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Wastewater Feasibility Study

ONSITE WASTEWATER DISPOSAL FEASIBILITY STUDY

FOR THE

KITOKO VINEYARDS WINERY

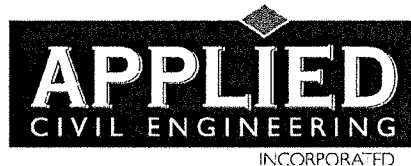
LOCATED AT:

3201 Atlas Peak Road
Napa, CA 94558
NAPA COUNTY APN 033-010-034

PREPARED FOR:

Kitoko Vineyards LLC
Care Of: Philippe Langner
3201 Atlas Peak Road
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9/12/2017

Date



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INTRODUCTION

Kitoko Vineyards LLC is applying for a Use Permit to construct and operate a new winery at their property located at 3201 Atlas Peak Road in Napa County, California. The subject property, known as Napa County Assessor's Parcel Number 033-010-034, is located along the west side of Atlas Peak Road approximately 4.3 miles north of the intersection of Atlas Peak Road and Hardman Avenue.

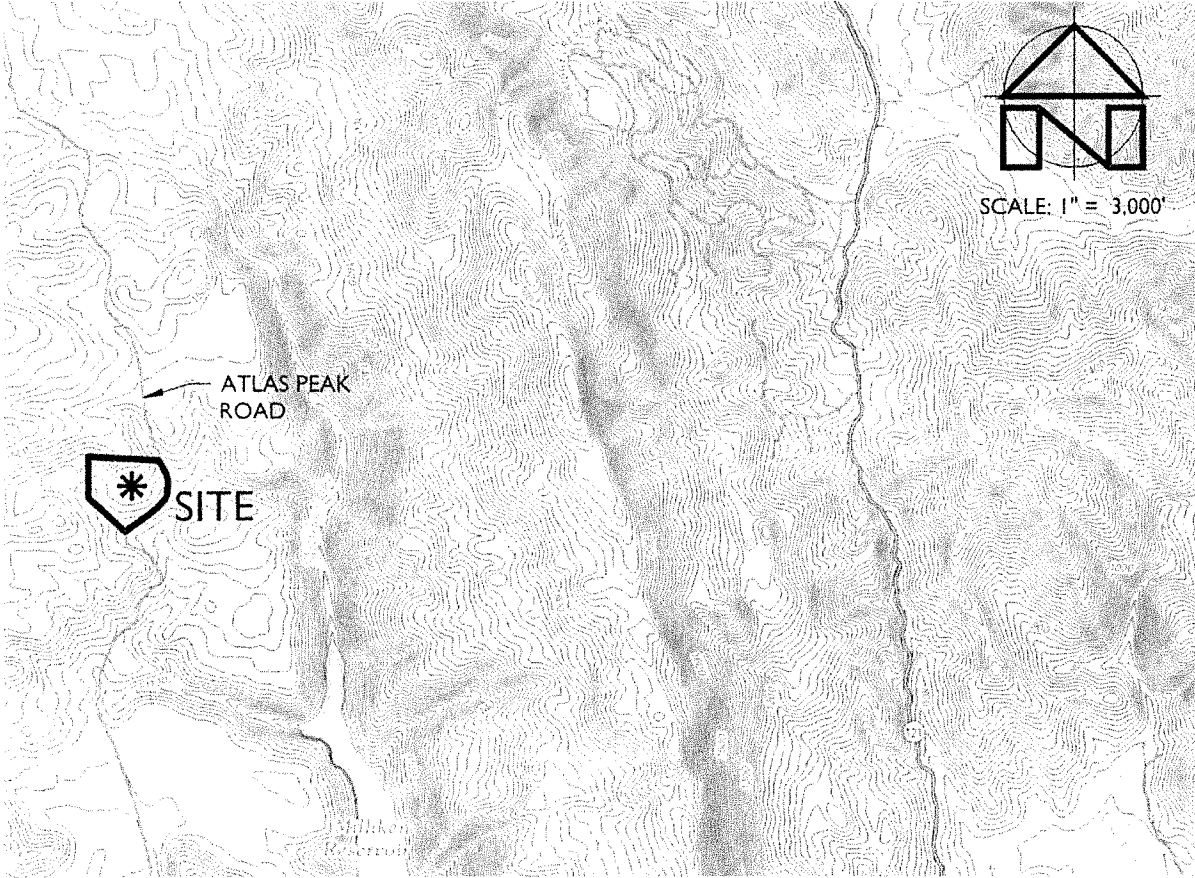


Figure 1: Location Map

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

- Wine Production:
 - 40,000 gallons of wine per year
 - Crushing, fermenting, aging and bottling

- Employees:
 - 4 full time employees
 - 3 part time employees

- Marketing Plan:
 - Daily Tours and Tastings by Appointment
 - 20 visitors per day maximum
 - Smaller Marketing Events
 - 10 per year
 - 30 guests maximum
 - Food prepared offsite by catering company
 - Larger Marketing Events
 - 1 per year
 - 100 guests maximum
 - Food prepared offsite by catering company
 - Portable toilets brought in for guest use

Existing development on the property includes a single-family residence, a shop a groundwater well and the access and utility infrastructure typical of this type of rural residential and agricultural development. Please see the Kitoko Vineyards Winery Use Permit Conceptual Site Plans for approximate locations of existing and proposed features.

