SEPTIC SYSTEM FEASIBILITY REPORT

FOR
REVERIE WINRY
BY
CAB CONSULTING ENGINEERS
DATE: December 12, 2013

I. Contents

II. INTRODUCTION 2
III. SITE EVALUATION DATA 2
IV. EXISTING SEPTIC SYSTEM 2
V. PROPOSED SEPTIC SYSTEM MODIFICATIONS 3
A.DOMESTIC WASTE SYSTEM 3
B.PROCESS WASTE SYSTEM 3
VI. CONCLUSION 4
VII. APPENDIX A 5
VIII. APPENDIX B 6
IX. APPENDIX C 7
X. APPENDIX D 8

II. INTRODUCTION

The purpose of this feasibility report is to provide preliminary calculations and siting for an alternative sewage treatment system for a Use Permit Major Modification to the Reverie Winery Use Permit. The project is located at 1520 Diamond Mountain Road approximately ¾ miles southwest of the Highway 29 and Diamond Mountain Road intersection. There currently exists a single family residence and winery with caves on the site. The winery and septic system were constructed in 1995 prior to inclusion of cave setback guidance and regulations by Napa County.

The Use permit Major Modification looks to substantiate the use of the existing cave, install a new code compliant domestic waste system for the winery and propose two alternatives for process waste disposal to bring the site into current code compliance. Winery production is proposed at a maximum of 9,200 gallons per year under this modification. Both hold and haul and rapid aerobic treatment with storage are proposed for the process waste system.

III. SITE EVALUATION DATA

A site evaluation was conducted on October 26th, 2012 with representatives of CAB Consulting Engineers and Napa County. In total, six test holes were dug with varying results. Test Pits #5/6 provided the best results with acceptable soils over 60" in depth and are used in determining the primary disposal area. Test Pits #2/3 had acceptable soil to 24" in depth and are used in determining the reserve disposal area.

In accordance with Table 3 of the Napa County Alternative Sewage Treatment System Guidelines, a design hydraulic loading rate of 0.75 gallons/sf/day is used in field sizing for the proposed primary domestic waste disposal area. A design hydraulic loading rate of 0.4 gallons/sf/day is used in field sizing for the proposed reserve disposal area.

The vineyard is nearly void of flat areas suitable for pressure distribution or subsurface drip dispersal engineered systems. In addition, the vineyard is characterized by cemented clays at a depths of 20-24" in many areas. Those factors, in addition to many setback constraints, severely limit suitable disposal areas within the property.

The test pit map and site evaluation data is provided in Appendix A.

IV. EXISTING SEPTIC SYSTEM

The existing pressure distribution septic system was designed in 1994 by Summit Engineering. Winery domestic and process wastewater are plumbed into 1200 and 1500 gallon septic tanks, respectively. Both flows are combined in an 800 gallon sump basin that transmits primary treated waste to the pressure distribution leachfield. 460 linear feet of leachline are shown with calculations supporting 638 gallons of total daily flow. The existing septic system calculations and portion of the construction plans are provided in Appendix B.

The existing leachfield lies directly adjacent to the western cave portal at the winery and is well within the 100' setback to the cave. The leachfield will be disconnected from the existing system and abandoned in place. A constraints/site map is provided in Appendix C.

V. PROPOSED SEPTIC SYSTEM MODIFICATIONS

A. DOMESTIC WASTE SYSTEM

The project proposes to redirect domestic waste away from the existing leachfield due to the proximity of the cave. The existing 1200 gallon septic tank will be modified with new pump and alarms for use as a recirculation tank tied to a new Orenco AX-20 pre-treatment system. The AX-20 treatment system will be installed adjacent to the existing 1200 gallon septic tank. Pretreated domestic waste will be pumped from the existing 800 gallon sump tank to 126 linear feet of new pressure distribution leachfield south of Diamond Mountain Creek. This system is sized to serve a maximum daily flow of 350 gallons per day, accommodating the following demands:

Demand	Rate (gal/person)	Number (persons)	Total (gpd)
Tasting Visitation	3	65	195
Employees	15	5	75
10 Person Event	8	10	80
			350

Events larger than 10 persons will require use of temporary sanitary facilities. It is estimated that these facilities will be needed 6 times during the year, maximum, based on the most current entitlement modification. There are numerous locations on site where these facilities can be located, but most likely will be installed at the western most part of the driveway, near the western property line.

The designated reserve area for the domestic system is located approximately 75-feet northeast of the existing agricultural barn. The proposed reserve system will be subsurface drip in the vicinity of Test Pits 2 and 3 with 1725 square foot of dispersal area. Preliminary calculations, an exhibit of the new leachfield, reserve area and proposed trench section is provided in Appendix D.

B. PROCESS WASTE SYSTEM

Alternative 1:

In order to continue operations and comply with current code requirements, a new traffic rated 2000 gallon hold and haul tank is proposed adjacent to the winery in the parking area. The tank will be connected to the existing 1500 gallon process waste tank, thereby providing 3500 gallons of storage. An automated alarm will be provided activated when 70% of the system storage level is attained.

The minimum storage requirement based on 9200 gallon annual production is 3220 gallons. The new hold and haul system is shown on UP 1.0 in Appendix A.

A contract with a Napa County authorized wastewater hauler and East Bay Municipal Utilities District Oakland plant is forthcoming and will be provided in the near future.

