Wastewater Feasibility Study

Shadybrook Winery P18-00450
Planning Commission Hearing - December 4, 2019

WASTEWATER FEASIBILITY REPORT

SHADYBROOK ESTATE WINERY
100 RAPP LANE
NAPA, CA

APN 052-170-019

PROPERTY OWNER:

David & Alice Alkosser
PO Box 662
Napa, CA 94559

Project# 4118019.0
December 26, 2018

1515 Fourth Street, Napa, CA 94559 www.rsacivil.com 707.252.3301.v 707.252.4966.f

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INTRODUCTION

Shadybrook Estate Winery (APN 052-170-019) proposes to increase production from 30,000 to 70,000 gallons of wine per year with an increase in full time employees and visitors. The parcel has an existing that is served by a septic system that will not be altered. Domestic wastewater from the winery will be combined with domestic wastewater from the neighboring parcel (APN 052-170-018), under common ownership.

This report demonstrates that the existing domestic wastewater system at Shadybrook Estate Winery can be sufficiently sized to accommodate peak flows from the Winery and adjacent Equestrian Center and the process wastewater system can be modified to accommodate the increased production. Attachment 1 contains a Site Location Map and a USGS Site Map showing parcel topography, features and boundary.

WINERY PROCESS WASTEWATER CHARATERISTICS

The following is a summary of the winery wastewater characteristics:

Wine Production:
70,000 gallons of wine per year
2.38 gallons of wine per case
29,412 cases/year

Wastewater Production:
5 gallons of wastewater/gallon of wine
350,000 gallons/year

Peak Daily Waste Water Flow:
Crush Period = 60 days
Annual wine production x 1.5 / 60
1,750 gallons/day

Average Daily Flow:
350,000/365 = 959 gallons/day

Monthly Wastewater Flows:

Table 1

	% By Month	Waste/Month	
Sep	15%	52,500	Gal/Month
Oct	15%	52,500	Gal/Month
Nov	11%	38,500	Gal/Month
Dec	7%	24,500	Gal/Month
Jan	4%	14,000	Gal/Month
Feb	6%	21,000	Gal/Month
Mar	6%	21,000	Gal/Month
Apr	4%	14,000	Gal/Month
May	6%	21,000	Gal/Month
Jun	7%	24,500	Gal/Month
Jul	9%	31,500	Gal/Month
Aug	10%	35,000	Gal/Month
Totals	100%	350,000	Gal/Year

DOMESTIC WASTEWATER CHARACTERISTICS

The domestic wastewater system will accommodate the unit values in Table 1 below. The number of visitors and employees is based on information provided by the client. The projected flow is based on Napa County Environmental Management guidelines. The following is a summary of the estimated flows from the winery and equestrian center.

Table 2

Use	Source	Number	Projected Flow (gpd)	Total Flow No Event Day (gpd)	Total Flow Small Event (gpd)	Total Flow Medium Event (gpd)	Total Flow Large Event (gpd)
Winery	Employees	11	15	165	165	165	165
	Visitors	50	3	150	150	150	0
Winery Subtotal		**Total Peak Winery Flow**		315	315	315	165
Equestrian Center	Employees	9	15	135	135	135	0
	Visitors	50	3	150	150	150	0
Equestrian Center Subtotal		**Total Peak Equestrian Center Flow**		285	285	285	0
Events	Small Event	30	15	0	450	0	0
	Medium Event	50	10	0	0	500	0
	Large Event	100	10	0	0	0	1000
Grand Total		**Total Peak Flow**		**600**	**1050**	**1100**	**1165**

Both the Equestrian Center and Winery will host small, medium, and large sized events. These events will not occur on the same day. On days of a large event, there will be no visitors at the Winery or Equestrian Center. Small events with 30 or less attendees will be onsite catered with the commercial kitchen at the Winery site. Medium and large events will be catered off site.

WINERY PROCESS WASTEWATER – SURFACE DRIP IRRIGATION

The winery has two existing 5,000 gallon to hold process wastewater that is treated off site. Shadybrook Winery proposes to treat and disperse winery wastewater onsite with a Lyve or equivalent system. According to Napa County Environmental Management Sewage Treatment System Design Guidelines, winery process wastewater must be treated prior to surface discharge. Based on our experience, winery wastewater characteristics are as follows:

Characteristics	Units	Average
pH		3.5
BOD5	mg/l	6000
TSS	mg/l	500
Nitrogen	mg/l	20
Phosphorus	mg/l	10

The treatment goal is 160 mg/l BOD and 80 mg/l TSS. To meet this treatment goal a treatment train including a septic tank, equalization tank, membrane bioreactor tank, and pump tank are proposed. This treatment train may be modified for more desirable treatment processes prior to submitting construction plans. The following sections describe this process in more detail.

Septic Tank

The septic tank will serve to buffer peak flows and strengths from overwhelming the system and impairing treatment. This tank will provide two days storage and will also serve to function as a primary settling basin. This tank will be the existing 5,000-gallon tank that is currently used for holding untreated process wastewater.

Equalization Tank

The equalization tank will serve to buffer peak flows and monitor and adjust pH to prevent surges from overwhelming the system and impairing treatment. This tank will be continually aerated to prevent the contents from becoming septic. This tank will be the second existing 5,000-gallon tank that is currently used for holding untreated process wastewater.

Treatment Tank

The treatment tank will serve to treat wastewater flows using a two-stage Moving Bed Biofilm Reactor (MBBR) and a Membrane Bio Reactor (MBR). From the MBR, accumulated solids will be wasted to the dual sludge digesters. Clean effluent will be pumped out of the MBR directly to the holding tank.

Holding Tank and Dispersal Field

To provide a preliminary estimate of the amount of storage tanks required, we have prepared a monthly water balance, as shown in Appendix 3. Monthly wastewater production is based on a percentage of the total annual wastewater production. The amount of water allowed to be applied is estimated by the typical vine water demand. The irrigation will be applied to areas of vineyards outside well setback requirements. An area of 6.67 acres of vineyard and 1 acre of cover crop has been used to calculate the storage capacity required. Based on monthly analysis 0 gallons of storage are required. The winery has an existing 10,000-gallon tank for irrigation water storage. This tank will remain for treated process wastewater to be stored and used for irrigation.

During the summer months all of the treated wastewater will be used for irrigation. During the wet winter months, a limited discharge will be consistent with landscape water demand and no discharge will occur within 48-hours of a forecasted rain event and also for 48-hours after a rain event. These irrigation scheduling constraints necessitate installing a tank to store excess water that cannot be discharged during the winter months. All stored water will then be used for irrigation during the summer months.

DOMESTIC WASTEWATER TREATMENT AND DISPOSAL

The current domestic wastewater treatment system contains a 1,200-gallon grease interceptor, a 1,200-gallon septic tank, a 1,500-gallon pump tank, a Norweco ATU System Model 960-500, that has a capacity flow of up to 600 gallons per day, a 1,200-gallon sump tank, and a dispersal field sized for a flow of 500 gallons per day with 417 linear feet of drip lines as determined from the 2012 wastewater design report shown in Appendix 2.

To accommodate the expansion, Shadybrook Winery proposes to replace the 1,200-gallon septic tank with a 2,500-gallon tank, add duplex pumps to the 1,500 pump tank, and add an additional Norweco ATU

System Model 960-500 for a total capacity of 1,200 gallons per day. A solenoid valve will distribute the flow evenly between the two Norweco units. The drip lines in the dispersal field will be increased from 417 linear feet to 971 linear feet to serve a peak flow of 1,165. gpd. A 200% reserve of 3,884 sf will be provided. All wastewater treatment and dispersal will be on the Shadybrook Estate Winery parcel.