Kitoko Vineyards has 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 winery process and sanitary wastewater flows and outlines conceptual designs for options to onsite wastewater treatment and disposal.

SOILS INFORMATION

The United States Department of Agriculture Soil Conservation Service Soils Map for Napa County shows the entire property mapped as Hambright-Rock outcrop complex, 2 to 30 percent slopes and Hambright-Rock outcrop complex 30 to 75 percent slopes.

A site specific soils analysis was conducted during a site evaluation performed by ACE on May 11, 2017 (OE17-00068). The site evaluation consisted of the excavation and observation of eleven test pits throughout the property. The test pits generally revealed variable depths of acceptable soil with sandy clay loam texture. The limiting condition that was observed below the topsoil was the rocky subsoils and bedrock.

Please refer to the Site Evaluation Report in Appendix 4 for additional details.

PREDICTED WASTEWATER FLOW

The onsite wastewater disposal system(s) must be designed for the peak winery process wastewater flow and the peak sanitary wastewater flow from the proposed winery.

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:

$$\text{Annual Winery Process Wastewater Flow} = \frac{40,000 \text{ gallons wine}}{\text{year}} \times \frac{6 \text{ gallons wastewater}}{1 \text{ gallon wine}}$$

$$\text{Annual Winery Process Wastewater Flow} = 240,000 \text{ gallons per year}$$

$$\text{Average Daily Winery Process Wastewater Flow} = \frac{240,000 \text{ gallons}}{\text{year}} \times \frac{1 \text{ year}}{365 \text{ days}}$$

$$\text{Average Daily Winery Process Wastewater Flow} = 657 \text{ gallons per day (gpd)}$$

$$\text{Peak Winery Process Wastewater Flow} = \frac{40,000 \text{ gallons wine}}{\text{year}} \times \frac{1.5 \text{ gallons wastewater}}{1 \text{ gallon wine}} \times \frac{1 \text{ year}}{45 \text{ crush days}}$$

$$\text{Peak Winery Process Wastewater Flow} = 1,333 \text{ gpd}$$

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. For marketing events that will have catered meals that are prepared offsite we have conservatively estimated 5 gallons of wastewater per guest. Based on these assumptions, the peak winery sanitary wastewater flows are calculated as follows:

Employees

$$\text{Peak Sanitary Wastewater Flow} = 7 \text{ employees} \times 15 \text{ gpd per employee}$$

$$\text{Peak Sanitary Wastewater Flow} = 105 \text{ gpd}$$

Daily Tours and Tastings

Peak Sanitary Wastewater Flow = 20 visitors per day X 3 gallons per visitor

Peak Sanitary Wastewater Flow = 60 gpd

Smaller Marketing Events with Catered Meals Prepared Offsite:

Peak Sanitary Wastewater Flow = 30 guests X 5 gallons per guest

Peak Sanitary Wastewater Flow = 150 gpd

Larger Events with Catered Meals Prepared Offsite:

Peak Sanitary Wastewater Flow = 100 guests X 5 gallons per guest

Peak Sanitary Wastewater Flow = 500 gpd

Total Peak Winery Sanitary Wastewater Flow

As previously noted, all events with more than 30 guests in attendance will utilize portable sanitary facilities to minimize the load on the septic system. Therefore, 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 marketing event for 30 people and is calculated as follows:

Total Peak Winery Sanitary Wastewater Flow = 105 gpd + 60 gpd + 150 gpd

Total Peak Winery Sanitary Wastewater Flow = 315 gpd

RECOMMENDATIONS

Based on the anticipated wastewater flows, the proposed site layout and the onsite soil conditions it is our opinion that there are at least two feasible options for handling the proposed winery's wastewater onsite.