Alternative 2:

A rapid aerobic treatment system with surface drip dispersal is proposed as alternative 2 when the owner has retained sufficient funds for this capital improvement. The system will include use of the existing septic tank, hold and haul tank, and installation of a new sump to convey primary treated effluent to the rapid aerobic treatment system. A maximum effluent flow of 460 gallons per day is proposed. The rapid aerobic treatment system, such as one like the Lyve L10, is scalable and capable of treating flows up to 2,000 gallons per day, or up to a maximum winery production capacity of 80,000 gallons per year based on Napa County guidelines for winery waste sizing.

The system will convey secondary treated water to a series of 3, 5000-gallon holding tanks for storage during winter months, generally November through February. The water will then be land applied on nearly 3.2 acres of vineyard east of the winery building as noted on UP1, provided in Appendix A.

It is estimated that this system will be installed on or about 2018.

Process waste calculations are provided in Appendix E.

VI. CONCLUSION

This report shows that the project is capable of supporting a 9,200 gallon per year winery with 350 gallons per day maximum domestic sewage flow.

VII. APPENDIX A

Permit Number:
APN 020-440-005
CABCE Project Number:2012.04

Date: November 15, 2012

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 #:
APN: 020-440-005
(County Use Only) Reviewed by: Date:

PLEASE PRINT OR TYPE ALL INFORMATION

Property Owner Norm Klken	☐ New Construction ☐ Addition ☐ Remodel ☐ Relocation ☒ Other:
Property Owner Mailing Address 1520 Diamond Mountain Road	☐ Residential - # of Bedrooms: Design Flow : gpd
City: Napa State: CA Zip: 94558	☒ Commercial – Type: Sanitary Waste: gpd Process Waste: 500 gpd
Site Address/Location 1520 Diamond Mountain Road	☐ Other: Sanitary Waste: gpd Process Waste: gpd

Evaluation Conducted By:

Company Name CAB Consulting Engineers	Evaluator's Name Carl Butts	Signature (Civil Engineer, R.E.H.S., Geologist, Soil Scientist)
Mailing Address: 851 Napa Valley Corporate Way		Telephone Number 707 252 2011
City: Napa State: CA Zip: 94558		Date Evaluation Conducted 10/26/2012

Primary Area	Expansion Area
Acceptable Soil Depth: 60+ in. Test pit #'s: 5,6	Acceptable Soil Depth: 24/30" in. Test pit #'s: 2/3
Soil Application Rate (gal. /sq. ft. /day): 0.75	Soil Application Rate (gal. /sq. ft. /day): 0.6
System Type(s) Recommended: Pressure Distribution with Pretreatment	System Type(s) Recommended: Subsurface Drip
Slope: 11-20%. Distance to nearest water source: 100 ft.	Slope: 10-15 %. Distance to nearest water source: 150 ft.
Hydrometer test performed? No ☒ Yes ☐ (attach results)	Hydrometer test performed? No ☒ Yes ☐ (attach results)
Bulk Density test performed? No ☒ Yes ☐ (attach results)	Bulk Density test performed? No ☒ Yes ☐ (attach results)
Percolation test performed? No ☒ Yes ☐ (attach results)	Percolation test performed? No ☒ Yes ☐ (attach results)
Groundwater Monitoring Performed? No ☒ Yes ☐ (attach results)	Groundwater Monitoring Performed? No ☒ Yes ☐ (attach results)

Site constraints/Recommendations:

Site is constrained by two blue line creeks and neighboring well. Recommend PD system with pretreatment for domestic waste. Process waste to use existing PD trenches adjacent and west of winery building.

Test Pit # 1

X = Limiting Condition	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		0	SCL	S/SB	SH	FRB	NS	F/F	C/F	--
X	20+	G	0	SCL	S/M	VH	VH	NS	F/F	-	-

Notes: 6 ROWS UP FROM DRIVEWAY, EXCAVATOR REFUSAL AT 20"

Test Pit # 2

X = Limiting Condition	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		0	CL	S/SB	SH	FRB	NS	C/F	F/F	--
X	24+	G	0	C	S/M	VH	VH	NS	F/F	-	--

Notes: 20 ROWS NORTHWEST OF DRIVEWAY, EXCAVATOR REFUSAL AT 24"

Test Pit # 3

X = Limiting Condition	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		0	CL	M/SB	S	VFR B	NS	C/F	C/F	--
	12-30	G	0	CL	M/SB	S	FRB	NS	F/F	F/C	--
X	30+	G	20	C	S/M	VH	VF	NS	F/F	F/F	--

Notes: 5TH ROW 20' E OF OAK FROM PARKING

Test Pit # 4

X = Limiting Condition	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		0	CL	S/SB	SH	FRB	NS	C/F	F/F	--
X	20+	G	10	C	S/M	VH	VH	NS	F/F	F/F	--

