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Wastewater Feasibility Study



WINERY WASTEWATER FEASIBILITY REPORT

SLEEPING GIANT WINERY
2258 LAS AMIGAS ROAD
NAPA, CALIFORNIA

APN 047-290-031

PROPERTY OWNER:

Chris Dearden
P.O. Box 4364
Napa, CA 94558

Project# 4115030.0
August 25, 2015





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INTRODUCTION

The owner is applying to the County of Napa for a Winery Use Permit. The permit will allow a production of 30,000 gallons per year. The property is an 11.4 +/- acre parcel located at 2258 Las Amigas Road, Napa (APN 047-290-031). Access to the property is an existing driveway connecting to Las Amigas Road.

Most of the property is relatively level with increasing slopes to the west side of the property. The property slopes range from 1- 5% and is currently used for vineyards. A single 2-bedroom residence exists in the northeastern area of the property. The existing septic system runs west of the residence into the vineyard area. Two wells exist on the property. One well is located in the southern portion of the property, near the existing driveway. The second well is located east of the existing residence. The wells will be for winery use. Appendix 1 contains a Site Location Map and a USGS Site Map showing the parcel topography, features and boundary. Appendix 2 contains a reduced version of the proposed winery plan set.

This report will evaluate the disposal of wastewater consisting of winery process wastewater, and winery domestic wastewater. The report will also identify a 200% reserve dispersal field for the existing residence.

SITE EVALUATION

RSA+ conducted a site evaluation on the subject parcel on May 5, 2015. Appendix 3 contains a map of test pit locations and test pit logs for the site evaluation.

The site evaluation was conducted by Jake Strickler of RSA+ and observed by Rebecca Setliff of Napa County Environmental Management.

Representative soil samples were analyzed in the field during the site evaluation. The soil sample results are shown in Appendix 3. Site evaluation test pit logs are shown in Appendix 3.



WINERY PROCESS WASTEWATER CHARACTERISTICS

The following is a summary of the winery wastewater characteristics:

Wine Production: 30,000 gallons of wine per year
2.38 gallons of wine per case
12,605 cases/year

Wastewater Production: 5 gallons of wastewater/gallon of wine
150,000 gallons/year

Peak Daily Waste Water Flow: Crush Period = 45 days
Annual wine production x 1.5 / 45
1,000 gallons/day

Average Daily Flow: 150,000/365 = 411 gallons/day

Monthly Wastewater Flows:

TABLE 1

	% By Month	Waste/Month	
Sep	15%	21,000	Gal/Month
Oct	15%	21,000	Gal/Month
Nov	11%	16,500	Gal/Month
Dec	8%	12,000	Gal/Month
Jan	4%	6,000	Gal/Month
Feb	6%	9,000	Gal/Month
Mar	6%	9,000	Gal/Month
Apr	5%	7,500	Gal/Month
May	6%	9,000	Gal/Month
Jun	7%	10,500	Gal/Month
Jul	9%	13,500	Gal/Month
Aug	10%	15,000	Gal/Month
Totals	100%	150,000	Gal/Year



DOMESTIC WASTEWATER CHARACTERISTICS

The winery domestic wastewater system has been sized to accommodate the unit values in Table 2 below. The number of visitors and employees is based on information provided by the owner. The projected flow is based on Napa County Environmental Management guidelines. The following is a summary of the estimated flows from the proposed winery.

Table 2

Use	Source	Number	Projected Flow (gpd)	Total Flow No Event Day (gpd)	Total Flow Event Day (gpd)
WINERY	Full-time employees	5	15	75	75
	Part-time employees	1	15	15	15
	Harvest employees	2	15	30	30
	Visitors	15	3	45	45
	Private Event w/ meals (catered)	50	10	0	500
	Event Staff	3	15	0	45
Winery Subtotals				165	710
Grand Total			Total Peak Flow	165	710

The number of visitors is based on a maximum expected daily visitor count. Any combination of events where the expected total guest count exceeds 65 persons in a single day will require the use of portable sanitation facilities.

WINERY PROCESS WASTEWATER - SURFACE DRIP IRRIGATION

According to Napa County Environmental Management Sewage Treatment System Design Guidelines, winery process wastewater must be treated prior to surface discharge. Based on our experience, winery wastewater characteristics are as follows:

Characteristics	Units	Average
pH		3.5
BOD5	mg/l	6000
TSS	mg/l	500
Nitrogen	mg/l	20
Phosphorus	mg/l	10



The treatment goal is 160 mg/l BOD and 80 mg/l TSS. To meet this treatment goal a treatment train including a septic tank, treatment tank with High Strength Membrane Bio-Reactor (HSMBR) unit, and pump tank are proposed. This treatment train may be modified for more desirable treatment processes prior to submitting construction plans. The following sections describe this process in more detail. This system is shown on Sheet UP3 contained in Appendix 2.

Septic Tank

The septic tank will serve to buffer peak flows and strengths from overwhelming the system and impairing treatment. A new tank will be provided. This tank will provide three days storage and will also serve to function as a primary settling basin. This tank will be 3,000 gallons.

Treatment Tank

The treatment tank will serve to treat wastewater flows using a High Strength Membrane Bio-Reactor (HSMBR) unit. This tank will be 13,000 gallons.

Pump Tank

The pump tank will serve to hold wastewater prior to distribution to the storage tank. This tank will house dual pumps. This tank will be 1,000 gallons.

Holding Tank and Dispersal Field

To provide a preliminary estimate of the amount of storage tanks required, we have prepared a monthly water balance, as shown in Appendix 4. Monthly wastewater production is based on a percentage of the total annual wastewater production. The amount of water allowed to be applied is estimated by the typical vine water demand. The irrigation will be applied to areas of vineyards outside well setback requirements. The area proposed for irrigation is shown in Appendix 4. An area of 7.7 acres of vineyard and 0.3 acres of cover crop has been used to calculate the storage capacity required. Based on monthly analysis no storage is required. However, a storage capacity of 10,000 gallons will be provided for treated process wastewater generated during wet weather periods. This is based on providing a minimum of 10 days storage of the average process wastewater flows plus the storage required by the monthly water balance.

During the summer months all of the treated wastewater will be used for irrigation. During the wet winter months, a limited discharge will be consistent with landscape water demand and no discharge will occur within 48-hours of a forecasted rain event and also for 48-hours after a rain event. These irrigation scheduling constraints necessitate installing a tank to store excess water that cannot be discharged during the winter months. All stored water will then be used for irrigation during the summer months.



WINERY PROCESS WASTEWATER - HOLD & HAUL OPTION

Napa County Design Guidelines require a Hold and Haul volume equivalent to 7 days of peak process waste flow. This equates to 7,000 gallons of required storage for the proposed project at full production. Wastewater would be hauled to a facility permitted to accept winery process wastewater.

For this option pre-cast concrete holding tanks or equivalent capacity fiberglass tanks would be used. A high water alarm beacon, powered by the electrical system in the winery, will be located on an exterior panel.

Hold and haul would only be used in extenuating situations such as extended wet weather event exceeding 10 days of rain.

DOMESTIC WASTEWATER - SUB SURFACE DRIP

A septic system and dispersal field will be designed for the proposed winery. A HOOT treatment system and a new dispersal field are proposed.

Domestic wastewater from the proposed winery will flow into a new HOOT H-1000 tank. After pretreatment in the HOOT H-1000, wastewater will be pumped to the proposed distribution field.

The subsurface drip field is sized to meet Napa County Environmental Management guidelines. The distribution field will be placed in the area of the site evaluation where the most limiting usable soil type was clay with a moderate subangular-blocky structure. A 6-inch fill will be added to meet Napa County requirements. The allowable application rate for sandy clay is 0.3 gallons/square foot/day for pre-treated effluent. Peak daily domestic wastewater flow is 710 gallons/day.

$$\text{Dispersal Field Area(primary)} = \frac{710 \text{ gpd}}{0.3 \text{ gpd / SF}} = 2,367 \text{ square. feet}$$

In addition to the primary dispersal area of 2,367 square feet, a 200% reserve area is required. The reserve area will be located south of the primary field where the soil application rate is also 0.3 gallons/square foot/day.

$$\text{Dispersal Field Area(reserve area)} = \frac{710 \text{ gpd}}{0.3 \text{ gpd / SF}} = 2,367 \text{ square. feet}$$

The total requirement for winery domestic wastewater reserve dispersal area is 4,734 square feet. Total combined area required for the primary and reserve fields for the winery is 7,101 square feet.



