12505.0 Vintage Wine Estates
Girard Winery Use Permit
Wastewater Feasibility Study
September 9, 2015

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

Napa County Planning, Building, and Environmental Services (PBES)
Attn: Kim Withrow
1195 3rd St., Room 201
Napa, Ca 94559

Project: Girard Winery Use Permit
1077 Dunaweal Ln.
Calistoga, CA 94515
APN: 020-150-017

Copies	Document Date	Description
1	9/9/2015	Wastewater Feasibility Study and Attachments

Kim,

This letter and attached Wastewater Feasibility Study are provided in support of the sanitary sewage and winery process wastewater treatment and dispersal components of the Girard Winery Use Permit.

Winery process wastewater will be treated in two existing winery process wastewater ponds on the project parcel which currently treat the winery process wastewater from Clos Pegase Winery. Addition of the Girard winery process wastewater will include a pump station at Girard, connection into the existing forcemain to the rotary screen at the ponds, and addition of more aeration at the existing ponds. Treated effluent from the ponds is then discharged into an existing irrigation reservoir used for irrigation of vineyard and landscaping on the Close Pegase Winery and Girard Winery parcels. The existing ponds are sufficient in volume to provide greater than 100 days retention at the proposed process wastewater flows from both wineries combined. Specifics on aeration sizing, pond water balance, and irrigation reuse calculations are included in the attached study.

It is proposed to disperse of sanitary sewage from the proposed Girard Winery using a subsurface drip irrigation septic system and associated pretreatment system. The pretreatment system proposed shall be an AdvanTex Textile Filter or BioBarrier MBR system consisting of all below grade tanks which include a septic tank, recirculation tank (for AdvanTex only), a treatment tank (for BioBarrier only), and subsurface drip irrigation sump pump tank. The BioBarrier would also include use of a blower and effluent pump above grade and the AdvanTex would include an above grade AX100 Textile filter model. Specifics on sizing of the system components and subsurface drip irrigation sizing, site, and soil criteria are provided in the attached report.

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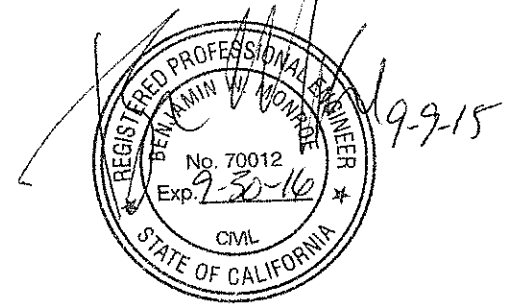
We trust that this letter and attached report are sufficient for review and to generate conditions of approval for the project which are satisfactory to the County. If you have any questions or comments with regards to this project, please feel free to contact me.

Sincerely,

Ben Monroe, P.E.
Project Manager
Always Engineering, Inc.



Enclosures

13530.0 Vintage Wine Estates_Girard Winery
Wastewater Feasibility Study
February 20, 2014
Revised: September 9, 2015

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Santa Rosa, CA 95401 Fax (707) 542-8798
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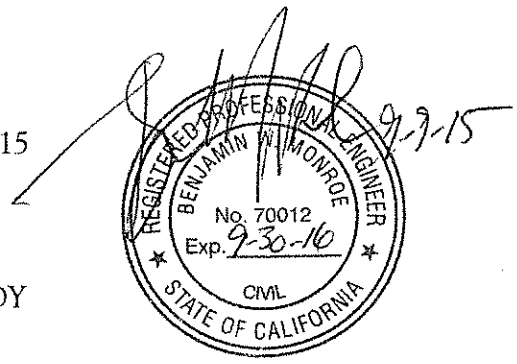
Girard Winery

1077 Dunaweal Ln., Calistoga, CA 94515
APN: 020-150-017

USE PERMIT
WASTEWATER FEASIBILITY STUDY



Project and Site Background

Vintage Wine Estates owns and operates the existing "Clos Pegase" Winery located at 1060 Dunaweal Ln in Calistoga, Ca (APN: 020-150-012). Vintage Wine Estates also owns the parcel across Dunaweal Ln., (1077 Dunaweal Ln., APN: 020-150-017), which has the existing process wastewater ponds and water well for Clos Pegase.

Vintage Wine Estates is proposing to construct a new winery and tasting room (the Girard Winery) on the above referenced parcel. A production capacity of 200,000 gal of wine annually is proposed for the new Girard Winery. With the Use Permit, it is proposed to also treat the process waste (PW) generated by Girard Winery using the existing Clos Pegase Pond Treatment system. A new collection system and transfer pump sump will be required for Girard Winery. A new aerator in the process waste ponds will also be required. A new sanitary sewage system on-site septic system is proposed to accommodate the winery employees, visitors, and events.

The parcel consists of existing vineyards, water supply well and treatment, an agricultural storage building, 2 PW treatment ponds and an irrigation storage pond. The parcel is generally flat, with a small flow line along the southern property line.

A site plan is provided in Enclosure B displaying the existing site and proposed wastewater system improvements.

SANITARY SEWAGE (SS)

Existing Site Evaluation

A site evaluation was performed by Ben Monroe, P.E. of Always Engineering and Peter Ex of Napa County on November 14, 2013. A total of 16 soil profiles were evaluated and 6 were logged for use. Test pits displayed a sandy clay loam surface soil which ranged in depth from 36" to 56" in depth. Soils were underlain by a sandy loam or loamy sand for a total permeable depth ranging from 49" to 60" in depth. All soil displayed a moderate to strong sub-angular blocky structure. Faint mottling was observed at 24" deep, with increasing intensity with depth below that. Prominent mottling was observed below 48" in all test pits. Additional groundwater monitoring

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Santa Rosa, CA 95401 Fax (707) 542-8798
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was required onsite to determine if the upper mottling is due to seasonal subsurface groundwater or heavy irrigation of the onsite vineyards.

Groundwater monitoring was performed onsite on February 9, February 10, and February 19, 2015 following receipt of 5.12 inches of rainfall on February 6 through February 9, 2015, as measured at the Napa County Rain Gauge at Dunaweal Lane and the Napa River. Approximately 1.62 inches of rain occurred on February 8 and the morning of February 9. This is far greater than the minimum 0.5 inches within a 48 hours which is required for groundwater monitoring which is required by Napa County Site Evaluation procedures. Groundwater readings on February 9, 2015 indicated a minimum of 24 inches to perched groundwater in all monitoring wells except for well #5, which is the lowest in elevation and will require a setback during design. Readings the following day indicated that groundwater elevations dropped by a minimum of 6 inches and had fallen an additional 37 inches minimum by February 19, 2015. All monitoring wells, except for #5 were dry on February 19. The monitoring revealed greater separation from groundwater in the northwestern area of testing and therefore the proposed primary septic system will be focused in this area. This monitoring, performed following substantial rains in a short period of time, and measured immediately following the cease of rain, is considered to represent a reasonably worst case scenario with respect to perched groundwater.

An interceptor drain is also proposed to ensure maximum separation to seasonal groundwater in the vicinity of septic dispersal. Surface drainage improvements for the winery will also be designed to increase diversion of surface water runoff away from the septic area and areas uphill of the dispersal system. The Napa County Site Evaluation procedures and table for *Alternative Sewage Treatment System Soil Application Rates* indicate a Sandy clay loam or sandy loam with moderate structure should be loaded at 0.75 to 1.0 gpd using pretreated effluent. A copy of the site evaluation and groundwater monitoring reports is included as an attachment to this report.

Proposed Wastewater Flows

The proposed onsite sanitary wastewater flow rate is entirely associated with the proposed Girard Winery. The use permit is requesting a similar level of use as Clos Pegase; an average number of 10 employees (15 gpcd) along with 75 visitors (3gpcd), and a peak number of 30 employees (15 gpcd) along with 100 visitors (3 gpcd). There will be one large event per year which will have 500 attendees. Portable toilets will be used for this event. All events will have fully catered food with all preparation and cleanup occurring off site. The proposed wastewater flows are estimated as follows:

Average

Employees

8 FT employees	x	15 gpd/employee	=	120 gpd
3 PT employees	x	7.5 gpd/employee	=	22.5 gpd

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Tasting Room

42 tasting visitors	x	3 gpd/visitor	=	126 gpd

Events

75 event visitors	x	5 gpd/visitor	=	375 gpd

TOTAL PROPOSED AVERAGE DESIGN FLOW = **643.5 GPD**

Peak

Employees

20 FT employees	x	15 gpd/employee	=	300 gpd
10 PT employees	x	7.5 gpd/employee	=	75 gpd

Tasting Room

100 tasting visitors	x	3 gpd/visitor	=	300 gpd

Events

200 event visitors	x	5 gpd/visitor	=	1,000 gpd

TOTAL PROPOSED PEAK DESIGN FLOW = **1,675 GPD**

Proposed Sanitary Sewage Loading

It is proposed to design a subsurface drip irrigation system to accommodate all sanitary sewage dispersal. Sizing as follows:

Proposed Septic System Design Flow: 1,675 gpd
Proposed Pretreated Effluent Loading Rate: 0.6 gpd/sf (Moderate -Strong Sandy Loam/Sandy Clay loam)

This loading rate is within the suitable range for pretreated effluent in the onsite soil types and is more conservative than what is permissible for the onsite soils.

