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Wastewater Feasibility Study

Paul Hobbs – Nathan Coombs Winery P15-00128
Planning Commission Hearing October 4, 2017

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April 1, 2015

Napa County Planning, Building,
and Environmental Services
1195 3rd Street, 2nd Floor
Napa, CA 94559

Attention: Project Planner

Re: Paul Hobbs – Nathan Coombs Winery
2184 Imola Avenue
Napa, CA
APN 046-351-001 & 016
Land Use Permit Application –
Wastewater Feasibility Study
SMA Project No. 2013016

To Whom It May Concern,

The purpose of this letter is to supplement the Paul Hobbs – Nathan Coombs Winery Land Use Permit application, which is requesting a new phased winery facility at this time. Phase I production is proposed to be 5,000 cases (or 12,000 gallons), with an ultimate, Phase II, production level of 25,000 cases (or 60,000 gallons) of wine. The facility will be located on a 77.96 acre parcel at the corner of Imola and 4th Avenues in Napa, CA. Steve Martin Associates, Inc. has prepared this Wastewater Feasibility Study for the purpose of assessing the onsite sanitary and process wastewater system treatment and disposal capacity necessary for the proposed new winery facility.

Production will have an ultimate capacity of 25,000 cases per year with tasting by appointment only and four marketing events per year. The winery will not be participating in county-wide industry events. The Phase I proposed combined SW and PW wastewater management system will consist of a pressure distribution (PD) onsite wastewater treatment and disposal system. The treatment of the wastewater will include PW solids removal in winery trench drains, PW settling tanks, a SW settling tank, and a combined sump tank where the two waste streams will be dosed to the pressure distribution system. At Phase II, the PW flows will be removed from the PD system to be treated in the existing pond onsite through aeration. The reclaimed PW will be disposed of via drip irrigation of the existing vineyards. The SW will continue to be treated and disposed of in the Phase I PD system, and as a result, the PD system will actually be oversized for sanitary only flows during Phase II.

The proposed new wastewater management system(s) described above and herein will be adequate to treat and dispose of the projected SW and PW flows generated from the new winery facility. To assist you in the evaluation of the above conclusions, the following information is enclosed:

Attachment I: Wastewater System Flow Diagram

Attachment II: Wastewater System Design Criteria, Evaluation, & Calculations

In addition, please refer to the overall site plan included with the Land Use Permit application for the locations of the combined PW and SW pressure distribution leach field system and the existing on site pond. The plans indicate the relative locations of buildings, roads, wastewater primary and expansion leachfields, and other site features that would be required for this project.

The attached information regarding the proposed improvements should be sufficient for review at the Use Permit level. If you have any questions or require further information, please feel free to contact me at (707) 824-9730.