Notes: 9 ROWS NE OF PARKING, UPSLOPE TP3

Test Pit # 5

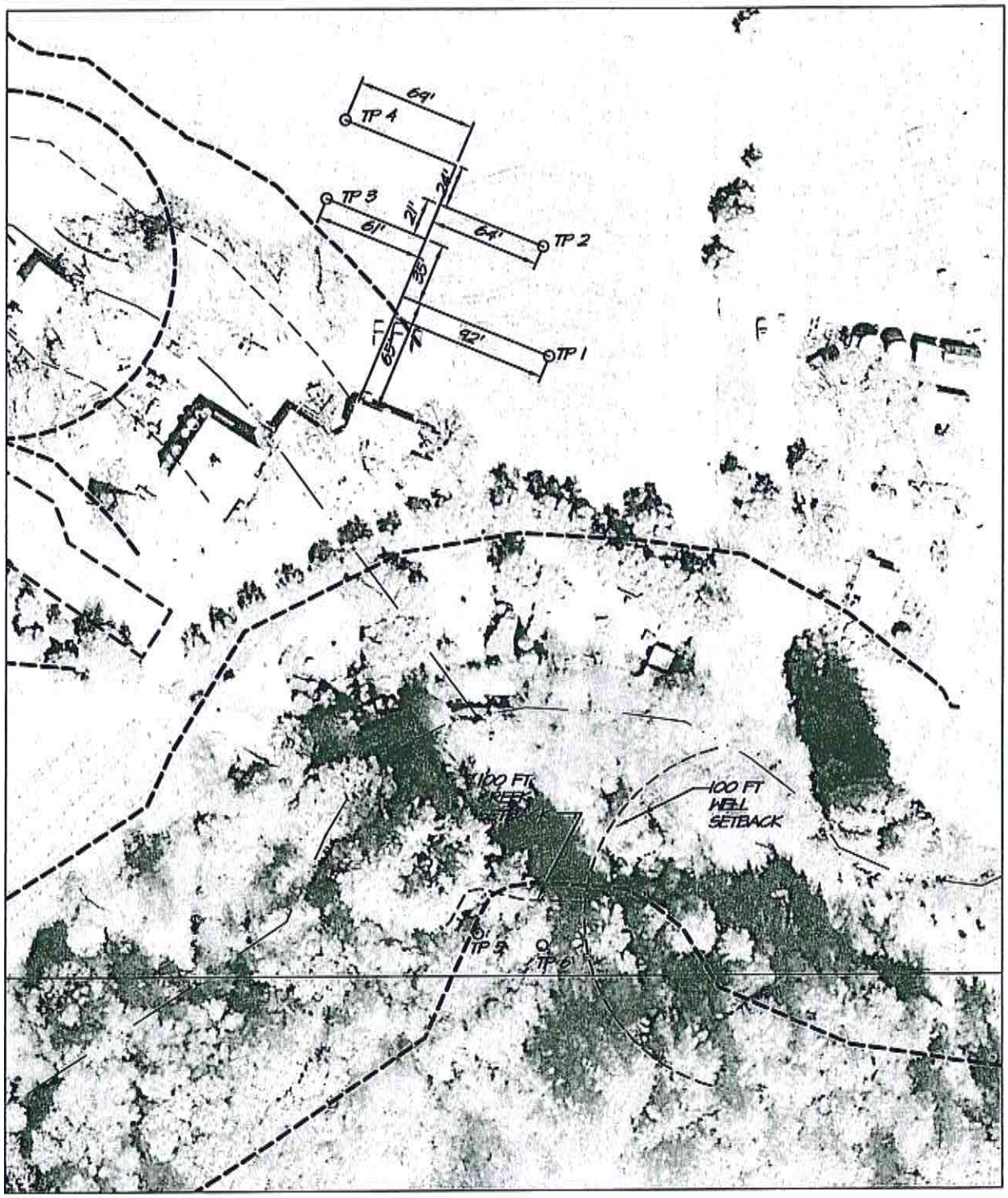
X = Limiting Condition	Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure (Grade / Shape)	Consistence			Pores (QTY / Size)	Roots (QTY / Size)	Mottling (QTY / Size/ Contrast)
						Side Wall	Ped	Wet			
	0-12		10	SCL	S/SB	S	FRB	NS	C/F	C/F	--
	12-60+	G	40	SCL	S/SB	SH	FRB	NS	C/F	C/C	--

Notes: NEAREST REDWOOD GROVE

Test Pit # 6

X = Limiting Condition	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		0	SCL	S/SB	S	VFR B	NS	C/F	C/F	--
	12-60+	G	40	SCL	S/SB	SH	FRB	NS	C/F	C/C	--

Notes: 50' EAST OF TP5



CAB
CONSULTING ENGINEERS
851 NAPA VALLEY CORPORATE WAY
SUITE D
NAPA, CA 94558
V 707.252.2011
C 707.694.6479

REVERIE WINERY
TEST PIT MAP
CALISTOGA CALIFORNIA

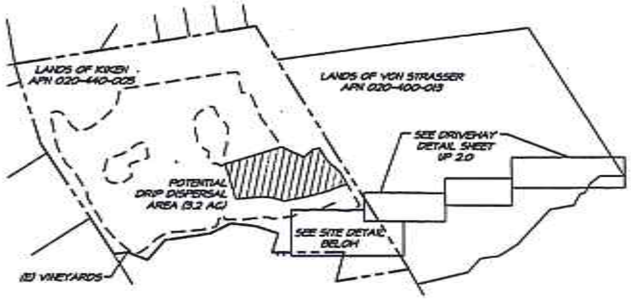
1" = 80'

IX. APPENDIX C

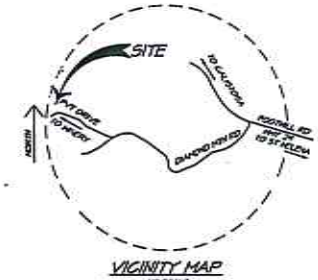
REVERIE WINERY

USE PERMIT MAJOR MODIFICATION

NAPA COUNTY CALIFORNIA



SITE OVERVIEW
SCALE: 1" = 300'



VICINITY MAP
NO SCALE

LINETYPE LEGEND

— —	FLOWLINE
— - - —	PROPERTY LINE
- - - - -	EASEMENT/SETBACK LINE
— - —	ROAD CENTERLINE
- - - - -	VINEYARD EXTENTS

NOTES:

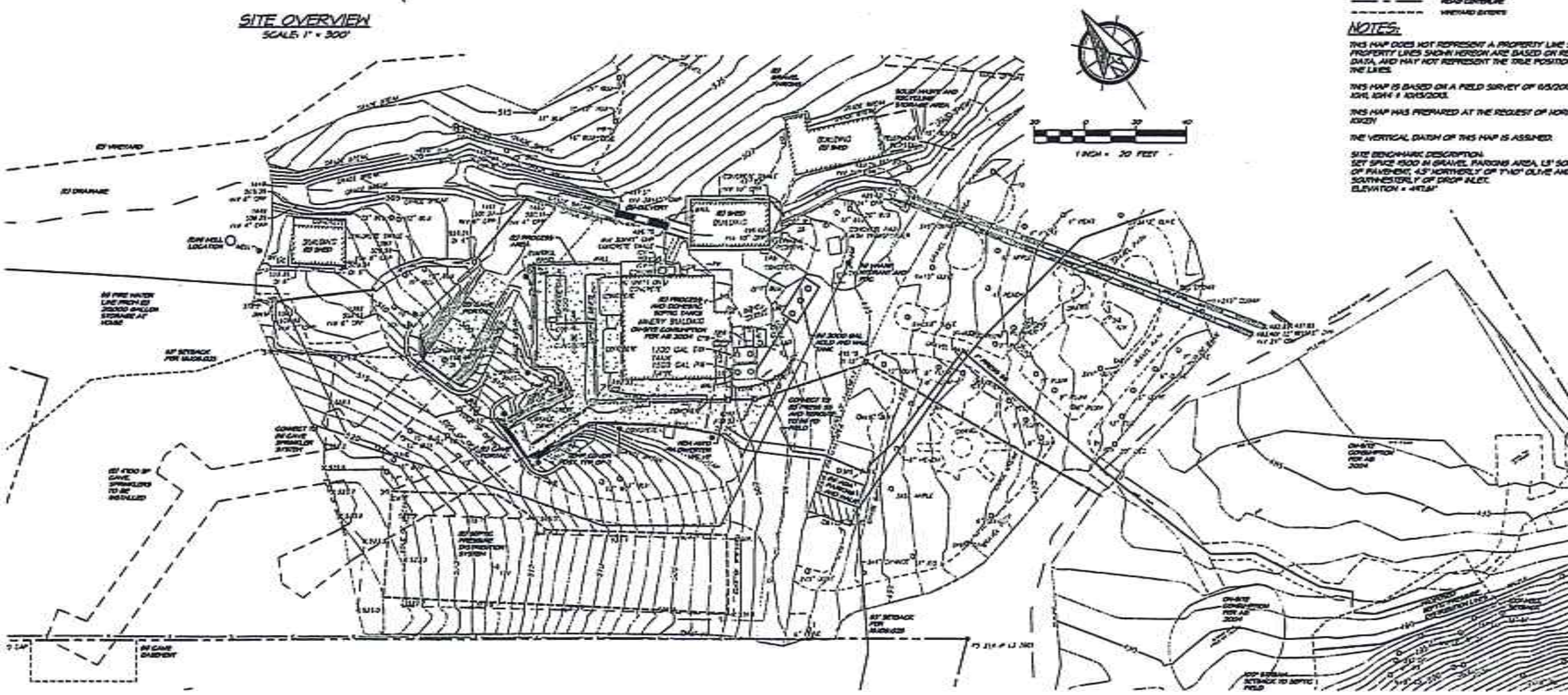
THIS MAP DOES NOT REPRESENT A PROPERTY LINE SURVEY. PROPERTY LINES SHOWN HEREON ARE BASED ON RECORD DATA, AND MAY NOT REPRESENT THE TRUE POSITIONS OF THE LINES.

THIS MAP IS BASED ON A FIELD SURVEY OF 6/5/2012, 10/9, 10/10, 10/14 & 10/15/2013.

THIS MAP WAS PREPARED AT THE REQUEST OF NORMAN KIKEN

THE VERTICAL DATUM OF THIS MAP IS ASSUMED.

SITE BENCHMARK DESCRIPTION:
SET SPIKE #500 IN GRAVEL PARKING AREA, 1.5' SOUTHERLY OF PAVEMENT, 4.5' NORTHERLY OF TWO" OLIVE AND 44' SOUTHWESTERLY OF DROP INLET.
ELEVATION = 487.81'



SITE PLAN DETAIL
SCALE: 1" = 20'

