

ONSITE WASTEWATER DISPOSAL FEASIBILITY STUDY

FOR THE

TITUS WINERY

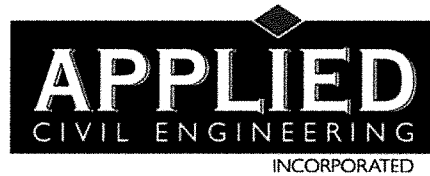
LOCATED AT:

2971 Silverado Trail
St. Helena, CA 94574
NAPA COUNTY APN 021-353-013

PREPARED FOR:

Eric and Phillip Titus
3264 Ehlers Lane
St. Helena, CA 94574
Telephone: (707) 963-3298

PREPARED BY:



2074 West Lincoln Avenue
Napa, California 94558
Telephone: (707) 320-4968
www.appliedcivil.com

Job Number: 11-123



Michael R. Muelrath

Michael R. Muelrath R.C.E. 67435

10/2/2013

Date

TABLE OF CONTENTS

LIST OF APPENDICES iv

INTRODUCTION 1

SOILS INFORMATION.....2

PREDICTED WASTEWATER FLOW2

Winery Process Wastewater2

Winery Sanitary Wastewater3

Employees.....3

Daily Tours and Tastings.....3

Private Promotional Tastings with Meals Prepared Onsite:.....3

Wine Club Marketing Events with Catered Meals3

Wine Release Events with Catered Meals3

Wine Auction Events with Catered Meals:.....3

Total Peak Winery Sanitary Wastewater Flow.....4

Combined Peak Wastewater Flow4

RECOMMENDATIONS.....4

Option #1 – Combined Sanitary and Process Wastewater Subsurface Drip Disposal
Field5

Required Disposal Field Area.....5

Available Disposal Field Area5

Reserve Area5

Pretreatment and Septic Tank Capacity6

Option #2 – Sanitary Wastewater Subsurface Drip Disposal Field and Process
Wastewater Treatment for Irrigation6

Required Disposal Field Area.....6

Available Disposal Field Area6

100% Reserve Area6

Pretreatment and Septic Tank Capacity7

Process Wastewater Treatment7

Process Wastewater Disposal7

Option #3 – Sanitary Wastewater Subsurface Drip Disposal Field and Process	
Wastewater Hold and Haul.....	8
Required Disposal Field Area.....	8
Winery Process Wastewater Disposal.....	8
CONCLUSION.....	8

LIST OF APPENDICES

APPENDIX 1: Site Topography Map.....	9
APPENDIX 2: Titus Winery Use Permit Conceptual Site Plans	11
APPENDIX 3: Site Evaluation Reports and Test Pit Map.....	16
APPENDIX 4: Treated Process Wastewater Storage Tank Calculations	31

INTRODUCTION

Eric and Phillip Titus are applying for a Use Permit to construct and operate a new winery at their property located at 2971 Silverado Trail in Napa County, California. The subject property, known as Napa County Assessor's Parcel Number 021-353-013, is located along the west side of Silverado Trail approximately 0.25 miles northwest of the Silverado Trail / Deer Park Road intersection.

The use permit application under consideration proposes the construction and operation of a new winery with the following characteristics:

- Wine Production:
 - 24,000 gallons of wine per year
 - Crushing, fermenting, aging and bottling

- Employees (based on maximum anticipated staffing level during harvest):
 - 10 full time employees
 - 2 part time employees

- Marketing Plan:
 - Daily Tours and Tastings by Appointment
 - 60 visitors per day maximum
 - Promotional Tastings with Meals:
 - 8 per year
 - 25 guests maximum
 - Food prepared in onsite kitchen
 - Wine Club Marketing Events
 - 4 per year
 - 125 guests maximum
 - Food prepared offsite by catering company
 - Portable toilets brought in for guest use
 - Wine Release Events
 - 6 per year
 - 125 guests maximum
 - Food prepared offsite by catering company
 - Portable toilets brought in for guest use
 - Wine Auction Events
 - 2 per year
 - 125 guests maximum
 - Food prepared offsite by catering company
 - Portable toilets brought in for guest use

Eric and Phillip Titus have requested that Applied Civil Engineering Incorporated (ACE) evaluate the feasibility of disposing of the winery process wastewater as well as the domestic sanitary wastewater that will be generated by the proposed winery via a new onsite wastewater disposal system. The remainder of this report describes the onsite soil conditions, the predicted process

and sanitary wastewater flows and outlines the conceptual design for three possible scenarios for disposing of the wastewater generated by the proposed winery.

SOILS INFORMATION

The United States Department of Agriculture Soil Conservation Service Soils Map for Napa County shows a majority of the parcel mapped as Bale loam, 0 to 2 percent slopes and a small strip of land along the Napa River at the western property boundary is mapped as Yolo loam, 0 to 2 percent slopes.

Site specific soils analysis was conducted during our site evaluations on December 15, 2011 (E11-00603) and February 6, 2013 (E13-00029). The two site evaluations included the excavation and observation of a total of nineteen test pits in various portions of the property. We generally encountered clay loam type soils with weak to moderate blocky structure. The limiting condition in the areas explored was the observed presence of mottling which indicates a potentially elevated seasonal groundwater level.

Please refer to the Site Evaluation Reports in Appendix 3 for additional details.

PREDICTED WASTEWATER FLOW

The onsite wastewater disposal system must be designed for the peak winery process and sanitary wastewater flows. It is planned that the existing residence will continue to be served by the existing leach field.

Winery Process Wastewater

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 size of the winery and our understanding that both red and white wines will be produced we have assumed a 45 day crush period. Using these assumptions, the average and peak winery process wastewater flows are calculated as follows:

$$\text{Annual Winery Process Wastewater Flow} = \frac{24,000 \text{ gallons wine}}{\text{year}} \times \frac{6 \text{ gallons wastewater}}{1 \text{ gallon wine}}$$

$$\text{Annual Winery Process Wastewater Flow} = 144,000 \text{ gallons per year}$$

$$\text{Average Daily Winery Process Wastewater Flow} = \frac{144,000 \text{ gallons}}{\text{year}} \times \frac{1 \text{ year}}{365 \text{ days}}$$

$$\text{Average Daily Winery Process Wastewater Flow} = 395 \text{ gallons per day (gpd)}$$

$$\text{Peak Winery Process Wastewater Flow} = \frac{24,000 \text{ gallons wine}}{\text{year}} \times \frac{1.5 \text{ gallons wastewater}}{1 \text{ gallon wine}} \times \frac{1 \text{ year}}{45 \text{ crush days}}$$

$$\text{Peak Winery Process Wastewater Flow} = 800 \text{ gpd}$$

Winery Sanitary Wastewater

The peak sanitary wastewater flow from the winery is calculated based on the number of winery employees, the number of daily visitors for tours and tastings and the number of guests attending private marketing events. In accordance with Table 4 of Napa County's "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 tours and tastings. Table 4 does not specifically address design wastewater flows for guests at marketing events. We have conservatively estimated 5 gallons of wastewater per guest at marketing events with catered meals and 15 gallons per guest at marketing events with meals prepared onsite (similar to a restaurant). 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 = 180 gpd

Daily Tours and Tastings

Peak Sanitary Wastewater Flow = 60 visitors per day X 3 gallons per visitor

Peak Sanitary Wastewater Flow = 180 gpd

Private Promotional Tastings with Meals Prepared Onsite:

Peak Sanitary Wastewater Flow = 25 guests X 15 gallons per guest

Peak Sanitary Wastewater Flow = 375 gpd

Wine Club Marketing Events with Catered Meals

Peak Sanitary Wastewater Flow = 125 guests X 5 gallons per guest

Peak Sanitary Wastewater Flow = 625 gpd

Wine Release Events with Catered Meals

Peak Sanitary Wastewater Flow = 125 guests X 5 gallons per guest

Peak Sanitary Wastewater Flow = 625 gpd

Wine Auction Events with Catered Meals:

Peak Sanitary Wastewater Flow = 125 guests X 5 gallons per guest

Peak Sanitary Wastewater Flow = 625 gpd

Total Peak Winery Sanitary Wastewater Flow

As previously described, portable toilets will be used for all events with more than 25 guests in attendance to minimize the impact on the proposed septic system. Assuming that daily tours and tastings and a maximum of one marketing event may occur on the same day the total peak winery sanitary wastewater flow is based on employees, daily tours and tastings and a private event for 25 people with meals prepared onsite. Based on these assumptions, the peak sanitary wastewater flow is calculated as follows:

Total Peak Winery Sanitary Wastewater Flow = 180 gpd + 180 gpd + 375 gpd

Total Peak Winery Sanitary Wastewater Flow = 735 gpd

Combined Peak Wastewater Flow

Combined Peak Wastewater Flow = Peak Winery Process Wastewater Flow + Total Peak Winery Sanitary Wastewater Flow

Combined Peak Wastewater Flow = 800 gpd + 735 gpd

Combined Peak Wastewater Flow = 1,535 gpd

RECOMMENDATIONS

Based on the anticipated wastewater flows and the finding of 30 to 54 inches of acceptable clay loam soil with a moderate angular blocky structure in the vicinity of Test Pits #4 & #5 we have identified three possible scenarios for disposing of the process and sanitary wastewater generated at the subject parcel.

Option #1 – Combined Sanitary and Process Wastewater Subsurface Drip Disposal Field

Option #2 – Sanitary Wastewater Subsurface Drip Disposal Field and Process Wastewater Treatment for Vineyard Irrigation

Option #3 - Sanitary Wastewater Subsurface Drip Disposal Field and Process Wastewater Hold and Haul

The Applicant is seeking conceptual approval for all three options. The decision about which type of wastewater disposal system(s) to implement will be made by the Applicant and the Engineer at the time of building permit submittal.

The following sections of this report outline the conceptual design of the wastewater disposal systems for each of these three options.

Option #1 – Combined Sanitary and Process Wastewater Subsurface Drip Disposal Field

In this scenario both the sanitary and process wastewater from the winery would be pretreated and disposed of in a subsurface drip type septic system.

Required Disposal Field Area

The disposal field area is calculated based upon the design hydraulic loading rate for the soil conditions and the proposed design flow. Since the slope of the natural ground surface in the area of the proposed disposal field is less than 20% no adjustment is required for slope. Based on these design parameters, the required disposal field area is calculated as follows:

$$\text{Required Disposal Field Area} = \frac{\text{Peak Flow}}{\text{Soil Application Rate}}$$

$$\text{Required Disposal Field Area} = \frac{1,535 \text{ gpd}}{0.6 \text{ gpd per square foot}}$$

$$\text{Required Disposal Field Area} = 2,558 \text{ square feet}$$

Available Disposal Field Area

Based on the proposed site layout and Napa County Geographic Information System topographic data, we have determined that there is enough area to install approximately 2,600 square feet of subsurface drip disposal field in the vicinity of Test Pits #4 & #5. The conceptual layout of the disposal field is shown on the Titus Winery Use Permit Conceptual Site Plans in Appendix 2.