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Proposed Sanitary Sewage Management System

With improvement to the site, the following tanks are proposed for the Girard Winery septic system. Because a pretreatment system is required for subsurface drip, a septic, recirculation, and sump tank are required for an AdvanTex pretreatment system. Other NSF Certified pretreatment systems may be reviewed at the time of Construction Drawings. Tank sizes are verified using the plumbing code commercial sizing formula.

V = 1,125 + 0.75 x Q
= 1,125 + 0.75 x 1,675 gpd
= 2,381.25 gallons

Septic Tank:	6,000 gallons (3.6 days retention time)
Recirculation Tank:	2,000 gallons (1.2 days retention time)
Sump/Dispersal Equalization Tank:	3,000 gallons (1.8 days retention time)

These tank volumes meet the minimum criteria for an AvanTex pretreatment system. Tank sizes may be revised if a different treatment system is selected, but all tanks associated with the septic system are proposed to be subsurface tanks of concrete or fiberglass construction. Whichever treatment system is selected, it will be required to have sufficient existing installations with satisfactory results for at least 5 years of operation, so as to avoid failures due to manufacturer's flaws in design.

Leachfield Sizing

The area required for a primary sanitary sewer drip system is as follows:

Area Required = Flow/Application Rate

= 1,675 gpd / 0.6 gpd/sf

= 2,792 sf

Reserve Area

200% reserve area, or 5,584 sf, is required for this site and is shown adjacent to the primary septic area on the Use Permit Site Plan.

Irrigation Reuse Alternative

Although groundwater monitoring has been performed and shown that the site can support a subsurface drip irrigation, mound, or at-grade type septic system it is also desired to have the ability to provide a pretreatment and irrigation reuse system, in the event that is desired to recycle the treated effluent for onsite irrigation of landscape. The Lyve Wastewaer System has been used at

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Alpha Omega Winery in St. Helena to treat and reuse domestic wastewater for irrigation on their site landscape. For this project, if reuse is pursued, the treatment system shall be a Biomicrobics BioBarrier Membrane Bioreactor (MBR) which is NSF 350 certified for reuse of graywater and NSF40 certified for treatment of domestic wastewater and is capable of consistently producing effluent with BOD and TSS of less than 10 mg/L . A process wastewater BioBarrier is installed at Sinegal Winery in St. Helena and operating without issue. A design for a BioBarrier MBR would include the following physical components:

Septic Tank:	2,000 gallons
Processing Tank:	13,000 gallons
Treated Collection Sump:	1,500 gallons
Treated Storage Tank:	40,000 gallons

The system also includes an aeration system as well as various pumps for transfer of waste and may also require nutrient addition to provide proper chemical ratios required for biological cell growth and waste degradation. Sampling of the waste stream in use is required to identify nutrient deficiencies. Ultraviolet (UV) disinfection would be provided after treatment as well as between treated storage and final irrigation reuse. A storage tank would be provided for periods in the winter when irrigation reuse cannot occur. The storage tank would be the only above grade tank involved and could end up below grade, depending on final layout and available space in the treatment system area. As demonstrated in the process wastewater section of this study, more than sufficient vineyard is available onsite for irrigation dispersal of effluent, as well as the proposed landscape areas. Approximately 3 acres is required for process wastewater and a total of 18 acres vineyard is available onsite.

If treatment, irrigation, and reuse is proposed for construction of this project, the project must first obtain approval from the San Francisco Bay Regional Water Quality Control Board (SFBREWQCB) for this use. Prior to issuance of building permits, the RWQCB will need to approve of the proposal, and issue Waste Discharge Requirements including monitoring requirements for the reuse of the sanitary sewage. In this event, the RWQCB must also grant system approval prior to building permit issuance.

PROCESS WASTEWATER (PW)

Existing System

The existing on-site process wastewater system consists of 2 aerated facultative lagoons and an irrigation holding pond. This system is currently treating the process waste from the Clos Pegase winery located across Dunaweal Lane under the same ownership. No sanitary wastewater is discharged into the process wastewater system.

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Before entering the process wastewater ponds, the entire flow of process wastewater is filtered through a rotary screen where suspended solids are collected and removed. Biological stabilization occurs in the facultative pond system. The total volume of the existing pond system is approximately 1.5 MG. There is a 10 hp aerator in Pond 1 and a 5 hp aerator in Pond 2. Clos Pegase is currently producing 200,000 gallons of wine with an average annual PW production of 920,000 gallons. This pond system is large enough to provide at least 200 days of retention time at current Clos Pegase average flow conditions. Treated PW is used for irrigation of the onsite vineyards.

Proposed System

The proposed PW system for the new Girard Winery will connect to the existing PW wastewater pond system. The new PW connection will include a pump sump and new aerators to accommodate the increase in flows.

Proposed Flow Calculations

The winery is currently proposing a production of 200,000 gallons of wine per year. Using a monthly PW distribution from multiple wineries and a PW generation rate of 4.6 gal PW per gal wine produced (from Clos Pegase data) flow rates are estimated as follows:

Winery Process Wastewater (PW)

Average Daily Flow	=	2,521 gal PW/day
Average Harvest Day	=	3,950 gal PW/day
Average Day, Peak Harvest Month	=	5,060 gal PW/day (See calculations spreadsheet)

The **design flow proposed** to the system is **10,120 gpd** (5,060 gpd from Girard and 5,060 gpd from Clos Pegase). It should be noted that although the assumption of 4.6 gallons of process wastewater per gallon wine produced is used for sizing (as taken from existing Clos Pegase winemaking practices and assumed to be similar for Girard), actual water use data from the existing Girard operation in Sonoma indicates a water use rate of 3.0, 2.7, and 2.5 gallons process wastewater per gallon of wine produced for 2012, 2013, and 2014, respectively. Therefore, with a new water-efficient winery and closer contact with winemaking at Clos Pegase, the overall water use per gallon should be less than historically used at Clos Pegase.

Aerator Sizing

The Aerators have been sized using a BOD mass loading and the Aqua-Jet Surface Mechanical Aerator brochure specifications. Calculations (attached) show that a total of 22.5 hp of aerators is required for both ponds. It is proposed to add a second 10 hp aerator to Pond 1 for a total of 20

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hp in Pond 1. This results in a power to volume (P/V) ratio of 0.21 hp per 1000 ft^3. This is sufficient for surface mixing and aeration in Pond 1. Pond 2 has an (E) 5 hp aerator. This provided a P/V ratio of 0.05 hp per 1000 ft^3. This is sufficient for surface mixing and to prevent odors in Pond 2. No aeration should be required in the irrigation pond due to dilution, level of treatment exiting Pond 2, and natural aeration from algae. In addition, an Anti-Erosion Assembly is recommended for both aerators, to minimize sediment mixing during periods of low liquid levels in the ponds.

Pond Sizing
The facultative ponds combined volume is roughly 1.5 MG. This provides for a retention time of >140 days at peak month flows (see calculations spreadsheet). Facultative pond systems are sized with a minimum of 60 days in the entire system, and at least 45 days in the first pond. Therefore, this system will have sufficient contact time for treatment before discharge. During the rainy winter months when irrigation needs are low the existing irrigation pond will be used as a detention system to hold excess effluent until the spring months when increased irrigation loading is appropriate.

Irrigation Reserve/Dispersal
A total of 7.5 acres of vineyard is required for dispersal of effluent to avoid ponding and concentration.

SUMMARY AND CONCLUSIONS

Sanitary Wastewater
With the proposed installation of a new sanitary management system, as discussed in this report, the site is capable of supporting the proposed sanitary sewage loads.

Process Wastewater
With the proposed installation of additional aerators and a collection system and pump station, the existing aerated facultative pond system is sufficient for the proposed Girard Winery PW flows in addition to the existing Clos Pegase Winery PW flows.

