March 2016
#08-31

BARTELT ENGINEERING

ONSITE WASTEWATER DISPOSAL FEASIBILITY STUDY FOR THE MOUNTAIN PEAK WINERY 3265 SODA CANYON ROAD, NAPA COUNTY, CA 94558 APN 032-500-033

As required by Napa County Planning, Building & Environmental Services, this study outlines the feasibility of providing onsite wastewater disposal for a potential winery and tasting room on the above referenced parcel located at 3265 Soda Canyon Road in Napa County, California.

PROJECT DESCRIPTION

It is our understanding that the project proposes to construct a full crush winery on the above referenced parcel with the intent of the facility having the capability of producing 100,000 gallons of wine per year. Along with the proposed wine production at the site, the project proposes a moderate staffing and marketing plan. The project proposes nineteen (19) full-time employees, four (4) part-time employees and four (4) seasonal (harvest) employees. The project also proposes to offer private tour and tasting appointments for a maximum number of eighty (80) guests per day and 320 guests per week. Furthermore, the Applicant plans to offer three (3) food and wine pairing events per month for parties up to 12 persons and three (3) food and wine pairing events per month for parties up to 24 persons. Additionally, the Applicant intends to host four (4) wine club / release events per year for groups of up to 75 persons and two (2) 125 person auction related events at the winery.

Table 1 summarizes the proposed marketing plan:

TABLE 1: MARKETING PLAN SUMMARY

Guest Experience Proposed	Frequency Proposed	Number of Persons Proposed
Private Tours & Tasting	Daily	80 per day
Food & Wine Pairings	3 per month 3 per month	12 per event 24 per event
Wine Club / Release Events	4 per year	75 per event
Auction Related Events	2 per year	125 per event

As part of our work, representatives from Bartelt Engineering have reviewed the planned operational methods for the winery with our Client, reviewed the parcel files at Napa County Environmental Health, held conversations with Napa County Environmental Health staff, performed a reconnaissance of the site to view existing conditions and conducted a site evaluation on May 29, 2013 to evaluate the feasibility of installing a septic system to serve the proposed winery and tasting room.

This study and the attached Use Permit Drawings will demonstrate that the proposed winery improvements and marketing plan can feasibly be developed and that the parcel can adequately dispose of all wastewater onsite.

WASTEWATER ANALYSIS

Winery Production Process Wastewater Flow

The winery facility's production wastewater (PW) flow rates for harvest and non-harvest seasons can be calculated as follows:

Harvest Peak Winery Process Wastewater Flow $(PW)_{HARVEST}$ =

$$\left(\frac{100{,}000 \text{ gallons of wine}}{\text{year}}\right) \times \left(\frac{1.5 \text{ gallons of water}}{1 \text{ gallon of wine}}\right) \times \left(\frac{1 \text{ year}}{60 \text{ days of crush}}\right) =$$

Harvest Peak Winery Process Wastewater Flow $(PW)_{HARVEST\ PEAK}$ = 2,500 gallons per day (gpd)

Non-Harvest Peak Winery Process Wastewater Flow $(PW)_{NON\text{-}HARVEST}$ =

$$\left(\frac{100{,}000 \text{ gallons of wine}}{\text{year}}\right) \times \left(\frac{4.5 \text{ gallons water}}{1 \text{ gallon of wine}}\right) \times \left(\frac{1 \text{ year}}{305 \text{ days}}\right) =$$

Non-Harvest Peak Winery Process Wastewater Flow $(PW)_{NON\text{-}HARVEST}$ = 1,475 gpd

Winery Sanitary Wastewater Flow

All plumbing fixtures in the winery production facility and tasting room will be water saving fixtures per the California Plumbing Code as adopted by the Napa County Building Division. The sanitary wastewater generated at the winery production facility and tasting room including full-time employees, part-time employees, seasonal (harvest) employees and guests (SW_{WINE}) and can be itemized as follows:

Employees (SW Employee):

- 19 Full-Time Employees x 15.0 gpd per employee = 285 gpd
- 4 Part-Time x 15.0 gpd per employee = 60 gpd
- 4 Harvest Season x 15.0 gpd per employee = 60 gpd

Guests[1,2]:

- Private Tours and Tasting (SW Tours & Tasting):
  - (80 guests per day) x (6 gpd per guest) = 480 gpd
- Food and Wine Pairings - Lunch (SW Food & Wine Pairings $_{LUNCH}$):
  - (12 guests per event) x (11 gpd per guest) = 132 gpd per event
- Food and Wine Pairings - Dinner (SW Food & Wine Pairings $_{DINNER}$):
  - (24 guests per event) x (11 gpd per guest) = 264 gpd per event
- Wine Club / Release Events (SW Wine Club / Release Events):
  - (75 guests per event) x (11 gpd per guest) = 825 gpd per event

[1] Volume rate accounts for 3 gpd to 8 gpd from the commercial kitchen and 3 gpd from restroom use
[2] Represents a maximum as event may occur during harvest or non-harvest seasons

- Auction Related Events (SW Auction Related Events):
  - (125 guests per event) x (11 gpd per guest) = 1,375 gpd per event

Total Harvest Season Peak Winery Sanitary Wastewater Flow

The total proposed harvest season peak winery sanitary wastewater flow ($SW_{WINE})_{HARVEST}$ is the combination of the winery and tasting room sanitary wastewater flow during the months of August through November (harvest season). Private Tours and Tasting with Food and both Food and Wine Pairings with lunch/dinner may be held on the same day; however, it is planned that Wine Club / Release Events will not occur simultaneously nor be held on the same day as Private Tours and Tasting with Food or Food and Wine Pairings. Furthermore, it is assumed that Auction Related Events will not occur during the harvest season.

$(SW\ Employee_{FULL\text{-}TIME + PART\text{-}TIME + SEASONAL})_{HARVEST}$ + $(SW\ T\&T)_{HARVEST}$ + $(SW\ F\&W_{LUNCH + DINNER})_{HARVEST}$ =

(285 + 60 + 60) gpd + 480 gpd + (132 + 264) gpd =

Winery Harvest Season Peak Sanitary Wastewater Flow $(SW_{WINE})_{HARVEST}$ = 1,281 gpd

Total Non-Harvest Season Peak Winery Sanitary Wastewater Flow

The total proposed non-harvest season peak winery sanitary wastewater flow $(SW_{WINE})_{NON\text{-}HARVEST}$ is the combination of the winery and tasting room sanitary wastewater flow during the months of December through July and is shown as follows:

$(SW\ Employee_{FULL\text{-}TIME + PART\text{-}TIME})_{NON\text{-}HARVEST}$ + $(SW\ T\&T)_{NON\text{-}HARVEST}$ + $(SW\ F\&W_{LUNCH + DINNER})_{NON\text{-}HARVEST}$ =

(285 + 60) gpd + 480 gpd + (132 + 264) gpd = 1,221 gpd

Again, Private Tours and Tastings with Food and both Food and Wine Pairings with lunch/dinner may be held on the same day; however, it is planned that Wine Club / Release Events and Auction Related Events will not occur simultaneously nor be held on the same day as Private Tours and Tastings with Food or Food and Wine Pairings. Furthermore, because the Auction Related Events occur during the non-harvest season and generate greater flows per day than the Private Tours and Tastings with Food and Food and Wine Pairings with lunch/dinner or the Wine Club / Release Events, the winery non-harvest season peak sanitary wastewater flow $(SW_{WINE})_{NON\text{-}HARVEST}$ is calculated as follows:

$(SW\ Employee_{FULL\text{-}TIME + PART\text{-}TIME})_{NON\text{-}HARVEST}$ + $(SW\ Auction\ Related\ Events)_{NON\text{-}HARVEST}$ =

(285 +60) gpd + 1,375 gpd =

Winery Non-Harvest Season Peak Sanitary Wastewater Flow $(SW_{WINE})_{NON\text{-}HARVEST}$ = 1,720 gpd

The greatest harvest and non-harvest season peak process and sanitary wastewater flows are summarized in the following table:

TABLE 2: HARVEST AND NON-HARVEST SEASON PEAK WASTEWATER SUMMARY

Wastewater Source	Harvest (gpd)	Non-Harvest (gpd)
Process Wastewater (PW)	2,500	1,475
Sanitary Wastewater (SW)	1,281	1,720
Combined Wastewater (SW + PW)	3,781	3,195

The greatest total proposed wastewater flow is the combination of the greatest winery facility's production flow (PW) and the winery and tasting room sanitary wastewater (SW_{WINE}) flow that occurs in the same season and on the same day. The project's wastewater treatment system will be designed based on the flows outlined in Table 2.