Printed on Recycled Paper Please Continue the Cycle

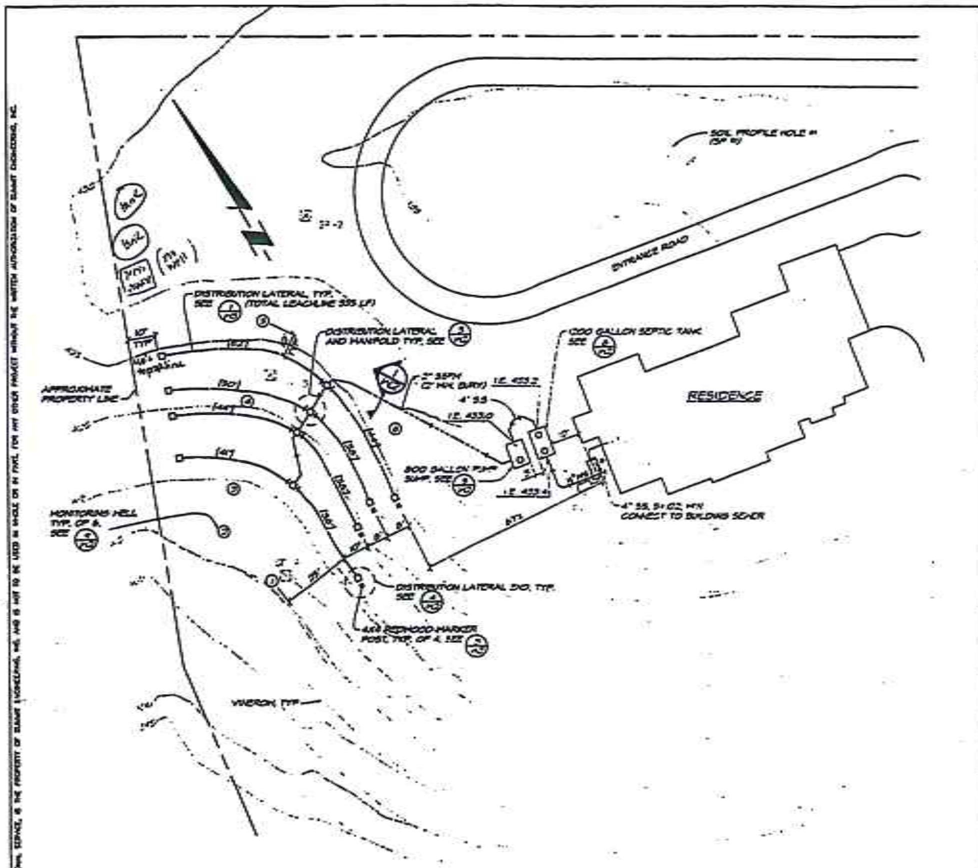
CAB ENGINEERS CONSULTING
255 NAPA VALLEY CORPORATE WAY SUITE D
NAPA, CA 94558

REVERIE WINERY
ENGINEERING SITE PLAN
NAPA CALIFORNIA

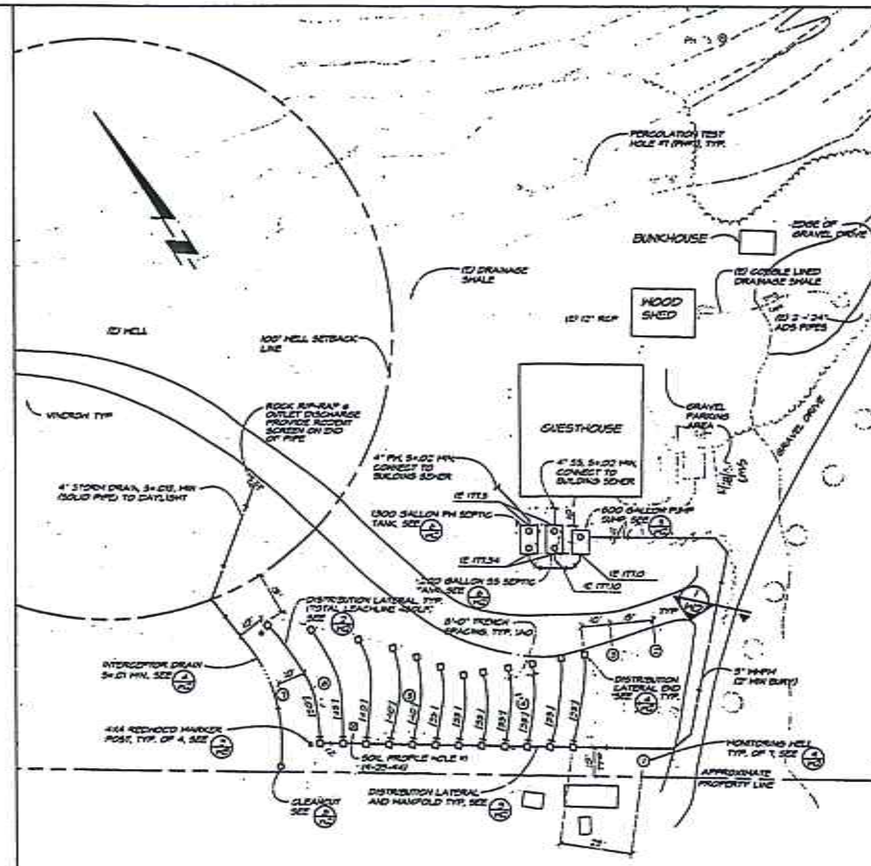
DATE	NOV 21, 2013
DRAWN	CAB
DESIGNED	CAB
CHECKED	CAB
JOB NO.	2013.04

SHEET NO.
UP1.0
OF 2 SHEETS

VIII. APPENDIX B



MAIN RESIDENCE SITE PLAN
1" = 20'



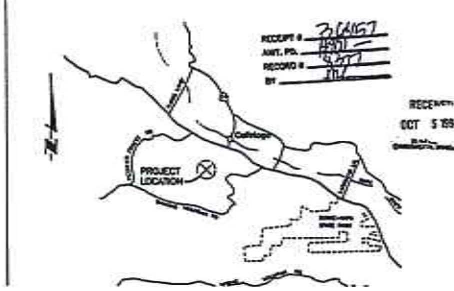
GUESTHOUSE SITE PLAN
1" = 20'

LEACHFIELD NOTES:

1. HEAVY EQUIPMENT SHALL NOT BE OPERATED OVER THE LEACHFIELD AREAS
2. REMOVAL OF EXISTING VINES IN THE AREA OF THE LEACHFIELDS SHALL BE COORDINATED WITH THE OWNER.
3. EXPANSION AREAS ARE LOCATED IN VINEYARD ABOVE THE GUESTHOUSE LEACHFIELD (AREA OF PERCOLATION TEST HOLES #1 - #3).
4. DISPOSAL SYSTEMS FOR THE MAIN RESIDENCE AND THE GUESTHOUSE ARE DESIGNED FOR A MAXIMUM DAILY FLOW OF 800 GPD AND ~~450~~ 640 GPD, RESPECTIVELY.
5. LIMITS OF SOIL FILL MATERIAL OVER THE LEACHFIELDS SHALL EXTEND AS FOLLOWS:
   - 5 FEET UPHILL OF UPPER LEACHLINE
   - 7 FEET LATERALLY FROM ENDS OF LEACHLINE
   - 10 FEET DOWN GRADIENT OF LOWER LEACHLINE

LIST OF DRAWINGS

W1 SITE PLANS
W2 SECTIONS AND DETAILS
W3 SECTIONS, DETAILS, GENERAL NOTES AND SPECIFICATIONS



RECEIPT # 3(4)67
AMT. PD. 480
RECORD # 9477

RECEIVED OCT 5 1994

Plans Approved
PLANS APPROVED
Dept. of Environmental Mgmt.
County of Napa

SUMMIT ENGINEERING, INC.
CONSULTING CIVIL ENGINEERS
1400 NORTH DUTTON AVENUE, STE. 22, SANTA ROSA, CALIFORNIA 95401-7152
PH. (707) 527-0775 FAX (707) 527-0213

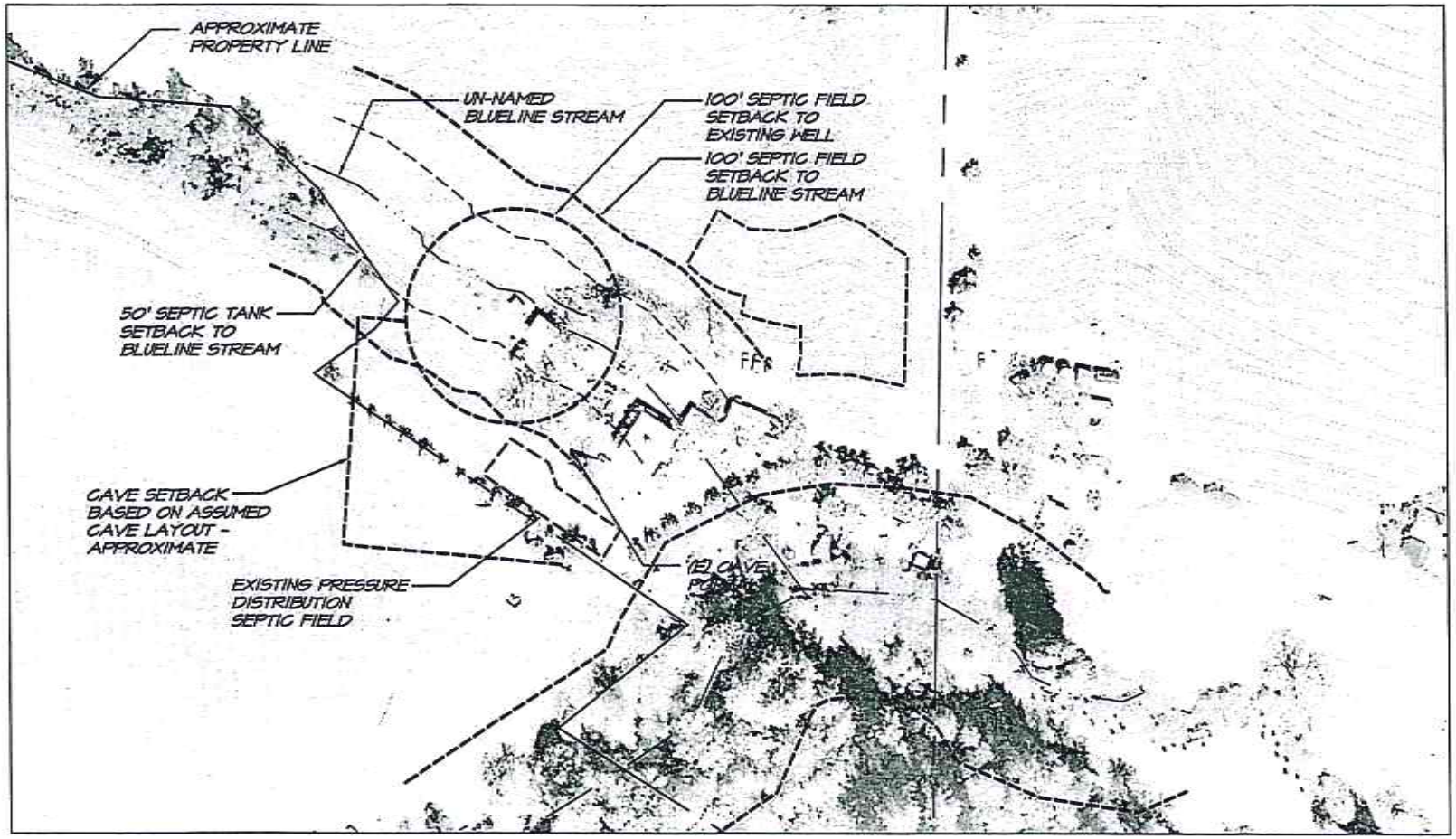
KIKEN RESIDENCE
1520 DIAMOND MOUNTAIN ROAD
CALISTOGA, CALIFORNIA

S.S. DISPOSAL SYSTEM
SITE PLANS

ISSUED FOR APPROVAL
REVISED 10-3-94

DATE 9-20-94

REVERIE WINERY
CONSTRAINTS MAP
CALISTOGA CALIFORNIA



CAB CONSULTING ENGINEERS
851 NAPA VALLEY CORPORATE WAY
SUITE D
NAPA, CA 94558
V 707.252.2011
C 707.694.6479

SCALE: 1" = 100'