OPERATION AND MAINENANCE

The domestic wastewater system will be fully automated and will be designed so minimal input from winery or equestrian center staff is required. Per Napa County guidelines, a Registered Civil Engineer, Registered Environmental Health Specialist, or Licensed Contactor will provide semi-annual monitoring and evaluation of the system. The contract with the responsible party will be provided prior to the final inspection for the installed system.

CONCLUSION

This report demonstrates that Shadybrook Estate Winery can treat and disperse process wastewater on site and that both Shadybrook Estate Winery and the Rapp Equestrian Center can treat and disperse domestic wastewater on the winery site, meeting the Napa County Environmental Management Design Standards for the treatment of process and domestic wastewater.

ATTACHMENT 1

VICINITY MAP
USGS MAP

SHADYBROOK ESTATE WINERY
VICINITY MAP
NAPA COUNTY CALIFORNIA

VICINITY MAP
SCALE: 1" = 3000'

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1515 FOURTH STREET
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+ www.RSAcivil.com +

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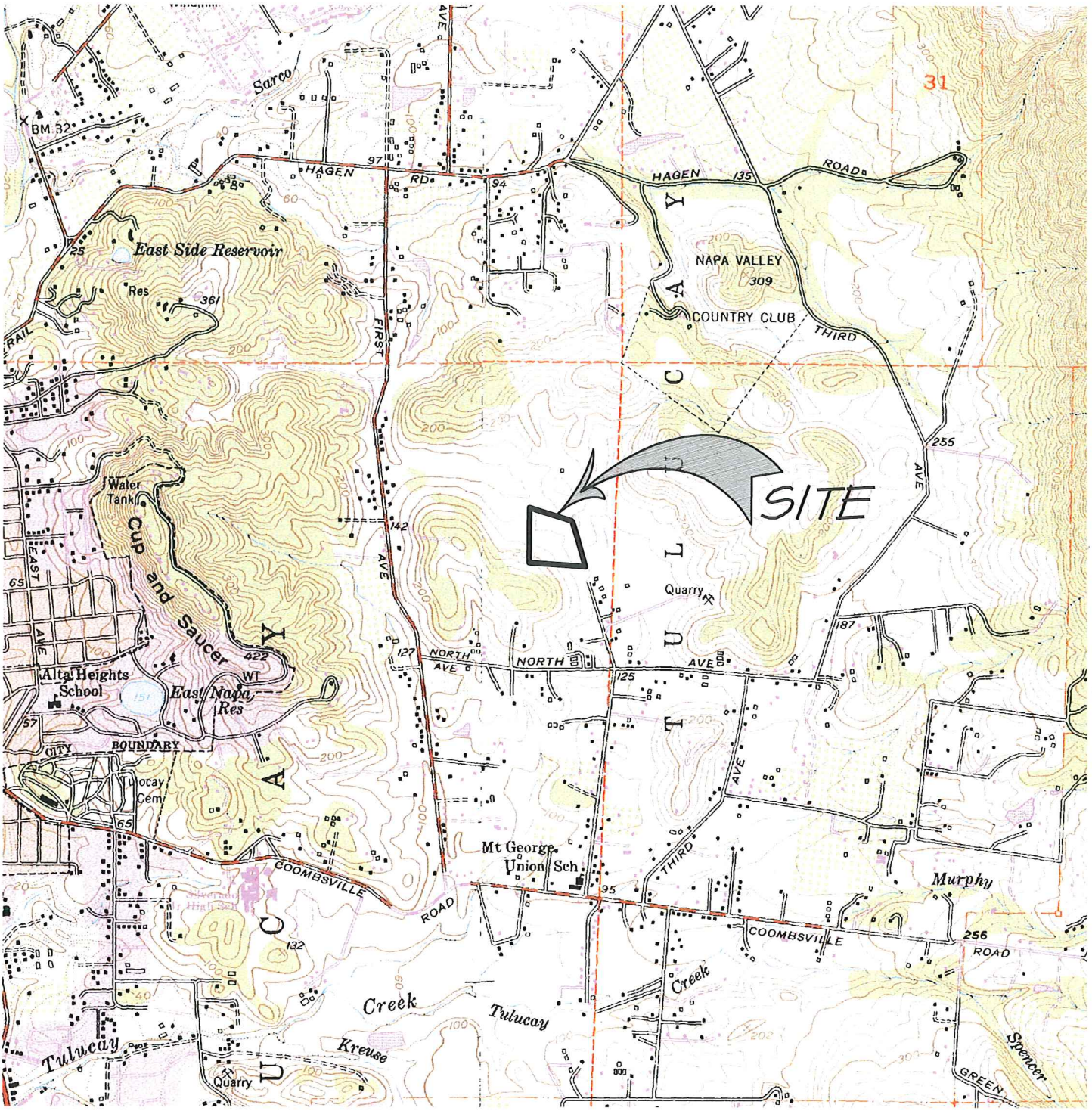
SHADYBROOK ESTATE WINERY
USGS MAP

NAPA COUNTY CALIFORNIA



GRAPHIC SCALE

2000 0 2000 4000

(IN FEET)

1 inch = 2000 FT

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ATTACHMENT 2

EXISTING SYSTEM WASTEWATER DESIGN REPORT AND AS BUILT PLANS

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REGISTERED ENVIRONMENTAL HEALTH SPECIALIST
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January 5, 2012

Sheldon Sapoznik, Supervising REHS
Napa County Department of Environmental Management
1195 Third Street
Napa, Ca. 95449

Re: Proposed Verismo Winery, 100 Rapp Lane, Napa, Ca. AP # 052-170-019; 11.37 acres) Winery Design for Processed and Domestic Wastewater Uses

Revised October 29, 2012

Dear Sheldon:

Mr. Frank D' Ambrosio is proposing a new Winery at the address mentioned above. At this time, the Use Permit that was approved by the County Planning Department identifies a Winery that will generate 30,000 gallons of wine per year. The Use Permit also indicates that there is limited Domestic Wastewater for this facility, up to 100 gallons per day.

This Design addresses the Project in terms of Domestic and the Processed Winery Wastewater to be generated at the new facility. It is our goal to have separate wastewater treatment systems Domestic Wastewater – DW and Processed Winery Wastewater – PW for this project. The site evaluations and septic feasibility reports are on file with your department. Riechers Spence and Associates and Delta Consulting were previous designers for this project.

At a recent meeting held at Environmental Management, the Supervising REHS (Sheldon) reviewed the mixed and not successful profile holes reported by Richers Spence Engineering. This area was the North Area of the parcel.

The second area (East Portion of the property), did have successful soils Profile Holes (labeled PH on the plan), and this area was reported by Delta Engineering. The Use Permit Report suggests placing the DW in the East Portion of the property. And then taking the PW, storing in a large watertight storage tank – and then having a regular Pumping of the Processed Wastewater, and hauling to a licensed POTW for disposal and treatment (like the City of Oakland Wastewater Treatment Plant). A hold and haul process.