Sincerely,

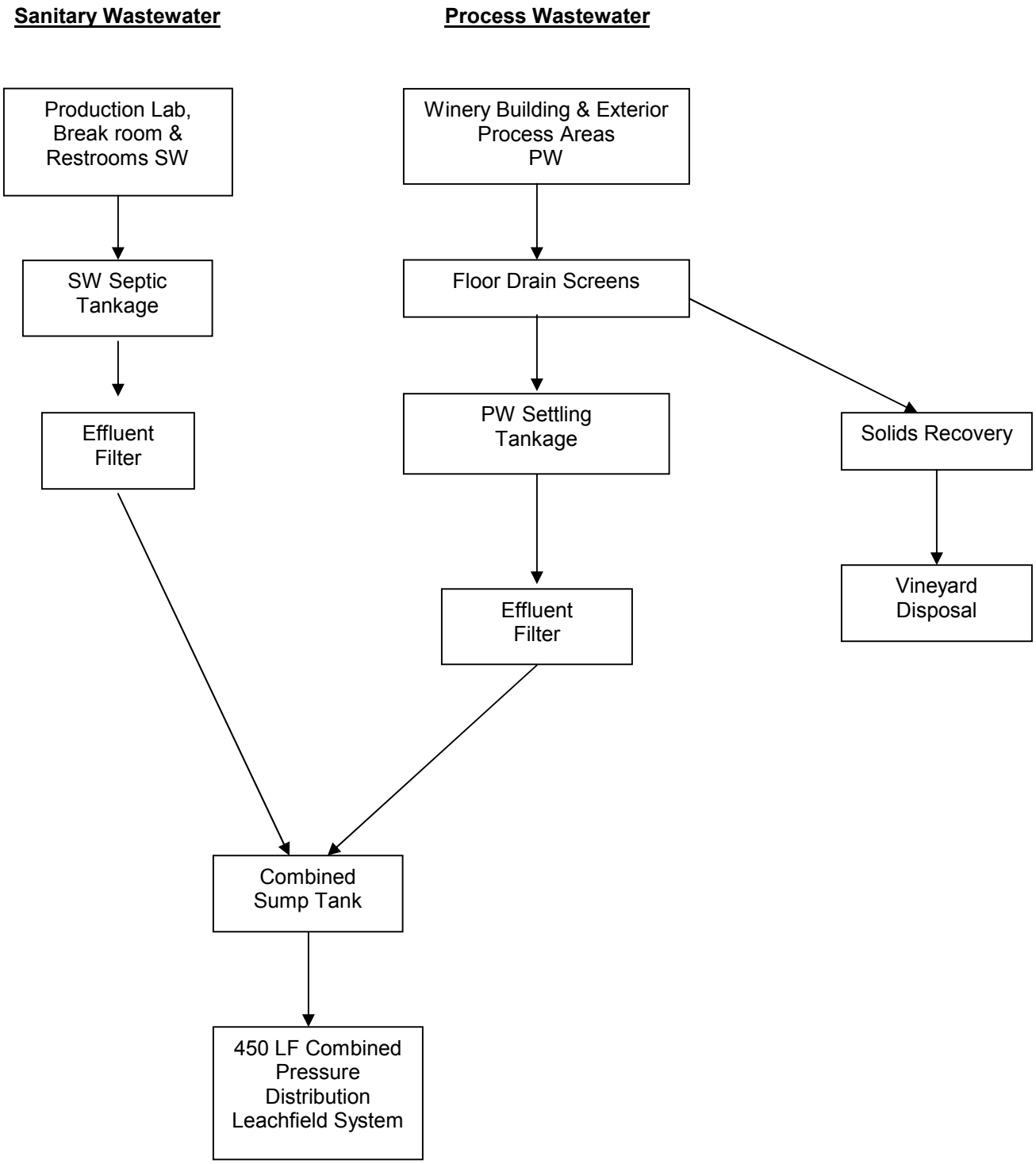
Steven Martin P. E.

