12501.0 Larkmead Barrel Building
Wastewater Feasibility Study
May 9, 2014
Revised:

Always Engineering, Inc.
Civil Engineering & Topographic Surveying
131 Stony Circle, Suite 1000 (707) 542-8795
Santa Rosa, CA 95401 Fax (707) 542-8798
www.alwayseng.com JasonH@alwayseng.com

Christine Secheli, REHS
Napa County Department of Environmental Management
1195 3rd St., Room 101
Napa, Ca 94555

Project: Use Permit Modification for Larkmead Vineyards
1100 Larkmead Lane
Calistoga, CA
AP 020-240-001

Copies	Document Date	Description
1	1/24/2014	C1 – Wastewater Feasibility Study Site Plan
1	2/2/2004	RAM Site Evaluation Report
1	6/6/2005	Summit Site Evaluation Report
1	1/24/2014	Always Engineering Site Evaluation Report
1	----------	Septic Monitoring Reports

Christine,

This letter is provided to address the Wastewater Feasibility Study requirements of the Larkmead Vineyards Hospitality and Production Increase Use Permit.

Project Proposal
Larkmead Vineyards has a Use Permit to produce 36,000 gallons of wine per year. The existing site consists of a fermentation building, a barrel hall, two hospitality buildings, an outdoor BBQ, and associated site improvements. Larkmead would like to increase their production to 75,000 gallons of wine per year at the existing site to accommodate the ultimate production from the vineyards already under their ownership. As grape contracts with other wineries expire, Larkmead would like to process them at their winery. At the same time, Larkmead would also like to increase the site tasting room and site event uses. No additional employees will be required.

Existing Septic System
The original existing septic system installed in 2005 consistes of two 2,000 gallon process wastewater septic tanks, one 1,500 gallon sanitary sewage septic tank, one 1,500 gallon pump sump and 2,760 lf of leachline separated into 6 equal zones of 460 lf each.

Always Engineering, Inc.
Civil Engineering & Topographic Surveying
131 Stony Circle, Suite 1000 (707) 542-8795
Santa Rosa, CA 95401 Fax (707) 542-8798
www.alwayseng.com JasonH@alwayseng.com

During the 2013 Larkmead Barrell Hall project a 1,500 gallon sanitary sewage septic tank, a 1,500 gallon process waste sewage septic tank, a 750 gallon grease tank, and a 750 gallon sump tank were added to the system.

Existing System Operations

Since installation, the system has been maintained and monitored by McCollum General Engineering. Attached are recent monitoring inspections prepared by McCollum General Engineering. These reports are dated July 7, 2011 and December 19, 2011. The average flow for these time periods are 412 gpd and 482 gpd respectively. This is well below the existing system design flow.

Existing Flow Calculations

The winery is currently permitted for a production of 36,000 gallons of wine per year with a total of 10 full-time employees and 4 part-time employees. In addition, the winery is approved for 40 peak daily tasting visitors and promotional events with 25 visitors which will occur 3 times per month. The winery is also approved for two large events, occurring 2 times per year with a maximum of 120 visitors. Both of these large events will use portable toilets and therefore are not addressed in the flow calculations. All current onsite food service is provided for with fully catered events, with all food preparation and cleanup occurring offsite. The onsite kitchen is used for staging of food only. Existing flows are estimated as follows:

Existing Winery Process Wastewater (PW)

Napa County Peak Day

$$\frac{36{,}000 \text{ gallons wine} \times 1.5}{45 \text{ days}} = 1{,}200 \text{ gpd PW}$$

Employees SS

10 FTemployees	x	15 gpd/employee	=	150 gpd
4 PT employees	x	7.5 gpd/employee	=	30 gpd

Tasting Room SS

40 tasting visitors x3 gpd/visitor = 120 gpd

Events SS

25 event visitors x 5 gpd/visitor = 125 gpd

Total Existing Peak Flow

Winery PW + Employee SS + Tasting SS + Event SS = Total Flow

Always Engineering, Inc.
Civil Engineering & Topographic Surveying
131 Stony Circle, Suite 1000 (707) 542-8795
Santa Rosa, CA 95401 Fax (707) 542-8798
www.alwayseng.com JasonH@alwayseng.com

1,200 gpd + 180 gpd + 120 gpd + 125 gpd – 1,625 gpd

Proposed Flow Calculations

The winery is proposing an increase to a production of 52,000 gallons of wine per year. In addition, the winery is requesting 100 peak daily tasting visitors with a weekly average of 43 visitors per day as well as promotional events which will occur 4 times per month. The winery is also requesting two large annual events, one with a maximum of 120 visitors, and one with a maximum of 300 visitors. Both of these large annual events will use portable toilets and therefore are not addressed in the flow calculations. Food associated with the monthly events of 25 people will be prepared onsite. Using Table 4 from the Napa County ASTS Guidelines, 5 gallons per visitor is assumed for kitchen waste and an additional 8 gallons per visitor is assumed. The short order generation rate rather than conventional sit down rate is used because one single meal will be prepared and served to all attendees, rather than being able to choose from multiple entrees.

All onsite food service for annual events is fully catered, with all food preparation and cleanup occurring offsite. The onsite kitchen shall be used for staging of food only for the annual events. Flows are estimated as follows:

Proposed Winery Process Wastewater (PW)

Napa County Peak Day
75,000 gallons wine x 1.5
60 days
= 1,875 gpd PW

Employees SS

10 FT employees	x	15 gpd/employee	= 150 gpd
6 PT employees	x	7.5 gpd/employee	= 45 gpd

Tasting Room SS

Peak	150 tasting visitors	x	3 gpd/visitor	= 450 gpd
Average	43 tasting visitors	x	3 gpd/visitor	= 129 gpd

Events SS

25 event visitors x 13 gpd/visitor = 325 gpd

Proposed Total Peak Flow

Winery PW + Employee SS + Tasting SS + Event SS = Total Flow

Always Engineering, Inc.
Civil Engineering & Topographic Surveying
131 Stony Circle, Suite 1000 (707) 542-8795
Santa Rosa, CA 95401 Fax (707) 542-8798
www.alwayseng.com JasonH@alwayseng.com

1,875 gpd + 195 gpd + 450 gpd + 325 gpd = 2,845 gpd

The **total flow proposed** to the system is **2,845 gpd.**

Septic Tank Sizing

Process Wastewater Tank Sizing

The required settling tank size for the winery PW flow per criteria from the NCEM is calculated as a minimum detention time of 3 days, resulting in:

1,875 gpd PW x 3 days detention = 5,625 gallon septic tank

The existing two (2) 2,000 gallon PW septic tanks provide 3.1 days of detention. An additional 1500 gallon tank is provided for barrel work, so detention time will be greater than 3 days for each source.