Reserve Area

Napa County code requires that an area be set aside to accommodate a future onsite wastewater disposal system in the event that the primary system fails or the soil in the primary area is otherwise rendered unsuitable for wastewater disposal. For subsurface drip type septic systems the reserve area must be 200% of the size of the disposal field area. Since there is not a reserve area already designated for the existing residence's septic system the proposed reserve area must accommodate that system's reserve area requirements as well. For the purpose of this analysis we have assumed a total of 3 potential bedrooms in the existing residence.

The design flow for the reserve area is 1,535 gpd for the winery process and sanitary wastewater plus 450 gallons per day for the residence for a total of 1,985 gpd. Based on these design parameters, the required reserve area is calculated as follows:

$$\text{Required Reserve Area} = 200\% \times \frac{\text{Peak Flow}}{\text{Soil Application Rate}}$$

$$\text{Required Reserve Field Area} = 200\% \times \frac{1,985 \text{ gpd}}{0.6 \text{ gpd per square foot}}$$

$$\text{Required Reserve Area} = 6,617 \text{ square feet}$$

Based on the proposed site plan and Napa County GIS topographic data, we have determined that there is enough area to set aside for an additional 6,700 square feet of subsurface drip disposal field in the vicinity of Test Pits #14, #15, #18 & #19 as shown on the Titus Winery Use Permit Conceptual Site Plans in Appendix 2.

Pretreatment and Septic Tank Capacity

Pretreatment must be provided to treat the winery process and sanitary wastewater to meet Napa County pretreated effluent standards (BOD<30 mg/l, TSS < 30 mg/l). There are several options for pretreatment systems that are available to meet this requirement. The Applicant and the Engineer will review options and select a suitable pretreatment system designed to meet this requirement prior to application for a sewage permit for the winery. Septic tanks will be sized in accordance with the requirements of the selected pretreatment system.

Option #2 – Sanitary Wastewater Subsurface Drip Disposal Field and Process Wastewater Treatment for Irrigation

In this scenario the sanitary wastewater would be disposed of in a subsurface drip type septic system and the winery process wastewater would be collected separately, pretreated, stored and used onsite for irrigation of the existing vineyards or landscaping.

Required Disposal Field Area

Sanitary wastewater disposal is similar to the system described in Option #1 above, however the size of the subsurface drip disposal field is much smaller since only the sanitary wastewater is being disposed of. The required disposal field area is calculated as follows:

$$\text{Required Disposal Field Area} = \frac{\text{Peak Flow}}{\text{Soil Application Rate}}$$

$$\text{Required Disposal Field Area} = \frac{735 \text{ gpd}}{0.6 \text{ gpd per square foot}}$$

$$\text{Required Disposal Field Area} = 1,225 \text{ square feet}$$

Available Disposal Field Area

There is enough area to install the required 1,225 square feet of subsurface drip disposal field in the vicinity of Test Pits #4 and #5.

100% Reserve Area

The design flow for the reserve area is 735 gpd for the winery sanitary wastewater plus 450 gallons per day for the existing residence for a total of 1,185 gpd. Based on these design parameters, the required reserve area is calculated as follows:

$$\text{Required Reserve Area} = 200\% \times \frac{\text{Peak Flow}}{\text{Soil Application Rate}}$$

$$\text{Require Reserve Field Area} = 200\% \times \frac{1,185 \text{ gpd}}{0.6 \text{ gpd per square foot}}$$

Required Reserve Area = 3,950 square feet

There is enough area to accommodate the required 3,950 square feet of reserve area in the vicinity of Test Pits #14, #15, #18 & #19

Pretreatment and Septic Tank Capacity

Sanitary wastewater pretreatment and septic tank requirements in this scenario are the same as previously described in Option #1 above.

Process Wastewater Treatment

Based on the winery's planned production level we recommend that treatment be achieved through the use of a package plant type system or other treatment system designed to accept winery process wastewater that is capable of meeting the following treatment requirements:

<u>Parameter</u>	<u>Pre-treatment*</u>	<u>Post Treatment**</u>
pH	3 to 10	6 to 9
BOD ₅	500 to 12,000 mg/l	<160 mg/l
TSS	40 to 800 mg/l	<80 mg/l
SS	25 to 100 mg/l	<1 mg/l

* Reference California Regional Water Quality Control Board Central Coast Region General Waste Discharge Requirements Order No. R3-2008-0018 for winery process wastewater characteristics

** Required for discharge to land via surface irrigation by Napa County for samples taken at the discharge of the treatment unit.

Process Wastewater Disposal

We have identified approximately 2 acres of vineyard located just west of the proposed winery building that can be used to dispose of the treated winery process wastewater via irrigation of the existing vineyard and general land application. This area could be expanded dramatically if desired by the Applicant and we estimate that approximately 20 acres of vineyard in total could be irrigated outside of the required well and stream setbacks. Given the limited amount of process wastewater that will be generated we have conservatively assumed that the irrigation area will be limited to the single two acre vineyard block. All application of treated winery process wastewater must comply with the requirements of the Napa County Winery Process Wastewater Guidelines for Surface Drip Irrigation.

In order to accommodate differences in the timing of wastewater generation, irrigation demand and prohibitions on applying water to the land during rainy periods a storage tank will be required. We have prepared a water balance calculation to size a tank that will temporarily store wastewater generated at the winery before it is applied to the vineyard. The water balance calculation assumes a monthly wastewater generation rate and a monthly vineyard irrigation schedule based on our past experience with projects of this type. The water balance calculations show that the water generated by winery production operations each month can be effectively managed after treatment by applying it to the identified vineyard area. We recommend a minimum storage tank capacity of 10,000 gallons to provide operational flexibility (see Appendix 4).

Option #3 – Sanitary Wastewater Subsurface Drip Disposal Field and Process Wastewater Hold and Haul

In this scenario the sanitary wastewater would be disposed of in a subsurface drip type septic system and the winery process wastewater would be temporarily stored and then would be hauled offsite for treatment and disposal by the Napa Sanitation District, East Bay Municipal Utility District or a similar municipal wastewater treatment plant.

Required Disposal Field Area

Sanitary wastewater disposal is the same as that described in Option #2 above.

Winery Process Wastewater Disposal

The winery process wastewater hold and haul system must be designed to hold at least seven days of peak flow (7 days x 800 gallons per day = 5,600 gallons), have a water level alarm and be designed and constructed in accordance with the requirements outlined in the Napa County Hold and Haul for Winery Process Wastewater Management information sheet.

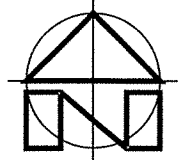
CONCLUSION

It is our opinion that the wastewater from the proposed winery can be accommodated in any of the three options previously described. Full design calculations and construction plans for the wastewater system(s) must be prepared in accordance with Napa County standards at the time of building permit application.

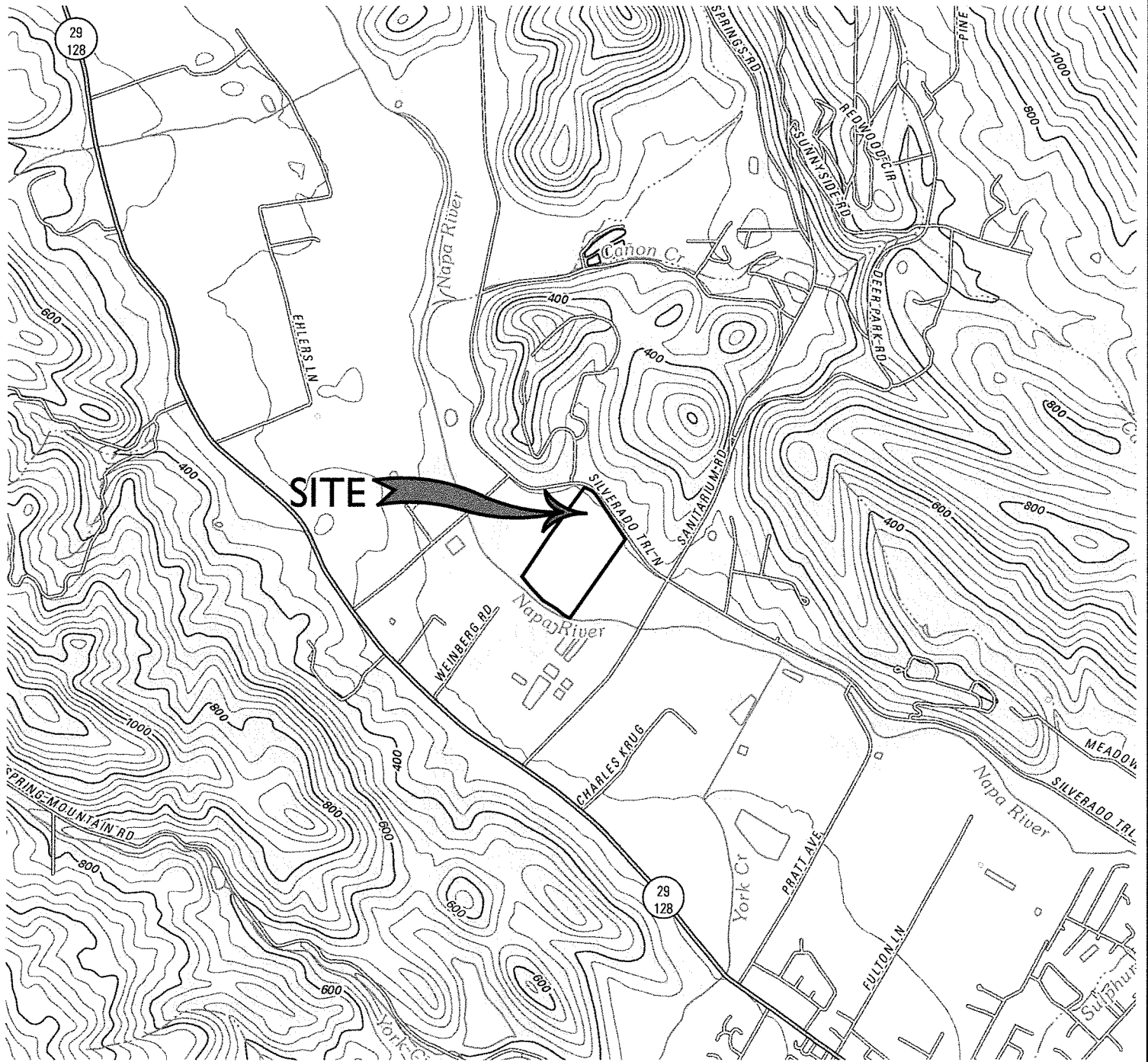
APPENDIX I: Site Topography Map

SITE TOPOGRAPHY MAP

REPRESENTS A PORTION OF THE
UNITED STATES GEOLOGICAL SURVEY 7.5 MINUTE QUADRANGLE
"ST. HELENA, CA"



SCALE: 1" = 2,000'



INCORPORATED
2074 West Lincoln Avenue
Napa, CA 94558
(707) 320-4968 (707) 320-2395 Fax
www.appliedcivil.com