A 200% reserve area for the existing 2-bedroom residence will be provided. The reserve area will be located adjacent to the winery primary dispersal field where the soil application rate is also 0.3 gallons/square foot/day.

$$\text{Dispersal Field Area (reserve area)} = \frac{240 \text{ gpd}}{0.3 \text{ gpd / SF}} = 800 \text{ square.feet}$$

The total requirement for the residence domestic wastewater reserve dispersal field area is 1,600 square feet.

The system layout is shown on UP3 in Appendix 2.

OPERATION AND MAINTENANCE

The winery process and domestic wastewater systems will be fully automated and will be designed so minimal input from winery staff is required. Per Napa County guidelines, a Registered Civil Engineer, Registered Environmental Health Specialist, or Licensed Contractor will provide semi-annual monitoring and evaluation of the system. The contract with the responsible party will be provided prior to the final inspection for the system installed.

CONCLUSION

This report demonstrates that enough dispersion area is available making a sub-surface drip system a feasible option for treating the Sleeping Giant Winery domestic wastewater. It has also been demonstrated that it is feasible to treat the winery process wastewater and distribute this to the vineyard using drip irrigation.

The above methodology results in a design that meets the Napa County Environmental Management Design standards for the treatment of winery and domestic wastewater.



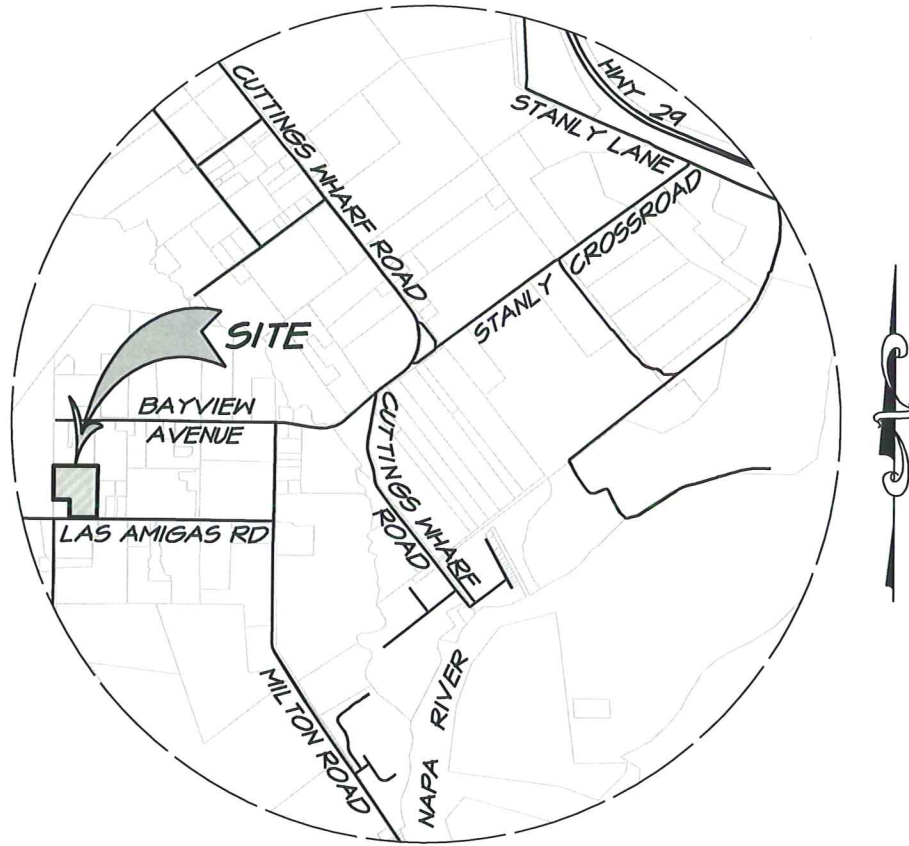
Appendix 1

Vicinity Map & USGS Site Map

SLEEPING GIANT WINERY VICINITY MAP

NAPA COUNTY

CALIFORNIA



VICINITY MAP

SCALE: 1" = 3000'

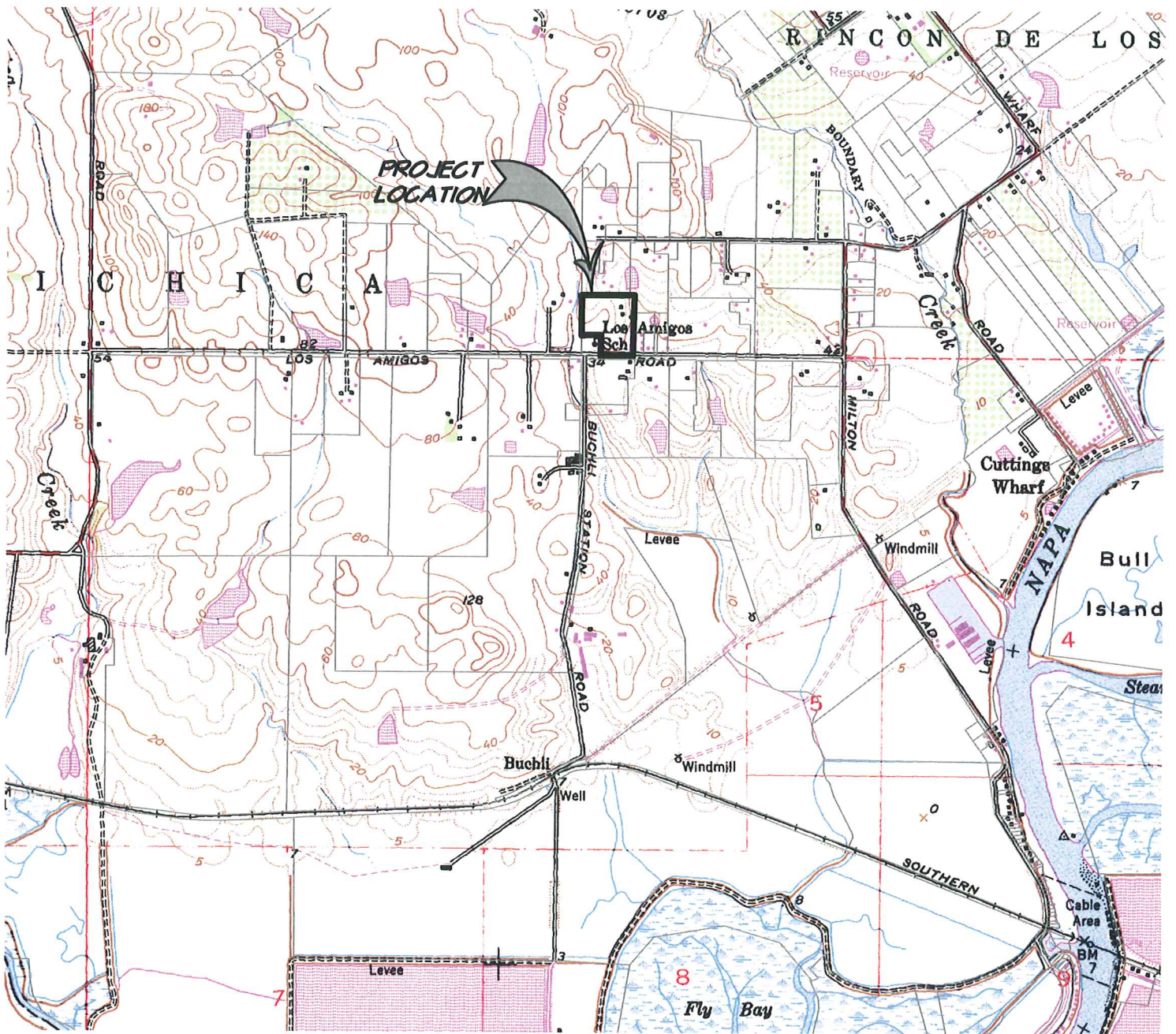
RSA⁺	1515 FOURTH STREET
	NAPA, CALIF. 94559
	OFFICE 707 252.3301
	+ www.RSAcivil.com +

RSA⁺ | CONSULTING CIVIL ENGINEERS + SURVEYORS + est. 1980

MAY 8, 2015

4115030.0 Exh-Vic Map.dwg

SLEEPING GIANT WINERY USGS QUAD MAP



SCALE: 1"=2000'