Grease Tank Sizing

The required grease tank size for the kitchen waste flow per criteria from the UPC is calculated as a minimum detention time of 1.5 hours, resulting in:

(meals/peak hour) x (waste flow rate) x (detention time) x (storage factor) = interceptor size (gal)

25 meals x 6 gpm x 1.5 hours x 1.5 = 337.5 gallons

A 750 gallon grease tank is installed. Alternatively, if it is assumed all 325 gallons of event SS flows through the grease tank, detention of 2.3 days is provided. Because the kitchen will not be used on contiguous days, the calculations above are a guideline and actual detention will be much greater than that presented.

Sanitary Sewer Tank Sizing

One 1500 gallon septic tank is existing for the tasting room and fermentation building. A second 1500 gallon septic tank is existing for the barrel hall and hospitality building. For the purposes of this study, we will assume that all employees and the tasting room discharge to one tank (195 gpd + 450 gpd = 645 gpd) and that all employees plus events drain to the other tank (195 gpd + 325 gpd = 520 gpd). Both of these flows are greater than flows from a 5 bedroom and therefore an additional 750 gallon septic tank will be provided in addition to the existing 1500 gallon septic tank, resulting in a combined capacity of 2250 gallons. The larger flow is verified using the plumbing code commercial sizing formula:

Always Engineering, Inc.
Civil Engineering & Topographic Surveying
131 Stony Circle, Suite 1000 (707) 542-8795
Santa Rosa, CA 95401 Fax (707) 542-8798
www.alwayseng.com JasonH@alwayseng.com

$$V = 1{,}125 + 0.75 \times Q$$
$$= 1{,}125 + 0.75 \times 1165 \text{ gpd}$$
$$= 1{,}998.75 \text{ gallons}$$

Therefore the combined capacity of 2250 gallons provided by the existing 1500 and proposed 750 gallon tanks is sufficient.

Site Evaluation and Leachfield Sizing

A site evaluation was performed by RAM Engineerring, Inc. (RAM) and Napa County Department of Environmental Management (NCEM) and the results and recommendations are indicated in the Site Evaluation Report dated January 24, 2004, a copy of which is provided as an Attachment.

Three backhoe pits were excavated on January 24, 2004. Soil profiles 1 and 2 displayed a sandy clay loam from 0 to 20 inches and a clay loam from 20 to 54 inches. Profile 3 displayed a sandy clay loam to 20 inches with clay loam from 20 to 48 inches. In the field, the soil was assigned a percolation rate of 1 inch per hour

Nine additional backhoe pits were excavated on June 6, 2005 (Attachment A). Soil profiles 1 and 2, west of the winery access road and adjacent to Larkmead Lane, displayed a sandy clay loam to approximate depths of 50 and 56 inches. Soil profiles 3 and 4, excavated east of the access road, displayed a clay loam to depths of 42 inches and 43 inches respectively, before encountering high seasonal groundwater. Soil profile 5 excavated at the NE corner of the winery displayed a clay loam to depths of approximately 56 inches. Soil profile 6 excavated directly west of the access road showed a sandy clay loam to 48 inches. Soil profile 7, located at the southwest corner of the parking area showed gravelly sand found at 36 inches. Soil profiles 8 and 9 were excavated in the vineyard access road west of the winery and both displayed clay loams to 48 inches. Soil profile 8 encountered a vineyard subdrain that must be removed if the area is to be used for a leachfield.

On October 9, 2013 I performed a site evaluation along with Napa County Department of Environmental Management (NCEM) and the results and recommendations are indicated in the Site Evaluation Report dated January 24, 2014, a copy of which is provided as an Attachment.

Nine backhoe pits were excavated. Soil profiles 1-7 displayed a silty loam from 0 to atleast 22 inches and a sandy clay from 22 to 60 inches. Soil profiles 8 and 9 displayed a silt loam to 36 inches. Based on soil type and structure the silty loam was assigned an application rate of 0.5 Gal/ft^2/day.

The system expansion will be in the area of profiles 1 – 6, with reserve available in the area of profiles 8 and 9.

Always Engineering, Inc.
Civil Engineering & Topographic Surveying
131 Stony Circle, Suite 1000 (707) 542-8795
Santa Rosa, CA 95401 Fax (707) 542-8798
www.alwayseng.com JasonH@alwayseng.com

Proposed Leachfield Sizing

It is proposed to install five (5) additional 460 LF leachfield zones for PW + SS discharge. This would result in a total of 5,060 LF of PW+SS leachfield.

With installation of the new 5 zones, It is proposed to modify the operations of the existing system. The existing leachfield area is sized at 0.35 gpd/sf. However, soils in the proposed septic area indicate that the new area can be sized using 0.5 gpd/sf or higher. In order to take advantage of the higher permeability of the soils in the proposed area, the five new zones will be sized using this criteria. The existing 6 zones will continue to be operated at the capacity it was originally sized for and will operate with its own set of float controls. The new zones will be operated by a separated set of float level controls. After dosing of one zone, the control panel will alternate which float controls are operational, thus alternating operations of the new and proposed leachfield zones.

Sizing of these new zones is proposed as follows:

Existing Capacity	=	# Zones x LF/Zone x Loading Rate x Infiltration Area
	=	6 x 460 x 0.35 x 1.67
	=	1,613 Gal/day
Proposed Capacity	=	# Zones x LF/Zone x Loading Rate x Infiltration Area
	=	5 x 460 x 0.5 x 1.67
	=	1,921 Gal/day

The 5 additional proposed zones would increase the total capacity of the system to 3,534 Gal/day. which is substantially more than the proposed total flow of 2,845 Gal/day.

This will require use of an additional pump sump to accommodate the head demands for the additional leachfield zones. Design of these features will be developed with construction documents for plan check review.

PW Reserve Leachfield Area

The designated PW reserve area has been located in the following 2 separate areas:

Always Engineering, Inc.
Civil Engineering & Topographic Surveying
131 Stony Circle, Suite 1000 (707) 542-8795
Santa Rosa, CA 95401 Fax (707) 542-8798
www.alwayseng.com JasonH@alwayseng.com

The first designated PW reserve area is located in the vicinity of TP 2, TP 4, and TP 6 and consists of 1934 LF. Using an application rate of 0.5 Gal/ft²/day, this area has the following capacity:

Flow = Leachline Length x Application Rate x Infiltration Area

= 1943 x 0.5 x 1.67

= 1,622 Gal/day

The second designated PW reserve area is located in the vicinity of TP 7 and consists of 504 LF. Using an application rate of 0.3 Gal/ft²/day, this area has the following capacity:

Flow = Leachline Length x Application Rate x Infiltration Area

= 504 x 0.3 x 1.67

= 253 Gal/day

This results in a combined total reserve capacity of 1,875 Gal/day or 100% PW reserve area.

