Wastewater Feasibility Study

William Cole Use Permit Modification P19-00101-UP
Variance P19-00441-VAR
Planning Commission Hearing Date (May 1, 2024)

July 23, 2019

Job No. 12-119

Kim Withrow, REHS
Environmental Health Division
Napa County Planning, Building and Environmental Services Department
1195 Third Street, Suite 210
Napa, CA 94559

Re: Onsite Wastewater Disposal Feasibility Study for the
William Cole Winery Use Permit Modification Application
2849 St. Helena Highway North, St. Helena, California APN 022-230-015

Dear Ms. Withrow:

At the request of William Cole Winery we have evaluated the process and sanitary wastewater flows associated with the proposed Use Permit Modification. We have also analyzed the capacity of the existing process and sanitary wastewater system serving the winery facility to determine if it is adequate to serve the proposed changes in use.

The Use Permit Modification application under consideration proposes the following characteristics:

- Wine Production:
  - 30,000 gallons of wine per year (increase from 20,000)
  - Crushing, fermenting, aging and bottling

- Employees:
  - 12 total employees

- Marketing Plan:
  - Daily Tours and Tastings by Appointment
    - 18 visitors per day maximum (increase from 5 per day)
    - 125 visitors per week total (increase from 10 per week)
  - Private Marketing Events #1
    - 4 per year
    - 15 guests maximum
    - Food prepared offsite by catering company

- Private Marketing Events #2
  - 3 per year
  - 25 guests maximum
  - Food prepared offsite by catering company
- Private Marketing Events #3
  - 4 per year
  - 50 guests maximum
  - Food prepared by offsite catering company
  - Portable toilets used
- Private Marketing Events #4
  - 1 per year
  - 75 guests maximum
  - Food prepared offsite by catering company
  - Portable toilets used

Existing structures on the property include several winery, residential and agricultural buildings. No new buildings are planned as part of the Use Permit Modification however an existing agricultural storage building is proposed to be converted to a winery use.

The remainder of this letter describes the existing process and sanitary wastewater disposal system, its design capacity, peak flows associated with the proposed changes in use and our analysis and recommendations related to the system's capability to handle the anticipated wastewater flows and next steps in this process.

Existing Septic System

The winery facility is serviced by one combined domestic and process waste septic system. According to permit records on file with Napa County the septic system is a pressure distribution type system that was installed in 2004. The system was designed to serve a 20,000 gallon per year winery with a peak flow of 762 gallons per day (gpd) of combined process and domestic wastewater. The system consists of two 1,500 gallon PW septic tanks, one 1,500 gallon SS septic tank, one 1,500 gallon dosing tank, a four way distributing valve and 4 x 95 lf pressure distribution leach line laterals all located just east of the winery facility. The existing residence is served by a separate standard septic tank and leach line system.

Proposed Process Wastewater Design Flows

We have used the generally accepted standard that six gallons of winery process wastewater are generated for each gallon of wine that is produced each year and that 1.5 gallons of wastewater are generated during the crush period for each gallon of wine that is produced. Based on the 30,000 gallon production capacity and the expectation that both white and red wine will be produced at the winery, we have assumed a conservative 45 day crush period. Using these assumptions, the annual, average daily and peak winery process wastewater flows are calculated as follows:

$$\text{Annual Winery Process Wastewater Flow} = \frac{30{,}000 \text{ gallons wine}}{\text{year}} \times \frac{6 \text{ gallons wastewater}}{1 \text{ gallon wine}}$$

Annual Winery Process Wastewater Flow = 180,000 gallons per year

$$\text{Average Daily Process Wastewater Flow} = \frac{180{,}000 \text{ gallons wastewater}}{\text{year}} \times \frac{1 \text{ year}}{365 \text{ days}}$$

Average Daily Winery Process Wastewater Flow = 493 gallons per day

$$\text{Peak Winery Process Wastewater Flow} = \frac{30{,}000 \text{ gallons wine}}{\text{year}} \times \frac{1.5 \text{ gallons wastewater}}{1 \text{ gallon wine}} \times \frac{1 \text{ year}}{45 \text{ crush days}}$$

