August 2015- 2nd Revision
May 2015 - 1st Revision
September 2014
#14-02

BARTELT ENGINEERING

ONSITE WASTEWATER DISPOSAL FEASIBILITY STUDY FOR THE DAKOTA SHY WINERY 771 SAGE CANYON ROAD, NAPA COUNTY, CA APN 030-120-024

As required by Napa County Planning, Building & Environmental Services, this study outlines the feasibility of providing onsite wastewater disposal for a winery and tasting room expansion to an existing winery site on the above referenced parcel located at 771 Sage Canyon Road, Napa County, CA.

PROJECT DESCRIPTION

It is our understanding that the project proposes to expand the existing full crush winery operations on the above referenced parcel with the intent of increasing the facility's wine production capability from 1,000 gallons to 14,000 gallons of wine per year. Along with the increase in wine production, the project proposes a light staffing and marketing plan. The project proposes four (4) full-time employees, one (1) part-time employee and two (2) seasonal (harvest) employees. The project also proposes to offer private tour and tasting appointments for a maximum number of 20 guests per day and 140 guests per week. Additionally, the Applicant intends to host two (2) wine club/release events per year for groups of up to 40 guests. All Private Tours and Tastings and Wine Club/Release Events will have food catered with all food preparation and washing of tableware and serving dishes performed by an offsite catering service.

Table 1 summarizes the proposed marketing plan:

TABLE 1: MARKETING PLAN SUMMARY

Description	Frequency		Number of Persons	
	Current	Proposed	Current	Proposed
Private Tours & Tastings	0 per day	4 per day	0 per appointment	5 per appointment
Wine Club/ Release Events	0 per year	2 per year	0 per event	40 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 June 30, 2014 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 prepared by Bartelt Engineering will demonstrate that the proposed winery improvements and marketing plan can feasibly be developed and that the parcel has adequate space to 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 $(PW)_{HARVEST}$ =

$$\left(\frac{14{,}000\ \text{gallons of wine}}{1\ \text{year}}\right)\times\left(\frac{1.5\ \text{gallons of water}}{1\,\text{gallon of wine}}\right)\times\left(\frac{1\,\text{year}}{30\,\text{days of crush}}\right)=$$

Harvest Peak Winery Process Wastewater Flow $(PW)_{HARVEST}$ = 700 gallons per day (gpd)

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

$$\left(\frac{14{,}000\ \text{gallons of wine}}{1\,\text{year}}\right)\times\left(\frac{4.5\ \text{gallons water}}{1\,\text{gallon of wine}}\right)\times\left(\frac{1\ \text{year}}{335\ \text{days}}\right)=$$

Non-Harvest Peak Winery Process Wastewater Flow $(PW)_{NON\text{-}HARVEST}$ = 188 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 (SW_{WINE}) generated at the winery production facility and tasting room including full-time employees, part-time employees, seasonal (harvest) employees and guests and can be itemized as follows:

Employees (SW Employee):

- 4 Full-Time Employees x 15.0 gpd per employee = 60 gpd
- 1 Part-Time x 15.0 gpd per employee = 15 gpd
- 2 Harvest Season x 15.0 gpd per employee = 30 gpd

Guests[1,2]:

- Private Tours and Tasting (SW T&T):
  - (20 guests per day) x (3 gpd per guest)[1,2] = 60 gallons per day
- Wine Club / Release Events (SW WC/RE):
  - (40 guests per event) x (3 gpd per guest)[1,2] = 120 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 October (harvest season). Private Tours and Tasting along with Wine Club/Release Events may be held on the same day. All Private Tours and Tastings and Wine Club/Release Events will have food catered by an offsite catering service.

$(SW\ Employee_{FULL\text{-}TIME + PART\text{-}TIME + SEASONAL})_{HARVEST} + (SW\ T\&T)_{HARVEST} + (SW\ WC/RE)_{HARVEST}$

(60 + 15 + 30) gpd + 60 gpd + 120 gpd = 285gpd

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 November through July and is shown as follows:

$(SW\ Employee_{FULL\text{-}TIME + PART\text{-}TIME})_{NON\text{-}HARVEST} + (SW\ T\&T)_{NON\text{-}HARVEST} + (SW\ WC/RE)_{HARVEST} =$

(60 + 15) gpd + 60 gpd + 120 gpd = 255 gpd

Again, Private Tours and Tastings along with Wine Club/Release Events may be held on the same day. All Private Tours and Tastings and Wine Club/Release Events will have food catered by an offsite catering service.

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)	700	188
Sanitary Wastewater (SW)	285	255
Combined Wastewater (SW + PW)	985	443

[1] Volume rate accounts for 3 gpd from restroom use
[2] Represents a maximum wastewater flow as event may occur during harvest or non-harvest seasons

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 METHOD

Proposed Wastewater Disposal System

Bartelt Engineering proposes to dispose of the winery facility's process and sanitary wastewater utilizing a new alternative sewage treatment system (ASTS) and disposing of the wastewater effluent via a Septic Tank Effluent (STE) Pressure Distribution (PD) system.