SS Reserve Leachfield Area

A 5,700 sf area in the vicinity of TP 8 and TP 9 (10/09/2013) was found to be suitable for a drip system. The silty loam has a county approved application rate of 0.4 gpd/SF. Sizing is calculated as follows:

Area Required = Flow/Application Rate

= 970 gpd / 0.4 gpd/sf

= 2,425 sf

The 5,700 sf is equivalent to 235% SS reserve drip area for the site. Additional reserve area is also available with at least 42" of soil in the northeast corner of the parcel.

Conclusions

The proposed increases in Process Waste and Sanitary Sewage flows will result in a net increase of 1,220 gpd. This increase will be accommodated by the addition of 2,300 LF of leachlines. Substantial reserve areas including the required 100% PD for process waste and 200% drip for sanitary sewer flows are shown on site. The proposed additional 1,500 gallon process wastewater and 750 gallon sanitary sewage septic tanks

Always Engineering, Inc.
Civil Engineering & Topographic Surveying
131 Stony Circle, Suite 1000 (707) 542-8795
Santa Rosa, CA 95401 Fax (707) 542-8798
www.alwayseng.com JasonH@alwayseng.com

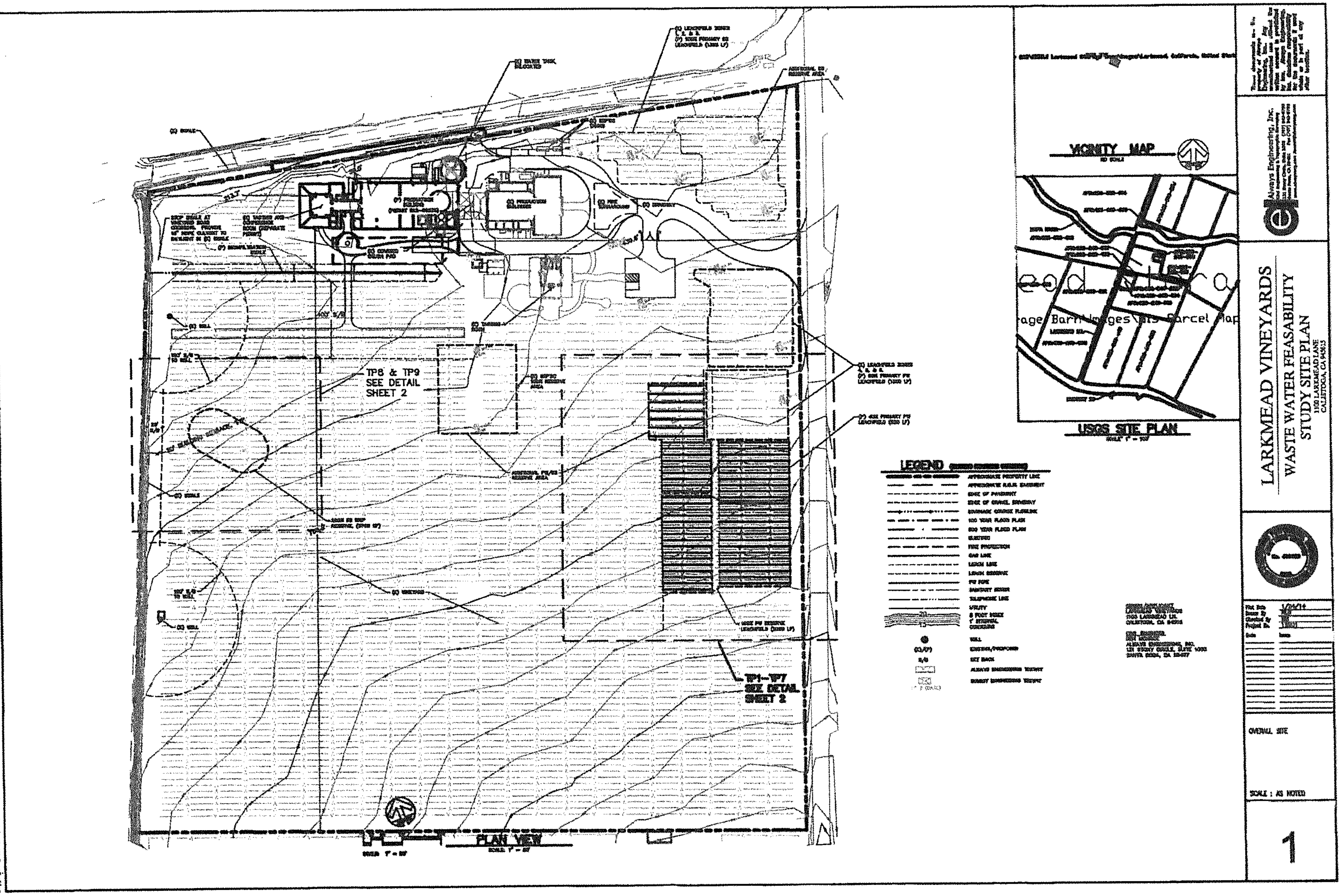
will ensure the increase in flows is still within the county guidelines for detention times in holding tanks.

We trust that this letter sufficiently responds to the items of incompleteness. If you require clarification or have any questions, please feel free to contact us.

Sincerely,

Ben Monroe, P.E.
ALWAYS ENGINEERING, INC.
Project Manager

cc: Cam Baker (Larkmead Vineyards)
Beth Painter (Balanced Planning)



RAM ENGINEERING

P.O. Box 1835 • Sebastopol, California 95473 • (707) 824-0266 • RAM4WW@aol.com

Date: February 2, 2004

Napa County Environmental Management
1195 Third St., Room 101
Napa, California 94559

Attention: Ms. Kim Withrow, REHS

Re: Cameron Baker Property
Larkmeade Lane
APN 24-240-01

Dear Kim,

The purpose of this letter is to summarize our findings during the site evaluation on January 24, 2004. Tammy Martin, REHS of RAM Engineering and Kim Withrow, REHS of Napa County Department of Environmental Management (NCDEM) were present. Three soil profile pits, noted as 1 through 3, were excavated and logged. All three pits exhibited similar soils with acceptable soil to a depth of 54", 54" and 48" respectively. A sandy clay loam from 0-20" was assigned a perc rate of 1" per hour. Clay loam from 20-54" was assigned a perc rate of ½" per hour. Ground water was encountered in all three pits at 54", 54", and 48" respectively. Please see attached mapping to locate the three soil profile pits.

This office recommends the design of a shallow trench pressure distribution system. This ould include 12" of fill material placed prior to excavation of 24" deep trenches. Design at 1" per hour would be appropriate due to the trench zone being within the first horizon.