The wastewater hauler will be under contract, and there will be an alarm package attached to the holding tank to alert the owner and hauler as to when the tank needs to be emptied. For the Expansion Area of PW, a pre-treatment system is described in this report. PW will be treated to a high quality level (in the future Tank Farm), a storage sump will be designed, and then the treated wastewater will be used for surface (grape vine irrigation) during the fall, spring, and summer months. The parcel has over 6.4 acres of grapes planted and in use. The treated PW will be recycled and used to irrigate these grapes if and when the pre-treated system is installed. Surface irrigated water will not be disposed of in areas within 100 feet of water wells, or 50 feet of drainage inlets, or within 50 feet of property lines.

Due to the size of the parcel, the overall site plan is set at a 1" equals 80 feet scale. On sheet #2, the scale is 1" = 40ft. This was done to reduce the number of sheets and the working drawings for the septic system. Attachment #1 on sheet #2 shows extra expansion area for the overall total project. Sorry for any confusion.

DOMESTIC SYSTEM
PROPOSED SEPTIC TANK SIZING FOR DOMESTIC WASTEWATER

The Verismo Winery anticipates operating with 3 employees. And up to 21 visitors per day (as per the Use Permit).

Using Table II of the Napa County onsite regulations, the domestic wastewater flow is calculated at:

Domestic Flow:

2 FTE Employees	x 15 gallons per employee per day	= 30 gals per day
1 PTE Employee	x 15 gallons per day	= 15 gals per day
21 Visitors	x 2.5 gals per visitor per day	= 52.5 gals per day

Total Domestic Wastewater of 97.5 gals per day, round up to 100 gals/day

Use Permit Allows for 8 Catered Food and Wine Events per year and 1 Wine Auction per year of up to 30 persons. Using the Metcalf & Eddy Engineering Design Book (like a similar facility at Whitehall Lane Vineyards in St. Helena), we use 11 gallons per day per persons for catered food events.

Therefore, with 30 persons at 11 gallons per person flow = 330 gallons of possible additional wastewater flow. With 100 gallons of wine tasting and 330 gallons per day for Catered Food Events = 430 gallons per day Peak Flow of Domestic Wastewater Flow.

When designing Drip Systems, I like to be conservative, so I will voluntarily round the design flow up to **500 gallons per day**. Based upon the results of the Site

Evaluation on September 13, 2006 by Delta Consulting & Engineering, and the conversation with Sheldon Sapoznik Supervising REHS and Peter Ex, REHS the estimated infiltration rate (of the East Area Septic Site, is .6 gals/sq.ft./day. for a Drip Dispersal System. .

KITCHEN USE: At this time, the owner wishes to make the kitchen an approved Commercial Kitchen from Napa County Environmental Health Department. This will make it much easier for a Caterer to utilize an approved Commercial Kitchen.

I will include a Grease Trap now, and it will be plumbed separately from the raw waste sewer line from the building. The Grease Trap will accept wastewater from the pot and pan sink, the dishwasher, floor drains and floor sinks (inside the kitchen only), and mop and bucket sink. This separate waste line will be a three or 3 inch ABS Sch. 40 pipe, with a cleanout placed five feet outside the building wall. The Grease Trap will be a Selvage 1200 gal two compartment Grease Trap. Wastewater from this Grease Trap will be plumbed into the domestic septic tank. The Grease Trap will be concrete, IAPMO approved, watertight, and filled with Orenco Risers to the surface of the ground for easy service and maintenance.

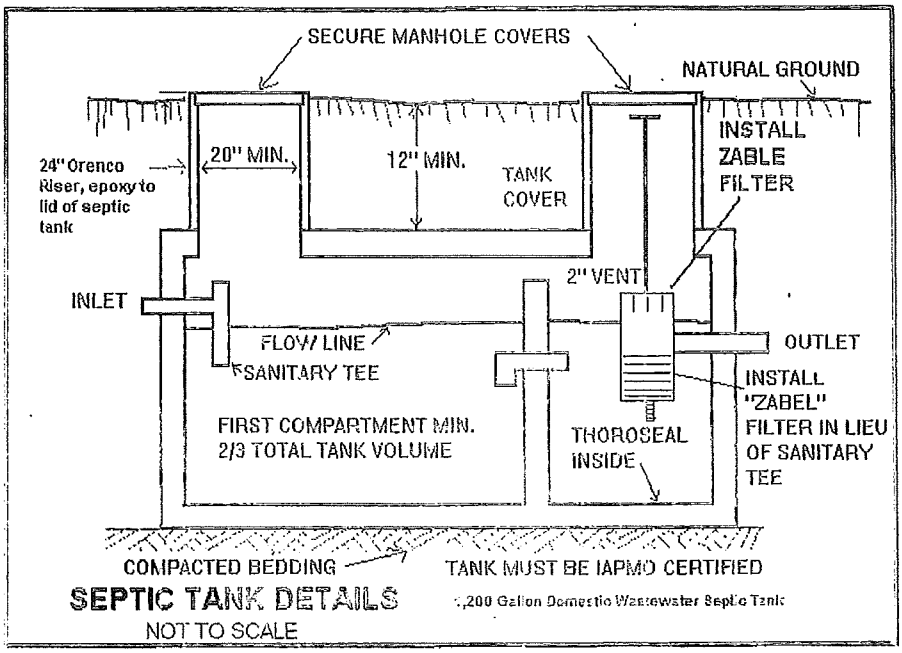
PROPOSED DOMESTIC WASTEWATER (DW) SYSTEM

Subsurface Drip Disposal Systems requires Pre-treatment of the DW. With the soil profile hole report of 2006 by Delta Consulting, the site and soil conditions indicate that the site is acceptable for a Drip Dispersal System.

In this case (with the quantity of domestic wastewater being low), we will use the Norweco ATU System pre-treatment. The Norweco System is NSF-40 Certified, Model 960-500 that has a capacity flow of up to 600 gallons per day. There is a small, kitchen being planned for this facility, with floor drains, floor sinks and a dishwasher. So, the domestic system will install **SPLIT PLUMBING.** (See comments in sections stated above). There will be a standard cleanouts installed outside the building for the split plumbing. Raw waste from the restroom toilet(s), hand wash sinks, and floor drain in the restroom with enter a 1,200 gallon septic tank, with risers, and a Zabel A300 effluent filter exiting the septic tank). Wastewater from the Grease Trap will also enter the Septic Tank (aka Trash Tank).

After the 1,200 gallon septic tank, Wastewater will travel down the hill towards the eastern portion of the property to the Norweco 500 ATU System in a 3 or 4 inch ABS Sch. 40 wasteline. Cleanouts will be every 100 feet.

DOMESTIC WASTEWATER SEPTIC TANK

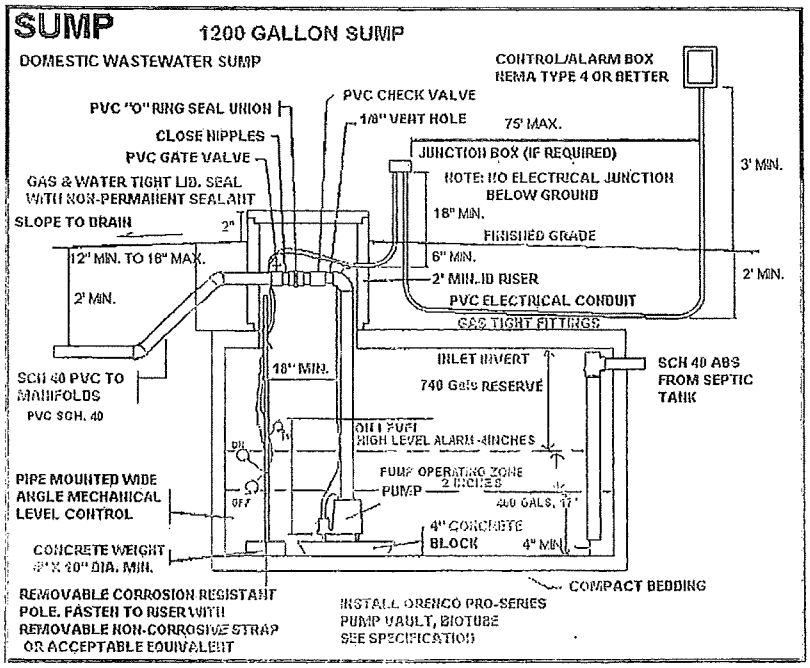


The Norweco ATU Detail is on the plans.