The winery facility's process wastewater system will consist of several steps. The floors of the proposed winery 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 septic tank fitted with filters to remove finer solids. From the septic tank, the process wastewater effluent will gravity flow and combine with the winery and tasting room sanitary wastewater effluent in a sump tank before being dose discharged to the disposal field.

The winery facility and tasting room sanitary wastewater will gravity flow to a series of septic tanks fitted with filters for solids removal. From the septic tank, the sanitary wastewater effluent will gravity flow to a sump tank where it will be combined with the winery process wastewater effluent before being dose discharged to the disposal field and dispersed via a pressure distribution dispersal field as stated previously.

Wastewater Disposal Field and Reserve Area

Based on the site evaluation performed by Bartelt Engineering on June 30, 2014, test pits #1 through #6 showed similar results and are acceptable for a Pressure Distribution (PD) type septic system and 100% reserve area. The site evaluation determined that the soil in the area of Test Pits #1 through #4 is Loam (L) and Clay Loam (CL) for Test Pits #5 and #6. According to Napa County Standards, a hydraulic loading rate of 0.8 gal/sf/day is allowed for Loam[3] (L) and 0.6 gal/sf/day is allowed for Clay Loam[4] (CL) using an alternative sewage treatment system. No limiting conditions were found for the entire depth of the test pits. Therefore, the maximum acceptable soil depth found during the site evaluation was the maximum excavation depth of the test pits at approximately 86 inches. Napa County Standards require a minimum of 36 inches of useable soil below the trench bottom to the limiting condition. The pressure distribution laterals would be installed in 18 inch wide by 40 inch deep trenches with 18 inches of Clear Lake lava rock under the inverts of the distribution laterals, 6 inches of Clear Lake lava rock over the inverts of the distribution

[3] Soil application rate is 0.8 gal/sf/day and 1.0 gal/sf/day for septic tank effluent (STE) and pre-treated effluent (PTE) alternative sewage treatment systems, respectively

[4] Soil application rate is 0.6 gal/sf/day and 0.75 gal/sf/day for septic tank effluent (STE) and pre-treated effluent (PTE) alternative sewage treatment systems, respectively

laterals and 16 inches of soil to match original grade. The proposed trench section provides for a maximum of 3 square feet of sidewall per lineal foot of trench. The minimum required lineal feet of trench for the PD system can be calculated as follows:

$$\text{Disposal Field Area} = \left(\frac{\text{design flow rate}}{(\text{soil application rate}) \times (\text{effective surface area})} \right) =$$

$$\frac{985 \frac{\text{gal}}{\text{day}}}{0.8 \frac{\text{gal}}{\text{day} \quad \text{ft}^2} \times 3.0 \frac{\text{ft}^2}{\text{lf}}} = 410.4, \text{ use 600 linear feet}$$

To make the best use of the available disposal field area we recommend the system consist of three (3) subfields, each containing two (2) laterals with each lateral 100 feet long, for a total of 200 linear feet (lf) of trench per subfield and a system total of 600 linear feet of leach line.

Based on the existing ground slope of less than 5%, the minimum trench spacing is five (5) feet between trenches or 6.5 feet between laterals; therefore, the minimum required primary disposal field area is approximately 3,400 square feet.

100% Reserve Area = 3,400 square feet

TANK SIZING

Existing Tanks

The 810 gallon septic tank and associated leach field currently used by the existing winery will be removed and disposed of properly offsite under the proposed design. The existing septic system that serves the existing residential structures (residence, guest house and pool house) is an alternative sewage treatment system subsurface drip dispersal system. It is our understanding that the existing residential structures will remain and that the existing subsurface drip dispersal system will remain operational solely for the residential structures.

Proposed Tanks

Under the proposed design, the combined sanitary and process wastewater septic tanks will have a minimum hydraulic retention volume capacity of 4,000 gallons which is sized to provide a minimum of three and one-half (3.5) days of retention time during peak wastewater flow.

Each septic tank will have a filter installed at the outlet to aid in the screening of suspended solids and the reduction of BOD in the wastewater effluent stream.

The sump tank will have a volume capacity of 1,500 gallons to provide for greater than one (1) day of combined septic and process wastewater peak flow capacity.

CONCLUSIONS

The parcel has adequate space to support the proposed 14,000 gallon per year winery and tasting room by disposing the combined process wastewater and the sanitary sewer wastewater effluent through a pressure distribution type dispersal field.

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

REFERENCES

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

Napa County Department of Environmental Management. "Design, Construction and Installation of Alternative Sewage Treatment Systems." April 12, 2010.

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.