WASTEWATER EFFLUENT DISPOSAL METHODS

Proposed Seasonal Surface Drip Irrigation Wastewater Disposal System

Bartelt Engineering proposes to dispose of the winery facility's process and sanitary wastewater utilizing a treatment system and dispersing treated wastewater effluent via seasonal surface irrigation to the existing onsite vineyards.

The winery facility's process wastewater treatment system will consist of several steps. The floors of the proposed winery crush pad and cave will be sloped so that all process wastewater is collected in trench drains and floor drains. The drains will be fitted with baskets to collect a majority of the larger debris. The winery process wastewater collected in the trench drains and floor drains will then gravity flow into a trash tank fitted with filters to remove finer solids. From the trash tank, the process wastewater effluent will gravity flow and combine with the winery and tasting room sanitary wastewater effluent before gravity flowing to two (2) 10,000 gallon equalization tanks.

The winery and tasting room sanitary wastewater will gravity flow to a series of septic tanks fitted with filters for solids removal. A grease interceptor tank will be required for the proposed commercial kitchen in the tasting room. From the septic tanks, sanitary wastewater effluent will gravity flow to a sump vault where it will be combined with the winery process wastewater effluent before gravity flowing to two (2) 10,000 gallon equalization tanks as stated previously.

The combined wastewater effluent in the equalization tanks will be treated by a treatment system. After the winery facility's process wastewater and winery and tasting room sanitary wastewater effluent has been treated, the treated effluent will then be stored in storage tanks from which it will be dispersed via seasonal surface irrigation on a designated portion of the existing vineyards on the parcel.

Alternative Winery and Tasting Room Sanitary Wastewater Dispersal Systems

Bartelt Engineering is also proposing alternatives to combining the winery facility process wastewater and winery and tasting room sanitary wastewater; both alternatives require two (2) separate wastewater dispersal systems be installed to treat and dispose of the wastewater generated by the winery and tasting room. Under both alternatives, the winery facility process wastewater would be treated and dispersed as described above via surface drip irrigation to the onsite vineyards; however, the winery sanitary wastewater would be kept separate from the process wastewater and dispersed along with the tasting room sanitary wastewater via a subsurface drip or pressure distribution (PD) dispersal field.

Under the subsurface drip and PD alternatives, the winery facility and tasting room sanitary wastewater will gravity flow to a series of septic tanks fitted with filters for solids removal. A grease interceptor tank will be required for the proposed commercial kitchen in the tasting room. From the septic tanks, sanitary wastewater effluent will gravity flow to a recirculation / blend tank from which it will be time dosed to an AdvanTex AX Treatment System. Filtrate from the AdvanTex Treatment system will flow via gravity to a recirculating / splitter valve located at the riser over the inlet compartment of the recirculation / blend tank. The recirculating / splitter valve will direct the filtrate either back into the recirculation / blend tank to mix with incoming septic tank effluent or to the discharge sump tank for delivery to the dispersal field depending on the effluent level in the recirculation / blend tank. Treated effluent stored in the sump tank will then be dispersed via a subsurface drip or pressure distribution dispersal field.

Sanitary Wastewater Effluent Subsurface Drip Dispersal Field and Replacement Area

Based on the site evaluation[3] performed by Bartelt Engineering on May 29, 2013, test pits #1 through #7 showed similar results and are acceptable for a subsurface drip dispersal type septic system and 200% replacement area. The site evaluation determined that the soil in the area of these test pits is Clay Loam (CL). According to Napa County Standards, a hydraulic loading rate of 0.75 gal/sf/day is allowed for this soil type using an alternative sewage treatment system with pre-treatment[4]. The maximum acceptable soil depth found during the site evaluation was approximately 60 inches. Napa County Standards require a minimum of 24 inches of useable soil below the drip lines and a minimum of six (6) inches and a maximum of eight (8) inches of cover above the drip lines. The maximum acceptable soil depth found at the site allows for 24 inches of useable soil beneath drip emitters buried six (6) inches below the ground surface. The required subsurface drip dispersal field area can be calculated as follows:

$$\text{Dispersal Field Area} = \left(\frac{\text{design flow rate}}{\text{soil loading rate}}\right) = \left(\frac{1{,}800\ \frac{gal}{day}}{0.75\ \frac{gal}{day \cdot ft^2}}\right) = 2{,}400, \text{ use } 2{,}500 \text{ square feet}$$

200% Replacement Area = 5,000 square feet

[3] Refer to Bartelt Engineering's Site Evaluation Report for Mountain Peak Vineyards, LLC (Napa County E13-00271).

[4] County of Napa Environmental Health Division requires an approved pretreatment system for a subsurface drip dispersal system treating commercial sewage.

Slopes within the dispersal field area are less than 20% so the design is based on two (2) foot lateral spacing between drip lines and two (2) foot emitter spacing.

The required number of emitters is calculated as follows:

$$\text{Minimum Required Number of Emitters} = 2{,}400 \text{ square feet} \times \frac{1 \text{ emitter}}{4 \text{ square feet}} = 600 \text{ emitters}$$

To make the best use of the available dispersal field area we recommend the system consist of four (4) zones, each zone having an area of 625 square feet with a total of 313 lineal feet of drip line per zone. This layout provides 156 emitters per zone or 624 total emitters.

Sanitary Wastewater Effluent Pressure Distribution Dispersal Field and Replacement Area

Based on the site evaluation[3] performed by Bartelt Engineering on May 29, 2013, test pits #1 through #7 showed similar results and are acceptable for a pressure distribution (PD) dispersal type septic system and 100% replacement area. The site evaluation determined that the soil in the area of these test pits is Clay Loam (CL). According to Napa County Standards, a hydraulic loading rate of 0.75 gal/sf/day is allowed for this soil type using an alternative sewage treatment system with pre-treatment[5]. The maximum acceptable depth found during the site evaluation was approximately 60 inches. Napa County Standards require a minimum of 36 inches below the trench bottom to the limiting condition, unless an approved pretreatment device is provided, then the distance may be reduced to 24 inches. The maximum acceptable soil depth found at the site allows for 28 inches of useable soil beneath a 32 inch deep trench from finish grade to the limiting condition. The test pits show that a 32 inch deep trench can be constructed that allows for a lateral to be buried 14 inches below original grade and provide 16 inches of rock below the lateral to the bottom of the trench (see the Proposed Pressure Distribution System - Proposed Trench Design worksheet). Slopes within the dispersal field area are less than 20% and the sidewall area is at or below the three (3) square feet per linear foot maximum. The minimum required lineal feet of trench for the PD system can be calculated as follows:

$$\text{Required Trench Length} = \left(\frac{\text{design flow rate}}{(\text{effective surface area}) \cdot (\text{soil aplication rate})} \right) =$$

$$\left(\frac{1{,}800 \ \frac{\text{gal}}{\text{day}}}{0.75 \frac{\text{gal}}{\text{day ft}^2} \times 3.00 \frac{\text{ft}^2}{\text{lf}}} \right) = 800.0\pm, \text{ use 800 linear feet}$$

Dispersal Area = 100% Replacement Dispersal Area = 4,284 square feet

To make the best use of the available dispersal field area we recommend the system consist of six (4) subfields, each subfield containing 200 linear feet (lf) of trench for a system total of 800 lineal feet of leach line.