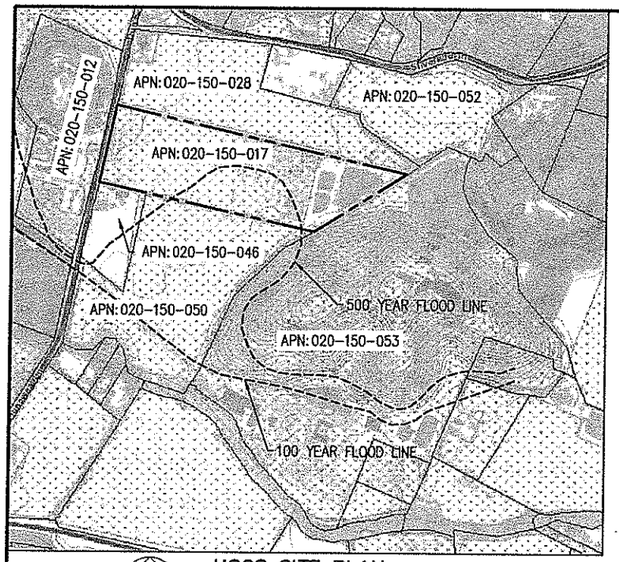
GIRARD WINERY

1077 Dunaweal Ln.

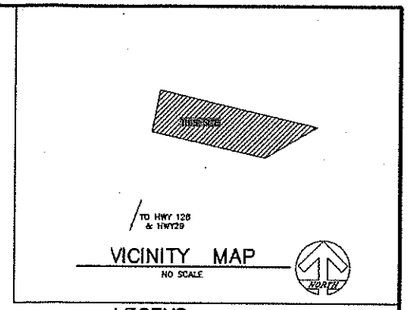
Calistoga, California 94515

APN 022-150-017

USE PERMIT APPLICATION

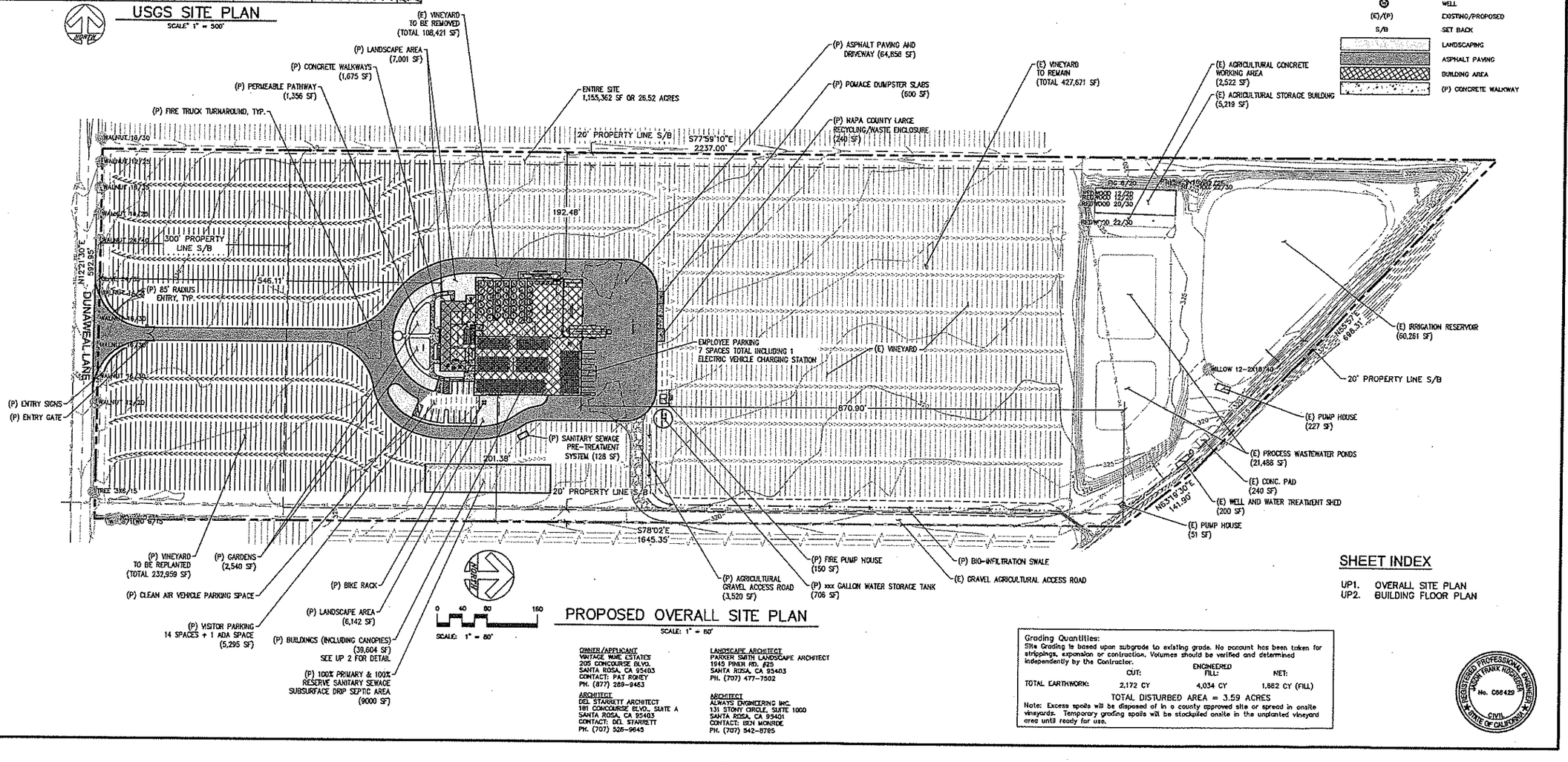


USGS SITE PLAN
SCALE: 1" = 500'



LEGEND

- APPROXIMATE PROPERTY LINE
- FENCE
- EDGE OF PAVEMENT
- EDGE OF GRAVEL DRIVEWAY
- DRAINAGE COURSE FLOWLINE
- WINDROW
- OHL — OVERHEAD UTILITIES
- SETBACK
- 100 YEAR FLOOD PLAIN
- 500 YEAR FLOOD PLAIN
- 5 FOOT INDEX 1' INTERVAL CONTOURS
- WELL
- (E)/(P) EXISTING/PROPOSED
- S/B SET BACK
- LANDSCAPING
- ASPHALT PAVING
- BUILDING AREA
- (P) CONCRETE WALKWAY



PROPOSED OVERALL SITE PLAN
SCALE: 1" = 80'

SHEET INDEX

OWNER/APPLICANT
VINTAGE WINE ESTATES
205 CONCOURSE BLVD.
SANTA ROSA, CA 95403
CONTACT: PAT RONEY
PH. (877) 289-9463

ARCHITECT
DEL STARRETT ARCHITECT
101 CONCOURSE BLVD., SUITE A
SANTA ROSA, CA 95403
CONTACT: DEL STARRETT
PH. (707) 526-9645

LANDSCAPE ARCHITECT
PARKER SMITH LANDSCAPE ARCHITECT
1945 PINER RD. #25
SANTA ROSA, CA 95403
PH. (707) 477-7502

ARCHITECT
ALWAYS ENGINEERING INC.
131 STONY CIRCLE, SUITE 1000
SANTA ROSA, CA 95401
CONTACT: BEN MONROE
PH. (707) 542-8795

Grading Quantities:
Site Grading is based upon subgrade to existing grade. No account has been taken for strippings, expansion or contraction. Volumes should be verified and determined independently by the Contractor.

	CUT:	ENGINEERED FILL:	NET:
TOTAL EARTHWORK:	2,172 CY	4,034 CY	1,882 CY (FILL)

TOTAL DISTURBED AREA = 3.59 ACRES

Note: Excess spoils will be disposed of in a county approved site or spread in onsite vineyards. Temporary grading spoils will be stockpiled onsite in the unplanted vineyard area until ready for use.

REGISTERED PROFESSIONAL ENGINEER JASON FRANK RODRIGUES No. C68429 CIVIL STATE OF CALIFORNIA

REVISION	DESCRIPTION	BY	DATE

Always Engineering, Inc.
Civil Engineering & Topographic Surveying
2360 Professional Drive (707) 542-8795
Santa Rosa, CA 95403 Fax (707) 542-6147
www.alwayseng.com

Prepared for: GIRARD WINERY
1077 DUNAWEAL LN., CALISTOGA, CA

Prepared on: February 4, 2014

USE PERMIT
OVERALL SITE PLAN
1077 DUNAWEAL LN., CALISTOGA, CA
APN:020-150-017

JOB# 13530
SHEET
UP1 OF UP2

Plot printed=Feb 03, 2014 - 8:26:58AM File=UP-140122.dwg

GRADE TO DRAIN
WELL
OUT HOUSE
WALNUT 8"
WALNUT 12"
APPROX. ℄
10,200 N
10,000 E
CLEARING LIMITS (COORDINATE WITH VINEYARD MANAGER)
CAP AT END. STAKE LOCATION
SHADING REPRESENTS LIMITS OF 6" AGG. BASE
CONC. SACK RIP-RAP PROTECTION. SEE (8/21)
AERATOR MOORING POST SEE (3/21) (TYP. OF 8)
W.L. 313.1 (6-17-87)
G x 6 CORNER POST, TYP. BRACE PANEL, TYP. SEE (9/21)
STAFF GAUGE SEE (8/21) (TYP. OF 2)
POND NO. 1 BOTTOM ELEV. 311.0
20' DIA CONC. PAD (TYP. OF 2)
10 H.P. AERATOR
45° BEND (TYP)
TOE OF FILL
MAX. HIGH WATER ELEV. = 321.0
AERATOR POWER CABLE SUPPORT POST. SEE (4/21)
AERATOR POWER CONDUIT
45° WYE (TYP.) CAP AT END, STAKE LOCATION
POND NO. 2 BOTTOM ELEV. 311.0
4" INFLUENT LINE CAPPED FOR FUTURE CONNECTION, STAKE LOCATION
GROUND WATER MONITORING WELL SEE (7/21) (TYP. OF 2)
FENCE SEE (9/21)
EXISTING INTERCEPTOR TRENCH
BASE LINE
GRADE AREA TO DRAIN (TYP.)
EQUIPMENT AREA PAD SEE (2/C5)
CONNECT TO EXIST. RECLAIMED WATER LINE. FIELD VERIFY
CLEARING LIMITS (TYP.)
℄ PER MAHONEY, ALFONSO & ASSOCIATES (APPROXIMATE LOCATION)
EXISTING IRRIGATION LINE (LOCATION ASSUMED) VERIFY IN FIELD.
UTILITY TRENCH SEE (2/C1)
MATCH LINE, DWG C3
EXIST. 3" RECL. WATER LINE TO WINERY
CONFORM
4" PROCESS WASTEWATER FORCE MAIN FROM WINERY
4" PWFM
POND ACCESS GATE
DIRT PILE
WOOD BRIDGE
TANK
SUMP
TBM
N 12° 18' 05" E 408.83'
S 12° 18' 05" W 143.83'
568.503
9,900 N
9,600 N
10,200 E
10,600 E
9,600 E
9,900 E