If you have any questions, please do not hesitate to call.

Sincerely,

Tamara Martin, REHS

cc: Greg Swaffar, Summit Engineering, Inc.

T.E. EVALUATION by RAM Engineering

1-24-04

LARKMEAD LN.

APN 20-240-01

4-2-1011

NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
REQUEST FOR SITE EVALUATION INSPECTION

ENTAL HEALTH DEPT. USE ONLY
2-18-
2-11-03
31664

PARCEL NUMBER: 20-240-01
JOB ADDRESS: Larkmead Ln
OWNER: Larkmead Vineyards
TEST CONDUCTED BY: KAM

TEST: FIELD ANALYSIS X
in on _____ at _____ am/pm

PERCOLATION TEST _____
To be run on _____ from _____ am/pm to _____ pm

OF TEST: HOUSE: _____ WINERY: X OTHER: _____

ED WASTEWATER FLOWS: 5,000-10,000 cases/yr = 600-800 + sanitary gpd

****

PERCOLATION TEST INSPECTION RESULTS

k checked? yes ____ no ____ Length of pre-soak: _____
by: _____ Date: _____
e of inspection: _____ Stabilized perc rate: _____
and Pipe Used? yes ____ no ____ If so, take the perc rate _____ x .6 = _____ in/hr

****

TYPE OF SYSTEM APPROVED - not acceptable for std system

D SYSTEM 54" (1&2)
ible soil to: 48" / Assigned perc range: (1-3) / 3-6 / 6-12
of trenches: _____ / Rock under pipe: _____ / Cover over rock: _____
feet of leachline required: _____ / Plot plan received: 2-4-04 KDW
0-2% / Surface drainage problems: none noted
onal information: _____

L DESIGN SYSTEM DUE TO THE FOLLOWING - Size constraints: _____
ate too slow: X / Perc rate too fast: _____ / Steep slope: _____
icient soil depth: 2 / High seasonal groundwater: X
e soil for special design: 54" (1&2) 48" (3) / Other problems: _____

Specialist Kevin Hartman Date 1-29-04

CLAY CONTENT	1	2	3	4	5	6
...le						
...2)						
...-27)	X	X	X			
...27-40)						
...40)						

SAND CONTENT Core Hole	1	2	3	4	5	6
High (>50)	X	X	X			
Mod (20-50)						
Low (<20)						

GRAVEL, COBBLE, STONE CONTENT Core Hole	1	2	3	4	5	6
Very High (>60)						
High (35-60)						
Mod (15-35)						
Low (<15)	X	X	X			

* *

DENSITY WHEN PICKED (Circle whether wet or dry) too 20" moist ...le	1	2	3	4	5	6
...uffs or caves soil in						
...tes and soil sluffs	X	X	X			
...tes/ little or no soil sluffs						

CONSISTENCE (Circle w or d) Core Hole	1	2	3	4	5	6
Easy						
Moderate	X	X	X			
Hard						

STRUCTURE ...le	1	2	3	4	5	6
...r						
	X	X	X			
...d						

MODIFIER CHARACTERISTICS

1) Soil Survey Name: ______

2) Horizon Boundaries: Diffuse ____ Gradual X Abrupt ____

3) Topography: Concave flat Convex ____ / Aspect: ______

4) Vegetation: Type grasses/weeds (used to be vineyard) Condition: ______

* *

CORE HOLE RECORD

HOLE #1 EST. PERC
25" sandy clay loam/clay loam — 1<3
... — 2½
silty clay loam — 4½
Roots: few, very fine
...Color: bright / (/) dull
...able: 54"
...y(e)/ hard / dusty / smear
...ble Soil To: 54"

HOLE #2 EST. PERC
____ to ______ ____
____ to same as 1 ____
____ to ______ ____
Roots: ______
Color: bright (/) dull
Water Table: 54"
Dug: (easy) / hard / dusty / smear
Acceptable Soil To: 54"

HOLE #3 EST. PERC
____ to ______ ____
____ to same as 1 ____
____ to ______ ____
Roots: ______
Color: bright (/) dull
Water Table: 48"
Dug: (easy) /hard /dusty /smear
Acceptable Soil To: 48"

CORE HOLE RECORD

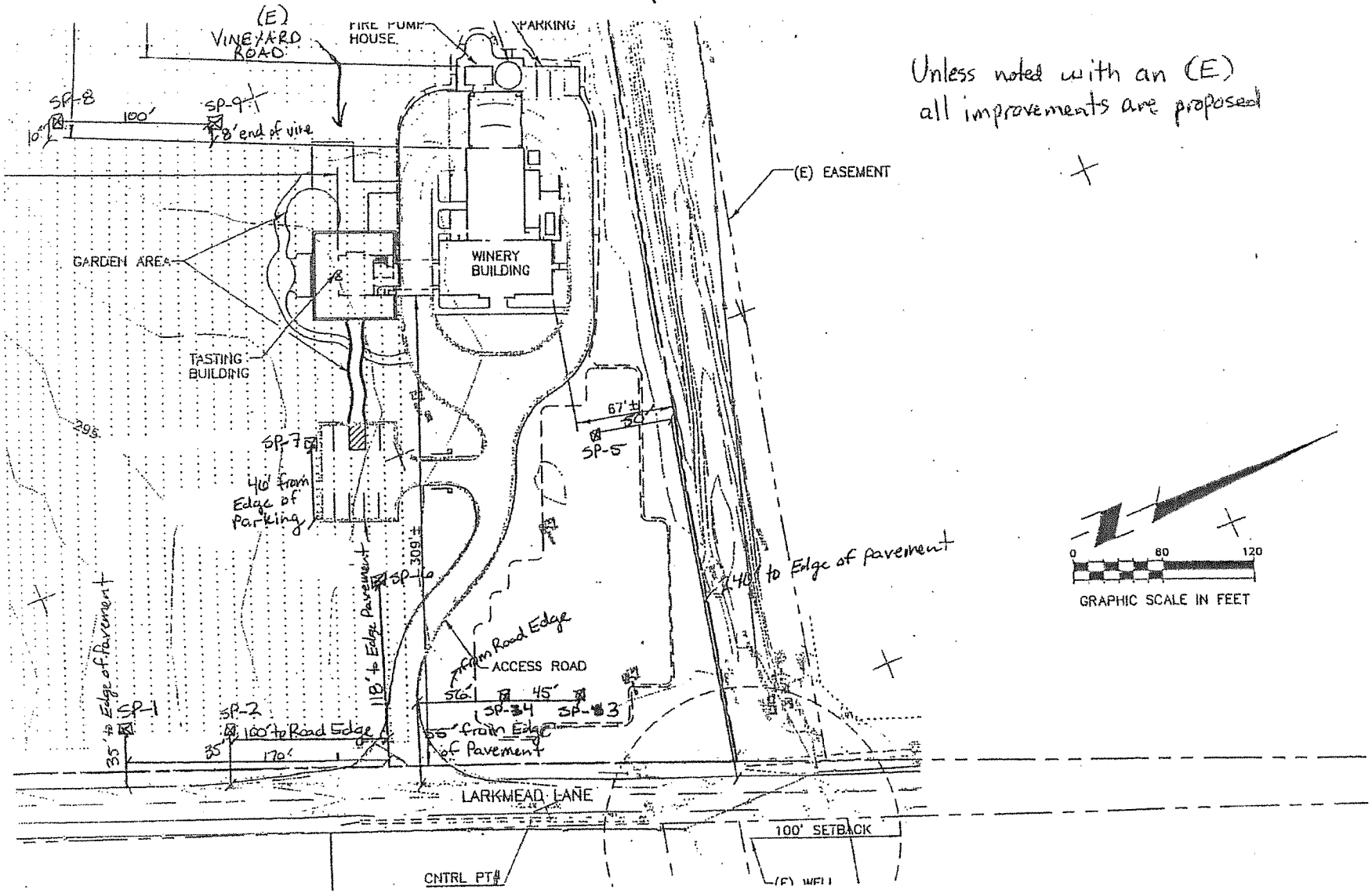
HOLE #4 EST. PERC
...bright / dull
...able: ______
...y / hard / dusty /smear
...ble Soil To: ______