TITUS WINERY
2971 SILVERADO TRAIL NORTH
ST. HELENA, CA 94574
APN 021-353-013

JOB NO. 11-123

SEPTEMBER 2013

APPENDIX 2: Titus Winery Use Permit Conceptual Site Plans

TITUS WINERY

USE PERMIT CONCEPTUAL SITE PLANS

© 2018 APPLIED CIVIL ENGINEERING INCORPORATED. DATE: 08/15/2018 11:41 AM. DWG: P01.dwg

APPLIED
CIVIL ENGINEERING INCORPORATED
2074 West Lincoln Avenue
Folsom, CA 95632
(925) 438-0270

DESIGNED BY: [Redacted]
DRAWN BY: BT
CHECKED BY: PRB
DATE: 08/15/2018

TITUS WINERY
2971 SILVERADO TRAIL NORTH
ST. HELENA, CA 94574
NAPA COUNTY APN 021-353-013

DATE: SEPTEMBER 2013
JOB NUMBER: 11-13
FILE: 11-13-001_L01.DWG
SHEET NUMBER: 4
SCALE: AS SHOWN
SHEET NUMBER: CI



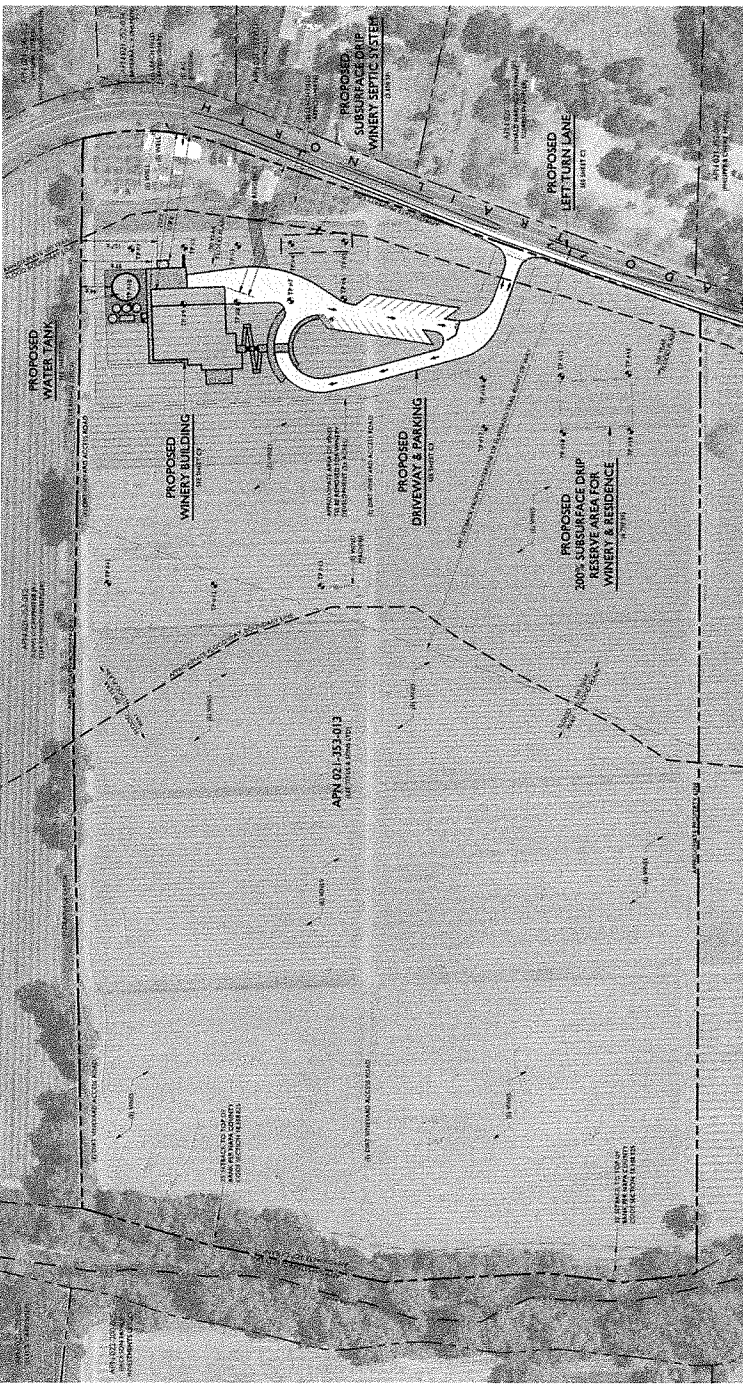
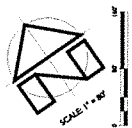
PROJECT INFORMATION
PROPERTY OWNER & APPLICANT: TITUS WINERY LTD
1254 HILLES LANE
ST. HELENA, CA 94574
SITE ADDRESS: 2971 SILVERADO TRAIL NORTH
ST. HELENA, CA 94574
ASSESSOR'S PARCEL NUMBER: 021-353-013
PARCEL SIZE: 31.77± ACRES
PROJECT SIZE: 3.2± ACRES
ZONING: AGRICULTURAL PRESERVE (AP)
DOMESTIC WATER SOURCE: PRIVATE WELL
FIRE PROTECTION WATER SOURCE: STORAGE TANK
WASTEWATER DISPOSAL: ONSITE TREATMENT AND DISPOSAL

SHEET INDEX

C1	OVERALL SITE PLAN
C2	LEFT TURN LANE CONCEPT PLAN
C3	WINERY CONCEPTUAL SITE PLAN
C4	IMPERVIOUS AREA EXHIBIT

NOTES:

- TEST PITS ONE THROUGH THIRTEEN (TP #1 - TP #13) WERE EXCAVATED BY TITUS WINERY MANAGEMENT ON DECEMBER 15, 2011 AND WERE WITNESSED BY A REGISTERED PROFESSIONAL GEOTECHNICAL ENGINEER AND NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT (JULIE LUDWIG).
- TEST PITS FOURTEEN THROUGH FIFTEEN (TP #14 - TP #15) WERE EXCAVATED BY TITUS WINERY MANAGEMENT ON FEBRUARY 6, 2012 AND WERE WITNESSED BY A REGISTERED PROFESSIONAL GEOTECHNICAL ENGINEER AND NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT (JULIE LUDWIG).
- PAVED BACKGROUND TERRAIN'S EXISTING TOPOGRAPHIC FEATURES, THE EXISTING SUBSURFACE GEOLITHOLOGICAL CONDITIONS AND THE EXISTING HYDROLOGICAL SITUATION ON THE TRUNKING PLOTS WERE OBTAINED FROM THE "TOP OF TOPOGRAPHY OF A PORTION OF THE LANDS OF TITUS" PREPARED BY TITUS WINERY MANAGEMENT ON FEBRUARY 15, 2011. THE "ACCURACY OF RECORDED" ASSURES AND LIABILITY REGARDING THE "ACCURACY OF COMPREHENSIVE OF THE TOPOGRAPHIC INFORMATION."
- CONTOUR INTERVAL: 2 FEET.
- SPOT ELEVATIONS: HIGHLIGHTED EVERY FIVE FEET IN THE EXHIBIT.
- IRREGULAR, VERTICAL OR HORIZONTAL DIMENSIONS: 10 FEET.
- THE PROPERTY LINES SHOWN ON THESE PLANS DO NOT REPRESENT A SURVEYOR'S SURVEY. THEY ARE APPROXIMATE AND ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY.
- PROPOSED WINERY MANAGEMENT INFORMATION IS APPROXIMATE. SEE FEMA 1984 CONTAMINANT PANEL OCCASIONALLY FOR MORE INFORMATION.
- BASE FLOOD ELEVATION AT BUILDING SITE WAS DETERMINED TO BE 239 FEET MEAN SEA LEVEL. THIS INFORMATION WAS OBTAINED FROM THE NAPA COUNTY BUILDING & ENFORCEMENT SERVICES DEPARTMENT, LOSING DIVISION, ON JANUARY 31, 2013.



GRADING QUANTITIES*

CUT	409.1 CY
FILL	10,809.1 CY
NET	3,980.3 CY (FILL)

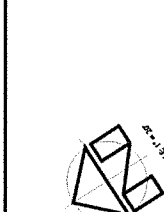
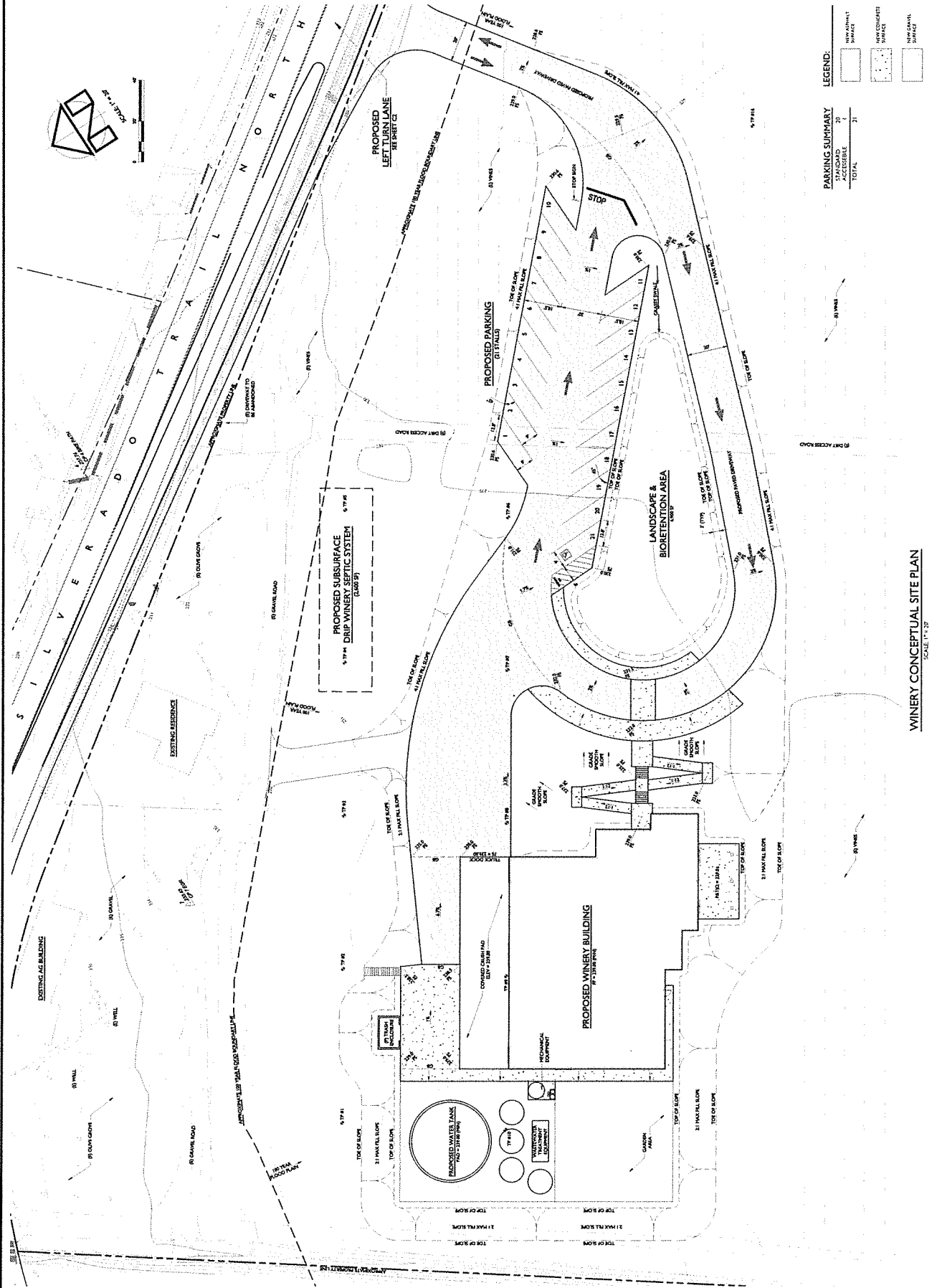
*THE ESTIMATES PROVIDED AS A TOOL FOR THE BROWNING ASSOCIATED TO EVALUATE THE ENVIRONMENTAL IMPACTS OF THE PROJECT. IF IS NOT TO BE USED FOR PERMITTING PURPOSES, THE ESTIMATES SHOULD BE USED TO OBTAIN THE MOST ACCURATE AND REALISTIC ESTIMATES POSSIBLE. THE ESTIMATES PROVIDED ABOVE, THE ESTIMATES ARE BASED ON THE PLACE VOLUMES AND DOES NOT INCLUDE PAVING, AGGREGATES OR SELECT FILL VOLUME.