REGISTERED PROFESSIONAL ENGINEER — WILLIAM A. PHILLIPS II — No. 24,878 — CIVIL — STATE OF CALIFORNIA
EXP. DATE 12/31/89

REV	DESCRIPTION	BY	DATE
1	REVISIONS/ISSUED FOR MCDEN APPROVAL	BP	2-11-88

SUMMIT ENGINEERING, INC.
Consulting Civil Engineers
1400 North Dutton Avenue #22
Santa Rosa, CA 95401
(707) 527-0775

CLOS PEGASE WINERY
NAPA COUNTY, CALIFORNIA

PROCESS WASTEWATER MANAGEMENT SYSTEM

SITE GRADING & POND PIPING

SCALE: 1"=30' | DATE: 2/2/88 | DRAWING NUMBER: C4
DR. SEI | CHK. BP: | PROJECT NO: 8737

87-94

Date: 02/20/2014 Designed By: BM/RO - Always Engineering, Inc.

Project: Girard Winery Use Permit

Girard Winery

Annual Process Wastewater Flow = 920,000 gallons PW/year

*Refer to the design calculations report for additional flow estimates.

Month	Percentage of Annual Flow (%)	Monthly Flow (MGal)	Days
January	6.50%	0.060	31
February	7.00%	0.064	28
March	8.00%	0.074	31
April	7.00%	0.064	30
May	6.50%	0.060	31
June	5.50%	0.051	30
July	6.00%	0.055	31
August	10.50%	0.097	31
September	16.50%	0.152	30
October	12.50%	0.115	31
November	7.50%	0.069	30
December	6.50%	0.060	31
Total	100.00%	0.920	365

Date: 02/20/2014
Project: Girard Winery Use Permit

Designed By: BM/RO - Always Engineering, Inc.

Girard Winery
PROCESS WASTEWATER

Annual Volume

Annual Production (projected)				=	1,212 ton/year
Wine Generation Rate (assumed)[a]				=	165 gal wine/ton
Wine Produced	1,212 ton/year	x	165 gal wine/ton	=	200,013 gal wine/year
Process Wastewater (PW) Generation Rate[b]	(assumed)			=	4.60 gal PW/gal wine
Annual PW Flow	200,013 gal wine/year	x	4.60 gal PW/gal wine	=	***920,060 gal PW/year***

Average Day Flow

	920,060 gal PW/year	÷	365 days	=	***2,521 gal PW/day***

Average Harvest Day

Total Harvest Flow[c]	920,060 gal PW/year	x	39.5%	=	363,424 gal PW/harvest
Average Harvest Flow (3 month harvest)	363,424 gal PW/harvest	÷	92 days	=	***3,950 gal PW/day***

Average Day, Peak harvest Month - Pond Design

Total Peak Month Flow[c]	920,060 gal PW/year	x	16.5%	=	151,810 gal PW/month
Average Day, Peak Month Flow	151,810 gal PW/month	÷	30 days	=	***5,060 gal PW/day***

a. 165 Gal wine per ton of grapes is used as a wine industr standard
b. 4.6 gal of PW per gallon wine prodcued over the course of 1 year is based on hisotrical data from Clos Pegase and existing Griard operations.
c. Percentage of PW prodcued during each month is based on the average flow distirubtion from 16 wineries

Date: 02/20/2014 Designed By: BM/RO - Always Engineering, Inc.
Project: Girard Winery Use Permit

Clos Pegase Winery

Annual Process Wastewater Flow = 920,000 gallons PW/year
*Refer to the design calculations report for additional flow estimates.

Month	Percentage of Annual Flow (%)	Monthly Flow (MGal)	Days
January	6.50%	0.060	31
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August	10.50%	0.097	31
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October	12.50%	0.115	31
November	7.50%	0.069	30
December	6.50%	0.060	31
Total	100.00%	0.920	365

Date: 02/20/2014 Designed By: BM/RO - Always Engineering, Inc.
Project: Girard Winery Use Permit

Clos Pegase Winery
PROCESS WASTEWATER

Annual Volume

Annual Production (projected)				=	1,212 ton/year
Wine Generation Rate (assumed)[a]				=	165 gal wine/ton
Wine Produced	1,212 ton/year	x	165 gal wine/ton	=	200,013 gal wine/year
Process Wastewater (PW) Generation Rate[b]	(assumed)			=	4.60 gal PW/gal wine
Annual PW Flow	200,013 gal wine/year	x	4.60 gal PW/gal wine	=	***920,060 gal PW/year***

Average Day Flow

	920,060 gal PW/year	÷	365 days	=	***2,521 gal PW/day***

Average Harvest Day

Total Harvest Flow[c]	920,060 gal PW/year	x	39.5%	=	363,424 gal PW/harvest
Average Harvest Flow (3 month harvest)	363,424 gal PW/harvest	÷	92 days	=	***3,950 gal PW/day***

Average Day, Peak harvest Month - Pond Design

Total Peak Month Flow[c]	920,060 gal PW/year	x	16.5%	=	151,810 gal PW/month
Average Day, Peak Month Flow	151,810 gal PW/month	÷	30 days	=	***5,060 gal PW/day***

a. 165 Gal wine per ton of grapes is used as a wine industr standard
b. 4.6 gal of PW per gallon wine prodcued over the course of 1 year is based on hisotrical data from Clos Pegase and existing Griard operations.
c. Percentage of PW prodcued during each month is based on the average flow distirubtion from 16 wineries

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

Date: 02/20/2014

Designed By: BM/RO - Always Engineering, Inc.

Project: Girard Winery Use Permit

Climate Data

Month	Days	Reference Evapotranspiration[1] (inches)	Pan Evaoporation (inches)	Lake Evaporation (inches)	Average Precipitation (inches)	10-Year Precipitation (inches)	100-Year Precipitation (inches)
January	31	1.0	1.5	1.2	9.0	12.9	17.6
February	28	1.5	2.2	1.7	5.6	8.0	11.0
March	31	2.9	3.8	2.9	5.7	8.1	11.2
April	30	4.7	5.8	4.5	2.6	3.7	5.1
May	31	5.8	8.9	6.9	0.6	0.9	1.2
June	30	6.9	11.0	8.5	0.2	0.3	0.4
July	31	7.2	13.2	10.2	0.1	0.1	0.2
August	31	6.4	12.1	9.3	0.2	0.3	0.4
September	30	4.9	8.7	6.7	0.3	0.4	0.6
October	31	3.5	5.7	4.4	2.4	3.4	4.7
November	30	1.6	2.5	1.9	6.8	9.7	13.3
December	31	1.2	1.7	1.3	8.2	11.7	16.1
TOTAL	365.0	47.7	77.0	59.3	41.7	59.6	81.8

1 Reference Evapotranspiration data is for the Angwin FS obtained from the California Irrigation Management Information System
See http://wwwcimis.water.ca.gov/cimis/monthlyEToReport.do

2 Average Monthly Pan Evaopration Rates observed at Berryessa Lake, Ca between 1957 and 1970.

3 Lake evaopration is pan evaporation multiplied by a 0.77 factor.

4 Average precipitation data is from TheWeatherChannel.com for Calistoga, CA
See http://www.weather.com/weather/wxclimatology/monthly/94515

Date: 02/20/2014 Designed By: BM/RO - Always Engineering, Inc.

Project: Girard Winery Use Permit

Pond 1 Balance

Month	Start Volume (Mgal)	Input		Output		Volume at end of Month (Mgal)	Water Depth at end of month (feet)	Volume Change (Mgal)
		Process Wastewater In (Mgal)	10 Year Precipitation (Mgal)	Pond Evaporation* (Mgal)	Discharge to Pond 2 (Mgal)			
January	0.300	0.120	0.173	0.009	0.000	0.593	8.7	0.293
February	0.593	0.129	0.108	0.015	0.100	0.730	10.0	0.137
March	0.730	0.147	0.110	0.027	0.257	0.730	10.0	0.000
April	0.730	0.129	0.050	0.042	0.179	0.730	10.0	0.000
May	0.730	0.120	0.012	0.061	0.231	0.630	9.1	-0.100
June	0.630	0.101	0.004	0.070	0.211	0.524	8.0	-0.106
July	0.524	0.110	0.002	0.072	0.312	0.324	5.7	-0.200
August	0.324	0.193	0.004	0.059	0.197	0.324	5.7	0.000
September	0.324	0.304	0.006	0.042	0.309	0.324	5.7	0.000
October	0.324	0.230	0.046	0.027	0.300	0.300	5.4	-0.024
November	0.300	0.138	0.131	0.012	0.269	0.300	5.4	0.000
December	0.300	0.120	0.158	0.008	0.278	0.300	5.4	0.000
Total		1.840	0.803	0.444	2.643			0.000

Date: 02/20/2014

Designed By: BM/RO - Always Engineering, Inc.