Attachments

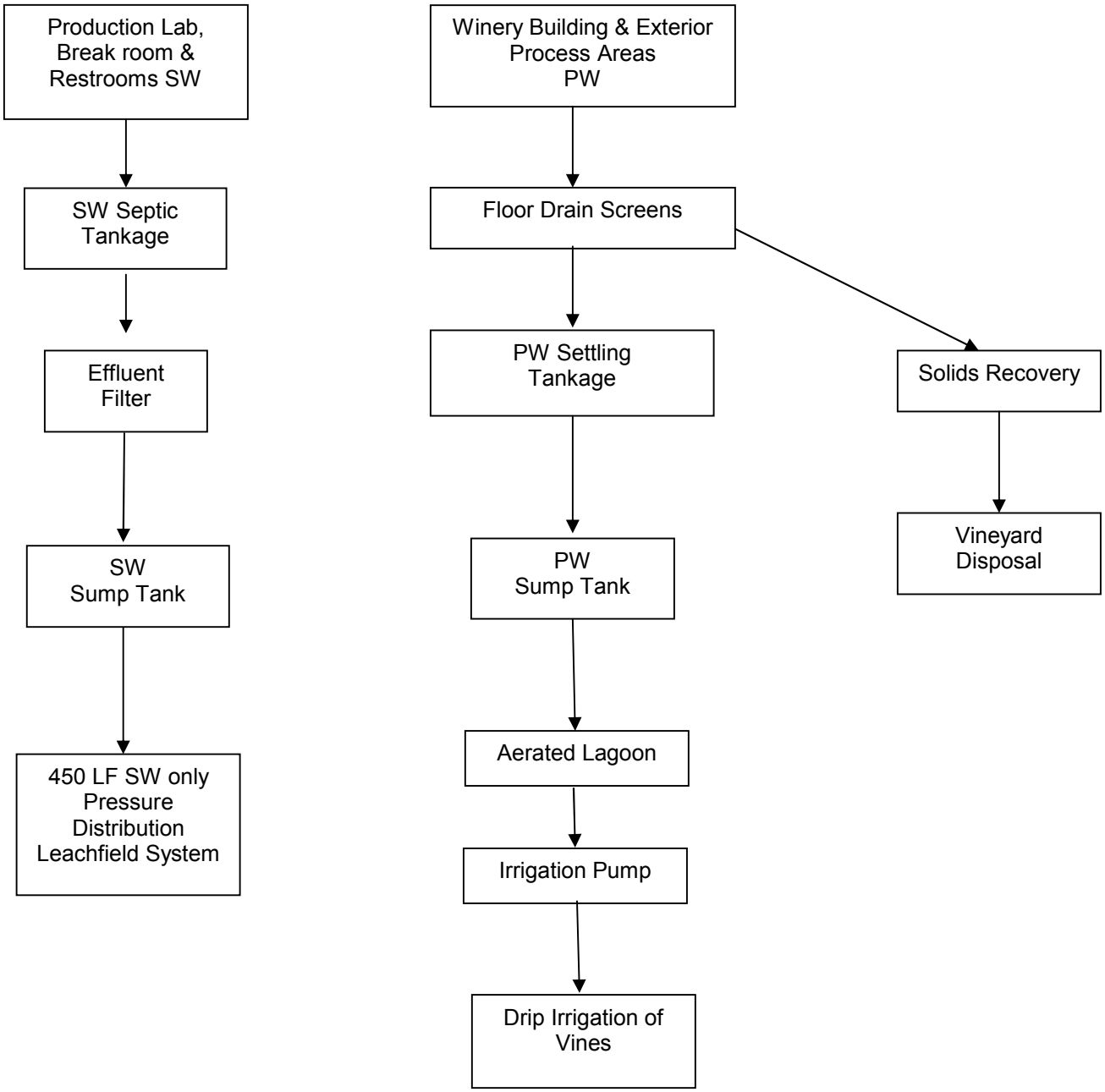
ATTACHMENT I

SANITARY & PROCESS WASTEWATER MANAGEMENT SYSTEM FLOW DIAGRAM

PHASE I SANITARY & PROCESS WASTEWATER MANAGEMENT SYSTEM FLOW DIAGRAM



PHASE II SANITARY & PROCESS WASTEWATER MANAGEMENT SYSTEM FLOW DIAGRAM



ATTACHMENT II

SANITARY & PROCESS WASTEWATER MANAGEMENT SYSTEM DESIGN CRITERIA, EVALUATION, AND CALCULATIONS

PAUL HOBBS – NATHAN COOMBS WINERY

2184 Imola Avenue
Napa, California

WASTEWATER MANAGEMENT SYSTEM
DESIGN CRITERIA & EVALUATION

SANITARY WASTEWATER

Sanitary wastewater (SW) at the proposed winery will consist of typical wastewater generated from restrooms, break rooms and laboratory facilities.

Paul Hobbs - Nathan Coombs Winery will have tasting and tours strictly by appointment only. A maximum of four wine club marketing events of up to 100 persons are being requested with this application. Those events that would include food service will be catered, as a result there will be no commercial kitchen waste associated with the events.

PHASE I SW FLOWS

AVERAGE DAY:

5 full-time employees x 15 gpcd	=	75
10 visitors x 3 gpcd	=	30
Total	=	105 gpd

PEAK DAY (HARVEST WEEKEND):

7 full-time employees x 15 gpcd	=	105
20 visitors x 3 gpcd	=	60
Total	=	165 gpd

PEAK DAY (MARKETING EVENT):

7 full-time employees x 15 gpcd	=	105
100 event guests w/out meals x 3 gpcd	=	300
Total	=	405 gpd

Phase I Design SW flow = 405 gpd SW

PHASE II SW FLOWS

AVERAGE DAY:

7 full-time employees x 15 gpcd	=	105
15 tasting visitors x 3 gpcd	=	45
Total	=	150 gpd

PEAK DAY (HARVEST WEEKEND):

9 full-time employees x 15 gpcd	=	135

30 tasting visitors x 3 gpcd	=	90
Total	=	225 gpd

PEAK DAY (MARKETING EVENT):

9 full-time employees x 15 gpcd	=	135
100 event guests w/out meals x 3 gpcd	=	300
Total	=	435 gpd
Phase II Design SW flow	=	**435 gpd SW**

SW SEPTIC TANK

The required total septic tank size for the projected SW flows based on the Manual of Septic Tank Practice is as follows:

V = 1.5 x Q
= 1.5 x 435 gpd
= 652.5 gallons

To allow for additional settling of solids, we recommend installing a 1200-gallon septic tank. Based on a total of 1200 gallons of septic tankage, the resulting detention time for a peak day flow would be 2.8 days. An effluent filter will be installed on the outlet of the septic tank. The SW effluent will then gravity flow to the SW sump tank.

PROCESS WASTEWATER

Process wastewater (PW) will be generated from typical winery processing activities including crushing, fermentation, barrel storage and bottling with tank, barrel, equipment and floor cleaning. Phase I production will include approximately 83 tons of grapes crushed, produced and bottled onsite (corresponding to 5,000 cases or 12,000 gallons of wine). Phase II production will include approximately 365 tons of grapes crushed, produced and bottled onsite (corresponding to 25,000 cases or 60,000 gallons of wine). Only wine processing will occur at the facility; no distilling operations will occur.

Based on historical and typical flow data from wineries of similar size and characteristics, the corresponding PW generation rates and calculated projected PW flows are as follows:

PHASE I PW FLOWS

Cases of wine produced onsite = 5,000 cases

Gallons of wine produced onsite = 2.4 gallons/case x 5,000 cases = 12,000 gal

Generation rate = 5.0 gal PW/gal wine

Annual Volume = 12,000 gal wine x 5.0 gal PW/gal wine = 60,000 gal PW

AVERAGE DAY FLOW:

60,000 gal PW ÷ 365 days = 164.4 gpd PW

AVERAGE DAY HARVEST FLOW (per PRMD guidelines):

Generation rate = 1.0 gal PW/gal wine

$$\frac{\text{12,000 gallons wine x 1.0 gal PW/gal wine}}{\text{30 days}} = \text{400 gpd PW}$$

PEAK WEEK HARVEST DAY FLOW (actual flow per day based on facility size):

Generation rate = 0.75 gal PW/gal wine

Peak week tonnage = 20 tons / peak week

Peak day tonnage = 4 tons

4 tons grapes crushed/day x 165 gal wine/ton grapes crushed x 0.75 gal PW/gal wine = 495 gpd PW

Phase I Design PW flow = 495 gpd PW

PHASE II PW FLOWS

25,000 cases crushed onsite:

Cases of wine produced onsite = 25,000 cases

Gallons of wine produced onsite = 2.4 gallons/case x 25,000 cases = 60,000 gal

Generation rate = 5.0 gal PW/gal wine

Annual Volume = 60,000 gal wine x 5.0 gal PW/gal wine = 300,000 gal PW

AVERAGE DAY FLOW:

300,000 gal PW ÷ 365 days = 821.9 gpd PW

AVERAGE DAY HARVEST FLOW:

Generation rate = 1.0 gal PW/gal wine

$$\frac{\text{60,000 gallons wine x 1.0 gal PW/gal wine}}{\text{60 days}} = \text{1000 gpd PW}$$

PEAK WEEK HARVEST DAY FLOW:

Generation rate = 0.75 gal PW/gal wine

Peak week tonnage = 60 tons / peak week

Peak day tonnage = 20 tons

20 tons grapes crushed/day x 165 gal wine/ton grapes crushed x 0.75 gal PW/gal wine = 2475 gpd PW

Phase II Design PW flow = 2475 gpd PW

PW SEPTIC TANKS

The required total septic tank size for the projected Phase I PW flows based on the Manual of Septic Tank Practice is as follows:

$$V = 1125 + 0.75 \times Q$$

However, based on past analysis and testing of anaerobic treatment at numerous wineries, the appropriate detention time for sufficient anaerobic treatment is 3-5 days.