VINEYARD STATISTICS

EXISTING VINEYARD	264 ACRES
PROPOSED VINEYARD	211 ACRES*

*APPROXIMATELY 28 ACRES OF VINES WILL BE EXCLUDED BY ORDER TO ACCOMMODATE DEVELOPMENT OF THE PROPOSED WINERY.

OVERALL SITE PLAN
SCALE: 1" = 40'



PARKING SUMMARY

STALLS	21
ACCESSIBLE	21
TOTAL	21

LEGEND:

- IMPAVMENT
- IMPACT
- IMPACT
- IMPACT

WINERY CONCEPTUAL SITE PLAN
SCALE 1" = 30'

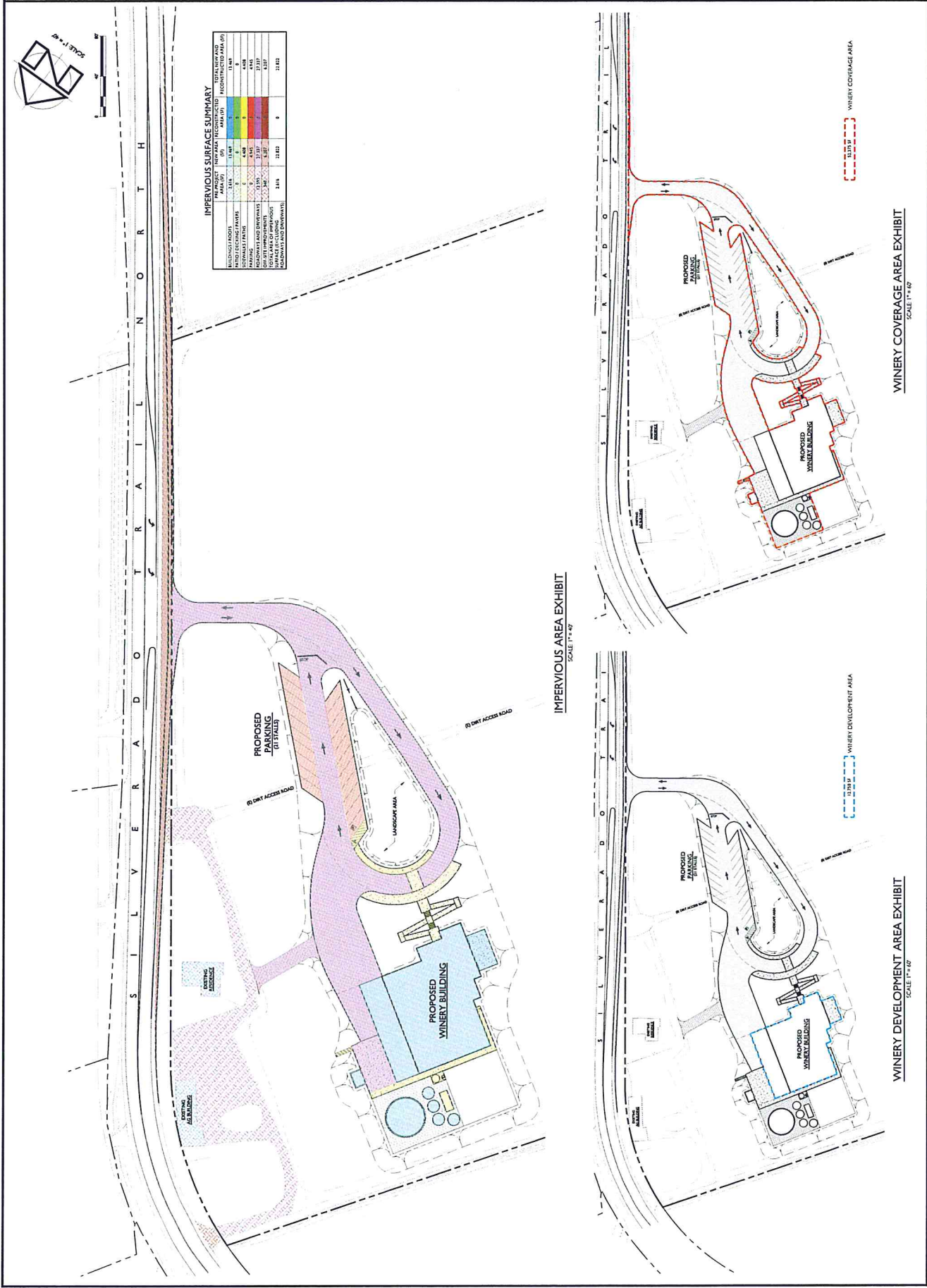
TITUS WINERY
2971 SILVERADO TRAIL NORTH
ST. HELENA, CA 94574
NAPA COUNTY APN 021-353-013

US PERMIT CONCEPTUAL SITE PLAN

TITUS WINERY
DESIGNED BY: PPH
DRAWN BY: BT
CHECKED BY: PPH

APPLIED
2024 West Lincoln Avenue
Napa, CA 94558
(707) 252-9968 (707) 252-2955 fax
www.appliedcivil.com

DATE: SEPTEMBER 2023
JOB NUMBER: 11-172
FILE: 11-172_C01_SITING
ORIGINAL SIZE: 11" x 17"
SCALE: AS NOTED
SHEET NUMBER: C3



IMPERVIOUS SURFACE SUMMARY

IMPERVIOUS SURFACE TYPE	AREA (SQ FT)	PERCENTAGE
ROADWAY	1,184	1.1%
PARKING	10,750	10.7%
DRIVEWAYS	1,184	1.1%
LANDSCAPE	1,184	1.1%
TOTAL	14,302	14.3%

IMPERVIOUS AREA EXHIBIT
 SCALE: 1" = 40'

WINERY DEVELOPMENT AREA EXHIBIT
 SCALE: 1" = 40'

WINERY COVERAGE AREA EXHIBIT
 SCALE: 1" = 40'

APPENDIX 3: Site Evaluation Reports and Test Pit Map

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 #:E11-00603

APN:021-353-013

(County/Use Only)

Reviewed by:

Date:

PLEASE PRINT OR TYPE ALL INFORMATION

Property Owner Lee Titus & Sons LTD.	<input checked="" type="checkbox"/> New Construction <input type="checkbox"/> Addition <input type="checkbox"/> Remodel <input type="checkbox"/> Relocation <input type="checkbox"/> Other:
Property Owner Mailing Address 3264 Ehlers Lane	<input type="checkbox"/> Residential - # of Bedrooms: Design Flow : gpd
City State Zip St. Helena CA 94574	<input checked="" type="checkbox"/> Commercial - Type: Winery Sanitary Waste: ~200 gpd Process Waste: ~800 gpd
Site Address/Location 2971 Silverado Trail North St. Helena, CA 94574	<input type="checkbox"/> Other: Sanitary Waste: gpd Process Waste: gpd

Evaluation Conducted By:

Company Name Applied Civil Engineering Incorporated	Evaluator's Name Michael R. Muelrath, R.C.E. 67435	Signature (Civil Engineer, R.E.H.S., Geologist, Soil Scientist) <i>Michael R. Muelrath</i>
Mailing Address: 2074 West Lincoln Avenue		Telephone Number (707) 320-4968
City State Zip Napa CA 94558		Date Evaluation Conducted December 15, 2011

Primary Area

Acceptable Soil Depth: 30 to 48 inches Test pit #'s: 1 through 10
Soil Application Rate (gal. /sq. ft. /day): 0.6
System Type(s) Recommended: Subsurface Drip
Slope: <5% Distance to nearest water source: 100+ feet
Hydrometer test performed? No Yes (attach results)
Bulk Density test performed? No Yes (attach results)
Percolation test performed? No Yes (attach results)
Groundwater Monitoring Performed? No Yes (attach results)

Expansion Area

Acceptable Soil Depth: inches Test pit #'s: 11, 12
Soil Application Rate (gal. /sq. ft. /day): 0.25
System Type(s) Recommended: Standard
Slope: <5% Distance to nearest water source: 100+ feet
Hydrometer test performed? No Yes (attach results)
Bulk Density test performed? No Yes (attach results)
Percolation test performed? No Yes (attach results)
Groundwater Monitoring Performed? No Yes (attach results)

Site constraints/Recommendations:

The purpose of this site evaluation was to find an area on the subject parcel to install a new septic system to serve a planned 10,000 case winery. The primary setbacks in the area tested on the site are the 100' setback to the existing wells and the 25' setback from the open channel drainage course that runs along the northwesterly property line.

The primary constraint in the area tested is the potential for a seasonally elevated groundwater table as evidenced by mottling. We recommend that groundwater monitoring be performed to verify seasonal groundwater levels. We have not proposed a primary standard system in the vicinity of Test Pits #10 & #11 because the property owner wishes to keep the system located closer to the building site and out of this more valuable vineyard land. Although we did not observe mottling in Test Pits #10 and #11 we recommend that groundwater monitoring be performed in this area as well to verify seasonal groundwater elevations.

If a subsurface drip type system is used special design consideration will be required to ensure that the winery process wastewater is treated to the required effluent quality standards. Alternatively, the process wastewater could be handled separately via a hold and haul system or pretreatment and surface drip irrigation. Depending on final site layout and design flows a shallow pressure distribution or infiltrator chamber system may be possible in the areas with at least 48 inches of acceptable soil.

It should be noted that there is a subsurface drainage system located throughout portions of the vineyard. All subdrains must be removed from any area that is to be used for a septic field.