Peak Winery Process Wastewater Flow = 1,000 gallons per day (gpd)

Proposed Winery Sanitary Wastewater Design Flows

The peak sanitary wastewater flow from the winery is calculated based on the number of winery employees and the number of daily visitors for tastings. In accordance with Table 4 of the Napa County "Regulations for Design, Construction, and Installation of Alternative Sewage Treatment Systems" we have used a design flow rate of 15 gallons per day per employee and 3 gallons per day per visitor for tastings and 5 gallons per visitor for marketing events with a catered meal. Based on these assumptions, the peak winery sanitary wastewater flows are calculated as follows:

Employees

Peak Sanitary Wastewater Flow = 12 employees X 15 gpd per employee
Peak Sanitary Wastewater Flow = 60 gpd

Daily Tastings

Peak Sanitary Wastewater Flow = 18 visitors per day X 3 gallons per visitor
Peak Sanitary Wastewater Flow = 54 gpd

Marketing Event with 25 Guests

Peak Sanitary Wastewater Flow = 25 guests x 5 gallons per guest
Peak Sanitary Wastewater Flow = 125 gpd

Total Peak Winery Sanitary Wastewater Flow

The worst-case peak winery sanitary wastewater flow is calculated based on 12 employees, tours and tastings for 18 visitors and an event for 25 guests with a catered meal. As noted above all events with more than 25 guests will utilize portable toilets and therefore are not included in this analysis. The peak flow for this scenario is calculated as follows:

Total Peak Winery Sanitary Wastewater Flow = 60 gpd + 54 gpd + 125 gpd

Total Peak Winery Sanitary Wastewater Flow = 239 gpd

Combined Peak Wastewater Flow

Combined Peak Wastewater Flow = Peak Winery Process Wastewater Flow

Combined Peak Winery Wastewater Flow = 1,000 gpd + 239 gpd

Combined Peak Winery Wastewater Flow = 1,239 gpd

Existing Septic System Capacity

As noted above the permit for the existing system indicates a design flow of 762 gpd for the winery process and domestic waste flows.

Proposed Design Flow vs Existing Capacity

The predicted Combined Peak Winery Wastewater Flow for the proposed winery operational characteristics (1,239 gpd) is more than the design capacity of the existing wastewater disposal system (762 gpd).

Recommendations

Based on the apparent need to increase the capacity of the system to accommodate the proposed increase in production William Cole Winery requested that ACE perform an evaluation to determine if it is possible to expand the existing leach field in the vineyard area immediately below the existing leach lines. Due to the fact that the existing lines were designed with 24 inches of soil beneath the trench and current code requires 36 inches we determined that expansion is not feasible.

Considering this finding we have the following recommendations for accommodating the additional flows associated with the proposed Use Permit Modification:

1) Separate the process waste stream from the domestic waste stream. In this scenario the domestic waste stream would continue to flow to the existing leach field (domestic flows are estimated to be well within the capacity of the existing system). The process wastewater would be collected separately, treated and disposed of via irrigation in the vineyard or on the natural hillsides. We have prepared a water balance (attached) and it is our opinion that the process wastewater can be applied to the existing vineyard area for disposal. A tank will be required to temporarily hold the waste when it cannot be applied (wet times, etc.). We recommend a minimum tank size of 10,000 gallons to hold one full week of peak flows. The proposed land application area is shown on the site plan prepared by Albion Surveys.

Summary

The calculations presented above illustrate that the estimated wastewater flows associated with the proposed Use Permit Modification will exceed the design capacity of the existing wastewater system. It is feasible to handle the proposed increase in waste flows by handling the sanitary and process waste streams separately as previously described.

Please feel free to contact us at (707) 320-4968 if you have any questions.