Phase I Winery Tank Volume = 5 days detention x Peak Day Flow
= 5 x 495 gpd
= 2,475 gallons

Phase II Winery Tank Volume = 3 days detention x Peak Day Flow
= 3 x 2475 gpd
= 7,425 gallons

During Phase I, we recommend a single 2500 gallon PW septic tank. During Phase II, we recommend adding another 5,000 PW septic tank for a total of 7,500 gallons.

PW & SW TREATMENT & DISPOSAL

PHASE I COMBINED PW & SW PRESSURE DISTRIBUTION SYSTEM:

For Phase I, we propose to combine the PW and SW system. The combined onsite wastewater treatment and disposal system will be located in the vicinity of a previously tested location known as "Area 2". A site evaluation was conducted in that location on 7/2/03 by Darrel Choate and Sheldon Sapoznik of Napa County, with results indicating an assigned percolation rate of faster than 12" per hour (or faster than 5 mpi). Acceptable soil for special design was indicated to 50" (excluding test pit #5). As a result, a pressure distribution system is being proposed with a design application rate of 1.2 gal/sf/d which corresponds to 1-3 mpi in the vicinity of Area 2, profile pits 4, 6, & 7.

PHASE I PRIMARY SYSTEM DESIGN CRITERIA

- Depth of new trench will be 14" into the existing soil (with 10" of fill material placed prior to excavating 24" deep trenches).
- Sidewall area of trench (allowable absorption area) = 1.666 sf/lf. This reflects 10" of sidewall from the top of the pipe to the trench bottom.
- Combined Phase I SW & Phase I PW flow = 405 gpd SW + 495 gpd PW = 900 gpd total
- Application Rate = 1.2 gallons/s.f./day (1-3 mpi)
- Ground slope is approximately 5%

PHASE I PRIMARY PD LEACHFIELD DESIGN

$$\text{Leachline Length} = \frac{\text{Design Flow}}{\text{Application Rate (Sidewall Area/lf)}}$$

$$\text{Leachline Length} = \frac{900 \text{ gpd}}{1.2 \text{ gal/s.f./day (1.666 sf/lf)}} = 450 \text{ l.f.}$$

4 – 100 and 1 – 50 lf leach lines will provide 450 l.f. of PD leachfield. Based on Table 5 of the Napa County DESIGN, CONSTRUCTION, AND INSTALLATION OF ALTERNATIVE SEWAGE TREATMENT SYSTEMS, leachlines shall be spaced at 5' on center.

PHASE I 100% EXPANSION SYSTEM DESIGN CRITERIA

Same as primary system information above

PHASE I 100% PD LEACHFIELD DESIGN

Same as primary system information above

PHASE II SEPARATE SW PD SYSTEM & PW AERATED LAGOON:

For Phase II, we propose to separate the PW from the Phase I PD system. This will result in an oversized SW system (design flows of 900 gpd, but SW flows of 435 gpd). The Process Wastewater will continue to be collected in septic tanks, but then will be conveyed to the existing onsite pond for treatment and ultimate disposal via drip irrigation of the existing vineyards on site. The PW will consist primarily of wastewaters collected at floor drains

and trenches within the buildings, receiving, crush, tank and wash-down areas. Exterior tank and process areas not under a roof will be provided with diversion capability to provide a means of sending rainwater to the storm drainage system when those areas are not in use for process purposes. The criteria used to evaluate the PW management system are summarized in this section.

PHASE II PW CONVEYANCE, TREATMENT, & DISPOSAL

The following features will be incorporated into the process wastewater management system:

1) Initial screening in floor trench drains in all buildings

2) Gravity collection system into septic tanks

3) PW pump station

4) Pretreatment consisting of:

    i) pH control (if necessary)

    ii) Flow measurement

    iii) Solids removal screen (for winery)

    iv) Grease interceptor (for essential oil facility)

5) Facultative aerated pond

6) Flow measurement

7) Filter

8) Irrigation disposal (reuse)

A discussion of each of these features is provided below. Refer to the Wastewater Management System Schematic above for a flow diagram of the PW management system.