PLEASE PRINT OR TYPE ALL INFORMATION

Test Pit #1

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-42	C	0-15	CL	WAB	VH	VF	S	MF/FM	FF/FM	NONE
42-73		0-15	CL	WAB	VH	VF	S	MF/FM	FF	FMD

Acceptable soil depth = 42"

Test Pit #2

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-36	C	0-15	CL	MAB	H	F	S	MF/FM	FF/FM	NONE
36-73		0-15	CL	MAB	H	F	S	MF/FM	FF	FMD

Acceptable soil depth = 36"

Test Pit #3

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-36	C	0-15	CL	MAB	H	F	S	MF/FM	FF/FM	NONE
36-73		0-15	CL	MAB	H	F	S	MF/FM	FF	FMFt

Acceptable soil depth = 36" Water observed at the bottom of pit.

Test Pit #4

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-30	C	0-15	CL	MAB	H	F	S	MF/FM	FF/FM	NONE
30-89		0-15	CL	MAB	H	F	S	MF/FM	FF	FMD

Acceptable soil depth = 30"

Test Pit #5

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-54	C	0-15	CL	MAB	H	F	S	MF/FM	CF/FM	NONE
54-89		0-15	CL	MAB	H	F	S	MF/FM	CF	FMFt

Acceptable soil depth = 54"

Test Pit #6

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-48	C	0-15	CL	MAB	H	F	S	MF/FM	CF/FM	NONE
48-90		0-15	CL	MAB	H	F	S	MF/FM	FF	FMFt

Acceptable soil depth = 48"

Test Pit #7

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-48	C	0-15	CL	MAB	H	F	S	MF/CM	CF/FM	NONE
48-80		0-15	CL	MAB	H	F	S	MF/CM	FF	FMD

Acceptable soil depth = 48"

Test Pit #8

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-42	C	0-15	CL	MAB	H	F	S	MF/FM	CF/FM	NONE
42-80		0-15	CL	MAB	SH	F	S	MF/FM	FF	FMFt

Acceptable soil depth = 42"

Test Pit #9

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-48	C	0-15	CL	MAB	H	F	S	MF/FM	FF/FM	NONE
48-88		0-15	CL	MAB	SH	F	S	MF/MM	FF	FMFt

Acceptable soil depth = 48" Water observed at the bottom of pit.

Test Pit #10

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-42	C	0-15	CL	MAB	H	F	S	MF/FM	FF/FM	NONE
42-84		0-15	CL	MAB	H	F	S	MF/FM	FF	FMFt

Acceptable soil depth = 42"

Test Pit #11

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-30	C	0-15	CL	WSB	S	VFRB	S	MF/FM	FF/FM	NONE
30-84		0-15	CL	MSB	SH	FRB	S	MF/MM	FF	NONE

Acceptable soil depth = 84"

Test Pit #12

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-50	C	0-15	CL	WSB	S	VFRB	S	MF/FM	FF/FM	NONE
50-80		0-15	CL	MSB	SH	FRB	S	MF/MM	FF/FM	NONE

Acceptable soil depth = 80"

Test Pit #13

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-36	C	0-15	CL	WSB	S	VFRB	S	MF/FM	FF/FM	NONE
36-67	G	0-15	CL	MSB	SH	FRB	S	MF/FM	FF	FMFt
67-76		>50%								

Acceptable soil depth = 36"

LEGEND

Boundary	Texture	Structure	Consistence			Pores	Roots	Mottling
			Side Wall	Ped	Wet			
A=Abrupt <1"	S=Sand	W=Weak	L=Loose S=Soft SH=Slightly 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 VC=Very Coarse	Quantity: F=Few C=Common M=Many Size: F=Fine M=Medium C=Coarse VC=Very Coarse ExC=Extremely Coarse	Quantity: F=Few C=Common M=Many Size: F=Fine M=Medium C=Coarse Contrast: Ft=Faint D=Distinct P=Prominent
C=Clear 1"-2.5"	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	S=Strong G=Granular PI=Platy Pr=Prismatic C=Columnar B=Blocky AB=Angular Blocky SB=Subangular Blocky M=Massive SG=Single Grain CEM=Cemented						
G=Gradual 2.5"-5"								
D=Difuse>5"								

Notes:

Structure is recorded as Modifier then Structure - for example, Moderate (M) Subangular Blocky (SB) is recorded as MSB

Pores and Roots are recorded as Quantity then Size - for example Few (F) Coarse (C) is recorded as FC

Mottling is recorded as Quantity then Size then Contrast - for example Few (F) Coarse (C) Distinct (D) is recorded as FCD



LOCATION MAP
NO SCALE

NOTES:

1. TEST PITS ONE THROUGH THIRTEEN (TP #1 - TP #13) WERE EXCAVATED BY PINA VINEYARD MANAGEMENT ON DECEMBER 15, 2011 AND WERE WITNESSED BY A REPRESENTATIVE OF APPLIED CIVIL ENGINEERING INCORPORATED AND NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT.
2. FADED BACKGROUND REPRESENTS EXISTING TOPOGRAPHIC FEATURES. TOPOGRAPHIC INFORMATION AND 2007 AERIAL PHOTOGRAPHS WERE OBTAINED FROM THE NAPA COUNTY GEOGRAPHIC INFORMATION SYSTEM (GIS) DATABASE. APPLIED CIVIL ENGINEERING INCORPORATED ASSUMES NO LIABILITY REGARDING THE ACCURACY OR COMPLETENESS OF THE TOPOGRAPHIC INFORMATION.

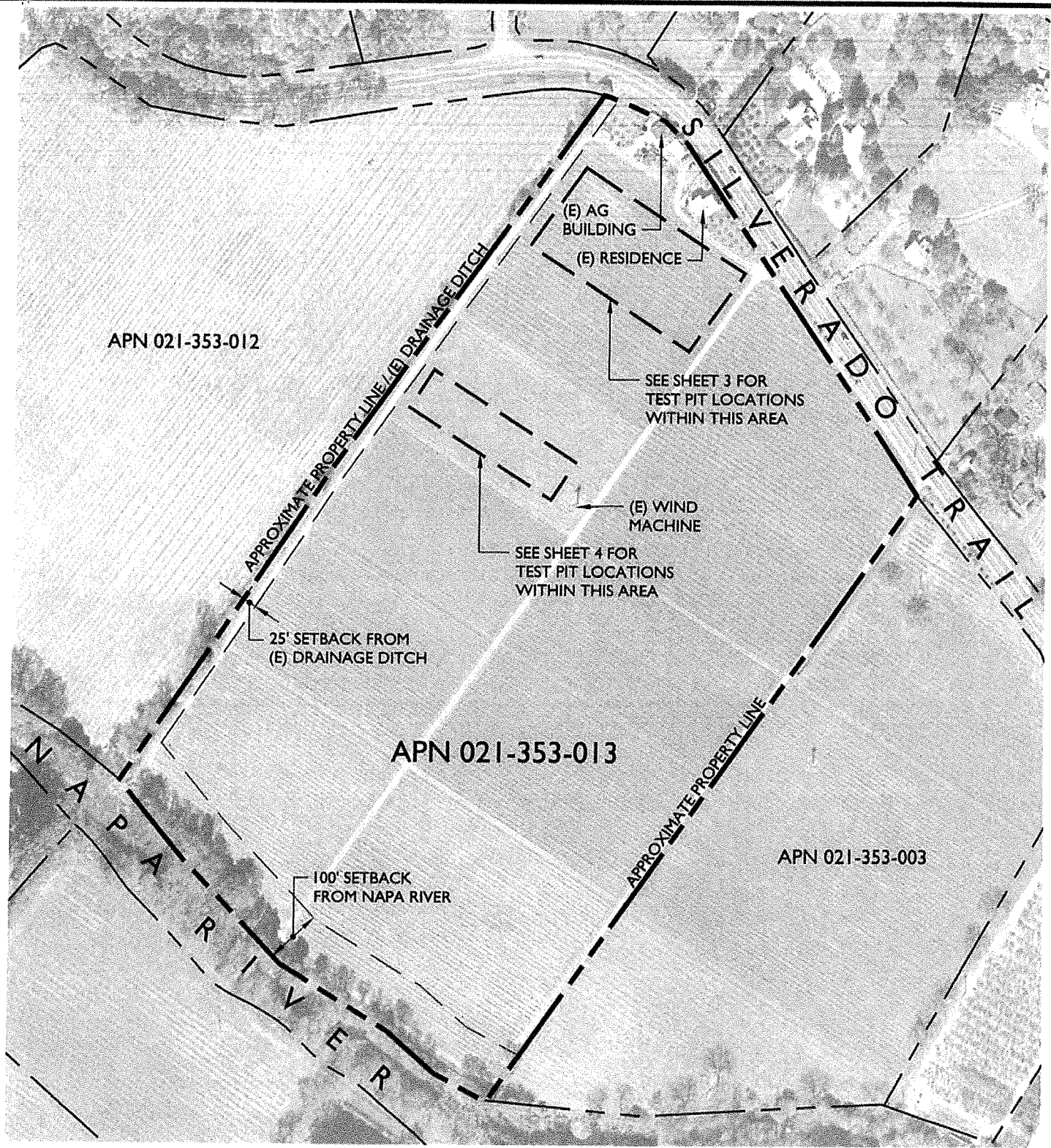


2074 West Lincoln Avenue
Napa, CA 94558
(707) 320-4968 (707) 320-2395 Fax
www.appliedcivil.com

TITUS VINEYARDS
2971 SILVERADO TRAIL NORTH
ST. HELENA, CA 94574
APN 021-353-013

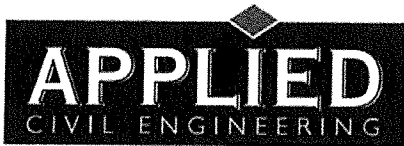


NO SCALE



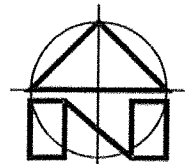
OVERALL SITE PLAN

SCALE: 1" = 250'