HOLE #5 EST. PERC
____ to ______ ____
____ to ______ ____
____ to ______ ____
Roots: ______
Color: bright / dull
Water Table: ______
Dug: easy / hard / dusty / smear
Acceptable Soil To: ______

HOLE #6 EST. PERC
____ to ______ ____
____ to ______ ____
____ to ______ ____
Roots: ______
Color: bright / dull
Water Table: ______
Dug: easy /hard /dusty /smear
Acceptable Soil To: ______

APN: 07 -240-001

June 6, 2005



Unless noted with an (E) all improvements are proposed

DEM REHS DChoate
Date 06/06/2005

Soil Profile Data

Site Plan Received Yes
Accuracy Checked by DC

Profile	Horizon Depth	Boundary	Color	% Coarse Particles (>2 mm)	Texture	Structure	Perc Rate (inches/hr)	Consistence			Pores	Roots	Mottling
								D	M	W			
1	0-20"	Diffuse		0 - 15%	CL	Mod Sb Blk	1-3	Hard	Frb	Sticky	Common Fine	Few Very Fine	None --/--
	20"-60"	Diffuse		0 - 15%	SiCL	Strong Sb Blk	1/2	Soft	Frb	Sticky	Few Fine	Few Very Fine	None --/--
	60"-64"	--		15 - 30%	SCL	Mod Sb Blk	3-6	Lo	Lo	SS	Common Medium	-- None	None --/--
2	0-20"	Diffuse		0 - 15%	CL	Mod Sb Blk	1-3	Hard	Frb	Sticky	Common Fine	Few Very Fine	None --/--
	20"-54"	--		0 - 15%	SiCL	Strong Sb Blk	1/2	Soft	Frb	Sticky	Few Fine	-- None	None --/--
3	0-20"	Diffuse		0 - 15%	CL	Mod Sb Blk	1-3	Hard	Frb	Sticky	Common Fine	Few Very Fine	None --/--
	20"-54"	--		0 - 15%	SiCL	Strong Sb Blk	1/2	Soft	Frb	Sticky	Few Fine	-- None	None --/--
4	0-20"	Diffuse		0 - 15%	CL	Mod Sb Blk	1-3	Hard	Frb	Sticky	Common Fine	Few Very Fine	None --/--
	20"-54"	--		15 - 30%	SiCL	Strong Sb Blk	1/2	Soft	Frb	Sticky	Few Fine	-- None	None --/--
5	0-20"	Diffuse		0 - 15%	CL	Mod Sb Blk	1-3	Hard	Frb	Sticky	Common Fine	Few Very Fine	None --/--
	20"-60"	--		0 - 15%	SiCL	Strong Sb Blk	1/2	Soft	Frb	Sticky	Few Fine	-- None	None --/--
		--		0 - 15%	--	-- --	--	--	--	--	-- --	-- --	-- --/--

Boundary	USDA Texture Class	Structure	Consistence			Pores	Roots	Mottles
			Dry- Loose; Soft; Slightly Hard; Hard; Very Hard; Extremely Hard	Moist: Loose; Very Friable; Friable; Firm; Very Firm; Extremely Firm;	Wet: NonSticky; Slightly Sticky; Sticky; Very Sticky; NonPlastic; Slightly Plastic; Plastic; Very Plastic			
Abrupt: <1"; Clear: 1" – 2.5"; Gradual: 2.5" – 5"; Diffuse: >5"	Sand; Loamy Sand; Sandy Loam; Sandy Clay Loam; Sandy Clay; Clay Loam; Loam; Clay; Silty Clay; Silty Clay Loam Silt Loam; Silt	Weak, Moderate, or Strong and Granular; Platy; Prismatic; Columnar; Blocky; Angular Blocky; Subangular Blocky; Massive; Cemented				Quantity: Few, Common or Many; Size: Very Fine, Fine, Medium, Coarse	Quantity: Few, Common or Many; Size: Very Fine, Fine, Medium, Coarse, Very Coarse	Quantity: Few, Common, or Many; Size: Fine, Medium, Coarse, Very Coarse or Extremely Coarse; Contrast: Faint, Distinct or Prominent

Site Address: 1100 Larkmead Ln. City: Calistoga AP Number: 020-240-001
Owner: Solari Site Evaluator: Summit Permit #: E05-0310