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 in a single pretreatment system 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:

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

$$\text{Required Disposal Field Area} = \frac{1,648 \text{ gpd}}{0.6 \text{ gpd per square foot}}$$

Required Disposal Field Area = 2,747 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 2,800 square feet of subsurface drip disposal field in the vicinity of Test Pits #5, #8 & #9. The conceptual layout of the disposal field is shown on the Kitoko Vineyards 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. The reserve area must also account for the reserve area required for the existing residence. County permit records indicate the existing residence has two bedrooms and therefore the peak flow from the residence is calculated as 240 gpd. The total design flow for the reserve area for the winery and residence is therefore 1,888 gpd. The required reserve area is calculated as follows:

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

$$\text{Required Reserve Field Area} = 200\% \times \frac{1,888 \text{ gpd}}{0.6 \text{ gpd per square foot}}$$

Required Reserve Area = 6,293 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 6,300 square feet of subsurface drip disposal field in the vicinity of Test Pits #6, #9 & #10 as shown on the Kitoko Vineyards 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, similar to Option #1, and the winery process wastewater would be collected separately, pretreated, stored and dispersed of via a surface irrigation system.

Sanitary Wastewater Treatment and Disposal

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.

Required Disposal Field Area

The required disposal field area is calculated as follows:

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

$$\text{Required Disposal Field Area} = \frac{315 \text{ gpd}}{0.6 \text{ gpd per square foot}}$$

$$\text{Required Disposal Field Area} = 525 \text{ square feet}$$

Available Disposal Field Area

There is enough area to install the required 525 square feet of subsurface drip disposal field in the vicinity of Test Pits #5, #8 and #9.

Reserve Area

The required reserve area, including a 240 gpd allowance for the existing residence, is calculated as follows:

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

$$\text{Required Reserve Field Area} = 200\% \times \frac{555 \text{ gpd}}{0.6 \text{ gpd per square foot}}$$

$$\text{Required Reserve Area} = 1,850 \text{ square feet}$$

There is enough area to accommodate the required 1,850 square feet of reserve area in the vicinity of Test Pits #5, #8 & #9.

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 land area located southwest of the proposed winery building that can be used to dispose of the treated winery process wastewater via irrigation. This is the area that is going to be used for placement of cave tailings. Once the grading is complete the surface soils can be amended and planted with a grass cover crop that can utilize the irrigation water in the spring, summer and fall and will allow percolation of the treated process wastewater when it is applied between rain storms in the winter if needed to maintain adequate tank storage capacity. This area could be expanded dramatically if desired by the Applicant as long as the land dispersal area is outside of all 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 two acre dispersal area. 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 land application 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 area without the needs for extensive

storage. However, we recommend a minimum storage tank capacity of 10,000 gallons to provide operational flexibility in timing of land applications (see Appendix 3).

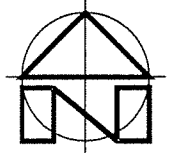
CONCLUSION

It is our opinion that the wastewater from the proposed winery can be accommodated in any of the two 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.

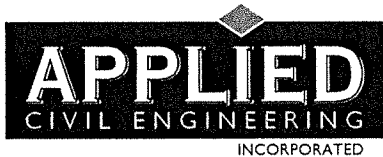
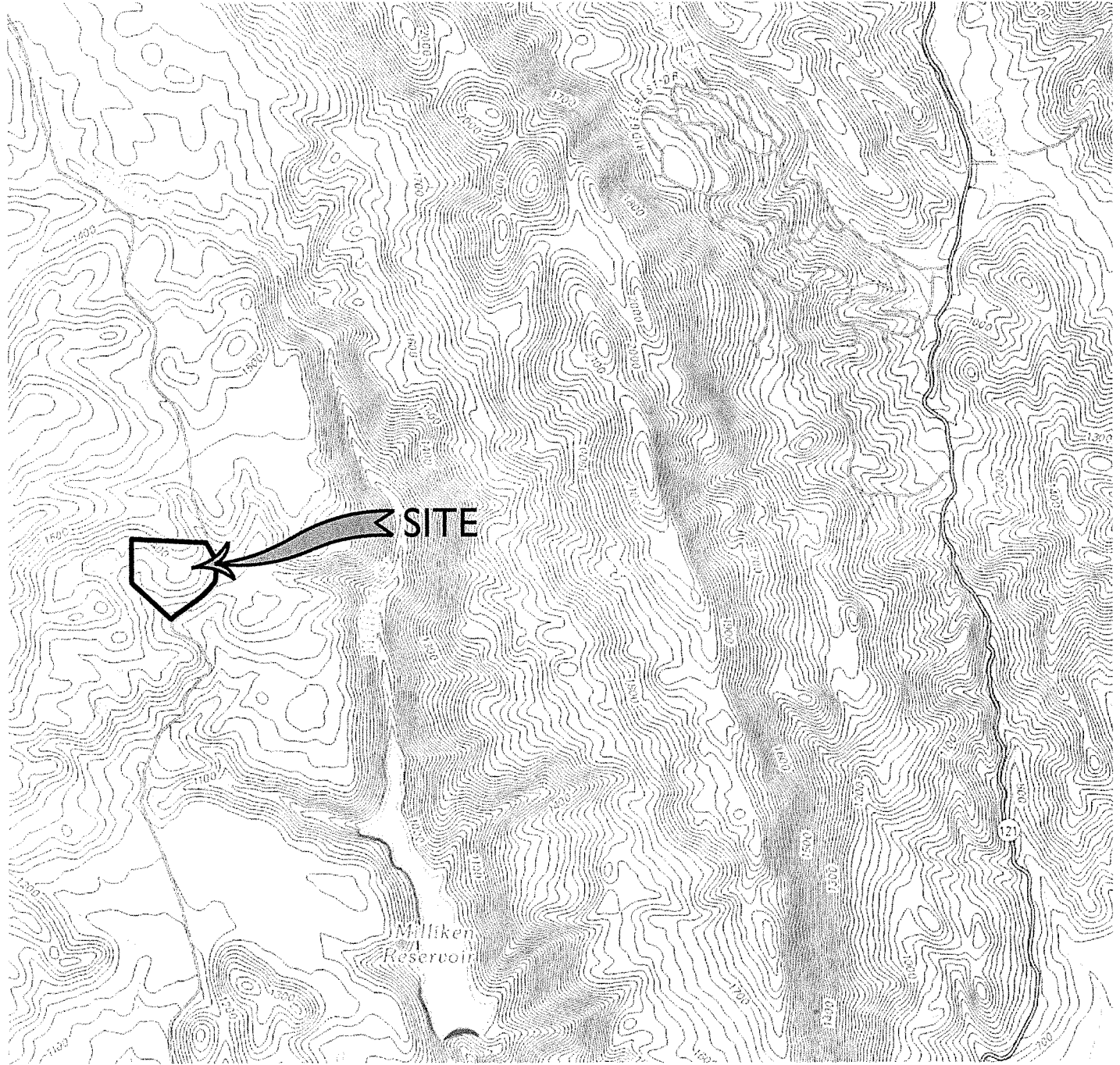
APPENDIX I: Site Topography Map