OCT 16, 2012 2012.04 REVERIE CONSTRAINT

X. APPENDIX D

Domestic Septic System

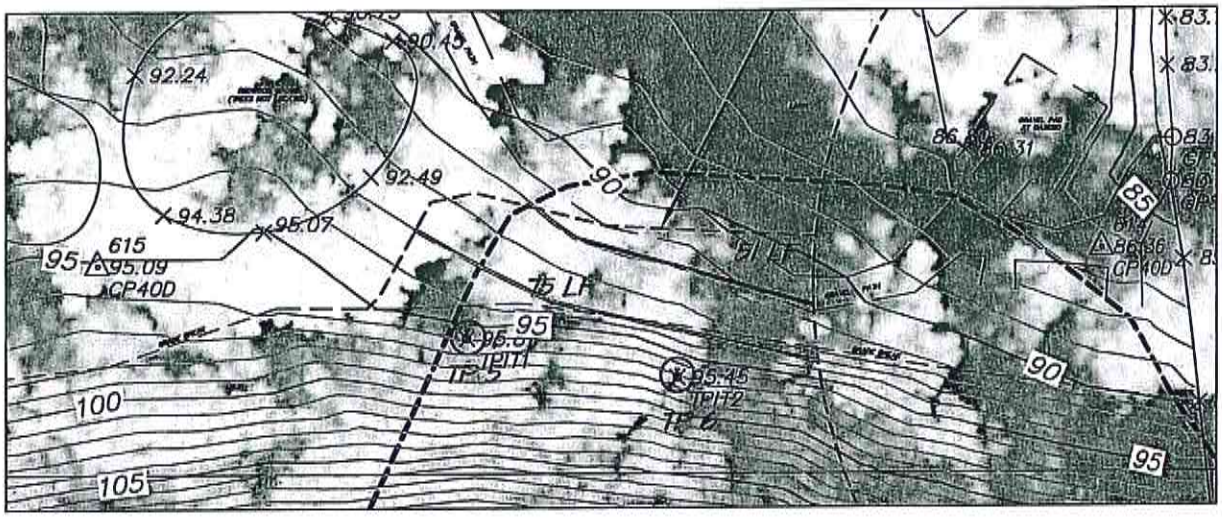
Given: Trench Length 126

System Demand

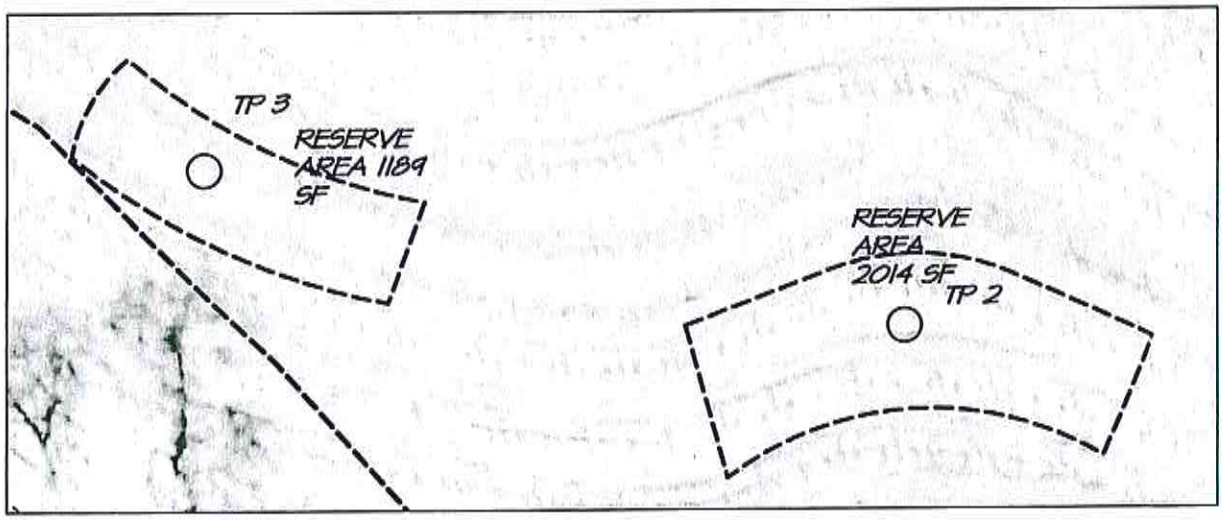
	Number	Rate	Total
	person	gal/person	gallons
Visitation	65	3	195
Employees	5	15	75
Events (10 person)*	10	8	80
			350

Assume:	Hydraulic Loading Rate (gal/sf-day)	0.75
	Trench Depth (ft)	2
	Pipe Cover (in)	2
	Pipe Cover (ft)	0.17
	Total Trench Sidewall (sf)	3.67
Maximum Flow (gpd):	Sidewall * Length * Loading Rate	347
		±350

Event = Short Order, All disposable flatware and plates, No washing.