DEM REHS DChoate
Date 06-06-2005

Soil Profile Data

Site Plan Received Yes
Accuracy Checked by DC

Profile	Horizon Depth	Boundary	Color	% Coarse Particles (>2 mm)	Texture	Structure	Perc Rate (inches/hr)	Consistence			Pores	Roots	Mottling
								D	M	W			
6	0-20"	Diffuse		0 - 15%	CL	Mod Sb Blk	1-3	Hard	Frb	Sticky	Common Fine	Few Very Fine	None --/--
	20"-64"	--		15 - 30%	CL	Mod Sb Blk	1-3	Hard	Frb	Sticky	Few Fine	-- None	None --/--
7	0-36"	Abrupt		15 - 30%	CL	Mod Sb Blk	1-3	Hard	Frb	Sticky	Common Fine	Few Very Fine	None --/--
	36"-54"	Abrupt		>50%	Sand	-- --	>12	Lo	Lo	NS	-- None	-- None	None --/--
	54"-60"	--		0 - 15%	Clay	-- Mass	<1	--	--	--	-- None	-- None	Few Med/Ft
8	Sub-drain	--		0 - 15%	--	-- --	--	--	--	--	-- --	-- --	-- --/--
9	0-20"	Diffuse		0 - 15%	CL	Mod Sb Blk	1-3	Hard	Frb	Sticky	Common Fine	Few Very Fine	None --/--
	20"-48"	Abrupt		0 - 15%	SiCL	Strong Sb Blk	1/2	Soft	Frb	Sticky	Few Fine	-- None	None --/--
	48"	--		0 - 15%	Clay	-- Mass	<1	--	--	--	-- None	-- None	None --/--
		--		0 - 15%	--	-- --	--	--	--	--	-- --	-- --	-- --/--
		--		0 - 15%	--	-- --	--	--	--	--	-- --	-- --	-- --/--
		--		0 - 15%	--	-- --	--	--	--	--	-- --	-- --	-- --/--

Boundary	USDA Texture Class	Structure	Consistence			Pores	Roots	Mottles
			Dry- Loose; Soft; Slightly Hard; Hard; Very Hard; Extremely Hard	Moist: Loose; Very Friable; Friable; Firm; Very Firm; Extremely Firm;	Wet: NonSticky; Slightly Sticky; Sticky; Very Sticky; NonPlastic; Slightly Plastic; Plastic; Very Plastic			
Abrupt: <1"; Clear: 1" – 2.5"; Gradual: 2.5" – 5"; Diffuse: >5"	Sand; Loamy Sand; Sandy Loam; Sandy Clay Loam; Sandy Clay; Clay Loam; Loam; Clay; Silty Clay; Silty Clay Loam Silt Loam; Silt	Weak, Moderate, or Strong and Granular; Platy; Prismatic; Columnar; Blocky; Angular Blocky; Subangular Blocky; Massive; Cemented				Quantity: Few, Common or Many; Size: Very Fine, Fine, Medium, Coarse	Quantity: Few, Common or Many; Size: Very Fine, Fine, Medium, Coarse, Very Coarse	Quantity: Few, Common, or Many; Size: Fine, Medium, Coarse, Very Coarse or Extremely Coarse; Contrast: Faint, Distinct or Prominent

Site Address: 1100 Larkmead Ln. City: Calistoga AP Number: 020-240-001
Owner: Solari Site Evaluator: Summit Permit #: E05-0310

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: 020-240-001
(County Use Only) Reviewed by: Date:

PLEASE PRINT OR TYPE ALL INFORMATION

Property Owner Larkmead vineyards	☐ New Construction ☐ Addition ☐ Remodel ☐ Relocation ☒ Other. Increase Visitation
Property Owner Mailing Address 1100 Larkmead Ln	☐ Residential - # of Bedrooms: Design Flow : gpd
City: Calistoga State: CA Zip: 94515	☒ Commercial – Type: WINERY Sanitary Waste: 100-300gpd Process Waste: 800 gpd
Site Address/Location 1100 Larkmead Ln Calistoga CA 94515	☐ Other: Sanitary Waste: gpd Process Waste: gpd

Evaluation Conducted By:

Company Name Always Engineering	Evaluator's Name Ben Monroe	Signature (Civil Engineer, R.E.H.S., Geologist, Soil Scientist)
Mailing Address: 131 Stony Circle, Suite 1000		Telephone Number (707) 542 - 8795
City: Santa Rosa State: CA Zip: 95401		Date Evaluation Conducted 10/09/2013

Primary Area	**Expansion Area**
Acceptable Soil Depth: 60 in. Test pit #'s: TP1-TP6	Acceptable Soil Depth: 48/36 in. Test pit #'s: TP7/(TP8 & TP9)
Soil Application Rate (gal. /sq. ft. /day): 0.5	Soil Application Rate (gal. /sq. ft. /day): 0.5
System Type(s) Recommended: Pressure Distribution (PD)	System Type(s) Recommended: PD, At-grade, Drip
Slope: 5 %. Distance to nearest water source: 500 ft.	Slope: 5 %. Distance to nearest water source: 500/160
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:

-Existing Wells
-Existing Bio Swale
-Existing Storm Ditches

Test Pit # 1

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
27	Diffuse	15%	SiL	3, SAB	F/Fr		S	2,M/F	1,M/F	0
65+	Diffuse	35%	SL	2, SAB /G	L		SS	2,M/F	1,M/F	0

Test Pit # 2

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
34	Diffuse	15%	SiL	3, SAB /G	F/Fr		S	2,3,M/C	1,M	0
72	Diffuse	15%	SCL	3, SAB /G	F		S	2,M	1,M	0
75+	Diffuse	5-10%	SL	2 SAB /G	L		SS	2,F	0	1,F

Test Pit # 3

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
22	Wavy	20%	SiL	3 SAB	F		S	2, 3 M/L	1,M	0
40	Wavy	30%	SiL /L	1 B/G	L		S	2,F	1,M/F	0
62+	Wavy	40%	SL	1 B/G	L		S	3,F	1,F	0

3 = Strong/Many
2 = Moderate/Common
1 = Weak/Few

Attach additional sheets as needed

Test Pit # 4

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
22	Diffuse	15%	SiL	3, SAB	Fr		S	1,M	1,VF	0
60+	Diffuse	15%	SCL	3, SAB	F		S	2,F	1,VF	0

Test Pit # 5

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
36+	Diffuse	15%	SiL	3, SAB	Fr		S	2,F	3,VF	0
66+	Diffuse	25%	SCL	2, SAB	F		S	3,VF	1,VF	0
	Cobbles at	36-48" +	or -							

Test Pit # 6

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
36+	Diffuse	15%	SiL	3, SAB	Fr		S	2,F	3,VF	0
66+	Diffuse	25%	SCL	2, SAB	F		S	3,VF	1,VF	0

3 = Strong/Many
2 = Moderate/Common
1 = Weak/Few

Attach additional sheets as needed

Test Pit # 7

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
22	Diffuse	15%	SiL	3, SA	F/Fr		S	2 ,M	2,F	0
48	Gradual	25%	SiL / CL	3, SAB	F		S	1,M	1,F	1,D
56+	Gradual	35%	SC / CL	3, SAB	VF		S	1,F	1,F	1,D