Project: Girard Winery Use Permit

Pond 2 Balance

Month	Start Volume (Mgal)	Input: Process Wastewater In From Pond 1 (Mgal)	Input: 10 Year Precipitation (Mgal)	Output: Pond Evaporation* (Mgal)	Output: Discharge to Irrigation Pond (Mgal)	Volume at end of Month (Mgal)	Water Depth (feet)	Volume Change (Mgal)
January	0.530	0.000	0.175	0.011	0.000	0.705	9.1	0.175
February	0.705	0.100	0.109	0.017	0.000	0.915	10.8	0.209
March	0.915	0.257	0.111	0.031	0.450	0.833	10.2	-0.082
April	0.833	0.179	0.051	0.044	0.400	0.662	8.7	-0.170
May	0.662	0.231	0.012	0.062	0.300	0.605	8.2	-0.057
June	0.605	0.211	0.004	0.073	0.300	0.520	7.4	-0.085
July	0.520	0.312	0.002	0.082	0.400	0.434	6.5	-0.086
August	0.434	0.197	0.004	0.068	0.300	0.335	5.4	-0.099
September	0.335	0.309	0.006	0.047	0.300	0.350	5.6	0.015
October	0.350	0.300	0.047	0.031	0.350	0.347	5.5	-0.003
November	0.347	0.269	0.133	0.013	0.450	0.299	5.0	-0.049
December	0.299	0.278	0.160	0.010	0.206	0.530	7.5	0.231
Total		2.643	0.813	0.489	3.456			0.000

Date: 02/20/2014 Designed By: BM/RO - Always Engineering, Inc.
Project: Girard Winery Use Permit

Landscape	0.5	acres
Vineyard =	2.5	acres
Pasture =	0	acres
Soil perc rate =	1	inches/hour

Month	Days	Reference Evapotranspiration[1] (inches)	Landscape Crop Coefficient	Pasture Crop Coefficient	Vineyard Crop Coefficient	Landscape ET (inches)	Pasture ET (inches)	Vineyard ET (inches)	Precipitation (inches)	Landscape Irrigation Demand (inches)	Landscape Irrigation Demand (Mgal)	Pasture Irrigation Demand (inches)	Pasture Irrigation Demand (Mgal)	Vineyard Irrigation Demand (inches)	Vineyard Irrigation Demand (Mgal)	Irrigation Days per Month (days)	Percolation Capacity (in)	Percolation Capacity (Mgal)	Dispersal Capacity (in)	Dispersal Capacity (Mgal)	Treated Effluent to Irrigation Pond (in)	Treated Effluent to Irrigation Pond (Mgal)	Residual Capacity[7] (Mgal)
January	31	1.0	0.8	0.8	0.0	0.8	0.8	0.0	9.0	0.0	0.000	0.0	0.000	0.0	0.000	6	0.0	0.000	0.0	0.000	0.000	0.000	0.000
February	28	1.6	0.8	0.8	0.0	1.3	1.3	0.0	5.6	0.0	0.000	0.0	0.000	0.0	0.000	5.0	0.0	0.000	0.0	0.000	0.000	0.000	0.000
March	31	3.0	0.8	0.8	0.0	2.4	2.4	0.0	5.7	0.0	0.000	0.0	0.000	0.0	0.000	12.0	5.8	0.474	5.8	0.474	0.460	0.450	0.024
April	30	4.6	0.9	0.9	0.2	4.2	4.2	0.9	2.6	1.6	0.021	1.6	0.021	0.0	0.000	13.0	9.9	0.805	13.0	0.848	0.409	0.400	0.448
May	31	6.0	0.9	0.9	0.6	5.4	5.4	3.6	0.6	4.8	0.065	4.8	0.065	3.0	0.041	16.0	14.8	1.202	27.3	1.373	0.307	0.300	1.073
June	30	7.0	0.9	0.9	0.7	6.3	6.3	4.9	0.2	6.1	0.083	6.1	0.083	4.7	0.064	17.0	16.1	1.313	33.0	1.543	0.307	0.300	1.243
July	31	8.0	0.9	0.9	0.6	7.2	7.2	4.8	0.1	7.1	0.096	7.1	0.096	4.7	0.064	30.0	28.7	2.338	47.6	2.594	0.409	0.400	2.194
August	31	7.0	0.9	0.9	0.5	6.3	6.3	3.5	0.2	6.1	0.083	6.1	0.083	3.3	0.045	31.0	29.6	2.408	45.1	2.619	0.307	0.300	2.319
September	30	5.2	0.9	0.9	0.3	4.7	4.7	1.6	0.3	4.4	0.059	4.4	0.059	1.3	0.017	30.0	28.5	2.322	38.5	2.457	0.307	0.300	2.157
October	31	3.4	0.9	0.9	0.1	3.0	3.0	0.3	2.4	0.6	0.008	0.6	0.008	0.0	0.000	16.0	13.0	1.056	14.2	1.073	0.358	0.350	0.723
November	30	1.4	0.8	0.8	0.0	1.1	1.1	0.0	6.8	0.0	0.000	0.0	0.000	0.0	0.000	14.0	6.6	0.541	6.6	0.541	0.460	0.450	0.091
December	31	0.9	0.8	0.8	0.0	0.7	0.7	0.0	8.2	0.0	0.000	0.0	0.000	0.0	0.000	5.0	0.0	0.000	0.0	0.000	0.211	0.206	-0.206
TOTAL	365.0	49.1				43.4	43.4	19.6	41.7	30.7	0.4	30.7	0.4	16.9	0.2	189.0	152.9	12.5	231.2	13.520	3.536	3.456	10.064

1 Average monthly reference evapotranspriation rates, refer to Climate spreadsheet.
2 Pasture coefficient from Table 5-1, "Irrigation with Reclaimed Municipal Wastewater - A Guideance Manual," Californai State Water Resources Control Board, July 1984 (San Juaquin Valley)
3 Vineayrd coefficient from Table 5-12, "Irrigation with Reclaimed Municipal Wastewater - A Guideance Manual," Californai State Water Resources Control Board, July 1984 (San Juaquin Valley)
4 Crop coefficient times the reference evapotranspiration.
5 Precipitation for a 10-yr event, refer to the Climate Spreadsheet.
6 Irrigation demand is the evapotrasnpiration minus the precipitation
7 Residual capacity estimates irrigation/percolation capacity with the assumption that all PW discharged from Pond 2 is used for irrigation. Effluent is actually discharged into the irrigation pond for use during spring and summer vineyard irrigation.

Date: 02/20/2014 Designed By: BM/RO - Always Engineering, Inc.
Project: Girard Winery Use Permit **Aeration Calculations**

Design Flow	=	Estimated Average Daily Flow								
	=	10,120	gal/day							
	=	0.010	Mgal/day							
	=	38	m^3/day							
	=	38,294	liters/day							

BOD MASS LOADING - Amount of Biochemical Oxygen Demand (BOD) Based on Amount of Organics in Wastewater

BOD into Pond	=	7700	mg/L	(Table 4-12 & 4-14 of *Small and Decentralized Wastewater Management Systems)*						
BOD Mass Load	=	38	m^3/day	x	7700	mg BOD/L	x	1000	mL/m^3	x 0.000001 kg/mg
	=	294.9	kg BOD/day							
	=	648.7	lb BOD/day							

OXYGEN REQUIREMENTS - The amount of oxygen requiremed to breakdown the waste in the water

O2 Requirement	=	648.7	lb BOD/day	x	1.5	lbs O2/lb BOD
	=	973.1	lbs O2/day			

HORSEPOWER REQUIREMENTS - The horsepower of aeration required to provide the necessary amount of oxygen

Oxygen Transfer Efficiency	=	1.8	lbs O2/Hp*hr (3.4 assumes a VBT aerator , model 100)					
Horsepower Requirement	=	973.1	lbs O2/day	÷	1.8	lbs O2/Hp*hr	÷	24 hr/day
	=	**22.5**	**Hp required**					

POWER TO VOLUME RATIO (Hp/10^3 ft^3) - This is used to estimate the amount of mixing which will occur in a pond due to aeration