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	NAPA, CALIF. 94559
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	+ www.RSAcivil.com +

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JULY 1, 2015

4115030.0

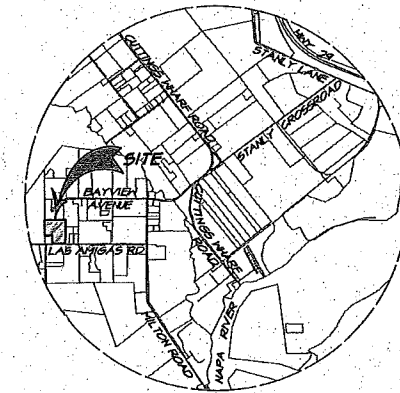
USGSMAP.dwg



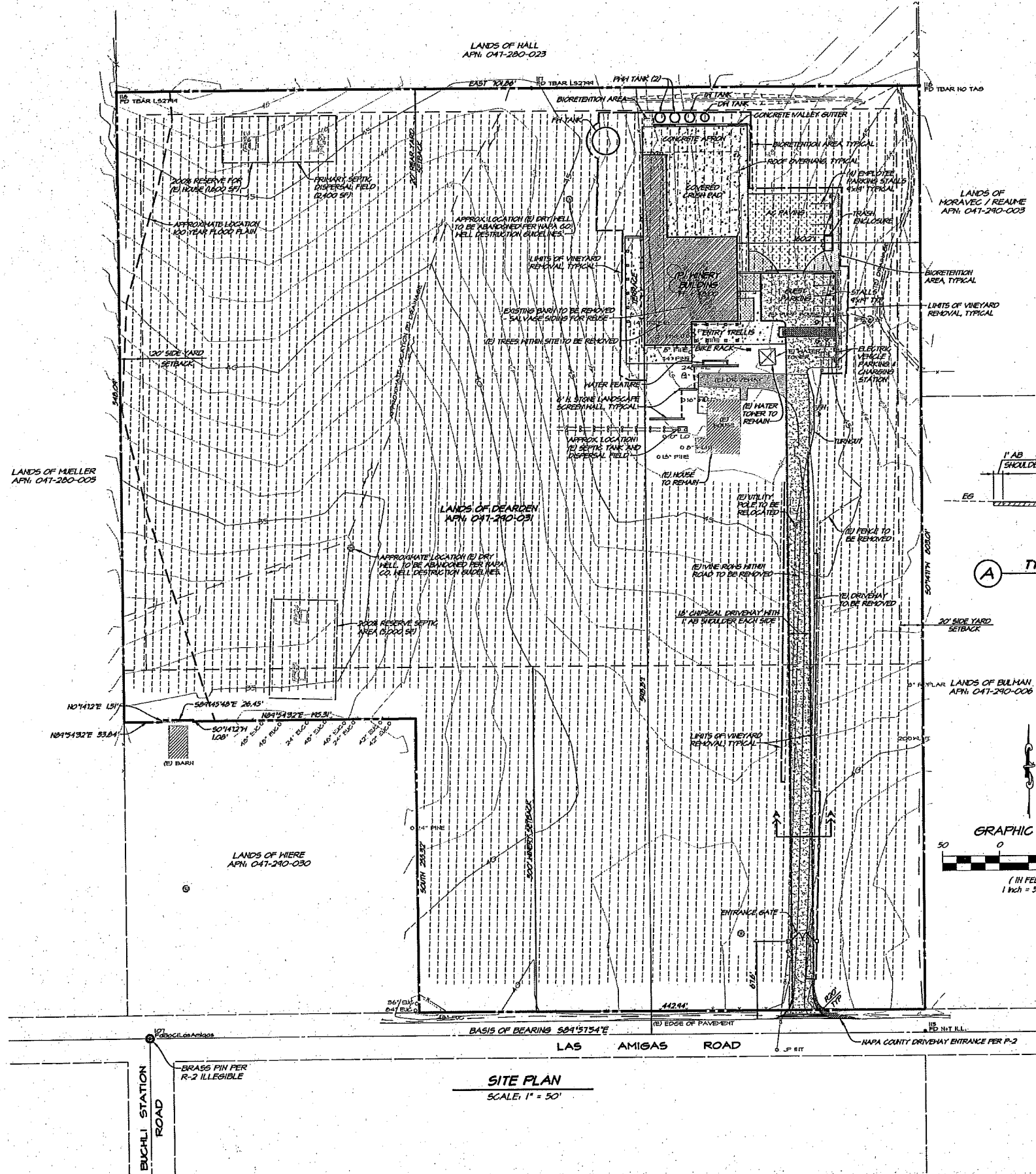
Appendix 2

Reduced Use Permit Plan Set

SLEEPING GIANT WINERY USE PERMIT PLANS



VICINITY MAP
SCALE: 1" = 3000'



SITE PLAN
SCALE: 1" = 50'

HATCH LEGEND

- (E) PAVED DRIVEWAY
- GUEST PARKING & DRIVEWAY, CHIPSEAL OVER AB
- EMPLOYEE PARKING, ASPHALT CONCRETE OVER CLASS II AB
- CONCRETE
- LANDSCAPING, S.A.D.

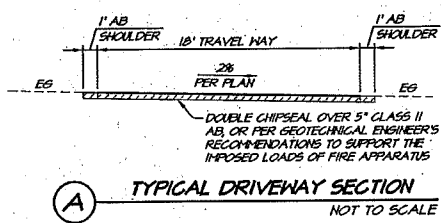
NOTE: PAVEMENT SECTIONS TO BE BASED ON MINIMUM TRAFFIC INDEX OF 6 AND BE CAPABLE OF SUPPORTING 120-44 LOADINGS.

SYMBOL LEGEND

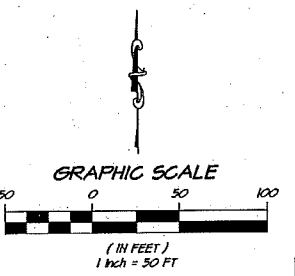
- EXISTING**
- △ SURVEY CONTROL STATION
 - FOUND
 - BRASS PIN
 - PROPERTY LINE
 - - - VINE ROW
 - FLOW LINE
 - - - SETBACK
 - - - SEPTIC LINE
 - TREE (AS NOTED)
 - ⊙ WELL
 - ~ NATURAL DRAINAGE FLOW
- PROPOSED**
- SS SANITARY SEWER
 - SS OR PPH FORCE MAIN
 - PH PROCESS WASTE WATER
 - CO CLEANOUT
 - DH DOMESTIC WATER
 - FW FIRE WATER
 - IR IRRIGATION WATER
 - RH RECYCLED WATER
 - HW WELL WATER
 - FH FIRE HYDRANT
 - ⊕ BUBBLE UP

ABBREVIATIONS

- CL CENTERLINE
- CO CLEANOUT
- DH DOMESTIC WATER
- EP EDGE OF PAVEMENT
- EV ELECTRIC VEHICLE
- EX / (E) EXISTING
- FD FOUND
- FF FINISH FLOOR
- PPPH FORCED PROCESS WASTE WATER
- FG FINISH GRADE
- E FLOW LINE
- FW FIRE WATER
- GB GRADE BREAK
- HP HIGH POINT
- INVERT
- IP IRON PIPE
- IR IRRIGATION WATER
- LF LINEAL FEET/FOOT
- LP LOW POINT
- MH MANHOLE
- OC ON CENTER
- PL PROPERTY LINE
- PP PROPOSED NEW WORK
- PH PROCESS WATER
- PPPH PROCESS WASTE WATER
- R RADIUS
- RH RECYCLED WATER
- S SLOPE (FEET/FOOT)
- S.A.D. SEE ARCHITECTS DRAWINGS
- SS SANITARY SEWER
- SSCO SANITARY SEWER CLEANOUT
- SSPH SANITARY SEWER FORCE MAIN
- STA STATION



TYPICAL DRIVEWAY SECTION
NOT TO SCALE



PARKING SUMMARY	
ACCESSIBLE PARKING	2
EV PARKING	2
GUEST PARKING	4
EMPLOYEE PARKING	4
TOTAL	12

PROJECT INFORMATION

CLIENT: COSTA DEL SOLL, LLC
DEARDEN WINES
P.O. BOX 4564
NAPA, CA 94558
CONTACT: CHRIS DEARDEN
SITE ADDRESS: 2258 LAS AMIGAS ROAD
NAPA, CA 94559
CIVIL ENGINEER: RSA+
1515 FOURTH STREET
NAPA, CA 94559
APN: 041-290-031
PARCEL AREA: 11.41 ACRES
EXISTING USE: VINEYARD / RESIDENTIAL
PROPOSED USE: WINERY
ZONING: AH

BOUNDARY NOTES

THE BOUNDARY SHOWN IS BASED ON A RECORD OF SURVEY BY MICHAEL H. BROOKS & ASSOCIATES, INC., DATED JANUARY 2008.
ADJOINING PARCEL LINES PROVIDED BY NAPA COUNTY GIS AND ARE TO BE CONSIDERED APPROXIMATE.
BASIS OF BEARINGS: THE BEARINGS OF S89°51'54"E BETWEEN THE FOUND MONUMENTS ON THE CENTERLINE OF LAS AMIGAS ROAD PER 6 PARCEL MAPS 01, MAP 12608.