After the Norweco ATU System, treated wastewater will then connect into a 1200 gallon one compartment sump. The treated wastewater will pressure pump (Feed) to the Domestic Drip System through the Geoflow Drip Control Box, then migrate up the hill in a 1 inch PVC Sch. 40 Feed Line to the Drip Field. The drip lines will be about 80 feet long, placed at 24 inch spacing, with emitters spaced at 24 inches on center.

The Flush Line will be 1 inch diameter. It will flush back to the front end of the Norweco ATU tank

DOMESTIC WASTEWATER SUMP



All tanks will have Orenco 24 inch diameter risers over the manholes, brought to grade. All tanks will be thorosealed so as to be watertight.

And finally, dual alarm boxes will be placed inside the building and at the Norweco and Sump Pump Sites. Multiple electrical conduits will be installed and wired to accomplish the dual alarm boxes and to also provide electricity to the Norweco System and the Sump/pump system.

DRIP DISPERSAL DOMESTIC SYSTEM DESIGN FACTORS

Following the Geoflow Design Manual, using 500 gpd peak flow, with a infiltration rate of .60 g/sq.ft./day - that gives us a minimum of 834 square feet of surface or 417 lineal feet of Drip Tubing to be installed for the domestic wastewater. This will be setup as a one zone system.

There is over 200% expansion area available

SUMP/PUMP CALCULATIONS FOR THE DOMESTIC SYSTEM

Please see the attached Geoflow Pump Size calculations. The pump needs to provide 7.8 gpm with a TDH of 92 feet of head.

The desired pump is an Orenco PF100552 pump.

Zones and Flow

With this system, I will use a One Zone System for the Common Primary System the spacing for the Drip Lines is 24 inches on center. And the spacing between

the drip holes is also 24 inches on center. That Wasteflow Dripline is Wasteflow PC 1/2gph dripline.

MISCELLANEOUS DESIGN ELEMENTS

The drip system will include:

1) A water meter (for measuring dosing) is required on the feed line,
2) A water meter (for measuring flushing is required on the flush line, as it back flushes back to the Norweco ATU.
3) Flush Velocity in the piping will be a minimum of 2 ft./sec.
4) There will be two Air Relief Valves on the drip system, at the high ends of the feed and flush lines,
5) There will be one Geoflow Control Box with Filters and Flush Cycle Control. With a BioDisc-150 filter,
6) 36 inch deep monitoring wells will be properly place uphill, downgradeint and laterally of the domestic drip system. See monitoring well detail and notes in this worksheet.
7) Drip system will be minimum of 25 feet to downhill property lines. It will be staked in the field, prior to construction.
8) The existing septic tank is located in the area identified as the Septic Tank Farm. It will be located, it will be pumped by a licensed septic tank pumper, and it will be completely removed. This septic tank is very old and cannot be used in the new design. It must be removed.

PROCESSED WASTEWATER (PW) HOLD AND HAUL SYSTEM

PROPOSED PROCESSED WASTEWATER PRODUCTION

The proposed facility is intended to produce up to 30,000 gallons of wine per year. The Napa County Regulations for determining processed wastewater (PW) peak flow is based upon a formulae, namely:

$$\frac{\text{30,000 gallons/wine/year X 1.5}}{\text{45 days crush period}} = \text{1,000 gallons PW peak per day during the crush season}$$

PROPOSED SEPTIC TANK SIZING FOR PW HOLD AND HAUL

The crush area for Verismo Winery will be located inside the existing building. As such, it will be covered and protected from the potential inflow of rainwater. The interior crush area will have a solids screen over the drains. The crush area will connect by gravity and exit the building in a separate wasteline. The wasteline will have a cleanout on the outside of the building.

I suggest a 4 inch ABS Sch. 40 wasteline for the PW. It will enter a 10,000 gallon, one compartment Holding Tank (like a septic tank, which is IAPMO

approved). It will be fitted with three Orenco 24 inch diameter risers to make pumping of the septic tank easy. This tank will be made watertight, and tested during construction to verify that it is watertight.

Napa County Policy requires a minimum of 7 days storage for a Hold and Haul System. Using a 10,000 gallon septic tank provides an improved Safety Factor.

The PW Holding Tank will be fitted with a float Alarm System. The Alarms shall be placed at the Tank Location and inside the Winery Building. Multiple electrical conduits are required for this arrangement. See site plan for location of the Hold and Haul Pump. A licensed septic tank pumper shall have a long term contract to haul the PW to a licensed POTW location. I suggest the City of Oakland. And the hauler shall provide a manifest of all hauling's to Napa County Environmental Management. The manifest shall include a record of the volume of PW collected and hauled.

FUTURE EXPANSION AREA FOR PW SYSTEM

At such time in the future, if hauling stops, the owner will be required to install the Expansion System for PW. This includes adding on the existing 10,000 gallon hold and haul system – and installing the Pre-treatment System.

FUTURE SEPTIC TANK (PW)

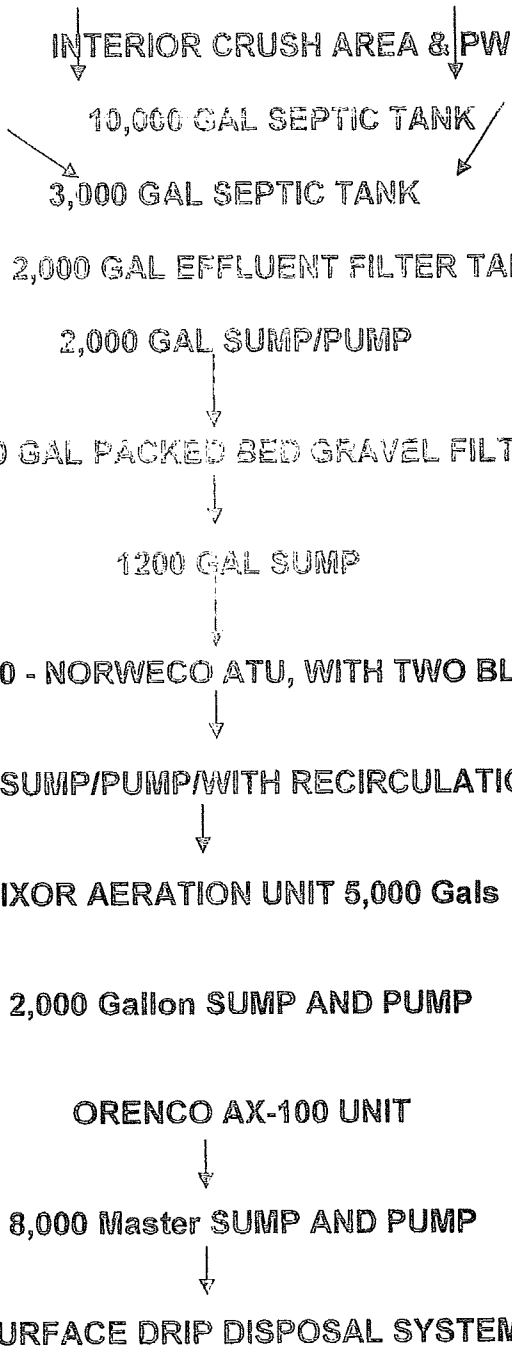
The PW Septic tank is used to remove suspended solids, seeds, skins and pomace for winery wastewater. A septic tank pumper is called four times per year to remove the solids in the septic tanks. All septic tanks, sumps, etc. are fitted with easily removable lids for servicing.