[5] Soil application rate is 0.60 gal/sf/day and 0.75 gal/sf/day for septic tank effluent (STE) and pre-treated effluent (PTE) alternative sewage treatment systems, respectively.

Surface Drip Irrigation Wastewater Flow Balance

Individual combined and separated process and sanitary wastewater flow models were created because of the proposed disposal methods discussed previously. Tables from the proposed separated wastewater flow model is provided herein because it is the most conservative version of the two types of disposal options, which reflects the greatest well water demand as a result of the least treated water reuse available (supply). The wastewater flow balance model estimates the monthly wastewater produced (see Table I - Proposed Process & Sanitary Sewer Wastewater Flow), the average irrigation flow based on estimated vineyard irrigation practice (see Table II - Proposed Vineyard Irrigation) and determines the required volume necessary to store excess treated wastewater effluent until it can be properly dispersed in the vineyard (see Table III -Proposed Treated Wastewater Irrigation Storage Tank Balance). The tables provided show the results if either of the separated wastewater flow alternatives are constructed.

The analysis concluded that the treated wastewater effluent storage tank(s) should have a minimum volume of 200,000 gallons (see attached Table III - Proposed Treated Wastewater Irrigation Storage Tank Balance) to provide for storage of the treated effluent through the winter months when surface drip land application is minimal and to equalize differences between the wastewater generation rate and the vineyard irrigation application rate. It is assumed that available groundwater in the root zone is depleted by April and that irrigation is primarily applied to the vines for the months of April through October. In the months where the irrigation demand exceeds the amount of treated effluent that is available for irrigation, it is assumed that the entire irrigation requirement for the vines is not met or that another water source (existing onsite well) is used to supply additional irrigation water.

The winery effluent surface irrigation drip dispersal area design is based on 25.04± acres or approximately 45,440 existing and/or proposed vines located on the parcel[6]. The dispersal area will need to be verified once all dispersal field setbacks are determined. Furthermore, all dispersal field areas will need to be labeled with signage indicating the use of treated effluent for irrigation in accordance with Napa County Environmental Health standards.

Tank Sizing

Utilizing a treatment system and seasonal surface irrigation, all septic tanks should be sized to provide a minimum of two (2) days retention time during peak wastewater flow. Based on discussions with the manufacturers of treatment systems, the equalization tank should be sized for a minimum of one and a half (1.5) days of peak flow capacity. Under the alternative designs, the septic tanks should be sized to provide a minimum of five (5) days of retention time during peak wastewater flow.

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[6] Refer to Bartelt Engineering's approved Track II Vineyard Erosion Control Plan for Mountain Peak Vineyards, LLC dated June 2013 (Napa County P13-00144-ECPA). Area and number of vines reported herein includes a 2.96± acre net reduction of approved plantable acreage as a result of this project's footprint, See Bartelt Engineering's Water Availability Analysis (WAA) Vineyard Development Statistics table.

Irrigation water storage tank(s) should be sized based on vineyard irrigation demands and flow balance calculations, see enclosed spreadsheets for preliminary calculations on treated wastewater flows and irrigation demands. Any recirculation/blend/equalization tank or dosing tank should be sized for a minimum of one and a half (1.5) days of peak wastewater flow.

A grease interceptor tank will be required for the proposed commercial kitchen in the tasting room and should be sized for a minimum retention time of three (3) days.

Regardless of the system, all septic tanks should have a Zabel A300 filter or approved equal installed at the outlet to aid in the screening of suspended solids and the reduction of BOD in the wastewater effluent stream.

Wine Cave Setbacks to Septic Systems

Napa County Environmental Health files were reviewed to determine if there are any septic systems located within 100 and 400 feet of the proposed cave location. Based on the Napa County Geographic Information System topographic maps and parcel boundary overlay, we have identified several parcels with existing septic systems that fall within 400 feet of the proposed cave that are at an elevation that is equal to or higher than the proposed cave finish floor. The only existing septic system within 100 feet of the proposed cave location is proposed to be destroyed/removed as a result of the construction of the Tasting Room and Offices building. If either of the proposed alternative wastewater dispersal systems is constructed, the dispersal field and replacement area will be located outside the 400 foot setback and below the cave elevation. The identified parcels and the associated septic systems are shown on the enclosed "Cave and Septic Location Map".

The following is a summary of our findings per Napa County Environmental Health records regarding the existing septic systems on the identified parcels:

APN 032-500-033 (subject parcel)	There is an existing residential septic system that was installed in 2005. The septic system is located at an elevation higher than the proposed cave floor and 152± feet to the northeast. This system will be demolished as part of project. The project does propose to install a treatment/pretreatment system with storage tanks to be located more than 550± feet from the proposed cave and at an elevation lower than the proposed cave. Both proposed alternative dispersal system's field and replacement area is located outside the 400 foot setback and at an elevation lower than the proposed cave elevation.
APN 032-500-041	There is one (1) existing septic system on the parcel that was installed in 1976. The septic system is located at an elevation lower than the proposed cave floor and 550± feet to the east. The location of the septic system is situated on slopes that drain away from the proposed cave location.
APN 032-230-001	There is one (1) existing septic system on the parcel that was installed in 1972 and expanded in 1977. The septic system is located at an elevation higher than the proposed cave floor and 125± feet to the south. The location of the septic system is situated on slopes that drain toward the proposed cave location. This septic system is separated from the proposed cave location by Soda Canyon Road and a road side ditch.
APN 032-230-010	There is one (1) existing septic system on the parcel that was installed in 1971. The septic system is located at an elevation higher than the proposed cave floor and 250± feet to the southeast. The location of the septic system is situated on slopes that drain away from the proposed cave location. This septic system is separated from the proposed cave location by Soda Canyon Road and a road side ditch.

The following parcels are in the surrounding area and are adjacent to properties within the 400 foot cave setback. These properties are not expected to drain toward the proposed cave location.

APN 032-230-002, -003, -008, -009, -011 and -012

The following parcels are located within the 400 foot cave setback, however they are downhill of the subject parcel or their natural drainage is either away from or does not allow drainage toward the proposed cave location.

APN 032-440-021 and -022
APN 032-500-032

CONCLUSIONS

The parcel will be able to support the wastewater generated by the proposed 100,000 gallon winery and tasting room by utilizing a treatment system to treat the combined process wastewater and the sanitary sewer wastewater effluent and disperse treated effluent through surface drip irrigation to the vineyard or the alternative options of treating process wastewater effluent utilizing a pretreatment system and disperse the treated effluent through a surface drip irrigation to the vineyard and dispersing the sanitary sewer effluent through either an onsite subsurface drip or a pressure distribution type dispersal field utilizing an AdvanTex AX Treatment System to pretreat the sanitary sewer effluent.

Full design calculations and construction plans will be completed after approval of the Use Permit under consideration[7].

REFERENCES

California Onsite Wastewater Association (COWA). "Pumping and Pressure Distribution Systems." May 1998.

Geoflow, Inc. *Wastewater Design, Installation and Maintenance Guidelines.* v1, 2007.

Napa County Department of Environmental Management. "Design, Construction and Installation of Alternative Sewage Treatment Systems." November 2013.

Telsco Industries. "Turf Irrigation Manual." By James A. Watkins. 1987.

U.S. Department of Health, Education and Welfare, Public Health Service Publication. *Manual of Septic-Tank Practice.* 1967.

U.S. Environmental Protection Agency. "Onsite Wastewater Treatment Systems Manual." February 2002.

[7] Refer to Napa County PB&ES permit number P13-00320.