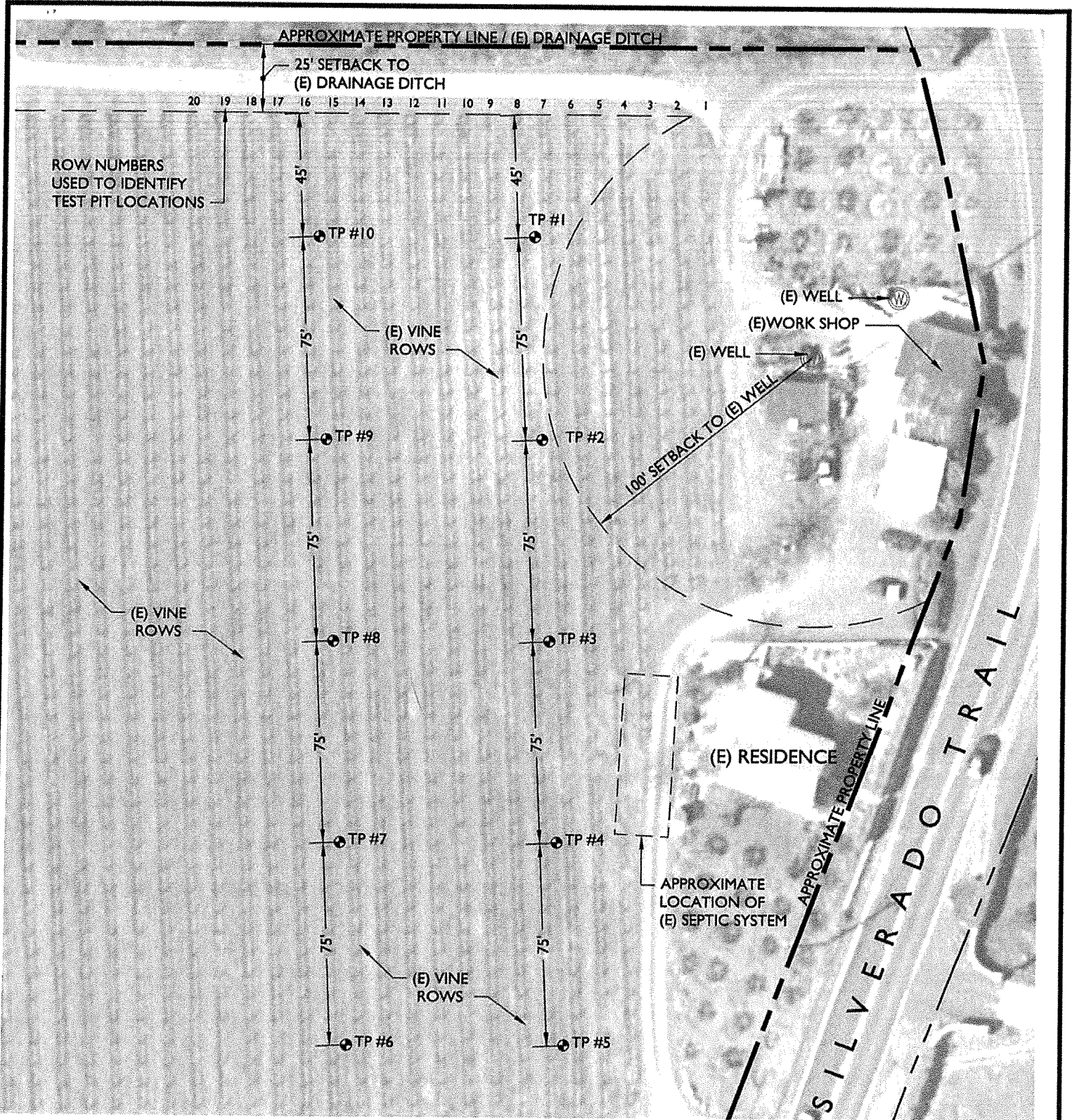


2074 West Lincoln Avenue
 Napa, CA 94558
 (707) 320-4968 (707) 320-2395 Fax
 www.appliedcivil.com

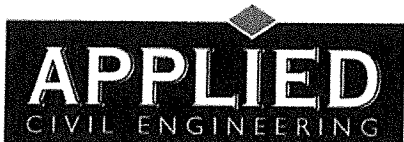
TITUS VINEYARDS
 2971 SILVERADO TRAIL NORTH
 ST. HELENA, CA 94574
 APN 021-353-013



SCALE: 1" = 250'

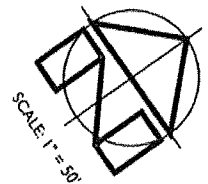


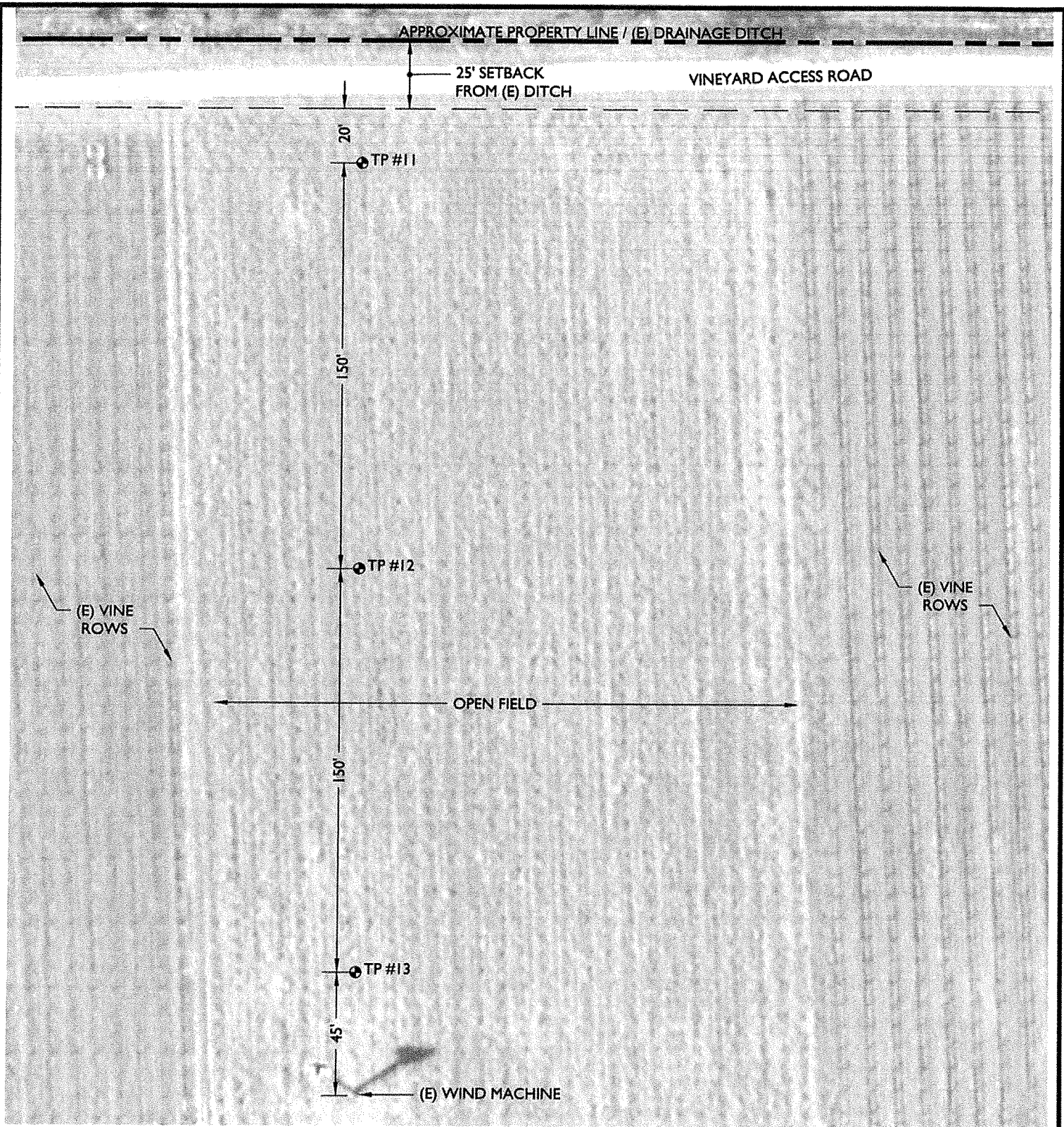
TEST PIT MAP
SCALE: 1" = 50'



2074 West Lincoln Avenue
Napa, CA 94558
(707) 320-4968 (707) 320-2395 Fax
www.appliedcivil.com

TITUS VINEYARDS
2971 SILVERADO TRAIL NORTH
ST. HELENA, CA 94574
APN 021-353-013

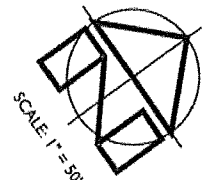




TEST PIT MAP
SCALE: 1" = 50'

APPLIED
CIVIL ENGINEERING
INCORPORATED
2074 West Lincoln Avenue
Napa, CA 94558
(707) 320-4968 (707) 320-2395 Fax
www.appliedcivil.com

TITUS VINEYARDS
2971 SILVERADO TRAIL NORTH
ST. HELENA, CA 94574
APN 021-353-013



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 #: E13-00029	
APN: 021-353-013	
(County Use Only) Reviewed by:	Date:

PLEASE PRINT OR TYPE ALL INFORMATION

Property Owner Lee Titus & Sons LTD.	<input checked="" type="checkbox"/> New Construction <input type="checkbox"/> Addition <input type="checkbox"/> Remodel <input type="checkbox"/> Relocation <input type="checkbox"/> Other:
Property Owner Mailing Address 3264 Ehlers Lane	<input type="checkbox"/> Residential - # of Bedrooms: Design Flow : gpd
City State Zip St. Helena CA 94574	<input checked="" type="checkbox"/> Commercial - Type: Winery Sanitary Waste: ~300 - 500 gpd Process Waste: ~1,200 gpd
Site Address/Location 2971 Silverado Trail North St. Helena, CA 94574	<input type="checkbox"/> Other: Sanitary Waste: gpd Process Waste: gpd



Evaluation Conducted By:

Company Name Applied Civil Engineering Incorporated	Evaluator's Name Michael R. Muelrath, R.C.E. 67435	Signature: (Civil Engineer, R.E.H.S., Geologist, Soil Scientist) <i>Michael R. Muelrath</i>
Mailing Address: 2074 West Lincoln Avenue		Telephone Number (707) 320-4968
City State Zip Napa CA 94558		Date Evaluation Conducted February 6, 2013

<u>Primary Area</u>	<u>Expansion Area</u>
Acceptable Soil Depth: 24 inches Test pit #'s: 14 through 19	Acceptable Soil Depth: 24 inches Test pit #'s: 14 through 19
Soil Application Rate (gal. /sq. ft. /day): 0.6	Soil Application Rate (gal. /sq. ft. /day): 0.6
System Type(s) Recommended: Subsurface Drip	System Type(s) Recommended: Subsurface Drip
Slope: <5% Distance to nearest water source: 100+ feet	Slope: <5% Distance to nearest water source: 100+ feet
Hydrometer test performed? No X Yes <input type="checkbox"/> (attach results)	Hydrometer test performed? No X Yes <input type="checkbox"/> (attach results)
Bulk Density test performed? No X Yes <input type="checkbox"/> (attach results)	Bulk Density test performed? No X Yes <input type="checkbox"/> (attach results)
Percolation test performed? No X Yes <input type="checkbox"/> (attach results)	Percolation test performed? No X Yes <input type="checkbox"/> (attach results)
Groundwater Monitoring Performed? No X Yes <input type="checkbox"/> (attach results)	Groundwater Monitoring Performed? No X Yes <input type="checkbox"/> (attach results)

Site constraints/Recommendations:

The purpose of this site evaluation was to explore additional area on the subject parcel to find soil suitable to install a new septic system to serve a planned winery.

The primary setbacks in the area tested on the site are the 100' setback to the existing wells and the 25' setback from the open channel drainage course that runs along the southerly property line.

The primary constraint in the area tested is the potential for a seasonally elevated groundwater table as evidenced by mottling.