Pond Volume	=	0.723	Mgal							
	=	722,797	gallons							
	=	96,631	ft^3							
Number if cells	=	2								
Ratio of first to second cell	=	2								
Volume in Pond 1	=	722,797	gallons							
	=	96,631	ft^3							
Volume in Pond 2	=	803,995	gallons							
	=	107,486	ft^3							
Horsepower in Pond 1; cell 1	=	20	Hp							
Pond 1 Power to Volume Ratio	=	20	Hp	x	1000	ft^3	÷	96,631	ft^3	÷ 1000 ft^3
	=	**0.21**	**Hp/1000 ft^3**							
Horsepower in Pond 1, cell 2	=	5	Hp							
Pond 2 Power to Volume Ratio	=	5	Hp	x	1000	ft^3	÷	107,486	ft^3	÷ 1000 ft^3
	=	**0.05**	**Hp/1000 ft^3**							
Complete Mix	=	0.75 - 1.5	Hp/1000 ft^3	(Page 463 of *Small and Decentralized Wastewater Management)*						
Partial Mix	=	0.4 - 0.75	Hp/1000 ft^3							
Facultative	=	0.1 - 0.4	Hp/1000 ft^3							

Pond 1
Retention Time (t)/ Estimated Effluent

Cn	=	Effluent BOD	
Co	=	7700	mg/L
n	=	1	for single cell pond
k	=	0.276	d^(-1)
t	=	71.4	days
Cn	=	372	mg/L
Effluent BOD	=	**372**	**mg/L**

Pond 2
Pond 1
Retention Time (t)/ Estimated Effluent

Cn	=	Effluent BOD	
Co	=	372	mg/L
n	=	1	for baffled pond
k	=	0.276	d^(-1)
t	=	71.4	days
Cn	=	18	mg/L
Effluent BOD	=	**18**	**mg/L**

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 #: E13-00744
APN: 020-150-017
(County Use Only) Reviewed by: Date:

PLEASE PRINT OR TYPE ALL INFORMATION

Property Owner Vintage Wine Estates dba Girard Winery	x New Construction ☐ Addition ☐ Remodel ☐ Relocation ☐ Other:
Property Owner Mailing Address 205 Concourse Blvd	☐ Residential - # of Bedrooms: Design Flow : gpd
City State Zip Santa Rosa CA 95403	x Commercial – Type: Winery domestic Sanitary Waste: 500-1675 gpd Process Waste: 0 gpd
Site Address/Location 1077 Dunaweal Lane Calistoga, CA 94515	☐ Other: Sanitary Waste: gpd Process Waste: gpd

Evaluation Conducted By:

Company Name Always Engineering, Inc.	Evaluator's Name Ben Monroe, P.E. RCE 70012	Signature (Civil Engineer, R.E.H.S., Geologist, Soil Scientist)
Mailing Address: 131B Stony Circle, Sutie 1000		Telephone Number (707) 542-8795 x 17
City State Zip Santa Rosa, Ca 95401		Date Evaluation Conducted 11/14/2013

Primary Area	**Expansion Area**
Acceptable Soil Depth: 24-48 in. Test pit #'s: TP1-TP6	Acceptable Soil Depth: 24-48 in. Test pit #'s: TP1-TP6
Soil Application Rate (gal. /sq. ft. /day): 0.75 to 1.0 gpd/sf	Soil Application Rate (gal. /sq. ft. /day):0.75 to 1.0 gpd/sf
System Type(s) Recommended: PD, drip – pending gw	System Type(s) Recommended: PD, drip – pending gw
Slope: 3-5 %. Distance to nearest water source: 1000 ft.	Slope: 3-5 %. Distance to nearest water source: 1000 ft.
Hydrometer test performed? No	Hydrometer test performed? No
Bulk Density test performed? No	Bulk Density test performed? No
Percolation test performed? No	Percolation test performed? No
Groundwater Monitoring Performed? Pending Rain	Groundwater Monitoring Performed? Pending Rain

Site constraints/Recommendations:

- Existing well
- Groundwater monitoring to be performed to identify perched groundwater level due to presence of mottling at less than 24 inches deep.
- Interceptor drain and surface drainage to divert away from septic area recommended.
- Proposed drainage features and grading will need to avoid.
- Additional test pits near wastewater ponds showed signs of significant seasonal saturation and lesser depths of permeable soils. Pits on map but not logged due to time onsite.

Test Pit # 1

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
34	D/G	15-20	SCL	SAB,3	FR	S	S	3,C	1,M	1,VF
48	D/G	35	SCL	SAB,3	VF	S	SS	3,M	1,M	1,F
60+	----------	<10	SCL	SAB,2	D/L	M	M	1,VF	1,M	2,P

Test Pit #2

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
24	D/G	15-20	SCL	SAB,3	FR	S	S	3,C	1,M	1,VF
56	D/G	35	SCL	SAB,3	VF	S	SS	3,M	1,M	1,F
65+	----------	<10	SCL	SAB,2	D/L	M	M	1,VF	1,M	2,P

Test Pit # 3

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
28	D/G	15-20	SCL	SAB,3	FR	S	S	3,C	1,M	1,VF
60	D/G	15-20	SL/LS	SAB,3	F	M	SS	3,M/F	1,M	1,F
70+	----------	<10	SCL	SAB,2	D/L	M	M	1,VF	1,M	2,P

Test Pit # 4

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
24	D/G	15-20	SCL	SAB,3	FR	S	S	3,C	1,M	1,VF
49	D/G	25	SCL	SAB,3	FR	F	S	2,M	1,M	2,F
60+	----------	<10	SCL	SAB,2	D/L	L	M	1,VF	1,M	2,P

Test Pit #5

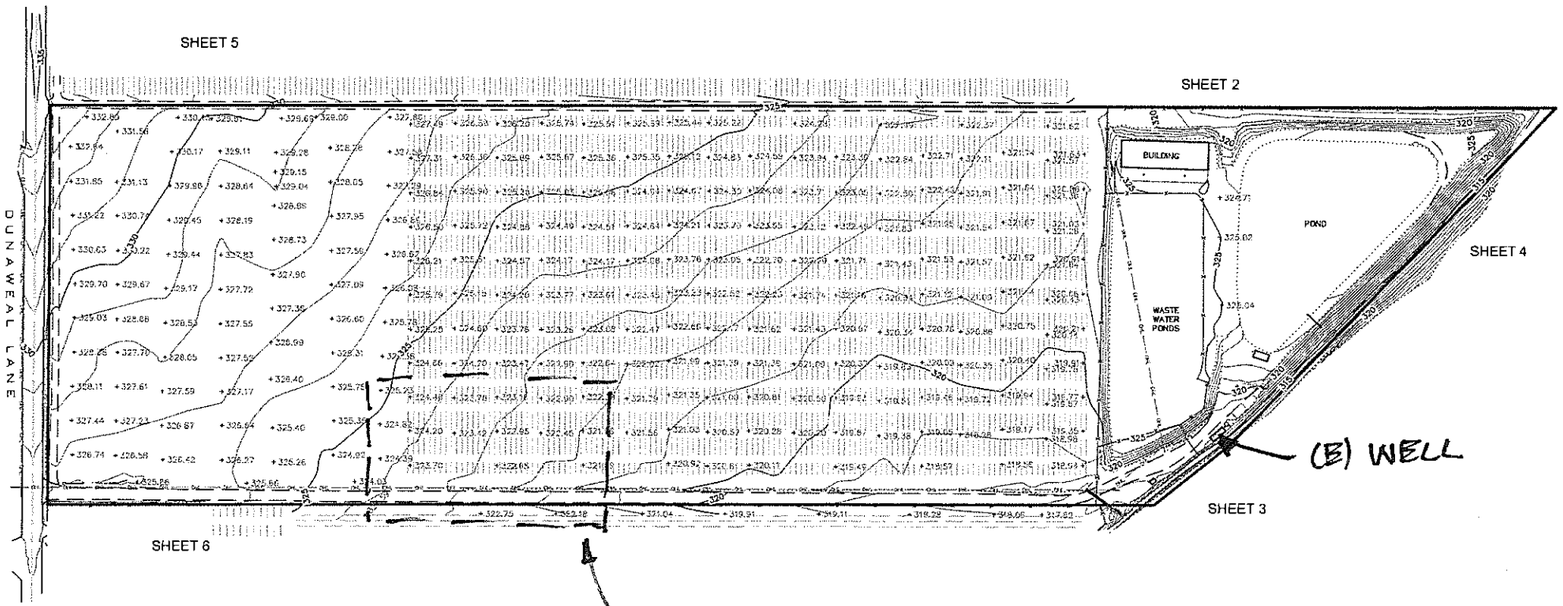
Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
24	D/G	15-20	SCL	SAB,3	FR	S	S	3,C	1,M	1,VF
49	D/G	25	SCL	SAB,3	F	M/FR	SS	2,F	1,F	1,F
54+		>50%								

Test Pit # 6

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
36	D/G	15-20	SCL	SAB,3	FR	S	S	3,C	1,M	1,VF
55	D/G	25	SL	G/B,2	L	L	SS	2,C	1,M	1,D
70+		>50%								

SITE EVALUATION
11/14/13
E13-00744

GRAPHIC SCALE
100 0 50 100 200
(IN FEET)
1 INCH = 100 FT.