1) Initial screening -- Provided by screened baskets and strainers installed on the trench drains and floor drains within the winery. Screen opening sizes will be on the order of 1/4 inch for exterior drains and 1/8 inch for interior drains.

2) Gravity collection system -- Designed to provide low maintenance and no infiltration or exfiltration. Piping is compatible with process wastewaters and satisfies Uniform Plumbing Code and local requirements.

3) PW pump station -- The duplex pump station will be capable of pumping all of the anticipated process wastewater flow ranges with one duty and one standby pump that can alternate functions. The duty pump would be used for all but the most extreme PW flow conditions. The second (standby) pump would be activated during peak hour events or similar events of infrequent occurrence and short duration. Storage in the pump sump would provide some additional factor of safety. A PVC force main to the ponds will be sized to be adequate for the peak flow rates anticipated from the duplex pump station. The pumps convey the PW to the Pond.

4) Pretreatment – Consisting of the following elements:

i) pH control system (if necessary)

(a) SMA's experience, over the last 10 years, has indicated that pH neutralization of winery PW is typically not required for aerated pond systems. The combination of naturally occurring alkalinity in the source water and the alkaline cleaning compounds used within the winery usually provides sufficient buffering to maintain pond pH above 6.5. Neutralizing chemicals should only be used when absolutely necessary. Since the Process Wastewater is ultimately disposed via irrigation, the neutralizing chemicals would be applied to the land.

(b) For the above reasons, the installation of pH control systems when the PW Management System is first constructed is not recommended. Instead, SMA recommends that the pH of the ponds be monitored for a year (monitoring is required by the RWQCB), especially through one harvest season. If at the end of the one-year monitoring period it has been demonstrated that pH control is necessary (or sooner if conditions warrant), a pH control system could be added.

ii) Flow measurement – An inline magnetic flow measurement device will be provided to measure flows from the PW pump station to the facultative aerated pond.

iii) Solids removal screen – A motorized rotary drum screen located at the winery will remove the large solids from the system and, as a result, reduce the organic biological loading on and the accumulation of solids in the aerated pond system. Solids from the screening operations will be treated as pomace (residual grape solids). Refer to solid waste section for disposal description of pomace.

iv) Grease interceptor – A grease trap will be installed to collect the grease and oils that will be part of the vegetable wastewater generated from the essential oil production. This interceptor will prohibit oil from reaching the lagoon and ultimately the vineyard.

5) Facultative aerated pond -- Biological stabilization will occur in the existing facultative aerated pond system which will consist of two cells separated by a floating baffle. The existing pond has a capacity of 35 acre feet or 11,404,800 gallons (11.4 Mgal). The first cell will be approximately 7.6 Mgal and the second cell will be approximately approximately 3.8 Mgal. This pond system will be large enough to provide a normal residence time of well over the 60-120 day recommended detention time at day peak harvest month flow conditions. The total usable volume of the pond system is approximately 11.4 MG in addition to a 2 ft minimum freeboard.

   Surface mechanical aerators for the aeration pond will be sized to satisfy biochemical oxygen demand as well as oxygen dispersion requirements. Time clock control of the aerators will be provided to allow operations personnel to adjust aerator operation to changing winery functions and pond conditions.

6) Flow Measurement – Flow measurement devices will be provided to measure the flows from the pretreatment area to the aerated pond and from the pond to the irrigation system.

7) Filter – A filter will be provided to screen secondary effluent prior to vineyard irrigation.

8) Irrigation disposal (reuse) -- Final reuse (disposal) of effluent is to be accomplished by drip irrigation of the 67 acres of vineyard on-site. The irrigation demand of the vineyard far exceeds the estimated annual process wastewater volume. Refer to the pond water balance for proposed application rates to the disposal area and effluent storage volumes. To meet the additional irrigation demand the treated PW can be supplemented with irrigation water. The irrigation demand is the lowest during the wet season (November through April) and application rates should be less than 0.2 inches per day. Irrigation of vineyards would likely be suspended in August, just prior to harvest, to control sugar content in the grapes.