If a subsurface drip type system is used special design consideration will be required to ensure that the winery process wastewater is treated to the required effluent quality standards. Alternatively, the process wastewater could be handled separately via a hold and haul system or pretreatment and surface drip irrigation.

It should be noted that there is a subsurface drainage system located throughout portions of the vineyard. All subdrains must be removed from any area that is to be used for a septic field and at least 50 feet beyond the septic field area.

PLEASE PRINT OR TYPE ALL INFORMATION**Test Pit #14**

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-24	G	0-15	CL	MSB	S	FRB	SS	CF/FM	FF	NONE
24-72		0-15	CL	MSB	S	FRB	SS	CF/CM	FF/FM	CFFt

Standing water at 44" 2 days after excavation
Acceptable soil depth = 24"

Test Pit #15

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-24	G	0-15	CL	MSB	S	FRB	SS	CF/FM	FF	NONE
24-72		0-15	CL	MSB	S	FRB	SS	CF/CM	FF/FM	CFFt

Standing water at 44" 2 days after excavation
Acceptable soil depth = 24"

Test Pit #16

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-24	G	0-15	CL	MSB	S	FRB	SS	CF/FM	FF	NONE
24-72		0-15	CL	MSB	S	FRB	SS	CF/CM	FF/FM	CFFt

Standing water at 48" 2 days after excavation
Acceptable soil depth = 24"

Test Pit #17

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-24	G	0-15	CL	MSB	S	FRB	SS	CF/FM	FF	NONE
24-72		0-15	CL	MSB	S	FRB	SS	CF/CM	FF/FM	CFFt

Standing water at 56" 2 days after excavation
Acceptable soil depth = 24"

Test Pit #18

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-24	G	0-15	CL	MSB	S	FRB	SS	CF/FM	FF	NONE
24-72		0-15	CL	MSB	S	FRB	SS	CF/CM	FF/FM	CFFt

Standing water at 72" 2 days after excavation
 Acceptable soil depth = 24"

Test Pit #19

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-24	G	0-15	CL	MSB	S	FRB	SS	CF/FM	FF	NONE
24-72		0-15	CL	MSB	S	FRB	SS	CF/CM	FF/FM	CFFt

Standing water at 48" 2 days after excavation
 Acceptable soil depth = 24"

LEGEND

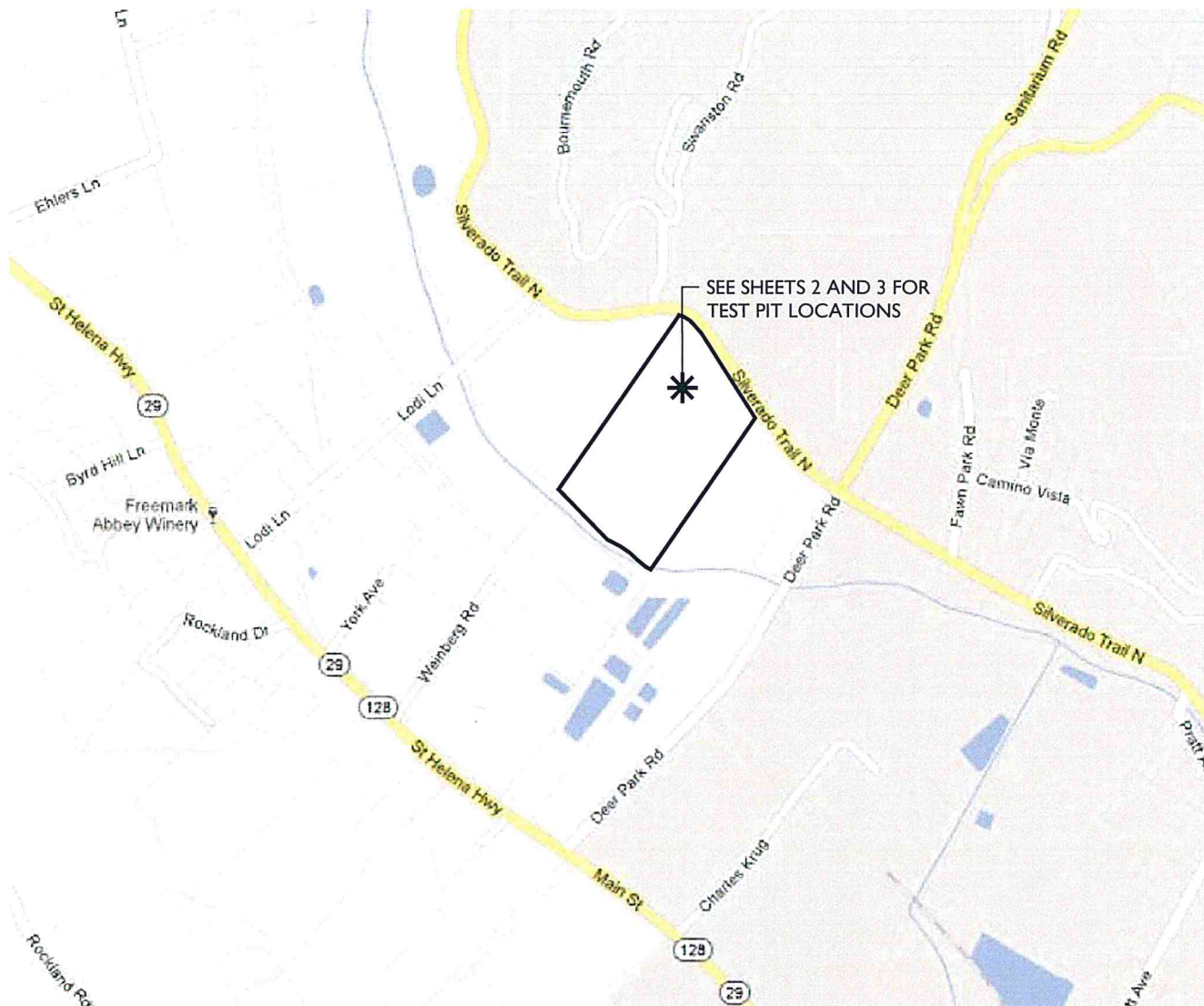
Boundary	Texture	Structure	Consistence			Pores	Roots	Mottling
			Side Wall	Ped	Wet			
A=Abrupt <1" C=Clear 1"- 2.5" G=Gradual 2.5"-5" D=Difuse>5"	S=Sand LS=Loamy Sand SL=Sandy Loam SCL=Sandy Clay Loam SC=Sandy Clay CL=Clay Loam L=Loam C=Clay SiC=Silty Clay SiCL=Silty Clay Loam SiL=Silt Loam Si=Silt	W=Weak M=Moderate S=Strong G=Granular Pl=Platy Pr=Prismatic C=Columnar B=Blocky AB=Angular Blocky SB=Subangular Blocky M=Massive SG=Single Grain CEM=Cemented	L=Loose S=Soft SH=Slightly 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	<u>Quantity:</u> F=Few C=Common M=Many <u>Size:</u> VF=Very Fine F=Fine M=Medium C=Coarse VC=Very Coarse	<u>Quantity:</u> F=Few C=Common M=Many <u>Size:</u> F=Fine M=Medium C=Coarse VC=Very Coarse ExC=Extremely Coarse	<u>Quantity:</u> F=Few C=Common M=Many <u>Size:</u> F=Fine M=Medium C=Coarse <u>Contrast:</u> Ft=Faint D=Distinct P=Prominent

Notes:

Structure is recorded as Modifier then Structure - for example, Moderate (M) Subangular Blocky (SB) is recorded as MSB

Pores and Roots are recorded as Quantity then Size - for example Few (F) Coarse (C) is recorded as FC

Mottling is recorded as Quantity then Size then Contrast - for example Few (F) Coarse (C) Distinct (D) is recorded as FCD

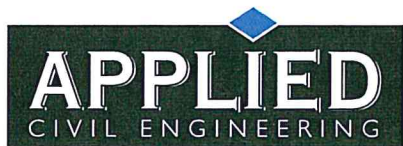


LOCATION MAP

NO SCALE

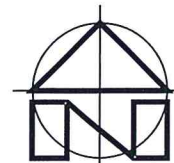
NOTES:

1. TEST PITS ONE THROUGH THIRTEEN (TP #1 - TP #13) WERE EXCAVATED BY PINA VINEYARD MANAGEMENT ON DECEMBER 15, 2011 AND WERE WITNESSED BY A REPRESENTATIVE OF APPLIED CIVIL ENGINEERING INCORPORATED AND NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT (SEE EI 1-00603).
2. TEST PITS FOURTEEN THROUGH NINETEEN (TP #14 - TP #19) WERE EXCAVATED BY PINA VINEYARD MANAGEMENT ON FEBRUARY 6, 2013 AND WERE WITNESSED BY A REPRESENTATIVE OF APPLIED CIVIL ENGINEERING INCORPORATED AND NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT.
3. FADED BACKGROUND REPRESENTS EXISTING TOPOGRAPHIC FEATURES. TOPOGRAPHIC INFORMATION AND 2007 AERIAL PHOTOGRAPHS WERE OBTAINED FROM THE NAPA COUNTY GEOGRAPHIC INFORMATION SYSTEM (GIS) DATABASE. APPLIED CIVIL ENGINEERING INCORPORATED ASSUMES NO LIABILITY REGARDING THE ACCURACY OR COMPLETENESS OF THE TOPOGRAPHIC INFORMATION.
4. FLOODPLAIN / FLOODWAY INFORMATION IS APPROXIMATE. SEE FEMA FIRM COMMUNITY PANEL 06055C0263E FOR MORE INFORMATION.