SEE SHEET 2 FOR DETAIL

LEGEND:

ELEC	ELECTRICAL
FF	FINISHED FLOOR
GUY	GUY WIRE
H2O	WATER
ICVB	IRRIGATION CONTROL VALVE BOX
JP	JOINT POLE
SP	SERVICE POLE
PP	POWER POLE
WO	WHITE OAK
12/25	TREE TRUNK DIA. IN INCHES/DRIPLINE IN FEET
	1' CONTOUR
	5' CONTOUR
	APPROXIMATE PROPERTY LINE; SEE DRAWING NOTES
	BUILDING LINE
	EDGE OF DIRT ROAD
	EDGE OF GRAVEL ROAD
	EDGE OF CONCRETE
	EDGE OF ASPHALT/CONCRETE PAVEMENT
	FENCE
	FLOW LINE OF CREEK OR DRAINAGE DITCH
	GRADE BREAK-TOP/TOE
	OVERHEAD POWER AND/OR TELEPHONE LINE
	WINDROW

ALBION SURVEYS, INC.
CONSULTING LAND SURVEYORS
1113 HUNT AVENUE
ST. HELENA, CA 94574
(707) 963-1217
FAX (707) 963-1829

DRAWING NOTES

THIS MAP IS NOT A BOUNDARY SURVEY.
IT IS PROVIDED TO LOCATE THE PROPOSED SUBJECT PROPERTY IN RELATION TO ADJOINING LANDS, HIGHWAYS, ROADS, STREETS AND NOT TO GUARANTEE ANY FIXED DIMENSION OR ACREAGE.
A FIELD SURVEY SHOULD BE PERFORMED PRIOR TO ANY CRITICAL DESIGN WORK, CONSTRUCTION OR CONVEYANCE.
EASEMENTS MAY AFFECT THIS PROPERTY.
THIS SURVEYOR WAS NOT PROVIDED ANY INFORMATION REGARDING EASEMENTS BY THE OWNER.

SITE INFORMATION

APN: 020-150-017
ADDRESS: 1077 DUNAWEAL LANE
CALISTOGA, CA 94515

MAP OF TOPOGRAPHY
OF A PORTION OF THE LANDS OF
CLOS PEGASE
COUNTY OF NAPA STATE OF CALIFORNIA

REVISIONS & ADDITIONS

DATE: 1-29-2014 DRAFTER: T. HICKS	FB: 877 & 874	PG: 2-5 81-88
DATE: DRAFTER:	FB:	PG:
DATE: DRAFTER:	FB:	PG:
DATE: DRAFTER:	FB:	PG:
DATE: DRAFTER:	FB:	PG:
DATE: DRAFTER:	FB:	PG:

ALBION REFERENCES

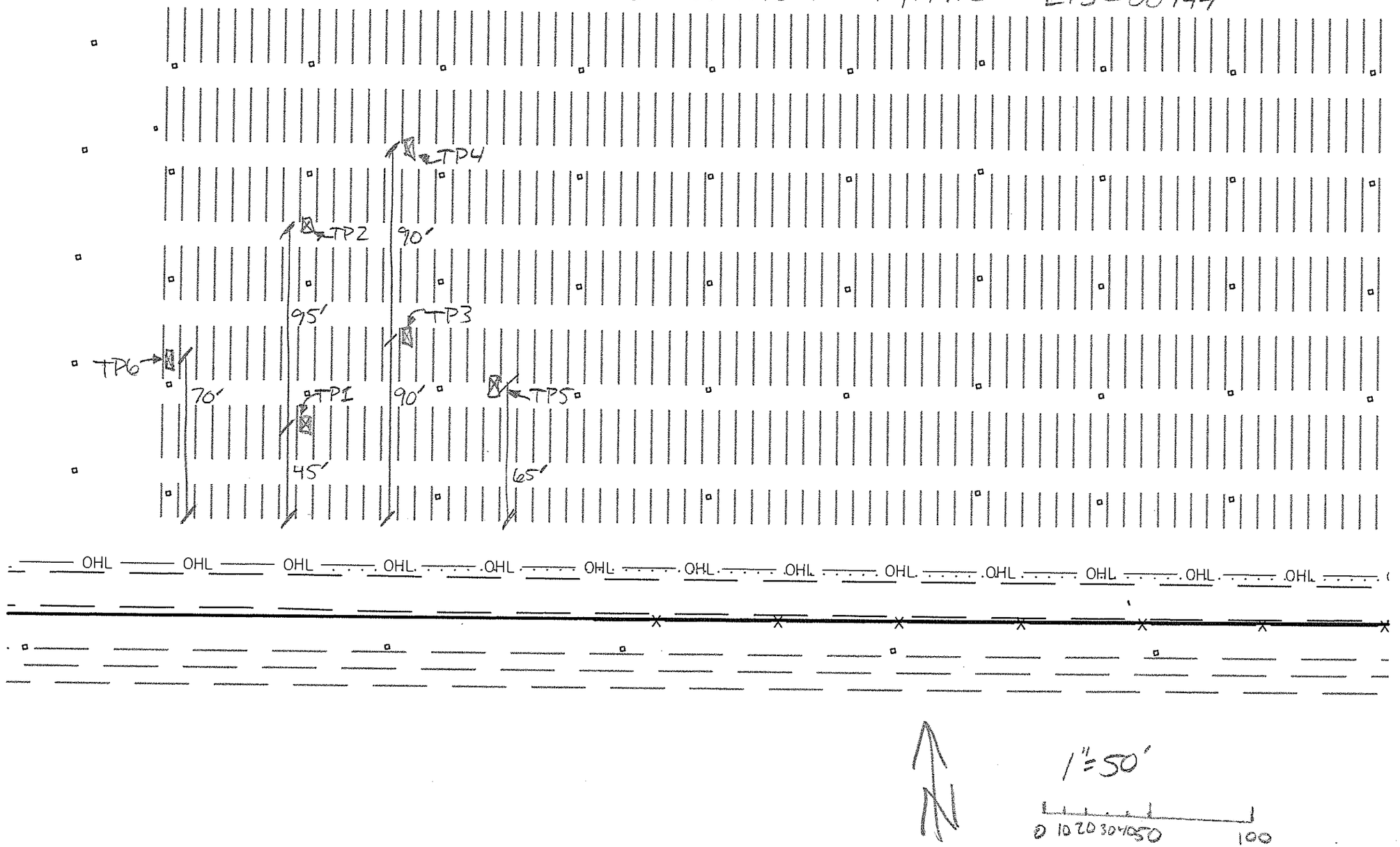
PROJECT NO: 3287
ASSOCIATED DWG(S):
PROJECT MANAGER: J. SULLIVAN
DATE OF SURVEY: 1-21-2014

CONTOUR INTERVAL = 1'
VERTICAL DATUM BASED ON NAVD 88'
DIRECTION OF NORTH BASED ON NAD 83' CALIFORNIA STATE PLANE ZONE 2

1077 DUNAWEAL LN
CALISTOGA, CA
APN: 020-150-017

SHEET 2 OF 2

SITE EVALUATION 11/14/13 E13-00744



13530.0 Vintage Wine Estates_Dunaweal Winery
Groundwater Monitoring Report
March 3, 2015

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

Napa County Planning, Building, and Environmental Services
1195 3rd Street, 2nd floor
Napa, Ca 94559

Project: 1077 Dunaweal Ln
Calistoga, CA 94515
APN: 020-150-017

Copies	Document Date	Description
1	3/3/2015	Groundwater Monitoring Data
1	2/05/2015	Groundwater Monitoring Site Map
1	.....	Napa County Dunaweal Rain Gauge

To whom it may concern,

This letter is provided as additional information for the Site Evaluation for the project located at 1077 Dunaweal Lane in Calistoga. This letter is a summary of the Groundwater Monitoring performed on the above referenced property.

On February 5, 2015 I installed eight (8) groundwater monitoring wells per the Napa County Instructions for Performing Site Evaluations. The holes were installed using 3" perforated pipes to a depth ranging from 48" to 58".

Monitoring was performed after the rains events occurring on 2/6 (accumulated total of 3.5") and 2/8-2/9 (accumulated total of 1.62"). Attached is rain data from the Napa County Dunaweal rain gauge. Three (3) separate sets of monitoring data were collected all within ten (10) days of this qualifying rain event and are attached to this letter.

The results of this monitoring can be found on the attached Groundwater Monitoring Data sheet. The most restrictive measurements will be used for septic system design. GW#5 was found to have groundwater at 13", making the area in the vicinity of this hole unsuitable for septic dispersal. ½ of the distance between this hole and passing holes should be used as a limit of suitable area. The remaining 7 holes (GW#1-4 & GW#6-7) all showed depths to groundwater ranging from 24.125" to 48.625", making this area suitable for a pre-treated subsurface drip irrigation system.

If there are questions please feel free to contact me.

Sincerely,

Ben Monroe, P.E.
Always Engineering, Inc.