In calculating the proper septic tank size for Winery PW, we size the septic tank size at 3- 5 times the daily peak flow to allow the settling of solids. With the Peak Flow at 1,000 gallons per day, we multiply by 4, to get a septic tank capacity of 4000 gallons. With the 10,000 gallon tank already in place, this will suffice. However, we will need to make this equivalent to a Two Compartment Septic Tank. So, we would have to add a 3,000 gallon – one compartment tank (after the 10,000 gallon tank.

FUTURE EFFLUENT FILTER TANK

After the septic tanks with primary settling, we will install a 2,000-gallon effluent filter tank. Inside this tank, there will be 4 - Zabel A-300 Double Stack Effluent Filters. The effluent filters will slow down the flow of PW through the system and improve the settling of solids. The effluent tank will have a removable lid for easy servicing and cleaning. This tank will be cleaned four times per year.

LAYOUT OF FUTURE PW WASTEWATER TREATMENT SYSTEM



THE TREATED WASTEWATER WOULD BE COMBINED INTO THE DRIP SYSTEM FOR THE SURFACE IRRIGATION OF THE GRAPE VINES

FUTURE PACKED BED GRAVEL FILTERS

ROCK FILTER PRE -TREATMENT SYSTEM

This system is similar in principal to gravel packed stratified filter. Here, primary wastewater is applied over stratified layers of gravel, pressured dosed, and PW will trickle vertically reducing BOD, TSS, increasing Total Alkalinity and pH..

FUTURE NORWECO ATU UNIT

The **Model 960 Norweco ATU Unit** is NSF approved, and will also reduce BOD, TSS, an improve the dissolved oxygen levels of the treated PW. This Norweco Unit will have dual blowers. Note: It does not require a Trash Tank in this installation.

FUTURE LIXOR Aeration Unit

The Lixor consists of a 5,000 gal single compartment tank. The Bio-Microbics Lixor is the 1 hp unit. The blending unit is placed and mounted at the bottom of the tank. The exterior aerator provides oxygen sent to the Lixor unit to increase Dissolved Oxygen.

FUTURE ORENCO ADVANTEX SYSTEM, AX-100 TEXTILE POLISHING FILTER/CLARIFIER

Install one AX-100 Series – Mode 3(b) Recirculation Textile Filter from Orenco System; Recirculating Tank and split system to sump to the final storage tank shall be sealed so as to be watertight. Wastewater will re-circulate through the Textile Filter every 10 minutes.. After this final polishing unit, the treated PW will be stored in a 2,000 gallon sump/tank, that will distribute the treated PW into a Subsurface a

This treatment system will produce a PW, water quality of less than 150 ppm, or BOD and at least a DO of 1.2 ppm.

CRUSH AREA

The Processed Wastewater (PW) is collected with interior piping that collects PW from floor drains surrounding wash down areas from crush, bottling, racking, and barrel storage. In this case, the crush pad area (along with collector drains) is located **inside the existing building.** If the crush pad is to be relocated outside the building, it shall be covered so as to prevent rain from entering the collection system. The PW pipe is not connected to domestic waste piping (it is separate and distinct from other wastewater piping). The 4 inch wastewater pipe travels with a minimum of 1% fall in the pipe, to the PW Septic Tanks.

2. Contractor shall stake out the proposed SDD tubing on contour as demonstrated on the plans, with the use of a transit or laser level. The contractor shall call the designer for inspection and verification before proceeding.

3. Contractor shall then chisel plow with a special drip tubing unit, or excavate digging by hand to a depth of not exceeding **6 inches in depth**, and not larger than 2 inches wide, and install the drip tubing, the SDD lines as shown on detail. The contractor shall call the designer for inspection prior to covering with native soil, and to inspect all valves, piping, air relief valves, control box, etc. Contractor shall scarify sidewall and bottom areas of trenches before placement of SDD. Lines shall be installed on contour.

6. Contractor shall connect the SDD tubing laterals to the distribution system, and shall prepare the system for the hydraulic squirt test for the SDD system. Call the Health Department and the designer for an inspection of the squirt test.

7. Contractor shall complete the trench work and shall place the soil cover over the SDD Drip tubing as shown in the detail. The contractor shall then proceed with completion of the soil cover.

8. Finished grade shall be completed with handwork. Then spread the soils cover. Fill soils shall be seeded with annual rye or native grasses. Erosion control measures such as the placement of straw waddles around the perimeter of the SDD shall be placed, and staked into the ground. A silt barrier shall be and straw waddles shall be placed around the perimeter and staked into the ground. And straw shall be spread over the entire area to allow native grasses to grow. The contractor shall install monitoring wells as shown on the plans.

9. The contractor shall install the septic tanks, sump tank, alarm system, electrical, piping, transmission line, plumbing, risers, Filters, etc. according to the details shown on the plans. The designer and Health Department shall be notified of all required inspections.

10. The designer shall send an installation and inspection notification letter to the Health Department along with a copy of "As Built" plans that indicate any modifications, which took place after, permit approval.

11. Contractor shall install soil erosion control measures onsite before Excavation or movement of any soil on the site. Contractor shall incorporate silt fence perimeter, straw waddles, and bales of hay along the downhill side of the excavated area. Contractor shall restore the site conditions and plant native grass seed and cover with straw to improve germination of the grasses.

12. Maintenance note for property owner and vineyard manager. The drip systems are being placed on contour and between existing vine rows. It may be necessary to move and replant some grape vines to properly install the septic system. After installation of the drip system, this area of the Vineyard cannot be plowed of disked in the future. Proper turf management is to plant grass, and to use a lawn mower to maintain grass vegetation. Never, never disc the ground.

PRESSURE FEED AND FLUSH LINE

Contractor must pay careful attending in the placement of the Pressure lateral that feeds the Air Relief Valve and the Pressure Side of the Drip System, as well as the Flush Line. Review Detail, discuss with designer. The Pressure Feed and Flush Line are both Sch. 40, PVC Pipe. The Air Relief Valves set uphill of the highest Drip Tubing as shown on the plans. **DO NOT OVEREXCAVATE THE PRESSURE FEED AND FLUSH LATERALS.**

Contractor shall follow detail that shows the Pressure Feed Line that runs through the GeoFlow Control Box, through the Vortex Filter. The contractor shall install the Geoflow Headwork's Control Box (Automatic Flush System) 3 inches above finish grade, and shall mount for easy access, and on a gravel bed base. The control box shall have a removable lid with locking bolts.

DRIP CONSTRUCTION NOTES

1. All surface grasses shall be mowed to the lowest possible height and grass clippings removed.

2. Contractor shall stake out the proposed SDD tubing **on contour** with the use of a transit or laser level. The contractor shall call the designer for inspection and verification before proceeding. In this case, the contractor will need to install two drip lines between the existing grape rows. In order to stay on contour, some grape vines will have to be removed, and maybe replanted.