Test Pit # 8

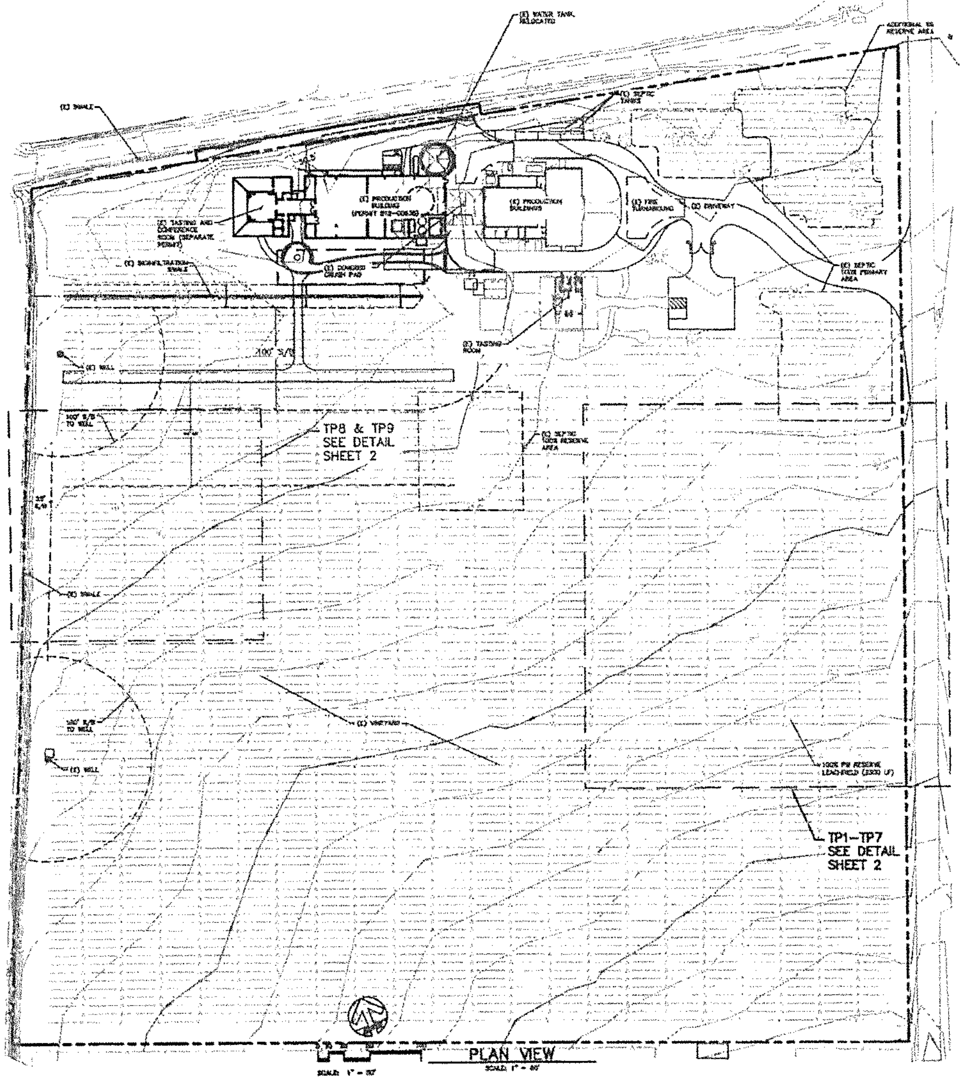
Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
24	Gradual	20%	S,SiL	3, SAB	Fr		S	2,M	1,M/F	0
48	Gradual	15%	SiL	2, SAB	L		S	1,F	1,F	1,F
54+	Gradual	15%	SiL	1, SC	VF		S	0	0	2,D

Test Pit # 9

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
36	Gradual	20%	S,SiL	3, SAB	Fr		S	2,M	1,M/F	0
60+	Gradual	15%	SiL	1, SC	L		S	0	0	2,D

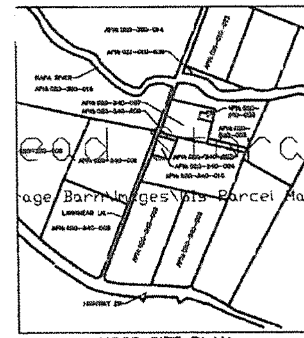
3 = Strong/Many
2 = Moderate/Common
1 = Weak/Few

Attach additional sheets as needed



PLAN VIEW

SCALE: 1" = 80'



VICINITY MAP

NO SCALE

USGS SITE PLAN

SCALE: 1" = 180'

LEGEND (EXISTING FEATURES SCREENED)

- APPROXIMATE PROPERTY LINE
- APPROXIMATE R.O.W. EASEMENT
- EDGE OF PAVEMENT
- EDGE OF GRAVEL DRIVEWAY
- DRAINAGE COURSE FLOWLINE
- 100 YEAR FLOOD PLAIN
- 500 YEAR FLOOD PLAIN
- ELECTRIC
- FIRE PROTECTION
- GAS LINE
- LEACH LINE
- LEACH RESERVE
- PW PIPE
- SANITARY SEWER
- TELEPHONE LINE
- UTILITY
- 5 FOOT INDEX 1' INTERVAL CONTOURS
- WELL
- (E)/(P) EXISTING/PROPOSED
- S/B SET BACK
- ALWAYS ENGINEERING TESTPIT
- SUMMIT ENGINEERING TESTPIT

OWNER/APPLICANT
LARKMEAD VINEYARDS
1100 LARKMEAD LN.
CALISTOGA, CA 94515

CIVIL ENGINEER
BEN MONROE
ALWAYS ENGINEERING, INC.
131 STONY CIRCLE, SUITE 1000
SANTA ROSA, CA 95407

These documents are the property of Always Engineering, Inc. Any unauthorized use without the written consent is prohibited by law. Always Engineering, Inc. disclaims responsibility for the documents if used whole or in part at any other location.

Always Engineering, Inc.

LARKMEAD VINEYARDS

SITE EVALUATION

1100 LARKMEAD LANE
CALISTOGA, CA 94515

Plot Date 1/27/14
Drawn By
Checked By
Project No.