SURVEY NOTES

TOPOGRAPHY BASED ON A FIELD SURVEY PERFORMED BY MICHAEL H. BROOKS & ASSOCIATES, INC. IN SEPTEMBER 2005. CONTOURS ARE SHOWN EVERY TWO FEET (2'), HIGHLIGHTED EVERY TEN FEET (10').
ELEVATIONS SHOWN ARE BASED UPON CITY OF NAPA BENCHMARK MNB24. ELEVATION = 49.53' NSVD29

SHEET INDEX

UP1.0 SITE & LAYOUT PLAN
UP2.0 GRADING, EROSION & SEDIMENT CONTROL PLAN
UP3.0 UTILITY PLAN

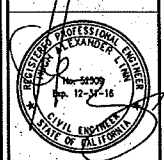
CALL USA
BEFORE EXCAVATING



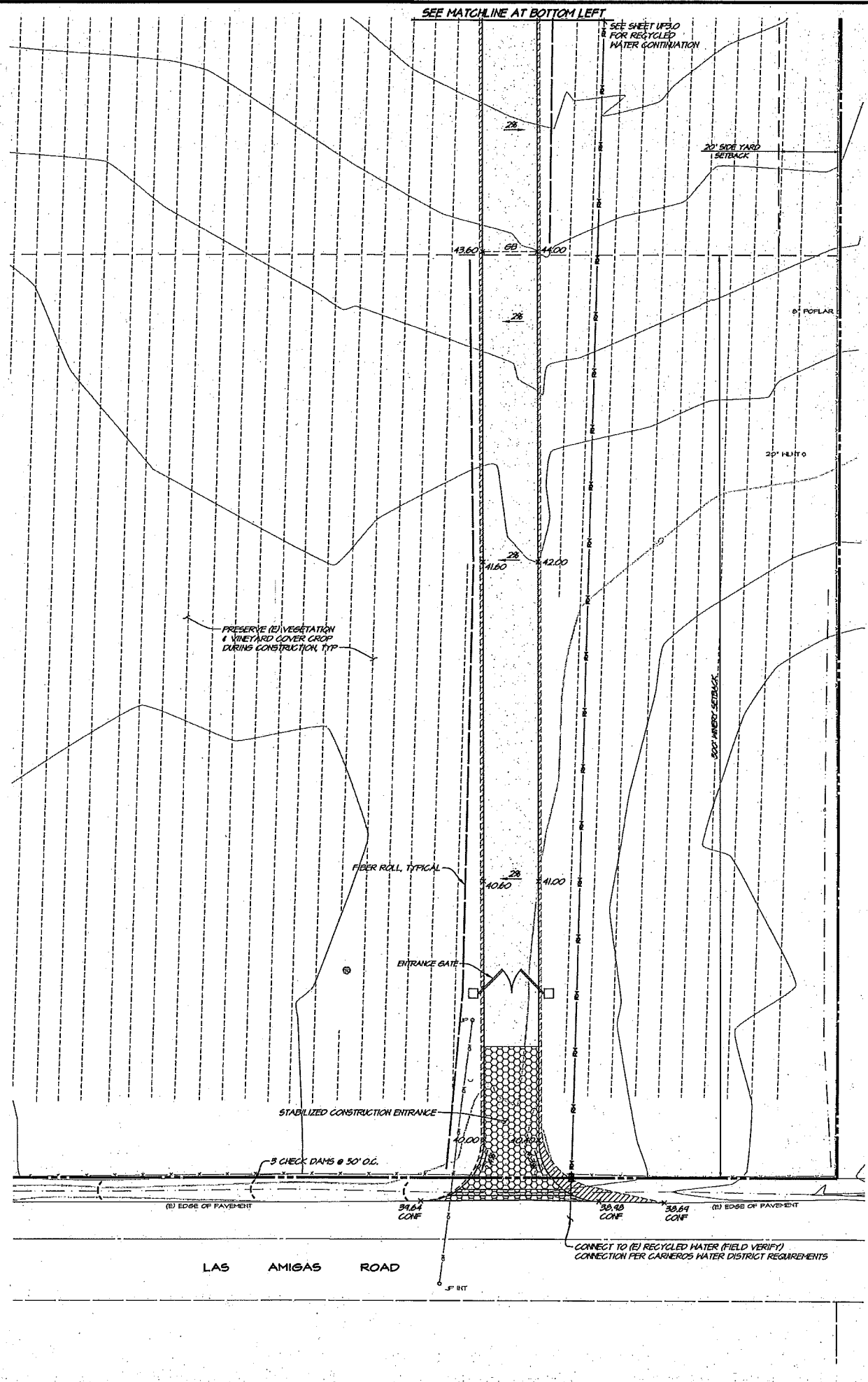
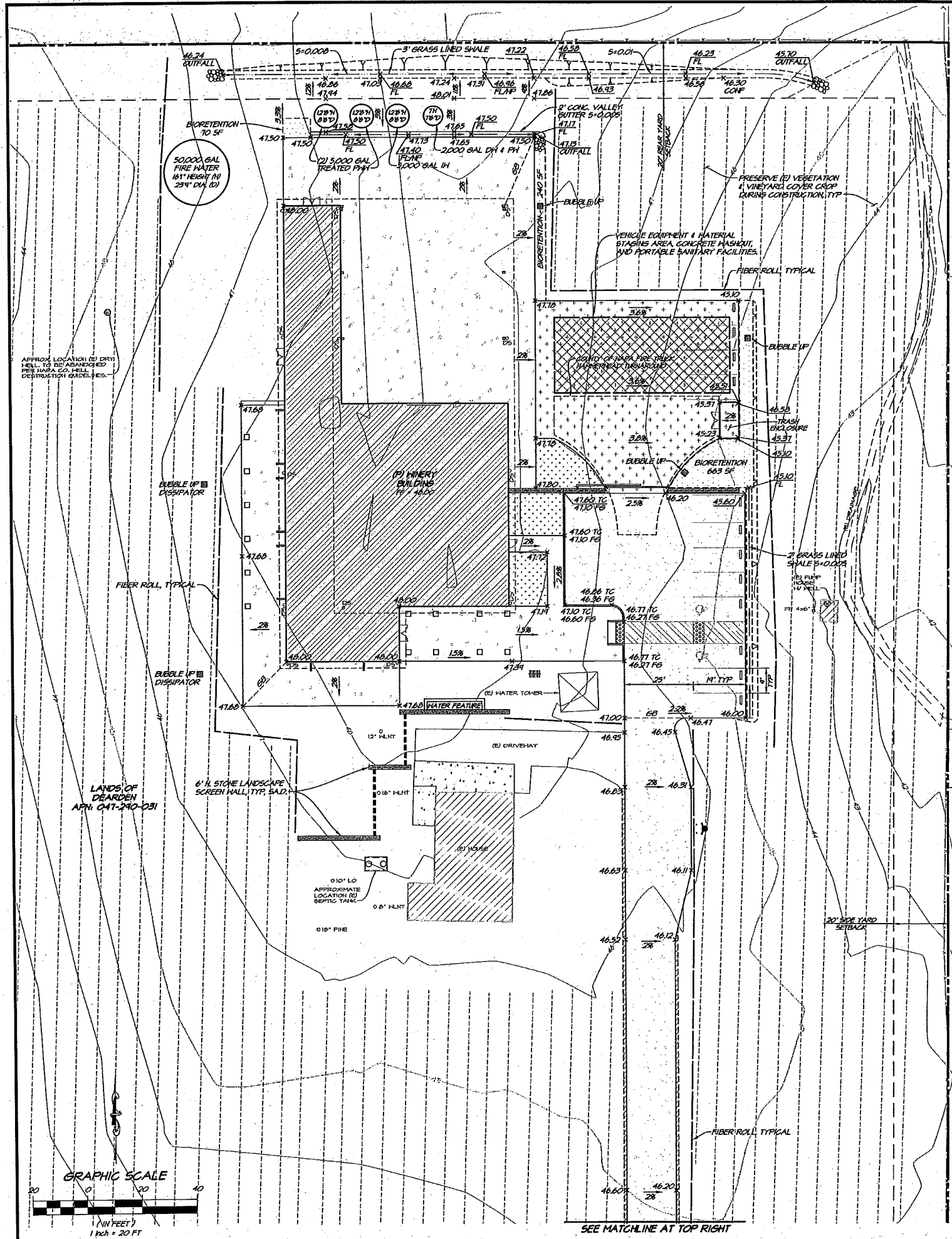
48 HOURS IN ADVANCE
1 (800) 227-2600