3. Contractor shall then chisel plow drip tubing, or excavate with a shallow trencher, or dig by hand to a depth of not exceeding **6 inches in depth**, and not larger than 2 inches wide, and install the drip tubing, the SDD lines as shown on detail. The contractor shall call the designer for inspection prior to covering with native soil, and to inspect all valves, piping, air relief valves, control box, etc. Contractor shall scarify sidewall and bottom areas of trenches

Contractor shall scarify sidewall and bottom areas of trenches before placement of SDD. Lines shall be installed on contour.

6. Contractor shall connect the SDD tubing laterals to the distribution system, and shall prepare the system for the hydraulic squirt test for the SDD system. Call the Health Department and the designer for an inspection of the squirt test

7. Contractor shall complete the trench work and shall place the soil cover over the SDD Drip tubing as shown in the detail. The contractor shall then proceed with completion of the soil cover.

8. Finished grade shall be completed with handwork. Then spread the soils cover, FILL shall be seeded with annual rye or native grasses. Erosion control measures such as the placement of straw waddles around the perimeter of the SDD shall be placed, and staked into the ground. A silt barrier shall be placed downhill of the straw waddles and staked into the ground. And straw shall be spread over the entire area to allow native grasses to grow. The contractor shall install monitoring wells as shown on the plans.

9. The contractor shall install the septic tanks, sump tank, alarm system, electrical, piping, transmission line, plumbing, risers, Filters, etc. according to the details shown on the plans. The designer and Health Department shall be notified of all required inspections.

The designer shall send an installation and inspection notification letter to the Health Department along with a copy of "As Built" plans that indicate any modifications, which took place after, permit approval.

10, Contractor shall install soil erosion control measure onsite before excavation or movement of any soil on the site. This shall incorporate silt fence perimeter, straw waddles, and bales of hay along the downhill side of the excavated area. Contractor shall restore the site conditions and plant native grass seed and cover with straw to improve germination of the grasses.

PRESSURE FEED AND FLUSH LINE

Contractor must pay careful attending in the placement of the Pressure lateral that feeds the Air Relief Valve and the Pressure Side of the Drip System, as well as the Flush Line. Review Detail, discuss with designer. The Pressure Feed and Flush Line are both Sch. 40, PVC Pipe. The Air Relief Valves set uphill of the highest

GEOFLOW — Pump Size

Job Description:	Verismo Winery, Domestic Wastewa
Contact:	Mark Phillips
Prepared by:	Ted Walker
Date:	Oct. 20, 2012

Pressure losses may be grossly overstated, particularly if designing with WASTEFLOW Classic
The letters on the diagram(right) match the letters in section 2 below

Worksheet - Pump Sizing

Section 1 - Summary from Worksheet 1	
Flow required to dose field	1.84 gpm
Flow required to flush field	5.92 gpm
Flow required to dose & flush field	7.76 gpm
Filter	BioKise-150
No. of Zones	1 zones
Zone valve	-
Dripline	Wasteflow PC - 1/2gph
Dripline longest lateral	220.00 ft.

Section 2	Ft of head	Pressure
A. Flush line - Losses through return line		
Size of flush line in inches	1 inch	
Length of return line	240 ft.	
Equivalent length of fittings	10 ft.	
Elevation change. (if downhill enter 0)	10 ft.	
Pressure loss in 100 ft of pipe	3.01 ft.	1.30 psi
Total pressure loss from end of dripline to return tank	*17.5 ft.*	7.59 psi
B. Dripline - Losses through Wasteflow dripline		
Length of longest dripline lateral	200 ft.	
Minimum dosing pressure required at end of dripline	23.10 ft.	10.00 psi
Loss through dripline during flushing	27.79 ft.	12.03 psi
Total minimum required dripline pressure	*50.89 ft.*	12.03 *psi*
A+B. Minimum Pressure required at beginning of dripfield		
CALCULATED pressure required at beginning of dripfield	*68.41 ft.*	29.62 *psi*
SPECIFIED pressure at beginning of dripfield (from worksht 1)	46.2 ft.	20.00 *psi*
!!! Urgent revision required SPECIFIED pressure must be greater than CALCULATED pressure and lower		
C. Drip components - Losses through headworks		
Filter	4.6 ft.	2.00 psi
Zone valve pressure loss (not in diagram)	- ft.	- psi
Flow meter pressure loss (not in diagram)	10.00 ft.	4.33 psi
Other pressure losses	ft.	- psi
Total loss through drip components	14.62 ft.	6.33 psi
D. Supply line - Minimum Pressure head required to get from pump tank to top of dripfield		
Size of supply line in inches	1 inch	
Length of supply line	220 ft.	
Equivalent length of fittings	5 ft.	
Height from pump to tank outlet	5 ft.	
Elevation change. (if downhill enter 0)	15 ft.	
Pressure loss/gain in 100 ft. of pipe	4.97 ft.	2.15 psi
Total gain or loss from pump to field	*31.2 ft.*	13.50 psi
Total dynamic head	92.0 ft.	39.83 *psi*
Pump capacity *	7.8 gpm	
Pump Model Number		
Volts / Hp / Phase		

* Note: Pump capacity flow assumes flow in dripline does not change during a dose cycle. With Wasteflow for more accurate flows please see Geoflow's Flushing worksheet.

If you need assistance designing for this additional flow, please

a. See Geoflow flushing worksheet or

b. Contact Geoflow at 800-828-3388.

GEOFLOW — Field Flow

Job Description:	*Verismo Winery, Domestic Wastewater System*
Contact:	*Mark Phillips*
Prepared by:	*Ted Walker*
Date:	*Oct. 20, 2012*

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	500	gallons / day
	Hydraulic loading rate	0.6	gallons / sq.ft. / day
	Minimum Dispersal Field Area	834	square ft.
	Total Dispersal Field Area	834	square ft.

Flow per zone

	Number of Zones	1	zone(s)
	Dispersal area per zone	834	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)	417	ft. per zone
	Total number of emitters per zone	209	emitters per zone
	Select Wasteflow dripline (16mm)	Wasteflow PC - 1/2gph	dripline
	Pressure at the beginning of the dripfield	20	psi
	Feet of Head at the beginning of the dripfield	46.2	ft.
	What is the flow rate per emitter in gph?	0.53	gph
	Dose flow per zone	**1.84**	**gpm**

Note: A few States or Counties require additional flow for filtering. Refer to Owner's manual and local regulations.
Flush velocity calculation below is for PC dripline. Classic dripline can also be used as an RC.
Please refer to Geoflow's spreadsheet "Design Flow and Flush Velocity" at www.geoflow.com or call 800-[illegible]

	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	75	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	7.76	gpm