Sincerely,

Applied Civil Engineering Incorporated

By:

Michael R. Muelrath

Michael R. Muelrath RCE 67435
Principal

Copy:

Jane and Bill Ballentine, William Cole Winery (via email)
Jon Webb, Albion Surveys (via email)

Irrigation Storage Tank Water Balance

Month	Beginning Balance	Process Wastewater	Land Application Capacity	Ending Balance
January	0	9,000	21,722	0
February	0	9,000	21,722	0
March	0	9,000	21,722	0
April	0	7,200	21,722	0
May	0	7,200	37,901	0
June	0	9,000	40,449	0
July	0	18,000	40,449	0
August	0	32,400	24,269	8,131
September	8,131	32,400	45,991	0
October	0	27,000	37,901	0
November	0	10,800	21,722	0
December	0	9,000	21,722	0
		180,000	357,292	

Notes:

1. All values shown above for beginning balance, inflow, outflow and ending balance are in units of gallons.
2. See attached tables for detailed explanation of process wastewater and irrigation data presented in this table.
3. This water balance is based on the assumption that the tank is empy in August, just prior to crush.
4. This table is intended to illustrate waste disposal capability only. Where irrigation demand exceeds availble treated wastewater availability additional irrigation water will be provided by another source.

Winery Process Wastewater Generation Analysis

Annual Wine Production	30,000 gallons
Wastewater Generation Rate	6 gallons per gallon of wine
Annual Wasewater Generation	180,000 gallons
Crush Season Length	45 days
Wastewater Generated During Crush	1.5 gallons per gallon of wine
Peak Wastewater Generation Rate	1,000 gallons per day

Winery Process Wastewater Generation Table			
Month	Percentage of Annual Total	Monthy Flow (gallons)	Average Flow (gpd)
January	5.0%	9,000	290
February	5.0%	9,000	321
March	5.0%	9,000	290
April	4.0%	7,200	240
May	4.0%	7,200	232
June	5.0%	9,000	300
July	10.0%	18,000	581
August	18.0%	32,400	1,045
September	18.0%	32,400	1,080
October	15.0%	27,000	871
November	6.0%	10,800	360
December	5.0%	9,000	290
Total	100.0%	180,000	

Notes:

1. Wastewater generation rates and monthly proportioning are based on our past experience with similar projects.

Irrigation Schedule Analsysis

Vineyard Information:

Total acres of vines	1 acres
Vine Row Spacing (approx)	7 feet (estimated)
Vine Spacing (approx)	5 feet (estimated)
Vine density	1,245 vines per acre (estimated)
Total Vine Count	1,245 vines

Irrigation Information:

Seasonal Irrigation[1]	130.0 gallons per vine (May through October)
Non-Irrigation Application	0.8 inches per month September through May

Irrigation Schedule					
Month	Monthly Percentage[2]	Irrigation per Vine (gallons)	Seasonal Irrigation (gallons)	Non-Seasonal Irrigation Application (gallons)	Total (gallons)
January		0.0	0	21,722	21,722
February		0.0	0	21,722	21,722
March		0.0	0	21,722	21,722
April		0.0	0	21,722	21,722
May	10%	13.0	16,179	21,722	37,901
June	25%	32.5	40,449	0	40,449
July	25%	32.5	40,449	0	40,449
August	15%	19.5	24,269	0	24,269
September	15%	19.5	24,269	21,722	45,991
October	10%	13.0	16,179	21,722	37,901
November		0.0	0	21,722	21,722
December		0.0	0	21,722	21,722
Total	100%	130.0	161,794	195,497	357,292

Notes:

1. Irrigation per vine is based on 0.5 acre-feet per acre of vines per WAA.
2. Monthly vineyard irrigation percentages are based on our past experience with projects of this type.
3. Non-Irrigation Application is for managing tank levels and assumes a maximum of 5 operational days per month based on historic weather data (Summit Engineering NBRID Capacity Study, 1996) and a saturated soil infiltration rate of 0.1 gallons per square foot per day uniformly over the entire area.