NO.	DATE	REVISIONS	BY	APPD

SLEEPING GIANT WINERY
SITE & LAYOUT PLAN
 CALIFORNIA
 NAPA COUNTY



DATE	AUGUST 21, 2015
DRAWN	JFH
DESIGNED	D.S.M.S.
CHECKED	CHP/PPH
JOB NO.	415030.0
SHEET NO.	UP1.0
1 OF 3 SHEETS	

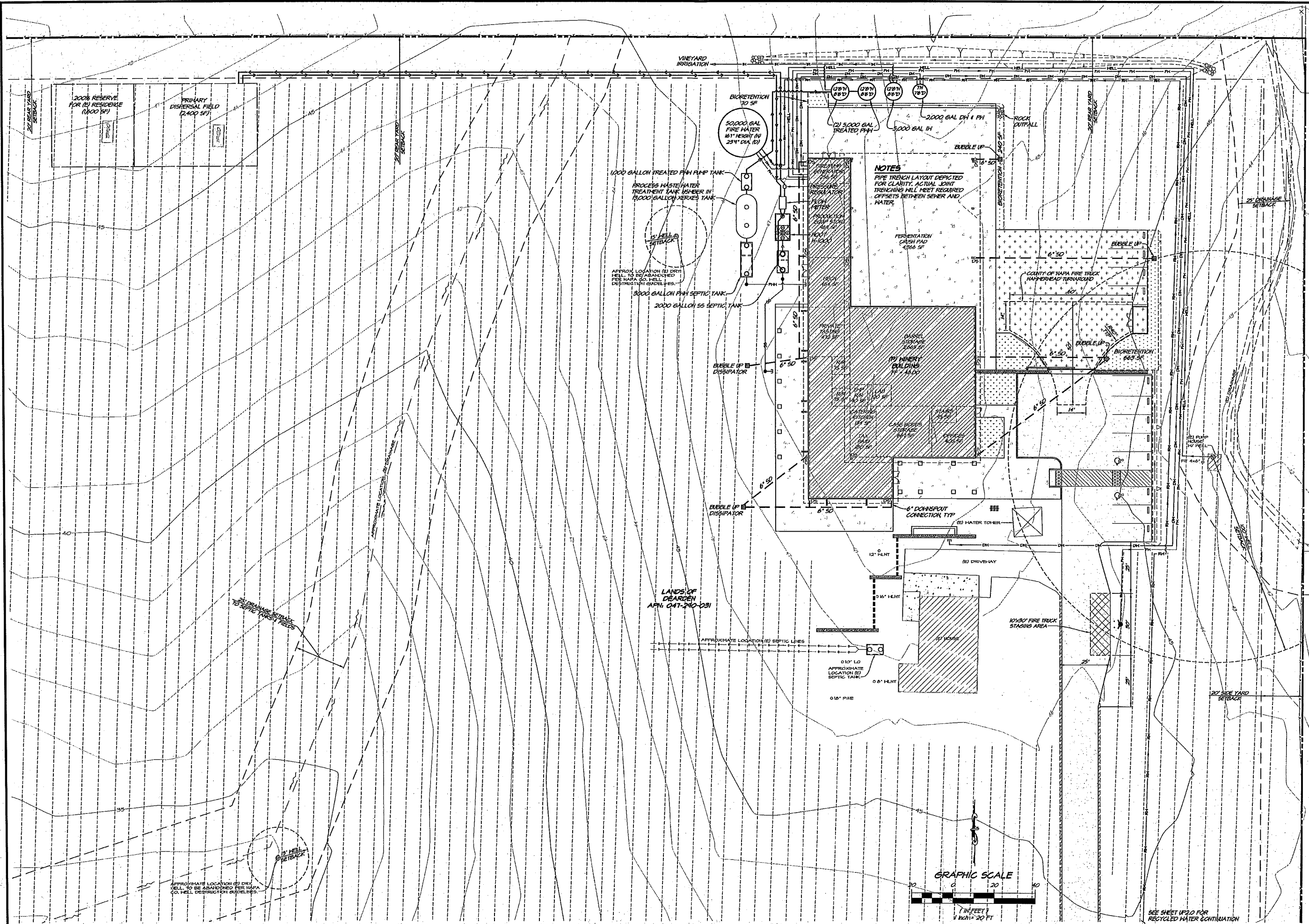


APP	BY	
REVISIONS	DATE	
NO.		

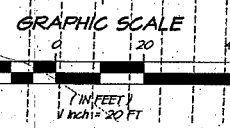
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 OFFICE (707) 252-3301
 + www.rsapl.com +

SLEEPING GIANT WINERY
GRADING, EROSION & SEDIMENT CONTROL PLAN
 CALIFORNIA
 NAPA COUNTY

DATE: AUGUST 21, 2015
 DRAWN: JFH
 DESIGNED: D.L.M.
 CHECKED: B.H.F.
 JOB NO.: 115230.0
 SHEET NO.: **UP2.0**
 2 OF 3 SHEETS



NOTES
 PIPE TRENCH LAYOUT DEPICTED FOR CLARITY. ACTUAL JOINT TRENCHING WILL MEET REQUIRED OFFSETS BETWEEN SEWER AND WATER.



NO.	DATE	REVISIONS	BY	APPD

RSA+
 1515 FOURTH STREET
 NAPA, CALIF. 94559
 OFFICE 707/252-3301
 + WWW.RSACAL.COM +
 RSA+ CONSULTING CIVIL ENGINEERS + SURVEYORS + [1980]

SLEEPING GIANT WINERY
UTILITY PLAN
 CALIFORNIA
 NAPA COUNTY



DATE	AUGUST 27, 2013
DRAWN	JFH
DESIGNED	C.S.A.G.
CHECKED	BNF/JFH
JOB NO.	1150300
SHEET NO.	UP3.0
3 OF 3 SHEETS	

SEE SHEET UP2.0 FOR RECYCLED WATER CONTINUATION



Appendix 3

Site Evaluation Report

**Napa County Department of
Environmental Management**

SITE EVALUATION REPORT


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 #: E15-00295	
APN:	047-290-031
(County Use Only) Reviewed by:	Date:

PLEASE PRINT OR TYPE ALL INFORMATION

Property Owner Chris Dearden	<input checked="" type="checkbox"/> New Construction <input type="checkbox"/> Addition <input type="checkbox"/> Remodel <input type="checkbox"/> Relocation <input type="checkbox"/> Other:
Property Owner Mailing Address 103 Winedale Lane	<input type="checkbox"/> Residential - # of Bedrooms: Design Flow : gpd
City State Zip Napa CA 94558	<input checked="" type="checkbox"/> Commercial – Type: Winery Sanitary Waste: 750 gpd Process Waste: gpd
Site Address/Location 2258 Las Amigas Road Napa, CA 94559	<input type="checkbox"/> Other: Sanitary Waste: gpd Process Waste:

Evaluation Conducted By:

Company Name RSA*	Evaluator's Name Jake Strickler	Signature (Civil Engineer, R.E.H.S., Geologist, Soil Scientist) 
Mailing Address: 1515 Fourth Street		Telephone Number 707-252-3301
City State Zip Napa CA 94559	Date Evaluation Conducted May 5, 2015	