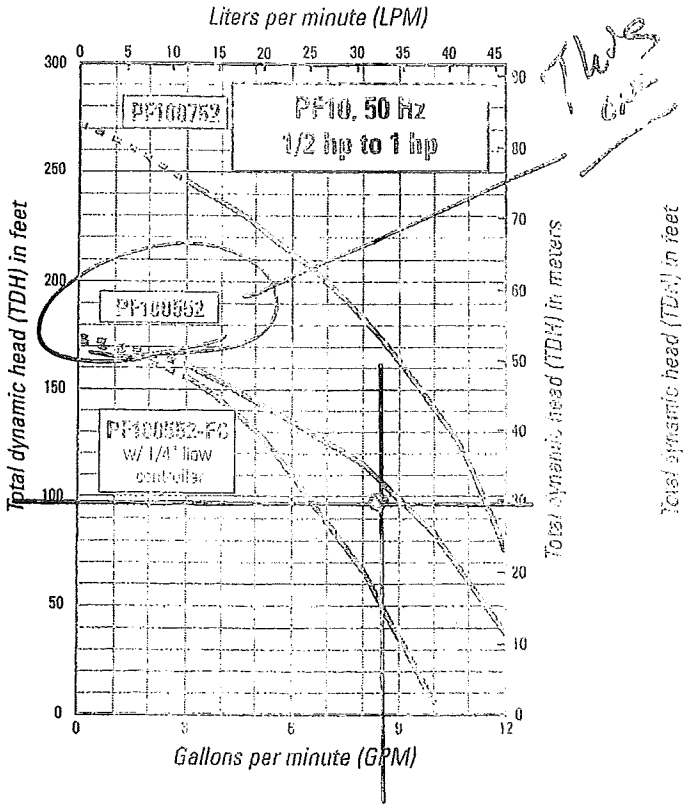
Select Filters and zone valves

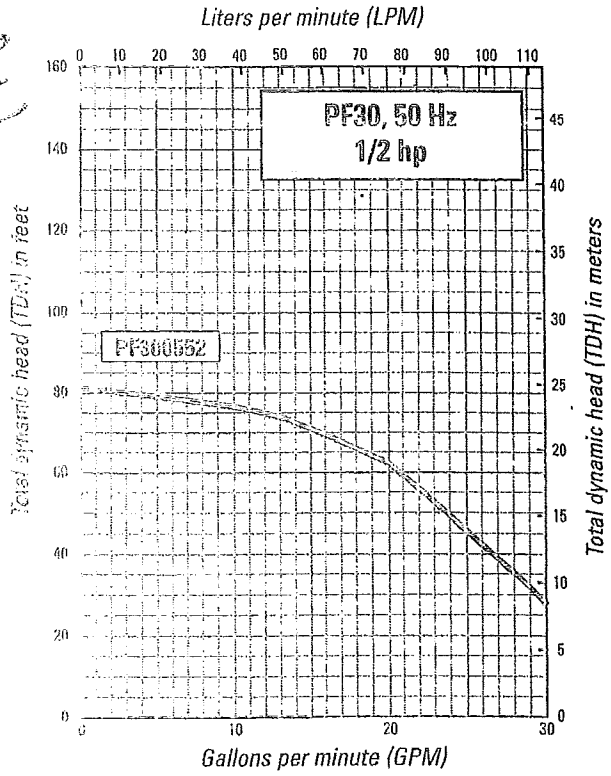
	Select Filter Type	BioDisc Filter	
	Recommended Filter (item no.)	BioDisc-150	1.5" Disc Filter 0-30gpm
	Select Zone Valve Type	Electric Solenoid	-
	Recommended Zone Valve (item no.)	0	0

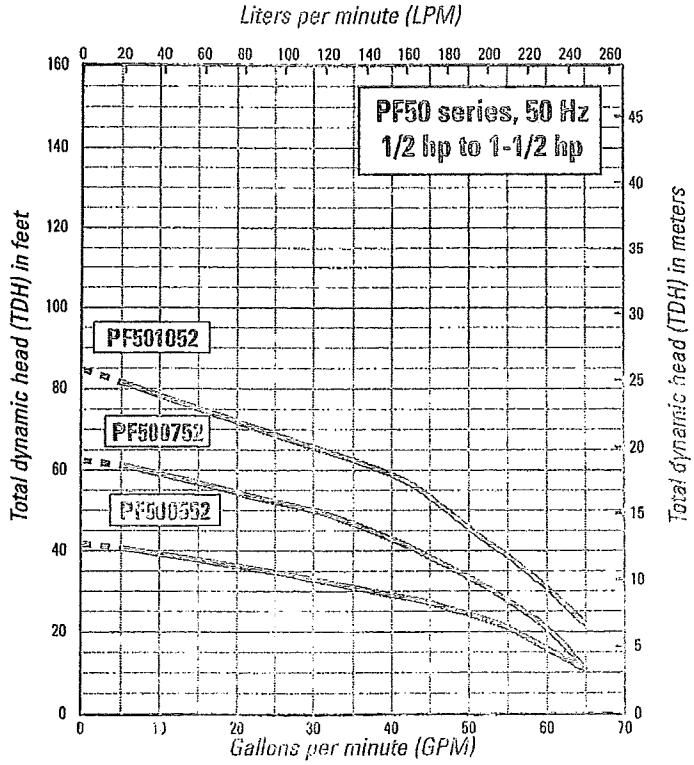
Dosing

	Number of doses per day / zone:	12	doses
	Timer ON. Pump run time per dose/zone:	22.37	mins:secs
	Timer OFF. Pump off time between doses	1:37	hrs:mins
	Per Zone - Pump run time per day/zone:	4:31	hrs:mins
	All Zones - Number of doses per day / all zones	12	doses / day

PF Series High-Head Effluent Pumps (continued)