Project Site: 1077 Dunaweal Lane
Calistoga CA
APN: 020-150-017

Groundwater Monitoring Data

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

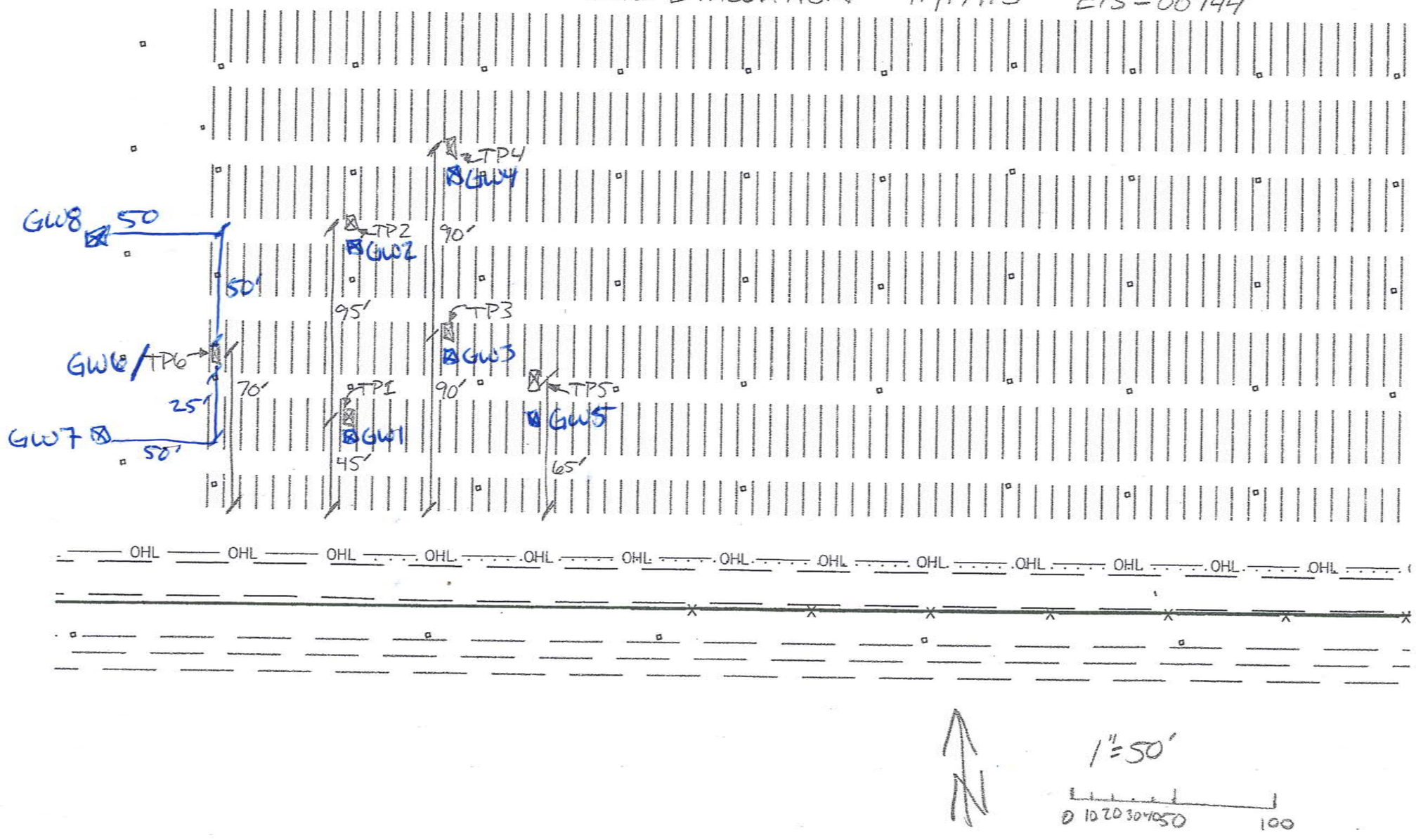
Groundwater Hole Id:			GW#1	GW#2	GW#3	GW#4	GW#5	GW#6	GW#7	GW#8	
H=Open Hole P=Pipe in Profile Pit W=Well											
Top of Pipe to Surface (Inches) =			4/8	1 2/8	2.5	2	2	4/8	3	3 6/8	
By	**Weather**	**Date**	**Depth from ground to groundwater (GW) in inches**								
BM	sunny	2/9/2015	33 4/8	32 6/8	24 1/8	31 2/8	13	43 6/8	46 3/8	49 5/8	
BM	sunny	2/10/2015	40 2/8	44	30 6/8	42 4/8	19 2/8	48 2/8	50 4/8	56 6/8	
BM	sunny	2/19/2015*	58	52	55	53 4/8	50 4/8	55 2/8	58	58	
	* All measurements on 2/19/15 were to bottom of pipe with exception of GW#5 which did still have groundwater present at the time of monitoring.										

Created: 2/19/2015
Revised: 3/03/2015

1077 DUNAWEAL LN
CALISTOGA, CA
APN: 020-150-017

SHEET 2 OF 2

SITE EVALUATION 11/14/13 E13-00744



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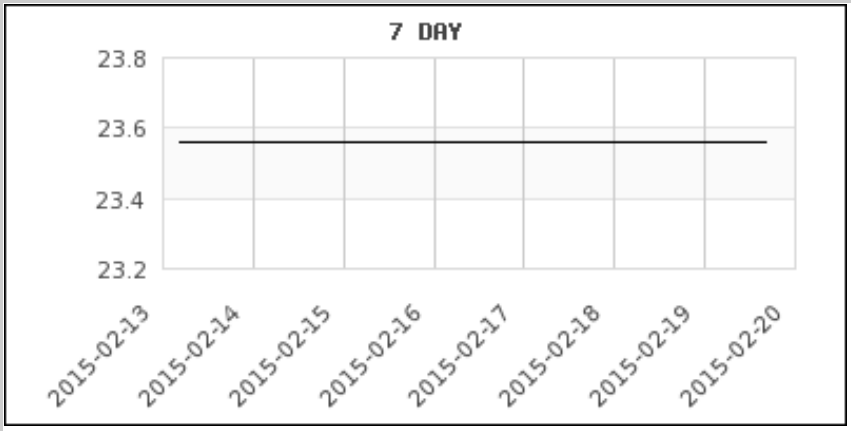
City of Napa
City of St. Helena
OneRain Corporate

Napa River at Dunaweal Ln:Precipitation accumulation

Site:	Napa River at Dunaweal Ln
Site ID:	42

Sensor:	Precipitation accumulation (2368) ▾
Sensor ID:	2368
Latest Report:	23.56 in 2015-02-19 16:00:09 0.00 in Precipitation increment
7 DAY Graph	

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2015-02-09 04:49:44	23.44 in
2015-02-09 01:04:34	23.44 in
2015-02-09 00:59:09	23.40 in
2015-02-09 00:54:34	23.36 in
2015-02-09 00:50:07	23.32 in
2015-02-09 00:45:57	23.28 in
2015-02-09 00:17:14	23.24 in
2015-02-08 22:34:32	23.20 in

2015-02-08 22:30:09	23.16 in
2015-02-08 21:36:09	23.13 in
2015-02-08 21:30:42	23.09 in
2015-02-08 21:24:57	23.05 in
2015-02-08 21:14:02	23.01 in
2015-02-08 21:09:44	22.97 in
2015-02-08 17:29:39	22.93 in
2015-02-08 17:13:57	22.89 in
2015-02-08 16:52:14	22.85 in
2015-02-08 12:28:04	22.85 in
2015-02-08 11:52:42	22.81 in
2015-02-08 11:42:42	22.77 in
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For support please contact: jeremy.sarrow@countyofnapa.org

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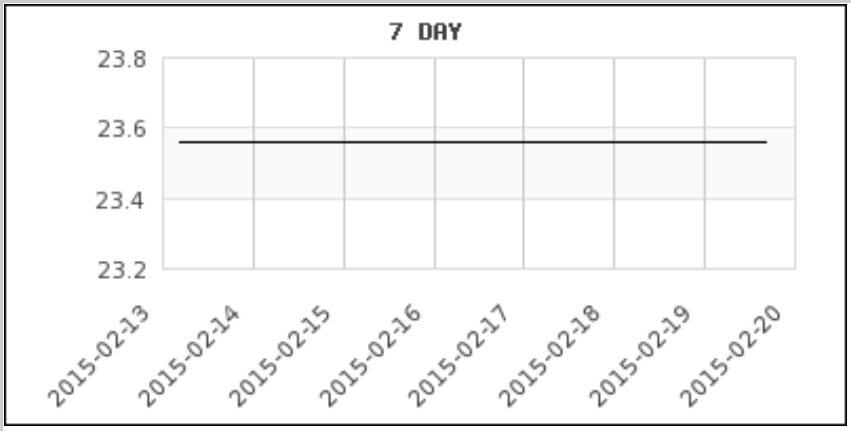
Napa River at Dunaweal Ln:Precipitation accumulation

Site:	Napa River at Dunaweal Ln
Site ID:	42

Sensor:	Precipitation accumulation (2368) ▾
Sensor ID:	2368
Latest Report:	23.56 in 2015-02-19 16:00:09 0.00 in Precipitation increment
7 DAY Graph	

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