<u>Primary Area</u>	<u>Expansion Area</u>
Acceptable Soil Depth: 24 in. Test pit #'s: 20, 30	Acceptable Soil Depth: 24 in. Test pit #'s: 24, 25
Soil Application Rate (gal. /sq. ft. /day): 0.3	Soil Application Rate (gal. /sq. ft. /day): 0.3
System Type(s) Recommended: sub-surface drip with pretreatment	System Type(s) Recommended: sub-surface drip with pretreatment
Slope: 1-5% Distance to nearest water source: >100 feet	Slope: 1-5% Distance to nearest water source: >100 feet
Hydrometer test performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)	Hydrometer test performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)
Bulk Density test performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)	Bulk Density test performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)
Percolation test performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)	Percolation test performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)
Groundwater Monitoring Performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)	Groundwater Monitoring Performed? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> (attach results)
Site constraints/Recommendations:	

Test Pit # 1 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-17	C	<15%	C	M/S-B	SH	L	S	C/M	F/C	Yes
X	17-28	Bottom	<15%	C	Massive						
Notes:											

Test Pit # 2 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-19	C	<15%	C	M/S-B	SH	L	S	C/M	F/C	N/A
X	19-29	Bottom	<15%	C	Massive						Yes
Notes:											

Test Pit # 3 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-20	C	<15%	C	M/S-B	SH	FRB	S	C/M	C/M	N/A
X	20-27	Bottom	<15%	C	M/S-B	SH	L	S	F/F	F/F	Yes
Notes:											

Test Pit # 4 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
X	0-16	C	<15%	C	M/S-B	SH	L	S	C/M	C/F	Yes
	16-30	C	<15%	C	Massive						
Notes:											

Test Pit # 5 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
X	0-20	C	<15%	C	M/S-B	SH	L	S	C/M	C/F	Yes
	20-31	Bottom	<15%	C	Massive						Yes
Notes:											

Test Pit # 6 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
X	0-18	C	<15%	C	M/S-B	SH	L	S	C/M	C/C	Yes
	18-30	C	<15%	C	Massive						Yes
Notes:											

Test Pit # 7 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
X	0-24	C	<15%	C	M/S-B	SH	L	S	C/M	C/F	Yes
	24-33	Bottom	<15%	C	Massive						Yes
Notes:											

Test Pit # 8 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
X	0-18	C	<15%	C	M/S-B	SH	L	S	C/M	C/M	Yes
	18-29	Bottom	<15%	C	Massive						Yes
Notes:											

Test Pit # 9 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
X	0-19	C	<15%	C	M/S-B	SH	L	S	C/M	C/M	Yes
	19-32	Bottom	<15%	C	Massive						Yes
Notes:											

Test Pit # 10 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
X	0-19	C	25%	C	M/S-B	SH	L	S	C/M	C/F	Yes
	19-36	Bottom	<15%	C	Massive						Yes

Notes:

Test Pit # 11 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-20	C	<15%	C	M/S-B	SH	FRB	S	C/M	F/C	N/A
X	20-36	Bottom	<15%	C	Massive						

Notes:

Test Pit # 12 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-19	C	<15%	C	M/S-B	SH	L	S	C/F	C/F	N/A
X	19-26	Bottom	<15%	C	Massive						

Notes:

Test Pit # 13 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-22	C	<10%	C	M/S-B	SH	L	S	M/F	M/M	N/A
X	22-30	C	<10%	C	M/S-B	SH	F	S	F/F	F/F	Yes
Notes:											

Test Pit # 14 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-22	C	<10%	C	M/S-B	SH	L	S	M/M	M/F	N/A
X	22-35	C	<10%	C	M/S-B	SH	F	S	F/F	F/F	Yes
Notes:											

Test Pit # 15 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-22	C	<10%	C	M/S-B	SH	L	S	C/M	C/M	N/A
X	22-33	C	<10%	C	M/S-B	SH	L	S	F/F	F/F	Yes
Notes: Moist Soil											

Test Pit # 16 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
X	0-22	C	<10%	C	M/S-B	SH	L	S	M/F	M/F	Yes
	22-31	Bottom	<10%	C	Massive						
Notes:											

Test Pit # 17 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-16	C	<15%	C	M/S-B	SH	FRB	S	C/M	C/F	N/A
X	16-33	Bottom	<15%	C	Massive						
Notes:											

Test Pit # 18 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-18	C	<15%	C	M/S-B	SH	FRB	S	C/M	C/F	N/A
X	18-34	Bottom	<15%	C	Massive						
Notes:											

Test Pit # 19 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-18	C	<15%	C	M/S-B	SH	FRB	S	C/F	C/M	N/A
X	18-31	Bottom	<15%	C	Massive						
Notes:											

Test Pit # 20 Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-27	C	<15%	C	M/S-B	SH	L	S	C/M	C/C	N/A
X	27-32	Bottom	<15%	C	M/S-B	SH	L	S	F/F	F/F	Yes
Notes:											

Test Pit # 21 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-18	C	<15%	C	M/S-B	SH	FRB	S	C/F	F/M	N/A
X	18-36	Bottom	<15%	C	Massive						
Notes:											

Test Pit # 22 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-14	C	20%	C	M/S-B	SH	FRB	S	F/M	F/M	N/A
X	14-23	Bottom	<15%	C	Massive						
Notes:											

Test Pit # 23 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-14	C	15%	C	M/S-B	SH	F	S	C/F	F/M	N/A
X	14-20	Bottom	<15%	C	Massive						
Notes:											

Test Pit # 24 Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-24	C	<15%	C	M/S-B	SH	FRB	S	C/M	C/F	N/A
X	24-36	Bottom	<15%	C	Masive						Yes
Notes:											

Test Pit # 25 Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-24	C	15%	C	M/S-B	SH	FRB	S	C/M	C/M	N/A
X	24-28	Bottom	<15%	C	Massive						Yes
Notes:											

Test Pit # 26 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-20	C	20%	C	M/S-B	SH	L	S	C/M	C/M	N/A
X	20-29	Bottom	20%	C	M/S-B	SH	L	S	F/F	F/F	Yes
Notes:											

Test Pit # 27 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-18	C	25%	C	M/S-B	H	F	S	F/M	F/C	N/A
X	18-27	Bottom	<15%	C	Massive						
Notes:											

Test Pit # 28 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-12	C	20%	C	M/S-B	H	F	S	F/M	F/M	N/A
X	12-26	Bottom	<15%	C	Massive						

Notes:

Test Pit # 29 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
X	0-12	C	15%	C	M/S-B	SH	F	S	C/M	F/F	Yes
	12-30	Bottom	<15%	C	Massive						

Notes:

Test Pit # 30 Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-24	C	<15%	C	M/S-B	SH	L	S	C/M	C/F	N/A
X	24-37	Bottom	<15%	C	Massive						

Notes:

Test Pit # 31 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-20	C	<15%	C	M/S-B	SH	L	S	C/M	C/M	N/A
X	20-32	C	<15%	C	M/S-B	SH	L	S	C/M	F/F	Yes
Notes:											

Test Pit # 32 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-22	C	<15%	C	M/S-B	SH	L	S	C/M	C/M	N/A
X	22-32	C	<15%	C	M/S-B	SH	L	S	F/M	F/F	Yes
Notes:											

Test Pit # 33 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-19	C	<15%	C	M/S-B	SH	L	S	C/M	C/M	N/A
X	19-35	Bottom	<15%	C	Massive						
Notes:											

Test Pit # 34 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-17	C	<15%	C	M/S-B	SH	L	S	M/M	C/F	N/A
X	17-34	Bottom	<15%	C	Massive						
Notes:											

Test Pit # 35 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-16	C	<15%	C	M/S-B	SH	L	S	M/M	C/M	N/A
X	16-33	Bottom	<15%	C	Massive						
Notes:											

Test Pit # 36 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-19	C	15%	C	M/S-B	SH	L	S	M/M	C/F	N/A
X	19-32	Bottom	<15%	C	Massive						Yes
Notes:											

Test Pit # 37 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-21	C	20%	C	M/S-B	SH	L	S	C/M	C/M	N/A
X	21-32	C	15%	C	M/S-B	SH	L	S	C/M	F/M	Yes
Notes:											