   The irrigation disposal area is on-site and adjacent to the winery facility and the process wastewater pond, as shown on the Overall Site Plan. Double check valves or similar backflow prevention devices will be installed on the existing irrigation system discharge to prevent any cross-contamination with treated effluent applied to

the vineyard irrigation distribution network. The treated PW is not recycled for winery use.

OTHER CONSIDERATIONS

Odor Control

There should be no obnoxious odors from a properly designed and operated treatment system of this type. See Alternative Courses of Action for operation alternatives for unforeseen conditions.

Ground Water Contamination

The nearest water well to the winery process wastewater treatment and disposal systems is over 100 feet from the aerated pond. No disposal of reclaimed wastewater will occur within 100 feet of any existing wells.

The groundwater in the pond area will be protected from possible contamination by the existing liner installed in the pond.

Irrigation/disposal of treated effluent is considered a beneficial use and is considered an effective means to protect groundwater quality. Well water may be added to the treated PW when capacity permits to supplement the volume of water used for irrigation.

Surface Waters

The new winery facility will be applying for an Industrial Stormwater Permit and the related Stormwater Pollution Prevention Plan (SWPPP) throughout and upon completion of construction.

All wastewater treatment facilities are designed with sufficient drainage facilities to divert local runoff. Irrigation/disposal operations will be routinely monitored to ensure against surface runoff. Irrigation/disposal will be suspended for approximately 24 hours prior to, during and following any forecasted storms. Irrigation/disposal will be suspended as long as saturated soil conditions persist.

Protection

Exposed wastewater treatment facilities will be posted with appropriate warning signs. The aerated pond will be fenced, if necessary, to restrict public access.

ALTERNATIVE COURSES OF ACTION

Although no operational difficulties are foreseen, the following additional courses of action would be available if necessary:

1) Ability to add carbon dioxide to reduce pH at the pretreatment site or installation of another type of pH control.

2) Ability to add hydrogen peroxide or liquid oxygen to the ponds as a supplemental oxygen source or for odor control

3) Provision of higher aeration capacity in the pond

4) Additional stages of treatment to increase effluent quality

5) Increased use of irrigation/disposal area to increase discharge capacity

The facultative aerated ponds have been designed for retention of wastewater and rainwater through the majority of the rainy season with minimal discharges to irrigation/disposal fields (based on a 10 year seasonal rainfall).

Should there be a winter with more rainfall than the design condition, several operational procedures are available to compensate:

1) Additional water conservation at winery

2) Light irrigation during periods between storms -- not exceeding the assimilative capacity of the soil

3) Increased irrigation during the months of planned irrigation.

4) Pumping and truck transfer of treated and diluted wastewater to a sewage treatment plant or land disposal site

TYPICAL WINERY WASTEWATER CHARACTERISTICS

Characteristic	Units	Crushing Season Range	Noncrushing Season Range	Reclaimed Water Range	Reclaimed Water Avg.
pH	--	2.5 - 9.5	3.5 - 11.0	6.5-9.5	7.9
Dissolved Oxygen	mg/L	0.5 - 8.5	1.0 - 10.0	1.0-10.0	6.0
BOD_s	mg/L	500 – 12,000	300 – 3,500	10-160	50
C.O.D.	mg/L	800 – 15,000	500 – 6,000	-	90
Grease	mg/L	5 - 30	5 - 50	-	0.2
Settleable Solids	mg/L	25 - 100	2 - 100	-	0.2
Nonfilterable Residue	mg/L	40 - 800	10 - 400	-	20
Volatile Suspended Solids	mg/L	150 - 700	80 - 350	-	15
Total Dissolved Solids	mg/L	80 – 2,900	80 – 2,900	8-1,500	900
Nitrogen	mg/L	1 - 40	1 - 40	-	5.0
Nitrate	mg/L	0.5 - 4.8	-	0.1-40	1.5
Phosphorous	mg/L	1 - 10	1 - 40	-	5.0
Sodium	mg/L	35 - 200	35 - 200	-	100
Alkalinity ($CaCO_3$)	mg/L	40 - 730	10 - 730	-	40
Chloride	mg/L	3 - 250	3 - 250	2.5-210	50
Sulfate	mg/L	10 - 75	20 - 75	-	25