F	N/A	N	

Boundary	Texture	Structure	Consistence			Pores	Roots	Mottling	Color
A=Abrupt <1" C=Clear 1"-2.5" G=Gradual 2.5"-5" D=Diffuse >5"	S=Sand LS=Loamy Sand SL=Sandy Loam SCL=Sandy Clay Loam SC=Sandy Clay CL=Clay Loam L=Loam C=Clay SiC=Silty Clay SiCL=Silty Clay Loam SiL=Silt Loam Si=Silt	W=Weak M=Moderate S=Strong  G=Granular Pl=Platy Pr=Prismatic C=Columnar AB=Angular Blocky SB=Subangular Blocky M=Massive SG=Single Grain C=Cemented	Side Wall	Ped	Wet	Quant: F=Few C=Common M=Many Size: VF=Very Fine F=Fine M=Medium C=Coarse VC=Very Coarse ExC=Extremely Coarse	Quant: F=Few C=Common M=Many Size: F=Fine M=Medium C=Coarse VC=Very Coarse ExC=Extremely Coarse	Quant: F=Few C=Common M=Many Size: F=Fine M=Medium C=Coarse VC=Very Coarse ExC=Extremely Coarse	Contrast: Ft=Faint, D=Distinct P=Prominent
			L=Loose S=Soft SH=Slightly Hard H=Hard VH=Very Hard ExH=Extremely Hard	L=Loose VFRB=Very Friable FRB=Friable F=Firm VF=Very Firm ExF=Extremely Firm	NS=NonSticky SS=Slightly Sticky VS=Very Sticky NP=NonPlastic SP=Slightly Plastic P=Plastic VP=Very Plastic				

Munsell color chart

Test Pit # 4

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling	Color
					Side Wall	Ped	Wet				
0-38		<5	SC	M/SB	SH	Frb	S	C/F	F/F	N	
38-60	G	<5	SC	W/SB	S	Frb	S	C/F	N/A	N	

Test Pit # 5

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling	Color
					Side Wall	Ped	Wet				
0-39		<5	SC	M/SB	SH	Frb	S	C/F	N/A	N	
36-60	G	<5	SC	W/SB	S	Frb	S	F/F	N/A	N	
Groundwater at 59"											

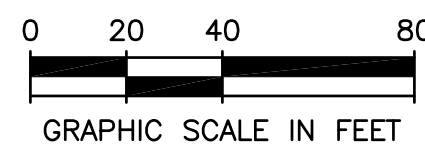
Test Pit # 6

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling	Color
					Side Wall	Ped	Wet				
0-36		<5	SC	M/SB	SH	Frb	S	C/F	N/A	N	
36-60	G	<5	SC	W/SB	S	Frb	SS	C/F	N/A	N	
Groundwater at 59"											

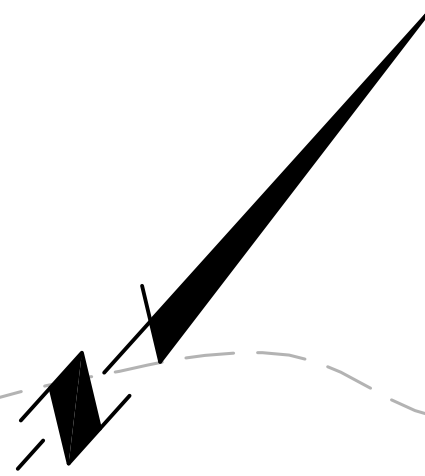
Boundary	Texture	Structure	Consistence			Pores	Roots	Mottling	Color
A=Abrupt <1" C=Clear 1"-2.5" G=Gradual 2.5"-5" D=Diffuse >5"	S=Sand LS=Loamy Sand SL=Sandy Loam SCL=Sandy Clay Loam SC=Sandy Clay CL=Clay L=Loam C=Clay SiC=Silty Clay SiCL=Silty Clay Loam SiL=Silt Loam Si=Silt	W=Weak M=Moderate S=Strong  G=Granular Pl=Platy Pr=Prismatic C=Columnar AB=Angular Blocky SB=Subangular Blocky M=Massive SG=Single Grain C=Cemented	Side Wall	Ped	Wet	Quanti: F=Few C=Common M=Many Size: VF=Very Fine F=Fine M=Medium C=Coarse VC=Very Coarse	Quanti: F=Few C=Common M=Many Size: F=Fine M=Medium C=Coarse VC=Very Coarse ExC=Extremely Coarse	Quanti: F=Few C=Common M=Many Size: F=Fine M=Medium C=Coarse VC=Very Coarse ExC=Extremely Coarse	Contrast: Ft=Faint, D=Distinct P=Prominent
			L=Loose S=Soft SH=Slightly Hard H=Hard VH=Very Hard ExH=Extremely Hard	VFRB=Very Friable FRB=Friable F=Firm VF=Very Firm ExF=Extremely Firm	NS=NonSticky SS=Slightly Sticky S=Sticky VS=Very Sticky NP=NonPlastic SP=Slightly Plastic P=Plastic VP=Very Plastic				

Munsell color chart

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GRAPHIC SCALE IN FEET



100' SETBACK TO BLUELINE

TEST PITS, E22-00136, "TP", TYP OF 6

60" TP-3

52" TP-2

APN 027-470-007

50" TP-1

60" TP-4

54" TP-6

58" TP-7

48" TP-10

54" TP-8

58" TP-5

58" TP-9

58" TP-11

58" TP-12

58" TP-13

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Bella Union Winery  
Wastewater Feasibility Study  
Revised: July 13, 2022

**SUMMIT ENGINEERING, INC.**  
Project No. 2021307



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