Test Pit # 38 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-22	C	15%	C	M/S-B	SH	L	S	C/M	C/F	N/A
X	22-33	C	<15%	C	M/S-B	SH	L	S	C/M	F/F	Yes
Notes:											

Test Pit # 39 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-20	C	<15%	C	M/S-B	SH	L	S	C/M	C/F	N/A
X	20-29	Bottom	<15%	C	Massive						Yes
Notes:											

Test Pit # 40 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-22			C	M/S-B	SH	L	S	M/M	M/M	N/A
X	22-34	Bottom	<15%	C	Massive						Yes
Notes:											

Test Pit # 41 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-16	C	<15%	C	M/S-B	SH	FRB	S	M/M	M/F	N/A
X	16-29	Bottom	<15%	C	Massive						
Notes:											

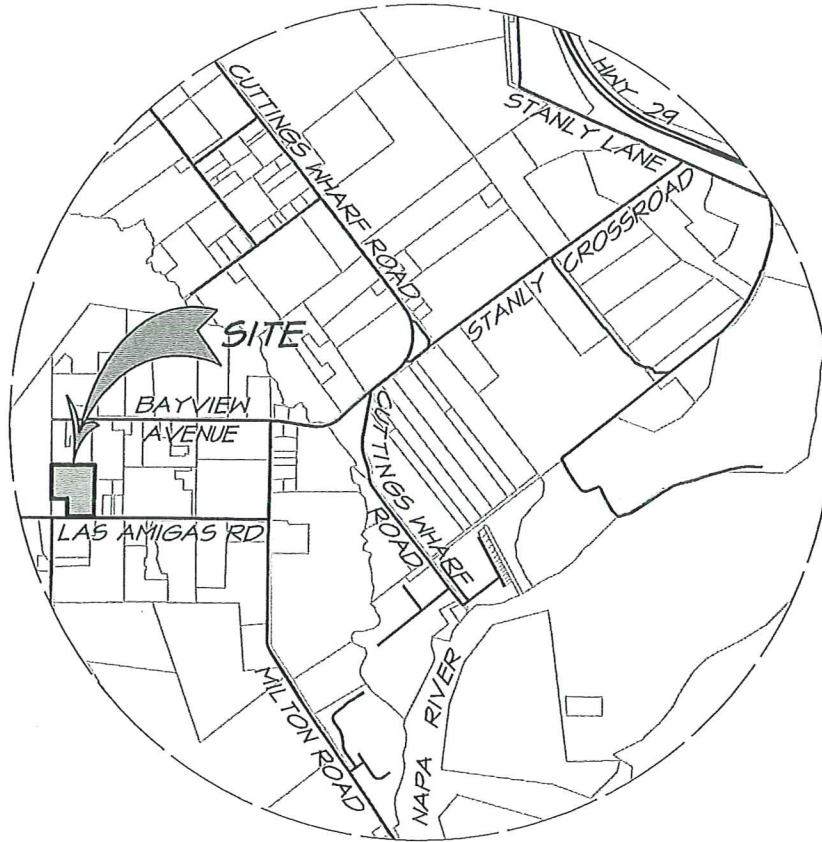
Test Pit # 42 No Good

X = Limiting Horizon	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-19			C	M/S-B	SH	FRB	S	M/M	M/F	N/A
X	19-33	Bottom	<15%	C	Massive						
Notes:											

DEARDEN PROPERTY VICINITY MAP

NAPA COUNTY

CALIFORNIA



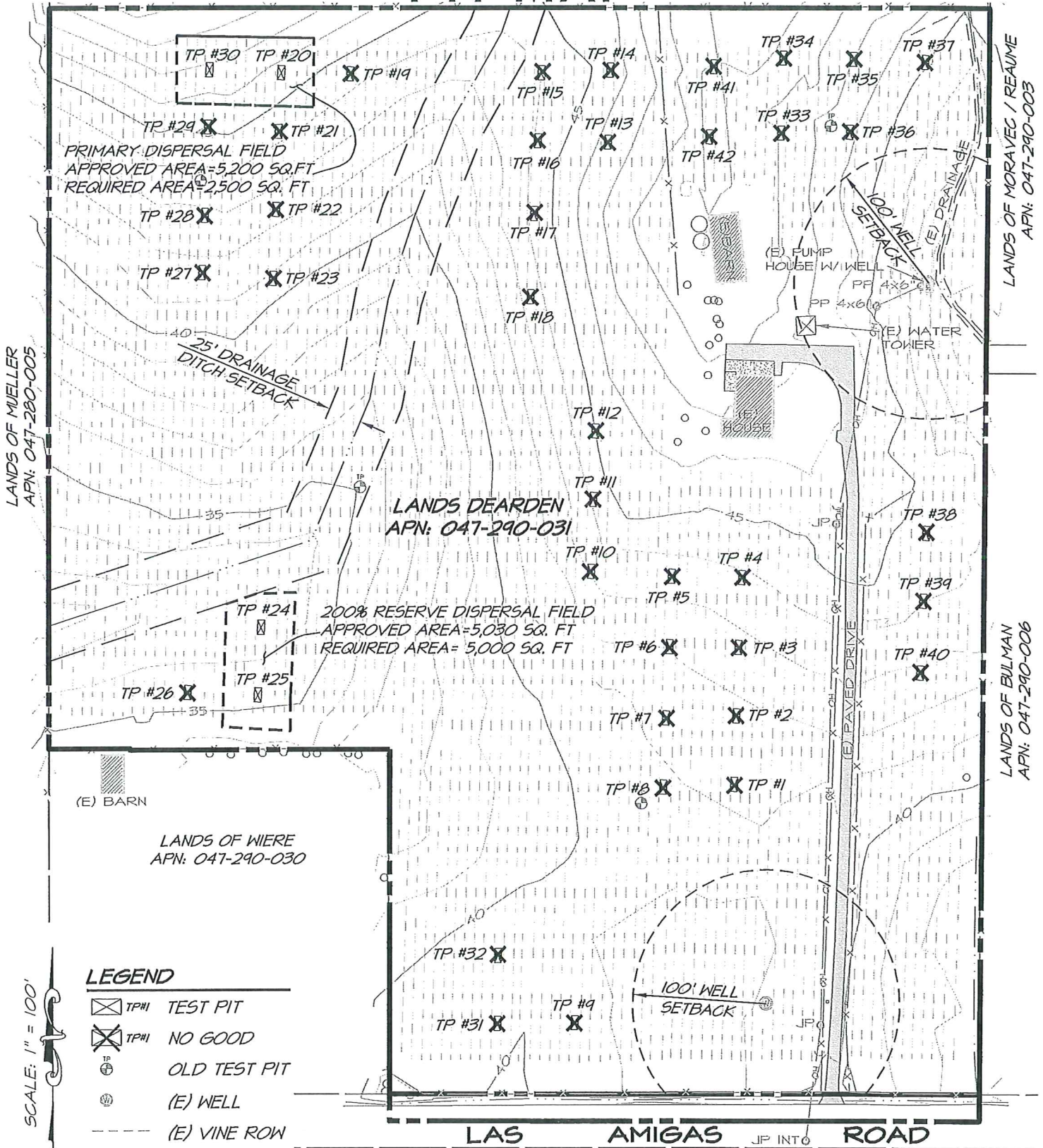
VICINITY MAP

SCALE: 1" = 3000'

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DEARDEN PROPERTY PIT MAP



SITE EVALUATION DATE: MAY 6, 2015
 APN: 047-290-031
 ADDRESS: 225B LAS AMIGAS ROAD
 NAPA, CA 94559
 ENV. HEALTH INSPECTOR: REBECCA SETLIFF

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Appendix 4

Water Balance for Irrigation and Storage, Irrigation Areas Exhibit

SLEEPING GIANT WINERY
Reclaimed Process Wastewater
Water Balance for Irrigation and Storage



Project Description		Annual Process Waste Flow Volume	
Project Number:	4115030.0	Wine Production:	30,000 gal/year
Project Name:	Sleeping Giant Winery		
Prepared By:	Jake Strickler	Annual Process Waste per Gallon Wine:	5 gal/year
Date:	July 21, 2015	Total Annual Process Waste Generated:	150,000 gal/year