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Mountain Peak Winery
Proposed Process & Sanitary Sewer Wastewater Flow
Table I

Total annual wine production (gallons):	**100,000**
Annual water usage per gallon of wine (gallons):	**6.0**
Annual process wastewater flow (gallons):	600,000
Average daily process wastewater flow (gpd):	1,644
Annual sanitary sewer wastewater flow (gallons):	0

MONTHLY WASTEWATER FLOW (gallons/month):

Process & Sanitary Sewer Wastewater Flow		
Month	**Process Annual Percent**	**Wastewater Flow**
September	12.5%	75,000
October	12.9%	77,400
November	10.0%	60,000
December	7.0%	42,000
January	4.0%	24,000
February	3.0%	18,000
March	3.5%	21,000
April	7.0%	42,000
May	8.0%	48,000
June	8.5%	51,000
July	11.5%	69,000
August	12.1%	72,600
TOTALS	100%	600,000

Notes:

> Process wastewater monthly proportioning (percent of annual) is based on industry information.

> Analysis assumes sanitary sewer wastewater flow is treated by one of the dispersal alternitives and not combined with process wastewater, which is treated and used for vineyard irrigation.

> The annual average water usage per gallon of wine is assumed to be 6.0 gallons.

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Mountain Peak Winery
Proposed Vineyard Irrigation
Table II

Vineyard area (acres):	25.04
Row width (feet):	4
Vine spacing (feet):	6
Total number of irrigated vines:	45,440
Total area receiving Frost Protection (acres):	8.00
Seasonal irrigation (April - October):	
Seasonal irrigation per vine (gallons/season):	**104**
Non-Seasonal irrigation (November - March):	
Depth of Frost Protection Irrigation (inches/month):	
November	0.10
December	0.11
January	0.11
February	0.11
March	0.11
April	
Total	**0.54**

MONTHLY VINEYARD IRRIGATION			
		Estimated	
Month [1]	**Seasonal Percent (%)**	**Seasonal Irrigation (gal/vine)**	**Total Irrigation (gallons)**
September	15.0%	15.6	708,864
October	15.0%	15.6	708,864
November [2]		See Frost Protection Above	21,722
December [2]		See Frost Protection Above	23,894
January [2]		See Frost Protection Above	23,894
February [2]		See Frost Protection Above	23,894
March [2]		See Frost Protection Above	23,894
April	5.0%	5.2	236,288
May	10.0%	10.4	472,576
June	15.0%	15.6	708,864
July	20.0%	20.8	945,152
August	20.0%	20.8	945,152
TOTAL	100.0%	104.0	**4,843,058**
			14.86 acre-feet

[1] *Includes Heat Protection Irrigation (as necessary)*

[2] *Non-seasonal irrigation =*

*(vineyard area) * (43,560 sq.-ft./acre) * (depth of irrigation/12 in./ft.) * (7.48 gal./cu.-ft.)*

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Mountain Peak Winery
Proposed Treated Wastewater Irrigation Storage Tank Balance
Table III

Month	Beginning Balance (gallons)	Wastewater Flow (gallons)	Vineyard Irrigation (gallons)	Tank Volume (gallons)
September	0	75,000	708,864	0
October	0	77,400	708,864	0
November	0	60,000	21,722	38,278
December	38,278	42,000	23,894	56,384
January	56,384	24,000	23,894	56,490
February	56,490	18,000	23,894	50,596
March	50,596	21,000	23,894	47,702
April	47,702	42,000	236,288	0
May	0	48,000	472,576	0
June	0	51,000	708,864	0
July	0	69,000	945,152	0
August	0	72,600	945,152	0
	TOTALS	**600,000**	**4,843,058**	
	Average	**50,000**	**403,588**	**49,890**

Recommended Tank Storage (gallons): 200,000
Recommended Tank Storage (acre-feet): 0.61

Notes:

> Water balance calculations assume storage tank is empty at the beginning of November due to post-harvest irrigation.

> In months when the irrigation demand exceeds the beginning balance plus the wastewater flow it is assumed that the full irrigation demand is not met or that the additional irrigation water is supplied from an alternate source (ie. well).

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GEOFLOW SUBSURFACE DRIP — Field Flow

Job Description:	*Mountain Peak Winery - Proposed Sanitary Wastewater Effluent Subsurface Drip Dispersal Fiel*
Contact:	*Bartelt Engineering*
Prepared by:	*Michael Grimes, PE*
Date:	*March 2016*

Please fill in the shaded areas and drop down menus:
This spreadsheet serves as a guide, and is not a complete hydraulic design.

Worksheet 1- Field Flow

Total field

Total Quantity of effluent to be disposed per day	1,800	gallons / day
Hydraulic loading rate	0.75	gallons / sq.ft. / day
Minimum Dispersal Field Area	2,400	square ft.
Total Dispersal Field Area	2,500	square ft.

Flow per zone

Number of Zones	4	zone(s)
Dispersal area per zone	625	square ft.
Choose line spacing between WASTEFLOW lines	2	ft.
Choose emitter spacing between WASTEFLOW emitters	2	ft.
Total linear ft.per zone (minimum required)	313	ft. per zone
Total number of emitters per zone	156	emitters per zone
Select Wasteflow dripline (16mm)	Wasteflow PC - 1 gph	dripline
Pressure at the beginning of the dripfield	25	psi
Feet of Head at the beginning of the dripfield	57.75	ft.
What is the flow rate per emitter in gph?	1.02	gph
Dose flow per zone	**2.65**	**gpm**

Note: A few States or Counties require additional flow for flushing. Please check your local regulations.
Flush velocity calculation below is for PC dripline. Classic dripline requires less flow to flush than PC.
Please refer to Geoflow's spreadsheet "Design Flow and Flush Curves" at www.geoflow.com or call 800-82

If required, choose flush velocity	2	ft/sec
How many lines of WASTEFLOW per zone?	4	lines
Fill in the *actual* length of longest dripline lateral	54	ft.
Flush flow required at the end of each dripline	1.48	gpm
Total Flow required to achieve flushing velocity	5.92	gpm
Total Flow per zone- worst case scenario	**8.57**	**gpm**

Select Filters and zone valves

Select Filter Type	Vortex Screen Filter	
Recommended Filter (item no.)	AP4E-1F	1" Screen Filter 0-20gpm
Select Zone Valve Type	Electric Solenoid	-
Recommended Zone Valve (item no.)	SVLVB-100	1-in. Solenoid valve

Dosing

Number of doses per day / zone:	10	doses
Timer ON. Pump run time per dose/zone:	16.58	mins:secs
Timer OFF. Pump off time between doses	2:06	hrs:mins
Per Zone - Pump run time per day/zone:	2:49	hrs:mins
All Zones - Number of doses per day / all zones	40	doses / day
Allow time for field to pressurize	0:00:30	hrs:mins:secs
Filter flush timer	0:00:20	hrs:mins:secs
Drain timer	0:05:00	hrs:mins:secs
Field flush timer	0:01:00	hrs:mins:secs
Field flush counter	4	cycles
Time required to complete all functions per day.	**15:52**	hrs:mins
Dose volume per zone	45	gallons per dose

BARTELT ENGINEERING

Sanitary Sewer Wastewater
Proposed Pressure Distribution (PD) Septic System (ASTS) Design Calculations

Date:	August 2015
Project Name:	Mountain Peak Winery
Project Address:	3265 Soda Canyon Road, Napa, CA 94558
Project APN:	032-500-033
Project Number:	08-31
Design By:	M. Grimes, PE