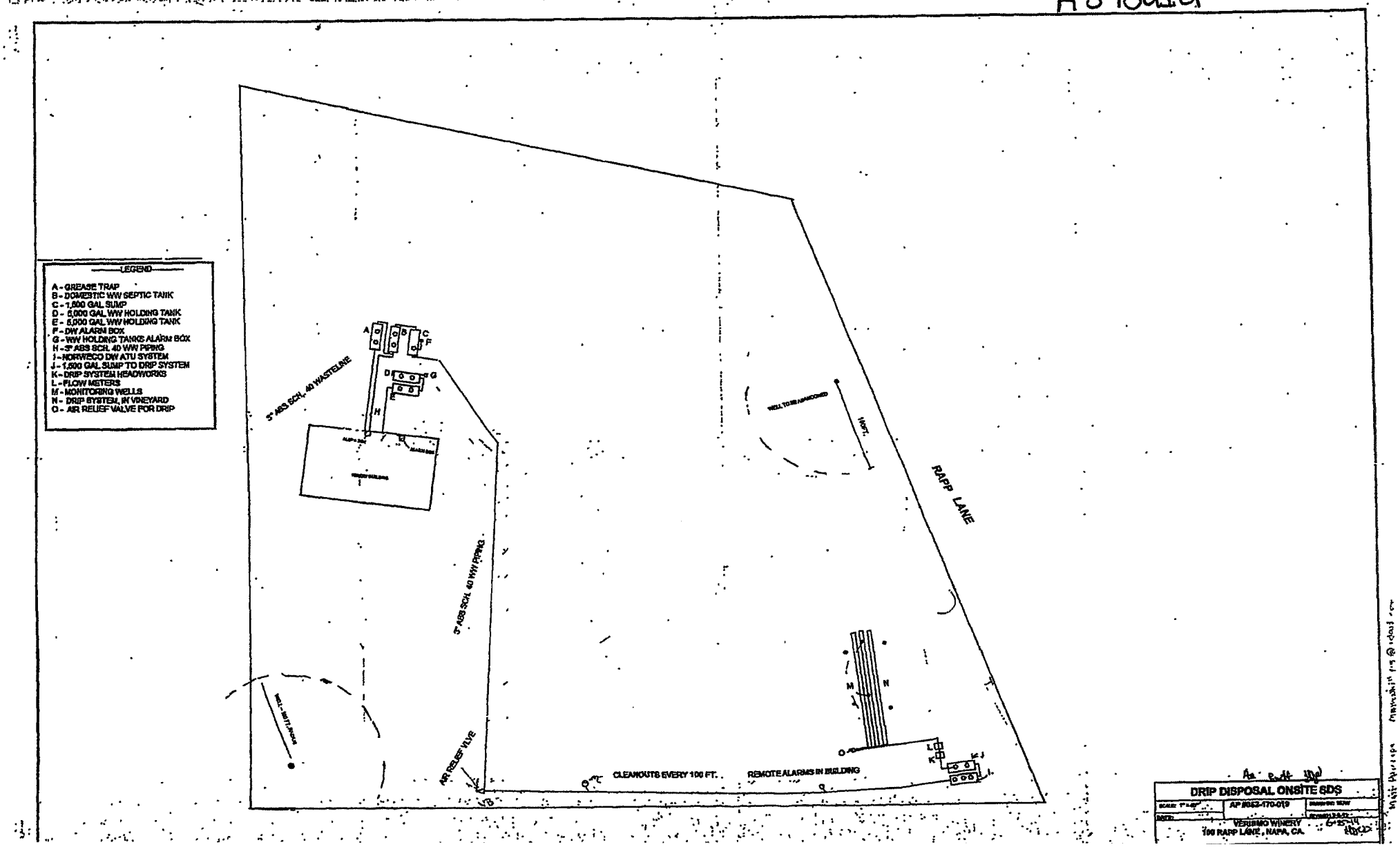




052-170-019-000

* Hold-N-Hill: E12-00753
E12-00752

AS BUILT



ATTACHMENT 3

IRRIGATION WATER BALANCE
IRRIGATION AREAS EXHIBIT

Reclaimed Process Wastewater
Water Balance for Irrigation and Storage

Project Description		Annual Process Waste Flow Volume		
Project Number:	4118019.0	Wine Production:	70,000	gal/year
Project Name:	Shadybrook Estate Winery			
Prepared By:	Julia King	Annual Process Waste per Gallon Wine:	5	gal/year
Date:	November 1, 2018	Total Annual Process Waste Generated:	350,000	gal/year

Vineyard Irrigation Parameters		Landscape Irrigation Parameters		
Acres of irrigated vineyard:	6.67 acres	Crop type / name:	Cover Crop	
Row spacing:	7.0 feet	Total irrigated acres of crop:	1.00 acres	
Vine spacing:	8.0 feet			
Total number of vines:	5,188 vines			
Water use per vine per month (peak):	26 gal			
Total peak monthly irrigation demand:	134,896 gal			

Monthly Process Wastewater Generation

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly process wastewater generated as % of annual total:	4%	6%	6%	5%	6%	7%	9%	10%	14%	14%	11%	8%
Monthly process wastewater generated [gallons]:	14,000	21,000	21,000	17,500	21,000	24,500	31,500	35,000	49,000	49,000	38,500	28,000

Monthly Vineyard Irrigation Water Use

(Based on per-vine water use)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Beginning of month reclaimed water in storage [gallons] (This number brought forward from end of previous month)	0	0	0	0	0	0	0	0	0	0	0	0
Vineyard irrigation as % of peak month irrigation demand:	6%	6%	10%	100%	100%	100%	100%	100%	100%	100%	10%	10%
Irrigation per month per vine (gallons):	1.6	1.6	2.6	26.0	26.0	26.0	26.0	26.0	26.0	26.0	2.6	2.6
Total vineyard irrigation demand [gallons]:	8,094	8,094	13,490	134,896	134,896	134,896	134,896	134,896	134,896	134,896	13,490	13,490
Will vineyard be irrigated with reclaimed water this month?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Process wastewater generated this month, reclaimed for vineyard irrigation [gallons]	8,094	8,094	13,490	17,500	21,000	24,500	31,500	35,000	49,000	49,000	13,490	13,490
Remaining vineyard irrigation demand after using this month's process water [gallons]	0	0	0	117,396	113,896	110,396	103,396	99,896	85,896	85,896	0	0
Drawdown from storage for remaining vineyard irrigation [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
Well water required to satisfy remaining vineyard irrigation demand	0	0	0	117,396	113,896	110,396	103,396	99,896	85,896	85,896	0	0
Net storage after vineyard irrigation drawdown [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
This month's process wastewater, remaining after vineyard irrigation, available for landscape irrigation[gallons]	5,906	12,906	7,510	0	0	0	0	0	0	0	25,010	14,510

Water balance continues on next page for cover crop irrigation.

Monthly Landscape Irrigation Water Use

(Based on evapotranspiration crop demand and irrigated area)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
This month's process wastewater, remaining after vineyard irrigation, available for landscape irrigation[gallons] *(From sheet 1)*	5,906	12,906	7,510	0	0	0	0	0	0	0	25,010	14,510
Reference ET (ETo) (in/month) (see note 1)	1.32	1.8	3.32	4.78	6.11	6.84	7.07	6.3	4.9	3.45	1.74	1.29
Crop Coefficient (k_c) (see note 2)	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Crop water demand per acre [inches]	0.79	1.08	1.99	2.87	3.67	4.10	4.24	3.78	2.94	2.07	1.04	0.77
Crop water demand per acre [gallons]	21,505	29,325	54,088	77,873	99,541	111,433	115,180	102,636	79,828	56,205	28,347	21,016
Total crop water demand for irrigated area [gallons]	21,505	29,325	54,088	77,873	99,541	111,433	115,180	102,636	79,828	56,205	28,347	21,016
Will landscape be irrigated with reclaimed water this month?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Process wastewater remaining after vineyard irrigation, reclaimed for landscape irrigation [gallons]	5,906	12,906	7,510	0	0	0	0	0	0	0	25,010	14,510
Landscape irrigation water required from storage or other source [gallons]	15,598	16,418	46,577	77,873	99,541	111,433	115,180	102,636	79,828	56,205	3,337	6,506
Drawdown from storage for landscape irrigation [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
Process wastewater generated this month, unused for irrigation, to be reclaimed and stored [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
Net end-of-month reclaimed water storage after all irrigation [gallons]	0	0	0	0	0	0	0	0	0	0	0	0

End of Water Balance

Peak Monthly Storage = **0 gallons**

Notes:

1. Reference ETo from California Irrigation Management Information System
2. Crop Coefficient from Table 1 of "Estimating Irrigation Water Needs of Landscape Plantings in California", University of California Cooperative Extension, August 2000.

SHADYBROOK ESTATE WINERY
PROCESS WASTEWATER IRRIGATION AREAS EXHIBIT

60' ROADWAY AND UTILITY EASEMENT

100' WELL SETBACK

LANDS OF RAPP RANCH ESTATES LLC APN: 052-170-018

(E) EQUESTRIAN CENTER

(E) WINERY

(E) BARN

LANDS OF RAPP RANCH ESTATES LLC APN: 052-170-019

RAPP LANE

CHATEAU LANE

100' WELL SETBACK

100' WELL SETBACK

GRAPHIC SCALE

100 0 100

(IN FEET)

1 Inch = 100 FT

AREA OF VINEYARD OUTSIDE OF SETBACKS TO BE IRRIGATED WITH TREATED PROCESS WASTEWATER=6.67 ACRES

RSA+

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DEC 20, 2018 4118019.0 Exh-Vineyard Irri-.dwg