Vineyard Irrigation Parameters		Landscape Irrigation Parameters	
Acres of irrigated vineyard:	7.69 acres	Crop type / name:	Native grass and trees
Row spacing:	8.0 feet	Total irrigated acres of crop:	0.30 acres
Vine spacing:	8.0 feet		
Total number of vines:	5,234 vines		
Water use per vine per month (peak):	26 gal		
Total peak monthly irrigation demand:	136,084 gal		

Monthly Process Wastewater Generation												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly process wastewater generated as % of annual total:	4%	6%	6%	5%	6%	7%	9%	10%	14%	14%	11%	8%
Monthly process wastewater generated [gallons]:	6,000	9,000	9,000	7,500	9,000	10,500	13,500	15,000	21,000	21,000	16,500	12,000

Monthly Vineyard Irrigation Water Use												
(Based on per-vine water use)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Beginning of month reclaimed water in storage [gallons] (This number brought forward from end of previous month)	0	0	0	0	0	0	0	0	0	0	0	0
Vineyard irrigation as % of peak month irrigation demand:	6%	6%	10%	100%	100%	100%	100%	100%	100%	100%	10%	10%
Irrigation per month per vine (gallons):	2	2	3	26	26	26	26	26	26	26	3	3
Total vineyard irrigation demand [gallons]:	8,165	8,165	13,608	136,084	136,084	136,084	136,084	136,084	136,084	136,084	13,608	13,608
Will vineyard be irrigated with reclaimed water this month?	y	y	y	y	y	y	y	y	y	y	y	y
Process wastewater generated this month, reclaimed for vineyard irrigation [gallons]	6,000	8,165	9,000	7,500	9,000	10,500	13,500	15,000	21,000	21,000	13,608	12,000
Remaining vineyard irrigation demand after using this month's process water [gallons]	2,165	0	4,608	128,584	127,084	125,584	122,584	121,084	115,084	115,084	0	1,608
Drawdown from storage for remaining vineyard irrigation [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
Well water required to satisfy remaining vineyard irrigation demand	2,165	0	4,608	128,584	127,084	125,584	122,584	121,084	115,084	115,084	0	1,608
Net storage after vineyard irrigation drawdown [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
This month's process wastewater, remaining after vineyard irrigation, available for landscape irrigation [gallons]	0	835	0	0	0	0	0	0	0	0	2,892	0
<i>Water balance continues on next page for cover crop irrigation.</i>												

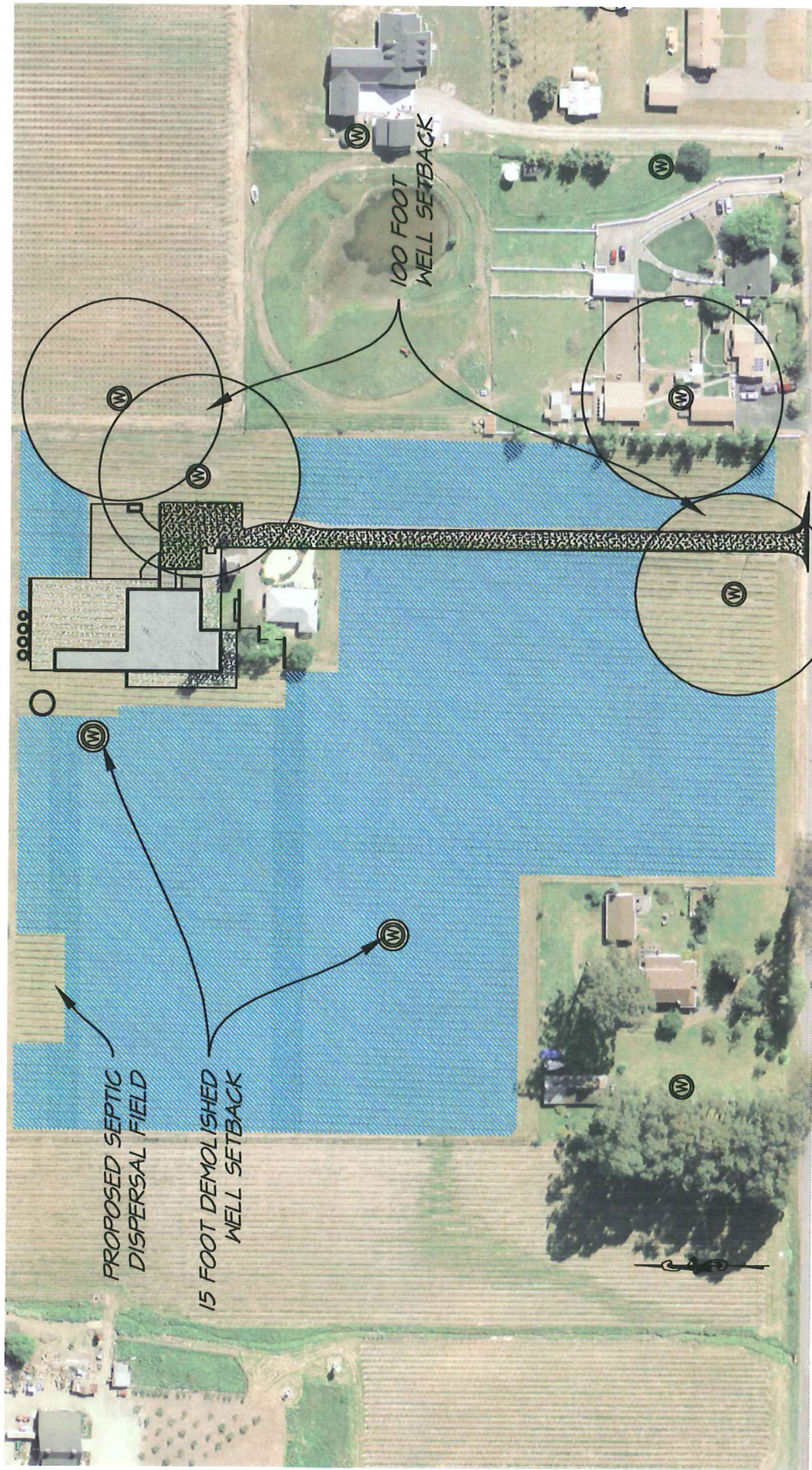
Monthly Landscape Irrigation Water Use												
(Based on evapotranspiration crop demand and irrigated area)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
This month's process wastewater, remaining after vineyard irrigation, available for landscape irrigation [gallons] (From sheet 1)	0	835	0	0	0	0	0	0	0	0	2,892	0
Reference ET (ET _o) (in/month) (see note 1)	1.03	1.53	2.93	4.71	5.82	6.85	7.21	6.44	4.87	3.53	1.64	1.17
Crop Coefficient (K _c) (see note 2)	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Crop water demand per acre [inches]	0.82	1.22	2.34	3.77	4.66	5.48	5.77	5.15	3.90	2.82	1.31	0.94
Crop water demand per acre [gallons]	22,374	33,235	63,645	102,310	126,422	148,795	156,615	139,889	105,786	76,678	35,624	25,415
Total crop water demand for irrigated area [gallons]	6,712	9,970	19,094	30,693	37,926	44,639	46,985	41,967	31,736	23,004	10,687	7,624
Will landscape be irrigated with reclaimed water this month?	Y	Y	Y	N	N	N	N	N	N	Y	Y	Y
Process wastewater remaining after vineyard irrigation, reclaimed for landscape irrigation [gallons]	0	835	0	0	0	0	0	0	0	0	2,892	0
Landscape irrigation water required from storage or other source [gallons]	6,712	9,135	19,094	0	0	0	0	0	0	23,004	7,796	7,624
Drawdown from storage for landscape irrigation [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
Process wastewater generated this month, unused for irrigation, to be reclaimed and stored [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
Net end-of-month reclaimed water storage after all irrigation [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
<i>End of Water Balance</i>												

Peak Monthly Storage = 0 gallons

Notes:

1. Reference ET_o from California Irrigation Management Information System
2. Crop Coefficient from Table 1 of "Estimating Irrigation Water Needs of Landscape Plantings in California", University of California Cooperative Extension, August 2000.

SLEEPING GIANT WINERY VINEYARD TO RECEIVE RECYCLED WATER



GRAPHIC SCALE



(IN FEET)
1 inch = 150 FT

7.69 ACRES VINEYARD
AVAILABLE FOR RECYCLED
WATER IRRIGATION



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JULY 24, 2015 4115030.0 Exh-Vineyard.dwg