Perc Rate:		
Assigned Perc Rate	**4.2**	inches per hour
Assigned Perc Rate	14.29	minutes per inch
Converted Perc Rate	0.75	gallons / square foot / day
Trench Design:		
Depth of Acceptable Soil (per Site Investigation)	**60**	inches
Design Depth of Lateral Invert Below O.G.	**14**	inches
Design Depth of Trench from Original Grade	**32**	inches
Design Depth of Gravel Cover to Backfill Over Lateral (Crown)	**2**	inches
Required Additional Fill (OG to FG) to Meet Minimum Req	**0**	inches
Actual Depth of Lateral Invert Below F.G.	**14**	
Actual Depth of Trench from FG	**32**	
Required Separation to Limiting Condition	**24**	inches
Actual Separation to Limiting Condition	**28**	inches
Design Diameter of Lateral	**2**	inches
Actual Depth of Gravel Below Lateral Invert	16	inches
Sidewall Area (square feet / lineal foot)	**3.00**	square feet per lineal foot
Design Flow:		
Winery Sanitary Wastewater:		
Number of Full Time Employees	**19**	employee
Number of Part Time Employees (no harvest season employees)	**4**	employee
Wastewater Generation Rate per Employee	15	gallons per day
Maximum Number of Guests per Day	**125**	guests per day
Wastewater Generation Rate per Guest	8	gallons per guest
Wastewater Generated for Food preparation per Guest	3	gallons per guest
Estimated Percentage of Usage per Day	100%	
Peak Winery Sanitary Wastewater Flow	1,720.0	gallons per day
∴ Use Design Flow	1,800	gallons per day

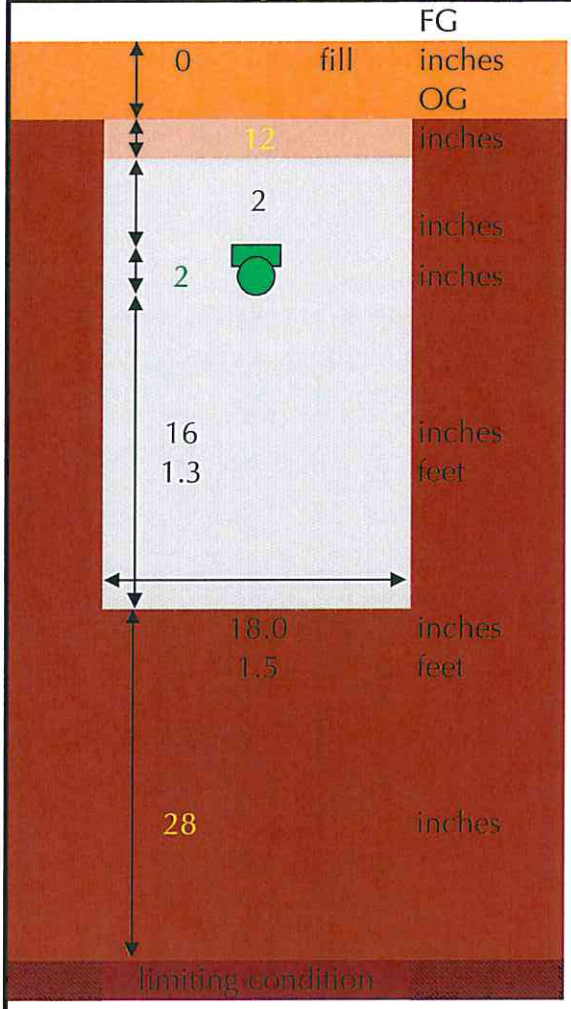
BARTELT ENGINEERING

Sanitary Sewer Wastewater
Proposed Pressure Distribution (PD) Septic System (ASTS) Design Calculations

Disposal Field Design:		
Calculated Required Length of Trench	800.0	lf
Use Length of Trench	800	lf
Number of Subfields	**4**	
Calculated Length of Trench per Subfield	200	
Lateral Length	**100**	
Calculated Number of Laterals per Subfield	2.00	
Actual Number of Laterals per Subfield	2.00	
Actual Length of Trench per Subfield	200	
Actual Total Length of Trench	800	
Factor of Safety	1.00	
Pump System Design:		
Number of Orifices per Subfield	56	
Discharge Rate per Orifice	0.72	gallons per minute / orifice
Total Discharge per Subfield	40.32	gallons per minute
Design Flow Rate	41	gallons per minute
Total Friction Loss Through Plumbing	37	feet
Head at End of Lateral	3	feet
Elevation Head	**20**	feet
Total Dynamic Head	60	feet
Increase for Pump Aging	20%	
Design Total Dynamic Head	72	feet

BARTELT ENGINEERING

Proposed Pressure Distribution System - Proposed Trench Design



Depth of soil to limiting condition
60 inches

Available trench depth below invert of pipe
16 inches
1.3 feet

Design trench depth below invert
16 inches
1.3 feet

Design trench depth from OG
32 inches
2.7 feet

Design trench depth from FG
32 inches
2.7 feet

Design trench width (maximize ESA)
18 inches
1.5 feet

Design trench ESA
3.00 sf/lf

Maximum Daily Sewage Flow
1,800 gal/day

Soil Application Rate
STE 0.60 gal/sf/day
PTE 0.75 gal/sf/day

Minimum LF of trench
STE 1000 ft
PTE 800 ft

Pretreatment device required due to mimimum soil depth under trench to limiting condition

BARTELT ENGINEERING

GREASE INTERCEPTOR SIZING

Project Name: Mountain Peak Winery
Project #: 08-31
Project Address: 3265 Soda Canyon Road
Napa County, CA
APN: 032-500-033

Required Capacity [gal]	=	(Peak No. of meals per Hour)	X	(Waste Flow Rate)	X	(Retention Time)	X	(Storage Factor)
2,250	=	125	x	6	x	3	x	1

2,500 Recommended

Waste Flow Rates:

1 gpd/meal	Food Waste Disposer
2 gpd/meal	Single Service Kitchen
3 gpd/meal	if Single Service Utensils
5 gpd/meal	if Multi-Service Utensils
5 gpd/meal	Without Dishwashing Machine
6 gpd/meal	With Dishwashing Machine

plus type of facility present:

3 gpd/person	bar/cocktail
8 gpd/person	short order

Retention Time:

1.5	if Single Service Utensils (Single Service Kitchen -- Single Serving)
2.5	if Multi-Service Utensils (Commercial Kitchen Waste -- Dishwasher)
3.0	As deemed appropriate by Engineer

Storage Factor:

Fully Equipped Commercial Kitchen

1	if hours of operation are	up to and including 8
2	if hours of operation are	9 to 16
3	if hours of operation are	17 to 24

Single Service Kitchen

1.5

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 #: E13-00271
APN: 032-500-033
(County Use Only) Reviewed by: Date:

PLEASE PRINT OR TYPE ALL INFORMATION

Property Owner Mountain Peak Vineyards, LLC, c/o Steven Rea	☒ New Construction ☐ Addition ☐ Remodel ☐ Relocation ☒ Other: Use Permit
Property Owner Mailing Address 3265 Soda Canyon Road, Napa, CA 94558	☐ Residential - # of Bedrooms: Design Flow : gpd
City State Zip Napa CA 94558	☒ Commercial – Type: Winery Sanitary Waste: 1,700± gpd Process Waste: gpd
Site Address/Location 3265 Soda Canyon Road, Napa, CA	☐ Other: Sanitary Waste: gpd Process Waste: gpd

Evaluation Conducted By:

Company Name Bartelt Engineering	Evaluator's Name Paul N. Bartelt, P.E.	Signature (Civil Engineer, R.E.H.S., Geologist, Soil Scientist)
Mailing Address: 1303 Jefferson Street, 200 B		Telephone Number (707) 258-1301
City State Zip Napa CA 94559		Date Evaluation Conducted May 29, 2013

Primary Area See below	Expansion Area See below
Acceptable Soil Depth: 60 in. Test pits #: 3, 4 & 5 Soil Application Rate (gal. /sq. ft. /day): STE 0.6	Acceptable Soil Depth: 60 in. Test pits #: 1, 2, 6 & 7 Soil Application Rate (gal. /sq. ft. /day): STE 0.6
System Type(s) Recommended: Pressure Distribution or Subsurface Drip	System Type(s) Recommended: Pressure Distribution or Subsurface Drip
Slope: 9.5% to 14.3%. Distance to nearest water source: 100+ feet	Slope: 12.5% to 14.5%. Distance to nearest water source: 100+ feet
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)
Groundwater Monitoring Performed? No ☒ Yes ☐ (attach results)	Groundwater Monitoring Performed? No ☒ Yes ☐ (attach results)

Site constraints/Recommendations:

A site evaluation was conducted on May 29, 2013 by Paul Bartelt and Rich Paxton of Bartelt Engineering. Test pits were excavated by Harold Smith & Son, Inc. Peter Ex of Napa County Environmental Health visited the site to inspect soil conditions. Test pits #1 thru #7 showed suitable soil for the installation of an Alternative Sewage Treatment System (ASTS) dispersal field within the area tested with required reserve area.