OVERALL SITE

SCALE : AS NOTED

1

NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICIAL SELF-MONITORING REPORT FORM

OWNERS NAME: Larkmead Winery

SITE ADDRESS: 1100 Larkmead Lane

ASSESSOR'S PARCEL#:020-240-001 TELEPHONE# 942-0167

SYSTEM TYPE: Pressure Distribution

INSPECTED BY: McCollum General Engineering DATE: 3/19/2013

SEPTIC TANK / SUMP TANK / PUMP/ALARM / CONTROLS -

Septic Tank

Liquid level: HIGH (above sanitary T) __ NORMAL (at sanitary T) X LOW (below sanitary T) __
Odor: NORMAL (musty, earthy, moldy) X PUNGENT(rotten egg, cabbage) __
Sludge/scum level: NORMAL (35% or less tank capacity) X HIGH (>35% tank capacity) _____
Date of last pumping: N/A

Sump Tank

Liquid level: HIGH(above alarm float) __ NORMAL(between on/off float level) X LOW(below off float) __
Odor: NORMAL(musty, earthy, moldy) X PUNGENT (rotten egg, cabbage) __
Sludge/scum level: NORMAL(no measurable amount) X HIGH (measurable amount) _____
Date of last pumping: N/A

Pump and Alarm

Pump tested and functioning properly: YES
Alarm tested and functioning properly: YES
Floats inspected and functioning properly: YES
If no, please explain: _____

CONTROLS

Current dose counter reading: P-1/3203, P-2/2841 Date: 3/19/2013
Previous dose counter reading:P-1/3121, P2/ 2760 Date: 12/18/2012
Gallons per dose: 270 #of doses: 163 #of days: 91
Calculate gallons per day (gal/dose) X (#of doses) ÷ (# days) = 484

DISPOSAL FIELD -
Monitoring Well Data

Well #	Distance from surface of ground to water	Well #	Distance from surface of ground to water	Well #	Distance from surface of ground to water
1	Dry	8	Dry	15	Dry
2	Dry	9	Dry	16	
3	Dry	10	Dry	17	
4	Dry	11	Dry	18	
5	Dry	12	Dry	19	
6	Dry	13	Dry	20	
7	Dry	14	Dry		

Soil cover: DRY MOIST X WET (spongy/saturated)
Condition of vegetation: NONE GOOD X OVERGROWN
Diversion/Distribution Valve: YES
If yes, inspected and functioning properly? YES If no, explain:

Date distribution network was last purged: 02/24/12
Additional comments: Pump controls checked, pumps checked, diversion valve cleaned, valves exercised, system tested - OK.

NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICIAL SELF-MONITORING REPORT FORM

OWNERS NAME: Larkmead Winery

SITE ADDRESS: 1100 Larkmead Lane

ASSESSOR'S PARCEL#:020-240-001 TELEPHONE# 942-0167

SYSTEM TYPE: Pressure Distribution

INSPECTED BY: McCollum General Engineering DATE: 7/30/2013

SEPTIC TANK / SUMP TANK / PUMP/ALARM / CONTROLS -

Septic Tank

Liquid level: HIGH (above sanitary T) __ NORMAL (at sanitary T) X LOW (below sanitary T) __
Odor: NORMAL (musty, earthy, moldy) X PUNGENT(rotten egg, cabbage) __
Sludge/scum level: NORMAL (35% or less tank capacity) X HIGH (>35% tank capacity) _____
Date of last pumping: N/A

Sump Tank

Liquid level: HIGH(above alarm float) __ NORMAL(between on/off float level) X LOW(below off float) __
Odor: NORMAL(musty, earthy, moldy) X PUNGENT (rotten egg, cabbage) __
Sludge/scum level: NORMAL(no measurable amount) X HIGH (measurable amount) _____
Date of last pumping: N/A

Pump and Alarm

Pump tested and functioning properly: YES
Alarm tested and functioning properly: YES
Floats inspected and functioning properly: YES
If no, please explain: _____

CONTROLS

Current dose counter reading: P-1/3352, P-2/2992 Date: 7/30/2013
Previous dose counter reading:P-1/3203, P2/ 2841 Date: 3/19/2013
Gallons per dose: 270 #of doses: 300 #of days: 131
Calculate gallons per day (gal/dose) X (#of doses) ÷ (# days) = 618

DISPOSAL FIELD -
Monitoring Well Data

Well #	Distance from surface of ground to water	Well #	Distance from surface of ground to water	Well #	Distance from surface of ground to water
1	Dry	8	Dry	15	Dry
2	Dry	9	Dry	16	
3	Dry	10	Dry	17	
4	Dry	11	Dry	18	
5	Dry	12	Dry	19	
6	Dry	13	Dry	20	
7	Dry	14	Dry		

Soil cover: DRY MOIST X WET (spongy/saturated)
Condition of vegetation: NONE GOOD X OVERGROWN
Diversion/Distribution Valve: YES
If yes, inspected and functioning properly? YES If no, explain:

Date distribution network was last purged: 02/24/12
Additional comments: Pump controls checked, pumps checked, diversion valve cleaned, valves exercised, system tested - OK.

NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICIAL SELF-MONITORING REPORT FORM

OWNERS NAME: Larkmead Winery

SITE ADDRESS: 1100 Larkmead Lane

ASSESSOR'S PARCEL#:020-240-001 TELEPHONE# 942-0167

SYSTEM TYPE: Pressure Distribution

INSPECTED BY: McCollum General Engineering DATE: 1/27/2014

SEPTIC TANK / SUMP TANK / PUMP/ALARM / CONTROLS -

Septic Tank

Liquid level: HIGH (above sanitary T) __ NORMAL (at sanitary T) X LOW (below sanitary T) __
Odor: NORMAL (musty, earthy, moldy) X PUNGENT(rotten egg, cabbage) __
Sludge/scum level: NORMAL (35% or less tank capacity) X HIGH (>35% tank capacity) _____
Date of last pumping: N/A

Sump Tank

Liquid level: HIGH(above alarm float) __ NORMAL(between on/off float level) X LOW(below off float) __
Odor: NORMAL(musty, earthy, moldy) X PUNGENT (rotten egg, cabbage) __
Sludge/scum level: NORMAL (no measurable amount) X HIGH (measurable amount) _____
Date of last pumping: N/A

Pump and Alarm

Pump tested and functioning properly: YES
Alarm tested and functioning properly: YES
Floats inspected and functioning properly: YES
If no, please explain: _____

CONTROLS

Current dose counter reading: P-1/3678, P-2/3303 Date: 1/27/2014
Previous dose counter reading:P-1/3352, P2/ 2992 Date: 07/30/13
Gallons per dose: 270 #of doses: 637 #of days: 177
Calculate gallons per day (gal/dose) X (#of doses) ÷ (# days) = 972

DISPOSAL FIELD -
Monitoring Well Data

Well #	Distance from surface of ground to water	Well #	Distance from surface of ground to water	Well #	Distance from surface of ground to water
1	Dry	8	Dry	15	Dry
2	Dry	9	Dry	16	
3	Dry	10	Dry	17	
4	Dry	11	Dry	18	
5	Dry	12	Dry	19	
6	Dry	13	Dry	20	
7	Dry	14	Dry		

Soil cover: DRY MOIST X WET (spongy/saturated)
Condition of vegetation: NONE GOOD X OVERGROWN
Diversion/Distribution Valve: YES
If yes, inspected and functioning properly? YES If no, explain:

Date distribution network was last purged: 02/24/12
Additional comments: Pump controls checked, pumps checked, diversion valve cleaned, valves exercised, system tested - OK.