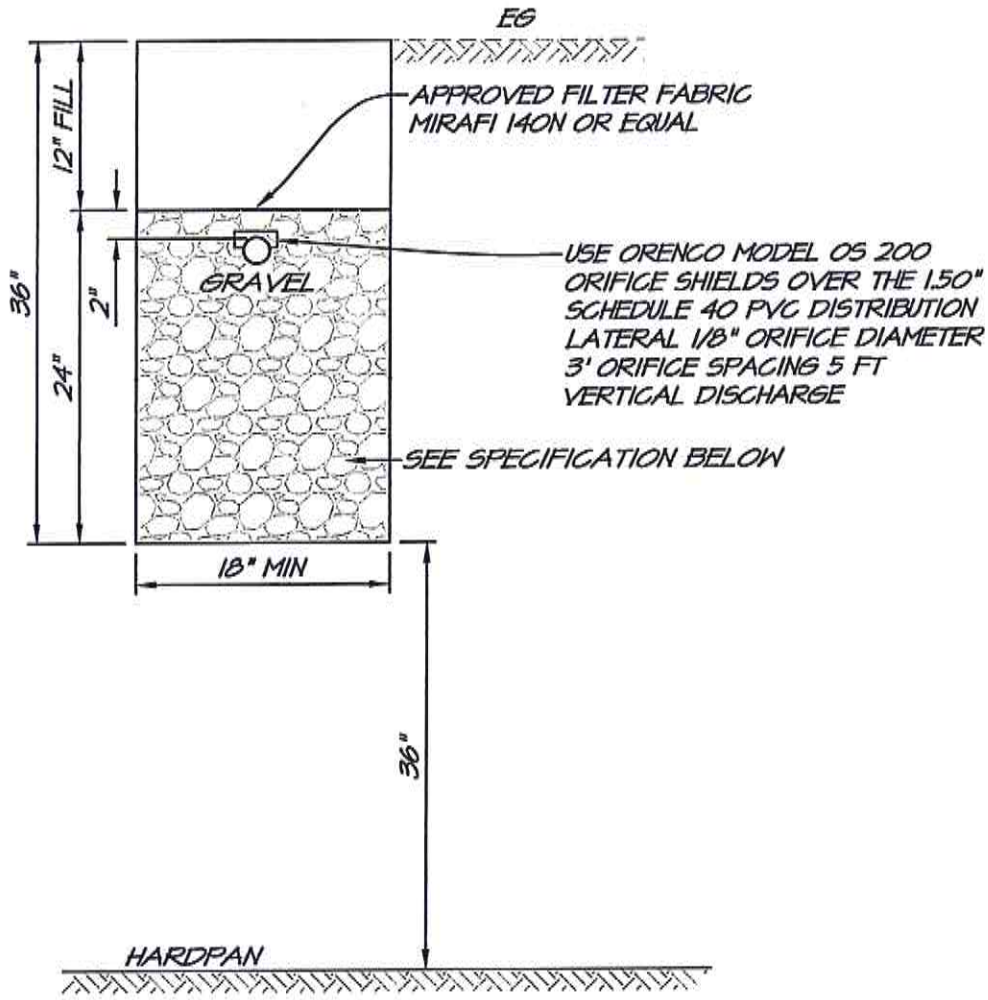
PRIMARY AREA
126 LF
PRESSURE DISTRIBUTION LINE



RESERVE AREA
1150 SF MIN
SUBSURFACE DRIP DISPERSAL

CAB
CONSULTING
ENGINEERS
851 NAPA VALLEY
CORPORATE WAY
SUITE D
NAPA, CA 94558
V 707.252.2011
C 707.694.6479

REVERIE WINERY
TEST PIT MAP
CALISTOGA CALIFORNIA
1" = 30'



PD TRENCH AGGREGATE SPECIFICATION

THE AGGREGATE MEDIA PLACED WITHIN A PRESSURE DISTRIBUTION TRENCH SHALL CONSIST OF THREE-EIGTH (3/8) TO TWO (2) INCH DIAMETER ROCK, CRUSHED DRAIN ROCK, LAVA ROCK, PEA GRAVEL, OR OTHER HARD ROCK AS APPROVED BY THE ADMINISTRATIVE AUTHORITY. ALL ABSORPTION BED MEDIA MUST HAVE LESS THAN ONE (1) PERCENT FINES, DUST, SAND, AND/OR SILTS (PASSING THE #200 SIEVE).

PD TRANCH SECTION

NO SCALE

CAB
CONSULTING ENGINEERS
851 NAPA VALLEY CORPORATE WAY
SUITE D
NAPA, CA 94558
V 707.252.2011
C 707.694.6479

NAPA CALIFORNIA

XI. APPENDIX E

Hold and Haul Alternative

Given:	Winery Production (gallons)	9200
	Crush Period (days)	30
	Holding Period (days)	7

Find: Minimum Holding Capacity

Maximum Daily Flow = (Production * 1.5)/Crush Period
460

Minimum Holding Capacity = Max Daily Flow * Holding Period
3220

Use - 3500 gallons Storage.

Rapid Aerobic Treatment Alternative

Minimum Holding Requirement (Nov - February)

	Percent Annual Flow	Monthly Flow (gallons)
October	0.20	9264
November	0.10	4472
December	0.05	2492
January	0.07	3258
February	0.07	3131
March	0.08	3578
April	0.06	2811
May	0.04	1661
June	0.06	2556
July	0.05	2236
August	0.07	3003
September	0.16	7539
Total Flows	1.00	46000

Total Storage = 13353