Recommend separating the two different waste streams (sanitary sewer & winery process wastewater) and dispose of the sanitary sewer via an ASTS dispersal field and disposing of the winery process wastewater via surface drip irrigation to the onsite vineyards.

Test Pit # 1 * Hydrometer Test Performed

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-28*		0-15	CL	SSB	SH	FRB	SS	MVF/MF/ CM/FC	MVF/MF/ FC/FM	None
28-60*	G	15-30	CL	SSB	H	FRB	SS	MVF/MF/ CM/FC	FVF/FF	None

Slope = 13.5%. Acceptable soil depth observed: 60 inches.
Assigned soil application rate = STE 0.33 gal/sf/day for a Conventional – Standard System
STE 0.6 gal/sf/day for ASTS
PTE 0.75 gal/sf/day for ASTS
Subsurface Drip = 0.6 gal/sf/day

No refusal at 60 inches deep.
No groundwater observed. *See attached Soil Texture Analysis by Bouyoucos Hydrometry Method prepared by RGH Consultants, Inc. dated June 5, 2013.

Test Pit # 2

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-24		0-15	CL	SSB	H	FRB	SS	MVF/MF/ CM/FC	MVF/MF	None
24-60	G	15-30	CL	SSB	H	FRB	S	MVF/MF/ FM	FVF/FF/ FM	None

Slope = 12.5%. Acceptable soil depth observed: 60 inches.
Assigned soil application rate = STE 0.33 gal/sf/day for a Conventional – Standard System
STE 0.6 gal/sf/day for ASTS
PTE 0.75 gal/sf/day for ASTS
Subsurface Drip = 0.6 gal/sf/day

No refusal at 60 inches deep.
No groundwater observed.

Test Pit # 3 * Hydrometer Test Performed

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-63*		0-15	CL	SSB	SH	FRB	SS	MVF/MF/ CM/FC	FVF/FF/ FM/FC	None

Slope = 9.5%. Acceptable soil depth observed: 63 inches.
Assigned soil application rate = STE 0.33 gal/sf/day for a Conventional – Standard System
STE 0.6 gal/sf/day for ASTS
PTE 0.75 gal/sf/day for ASTS
Subsurface Drip = 0.6 gal/sf/day

No refusal at 63 inches deep.
No ground water observed. *See attached Soil Texture Analysis by Bouyoucos Hydrometry Method prepared by RGH Consultants, Inc. dated June 5, 2013.

Test Pit # 4

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-33		0-15	CL	SSB	SH	FRB	SS	MVF/MF CM/FC	FVF/FF/ FM/FC	None
33-66	C	30-50	CL	SAB	H	VF	SS	MVF/MF/ FM/FC	MVF/MF/ FM/FC	None

Slope = 14.3%. Acceptable soil depth observed: 66 inches.
Assigned soil application rate = STE 0.33 gal/sf/day for a Conventional – Standard System
STE 0.6 gal/sf/day for ASTS
PTE 0.75 gal/sf/day for ASTS
Subsurface Drip = 0.6 gal/sf/day

No refusal at 66 inches deep.
No groundwater observed.

Test Pit # 5

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-72		0-15	CL	SSB	SH	FRB	SS	MVF/MF/ CM/FC	FVF/FF/ FM/FC	None

Slope = 10%. Acceptable soil depth observed: 72 inches.
Assigned soil application rate = STE 0.33 gal/sf/day for a Conventional – Standard System
STE 0.6 gal/sf/day for ASTS
PTE 0.75 gal/sf/day for ASTS
Subsurface Drip = 0.6 gal/sf/day

No refusal at 72 inches deep.
No groundwater observed.

Test Pit # 6

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-63		0-15	CL	SSB	H	FRB	SS	MVF/MF/ CM/FC	MVF/MF/ FM/FC	None

Slope = 14.5%. Acceptable soil depth observed: 63 inches.
Assigned soil application rate = STE 0.33 gal/sf/day for a Conventional – Standard System
STE 0.6 gal/sf/day for ASTS
PTE 0.75 gal/sf/day for ASTS
Subsurface Drip = 0.6 gal/sf/day

No refusal at 63 inches deep.
No groundwater observed.

Test Pit # 7

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-60		0-15	CL	SSB	SH	FRB	SS	MVF/MF/ CM/FC	FVF/FF/ FM/FC	None

Slope = 13.9%. Acceptable soil depth observed: 60 inches.
Assigned soil application rate = STE 0.33 gal/sf/day for a Conventional – Standard System
STE 0.6 gal/sf/day for ASTS
PTE 0.75 gal/sf/day for ASTS
Subsurface Drip = 0.6 gal/sf/day

No refusal at 60 inches deep.
No groundwater observed.

Table of Abbreviations

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

Attach additional sheets as needed

Alternative Sewage Treatment System Soil Application Rates

TEXTURE	STRUCTURE		APPLICATION RATE (Gal/ft^2 /day)	
	Shape	Grade	STE[1]	PTE[1,2]
Coarse Sand, Sand, Loamy Coarse Sand	Single grain	Structureless	1.0	1.2
Fine Sand, Loamy Fine Sand	Single grain	Structureless	0.6	1.0
Sandy Loam, Loamy Sand	Massive	Structureless	0.35	0.5
	Platy	Weak	0.35	0.5
	Prismatic, blocky, granular	Weak	0.5	0.75
		Moderate, Strong	0.8	1.0
Loam, Silt Loam, Sandy Clay Loam, Fine Sandy Loam	Massive	Structureless		
	Platy	Weak, moderate, strong		
	Prismatic, blocky, granular	Weak, moderate	0.5	0.75
		Strong	0.8	1.0
Sandy Clay, Silty Clay Loam, Clay Loam	Massive	Structureless		
	Platy	Weak, moderate, strong		
	Prismatic, blocky, granular	Weak, moderate	0.35	0.5
		Strong	0.6	0.75
Clay, Silty Clay	Massive	Structureless		
	Platy	Weak, moderate, strong		
	Prismatic, blocky, granular	Weak		
		Moderate, strong	0.2	0.25

1. See Table 1 in the Design, Construction and Installation of Alternative Sewage Treatment Systems.
2. A higher application rate for pretreated effluent may only be used when pretreatment is not used for one foot of vertical separation credit.