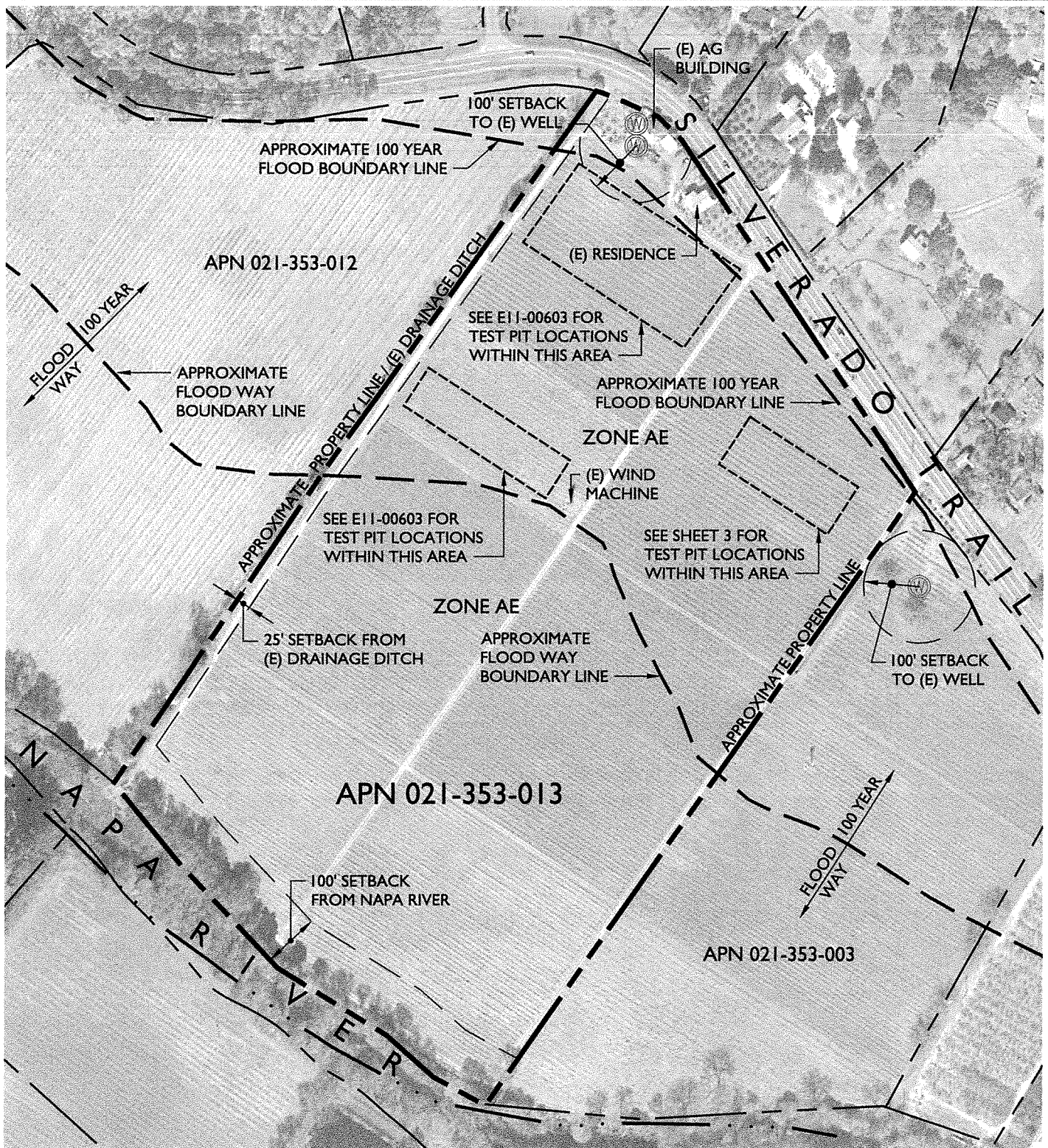


2074 West Lincoln Avenue
 Napa, CA 94558
 (707) 320-4968 (707) 320-2395 Fax
 www.appliedcivil.com

TITUS VINEYARDS
 2971 SILVERADO TRAIL NORTH
 ST. HELENA, CA 94574
 APN 021-353-013

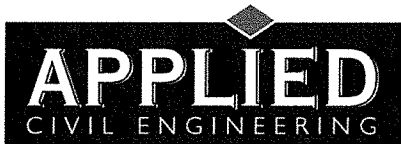


NO SCALE



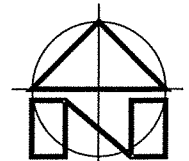
OVERALL SITE PLAN

SCALE: 1" = 250'

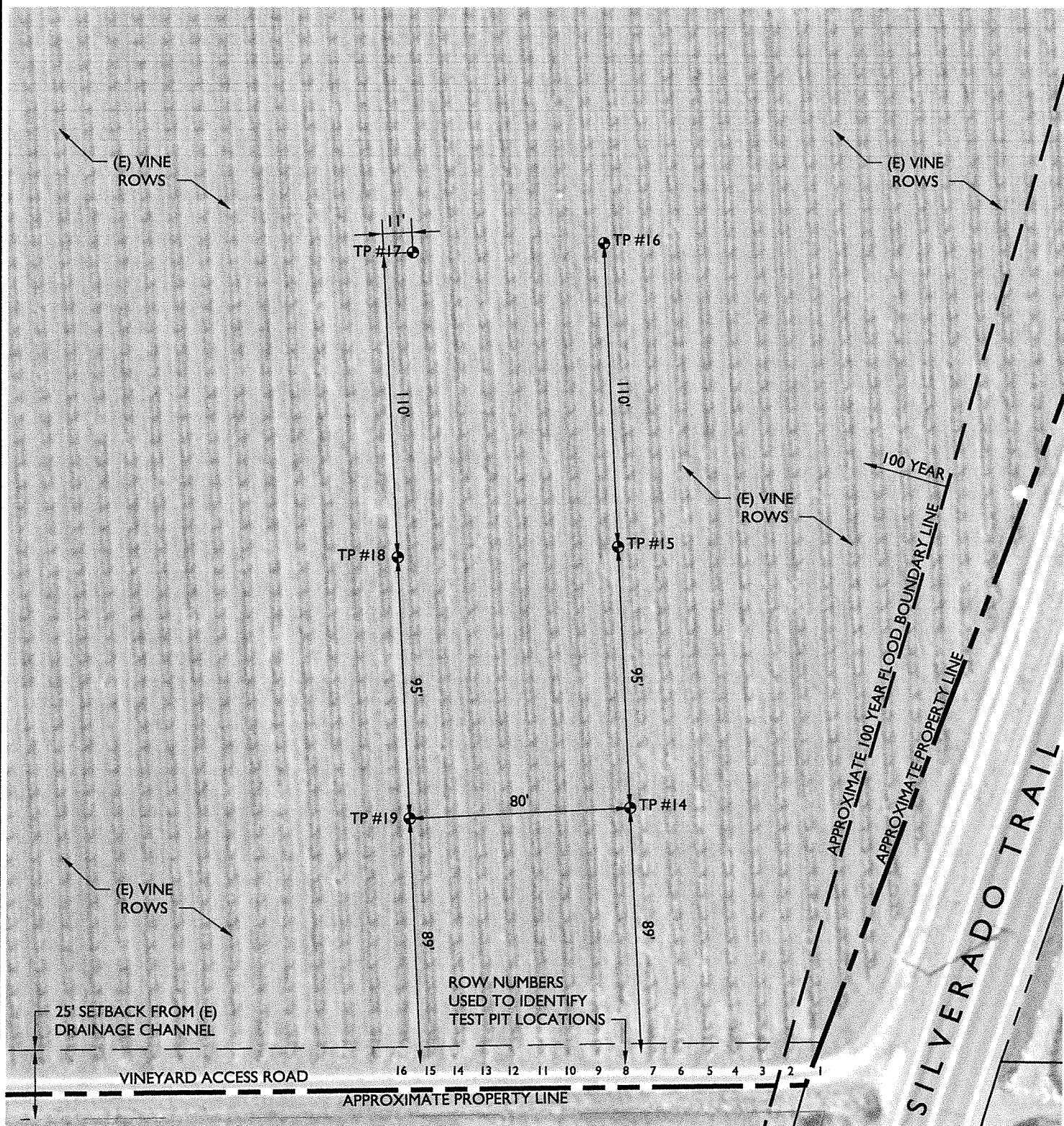


2074 West Lincoln Avenue
 Napa, CA 94558
 (707) 320-4968 (707) 320-2395 Fax
 www.appliedcivil.com

TITUS VINEYARDS
 2971 SILVERADO TRAIL NORTH
 ST. HELENA, CA 94574
 APN 021-353-013

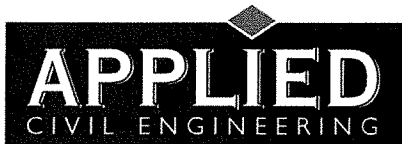


SCALE: 1" = 250'



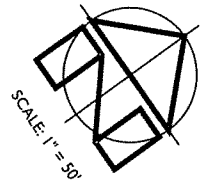
TEST PIT MAP

SCALE: 1" = 50'



2074 West Lincoln Avenue
 Napa, CA 94558
 (707) 320-4968 (707) 320-2395 Fax
 www.appliedcivil.com

TITUS VINEYARDS
 2971 SILVERADO TRAIL NORTH
 ST. HELENA, CA 94574
 APN 021-353-013



APPENDIX 4: Treated Process Wastewater Storage Tank Calculations

Irrigation Storage Tank Water Balance

Month	Beginning Balance	Process Wastewater	Land Application	Ending Balance
January	0	7,200	43,444	0
February	0	7,200	43,444	0
March	0	7,200	43,444	0
April	0	5,760	43,444	0
May	0	5,760	13,613	0
June	0	7,200	34,031	0
July	0	10,800	34,031	0
August	0	14,400	20,419	0
September	0	23,760	20,419	3,341
October	3,341	21,600	57,056	0
November	0	18,720	43,444	0
December	0	14,400	43,444	0
		144,000	440,232	

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 empty in August, just prior to crush.
4. Where irrigation demand exceeds available treated wastewater availability additional irrigation water will be provided by a well or non-irrigation land application will be reduced accordingly.

Winery Process Wastewater Generation Analysis

Annual Wine Production 24,000 gallons
 Wastewater Generation Rate 6 gallons per gallon of wine
 Annual Wastewater Generation 144,000 gallons
 Crush Season Length 45 days
 Wastewater Generated During Crush 1.5 gallons per gallon of wine
 Peak Wastewater Generation Rate 800 gallons per day

Winery Process Wastewater Generation Table

Month	Percentage of Annual Total	Monthly Flow (gallons)	Average Flow (gpd)
January	5.0%	7,200	232
February	5.0%	7,200	257
March	5.0%	7,200	232
April	4.0%	5,760	192
May	4.0%	5,760	186
June	5.0%	7,200	240
July	7.5%	10,800	348
August	10.0%	14,400	465
September	16.5%	23,760	792
October	15.0%	21,600	697
November	13.0%	18,720	624
December	10.0%	14,400	465
Total	100.0%	144,000	

Notes:
 1. Wastewater generation rates and monthly proportioning are based on our past experience with similar projects and input from the winery management team.

Irrigation Schedule Analysis

Vineyard Information:

Total acres of vines	2 acres
Vine Row Spacing	8 feet
Vine Spacing	6 feet
Vine density	908 vines per acre
Total Vine Count	1,815 vines

Irrigation Information:

Seasonal Irrigation¹ 75.0 gallons per vine (May through October)

Non-Irrigation Application 0.8 inches October through April

Irrigation Schedule					
Month	Monthly Percentage ²	Irrigation per Vine (gallons)	Irrigation (gallons)	Non-Irrigation Application (gallons)	Total (gallons)
January		0.0	0	43,444	43,444
February		0.0	0	43,444	43,444
March		0.0	0	43,444	43,444
April		0.0	0	43,444	43,444
May	10%	7.5	13,613	0	13,613
June	25%	18.8	34,031	0	34,031
July	25%	18.8	34,031	0	34,031
August	15%	11.3	20,419	0	20,419
September	15%	11.3	20,419	0	20,419
October	10%	7.5	13,613	43,444	57,056
November		0.0	0	43,444	43,444
December		0.0	0	43,444	43,444
Total	100%	75.0	136,125	304,107	440,232

Notes:

1. Irrigation per vine is based on 0.2 acre-feet per acre of vines
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. This is the maximum that can be applied during the non-irrigation season and less may be applied depending on water useage at the winery.