MINIMUM SURFACE AREA GUIDELINES TO DISPOSE OF 100 GPD OF SECONDARY TREATED EFFLUENT FOR SUBSURFACE DRIP DISPERSAL SYSTEMS

		Soil Absorption Rates		Design Application Rate (Gal/ft^2/day)	Total Area Required Sq. ft./100 gallons per day
Soil Class	Soil Type	Est. Soil Perc. Rate minutes/inch	Hydraulic Conductivity inches/hour		
I	Coarse sand	1 – 5	>2	1.400	71.5
I	Fine sand	5 – 10	1.5 – 2	1.200	83.3
II	Sandy loam	10 – 20	1.0 – 1.5	1.000	100.0
II	Loam	20 – 30	0.75 – 1.0	0.700	143.0
III	Clay loam	30 – 45	0.5 – 0.75	0.600	167.0
III	Silt - clay loam	45 – 60	0.3 – 0.5	0.400	250.0
IV	Clay non-swell	60 – 90	0.2 – 0.3	0.200	500.0
IV	Clay - swell	90 – 120	0.1 – 0.2	0.100	1000.0

1. For design purpose, the "Soil Type" category to be used in the above table shall be based on the most restrictive soil type encountered within two feet below the bottom of the drip line.
2. Dispersal field area calculation: Total square feet area of dispersal field = Design flow divided by loading rate.

Conventional Sewage Treatment System Soil Application Rates

TEXTURE	STRUCTURE		APPLICATION RATE (Gal/ft^2/day)
	Shape	Grade	STE
Coarse Sand, Sand, Loamy Coarse Sand	Single grain	Structureless	Prohibited
Sandy Loam, Loamy Sand	Massive	Structureless	Prohibited
	Platy	Weak, mod, strong	Prohibited
	Prismatic, blocky, granular	Weak	0.33
		Moderate, strong	0.5
Loam, Silt Loam, Sandy Clay Loam, Fine Sandy Loam	Massive	Structureless	Prohibited
	Platy	Weak, mod, strong	Prohibited
	Prismatic, blocky, granular	Weak	0.25
		Moderate, Strong	0.33
Clay Loam	Massive	Structureless	Prohibited
	Platy	Weak, moderate, strong	Prohibited
	Prismatic, blocky, granular	Weak, moderate	0.25
		Strong	0.33
Sandy Clay, Silty Clay Loam	Massive	Structureless	Prohibited
	Platy	Weak, moderate, strong	Prohibited
	Prismatic, blocky, granular	Weak, moderate	Prohibited
		Strong	0.25
Clay, Silty Clay	Massive	Structureless	Prohibited
	Platy	Weak, moderate, strong	Prohibited
	Prismatic, blocky, granular	Weak	Prohibited
		Moderate, strong	Prohibited

CONVENTIONAL SEWAGE TREATMENT SYSTEM SOIL APPLICATION RATES BASED ON PERCOLATION RATES	
Percolation Rate (mpi)	Application Rate (STE)
< 5 MPI	Prohibited
5 to 10 MPI	0.5
10-20 MPI	0.33
20-60 MPI	0.25
> 60 MPI	Prohibited

RGH CONSULTANTS

Experience is the difference

July 24, 2013
File: 9147.34

Bartelt Engineering
1303 Jefferson Street, Ste. 200B
Napa, CA 94559

Subject: **Laboratory Test Results**
Soil Texture Analysis by
Bouyoucos Hydrometry Method
Mountain Peak Vineyards
JOB# 08-31

Dear Mr. Bartelt:

This letter transmits the results of our laboratory testing performed for the subject project.

We performed a Soil Texture Analysis by the Bouyoucos Hydrometery Method with the following results:

Size/Density	TP-1 HORIZON-1
+ #10 Sieve	18.4 %
Sand	38.0 %
Clay	31.2 %
Silt	30.8 %
Db g/cc	--

We trust this provides the information required at this time. Should you have further questions, please call.

Yours very truly,

RGH GEOTECHNICAL

George Fotou
Laboratory Manager

RGH CONSULTANTS

Experience is the difference

July 24, 2013
File: 9147.34

Bartelt Engineering
1303 Jefferson Street, Ste. 200B
Napa, CA 94559

Subject: **Laboratory Test Results**
Soil Texture Analysis by
Bouyoucos Hydrometry Method
Mountain Peak Vineyards
JOB# 08-31

Dear Mr. Bartelt:

This letter transmits the results of our laboratory testing performed for the subject project.

We performed a Soil Texture Analysis by the Bouyoucos Hydrometery Method with the following results:

Size/Density	TP-1 HORIZON-2
+ #10 Sieve	30.2 %
Sand	36.0 %
Clay	29.2 %
Silt	34.8 %
Db g/cc	--

We trust this provides the information required at this time. Should you have further questions, please call.

Yours very truly,

RGH GEOTECHNICAL

George Fotou
Laboratory Manager

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July 24, 2013
File: 9147.34

Bartelt Engineering
1303 Jefferson Street, Ste. 200B
Napa, CA 94559

Subject: **Laboratory Test Results**
Soil Texture Analysis by
Bouyoucos Hydrometry Method
Mountain Peak Vineyards
JOB# 08-31

Dear Mr. Bartelt:

This letter transmits the results of our laboratory testing performed for the subject project.

We performed a Soil Texture Analysis by the Bouyoucos Hydrometery Method with the following results:

Size/Density	TP-3
+ #10 Sieve	16.5 %
Sand	37.8 %
Clay	30.2 %
Silt	32.0 %
Db g/cc	--

We trust this provides the information required at this time. Should you have further questions, please call.

Yours very truly,

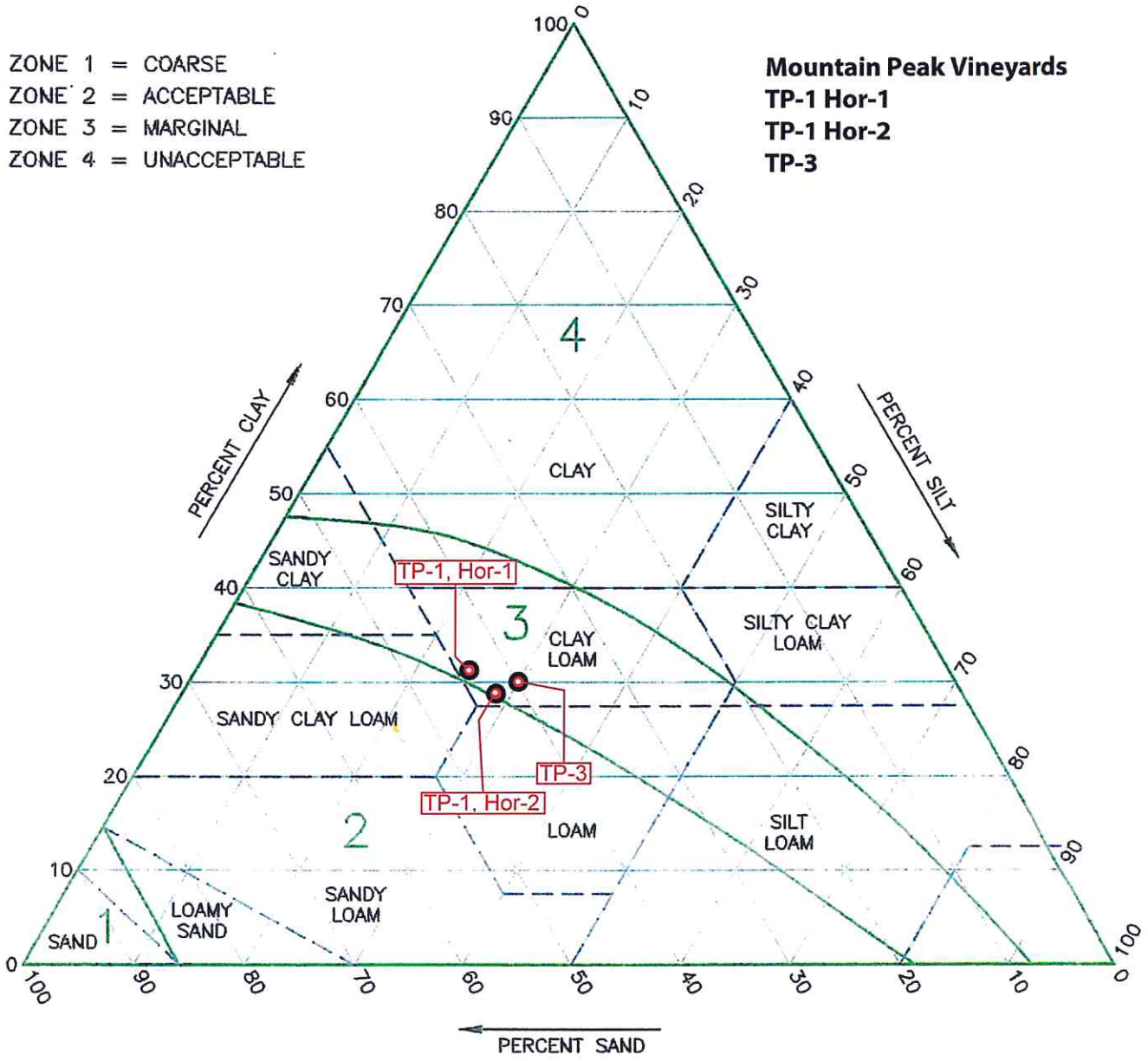
RGH GEOTECHNICAL

George Fotou
Laboratory Manager

SOIL PERCOLATION SUITABILITY CHART

ZONE 1 = COARSE
ZONE 2 = ACCEPTABLE
ZONE 3 = MARGINAL
ZONE 4 = UNACCEPTABLE

Mountain Peak Vineyards
TP-1 Hor-1
TP-1 Hor-2
TP-3

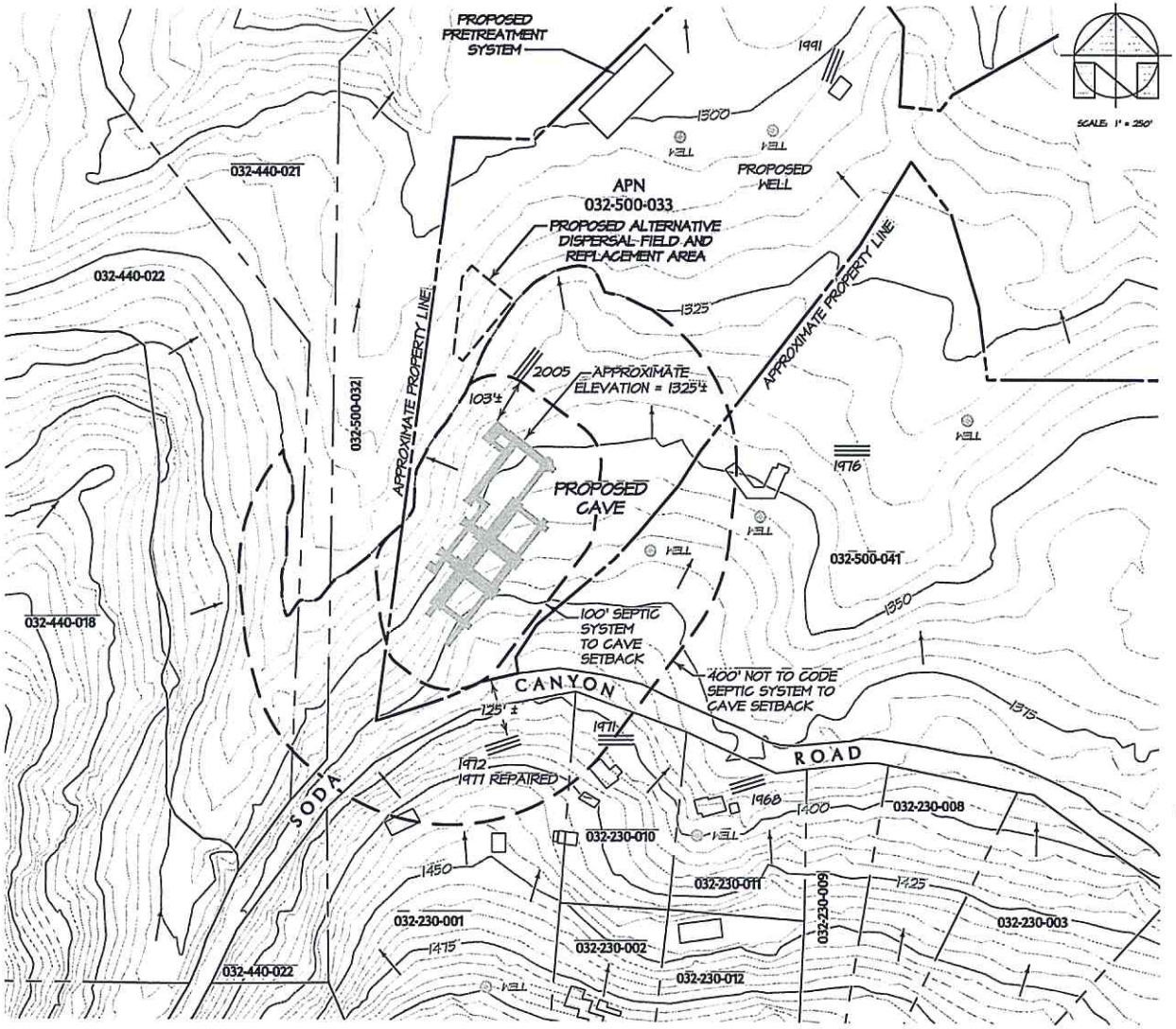


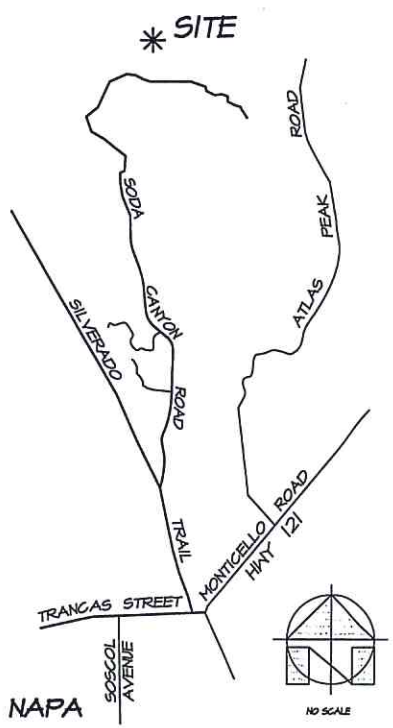
Instructions:

1. Plot texture on triangle based on percent sand, silt, and clay as determined by hydrometer analysis.
2. Adjust for coarse fragments by moving the plotted point in the sand direction an additional 2% for each 10% (by volume) of fragments greater than 2mm in diameter.
3. Adjust for compactness of soil by moving the plotted point in the clay direction an additional 15% for soils having a bulk-density greater than 1.7 gm/cc.

Note:

For soils falling in sand, loamy sand or sandy loam classification bulk density analysis will generally not affect suitability and analysis not neccesary.





LOCATION MAP

NO SCALE

BARTELT ENGINEERING
CIVIL ENGINEERING · LAND PLANNING
1303 Jefferson Street, 200 B, Napa, CA 94559
Tel: 707-258-1301 · Fax: 707-258-2926
· www.barteltengineering.com ·

CAVE & SEPTIC LOCATION MAP

SCALE: 1" = 250'

LEGEND

- = LIMITS OF CAVE SETBACK
- = APPROXIMATE LOCATION OF EXISTING SEPTIC SYSTEM
- 19XX = APPROXIMATE YEAR OF SEPTIC SYSTEM INSTALLATION AND/OR REPAIR
- = SURFACE FLOW DIRECTION

Mountain Peak Winery
3265 Soda Canyon Road
Napa, CA 94558
APN 032-500-033
Job No. 08-31
March 2016
Sheet 1 of 1