SITE TOPOGRAPHY MAP

REPRESENTS A PORTION OF THE
UNITED STATES GEOLOGICAL SURVEY 7.5 MINUTE QUADRANGLE
"CAPELL VALLEY, CA"



SCALE: 1" = 2,000'



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KITOKO VINEYARDS LLC

3201 ATLAS PEAK ROAD
NAPA, CA 94558
APN 033-010-034

APPENDIX 2: Kitoko Vineyards Winery Conceptual Site Improvement Plans
Reduced to 8.5" x 11"

KITOKO VINEYARDS WINERY

USE PERMIT CONCEPTUAL SITE PLANS

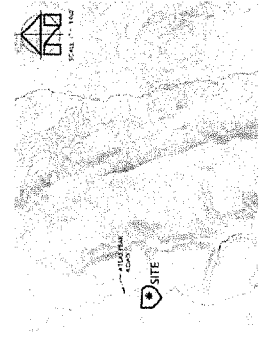


USE PERMIT CONCEPTUAL SITE PLANS
 KITOKO VINEYARDS WINERY

PREPARED UNDER THE
 DIRECTION OF



DATE	SEPTEMBER 11, 2017
BY	DAVID J. SMITH
PROJECT	KITOKO VINEYARDS WINERY
PROJECT NO.	17-117
DATE OF ISSUE	SEPTEMBER 11, 2017
PROJECT LOCATION	301 ATLAS PEAK ROAD, NAPA, CA 94558
PROJECT AREA	29 ± ACRES
PROJECT TYPE	WINERY
PROJECT OWNER	KITOKO VINEYARDS LLC
PROJECT ADDRESS	301 ATLAS PEAK ROAD, NAPA, CA 94558
PROJECT ASSessor'S PARCEL NUMBER	033-010-034
PROJECT ZONING	AM
PROJECT WASTEWATER SOURCE	ON-SITE TREATMENT AND DISPOSAL
PROJECT FIRE PROTECTION	WATER TANK
PROJECT FIRE PROTECTION WATER SOURCE	DOMESTIC WATER SOURCE
PROJECT WASTEWATER DISPOSAL	ON-SITE TREATMENT AND DISPOSAL
PROJECT SHEET INDEX	C1 COVER SHEET AND OVERALL SITE PLAN C2 CONCEPTUAL PLAN AND PROFILE C3 CONCEPTUAL WINERY SITE PLAN AND PROFILE C4 IMPERVIOUS SURFACE EXHIBIT C5 5"ORM WATER CONTROL PLAN
PROJECT FLOOD HAZARD NOTE	FLOOD HAZARD NOTE
PROJECT NOTES	1. FIELD BACKGROUND RESEARCH, EXISTING TOPOGRAPHIC, GEODESIC, AND PHOTOGRAPHIC DATA WAS TAKEN FROM THE PMP BY ALISON SWARTZ, INC. DATED MARCH 31, 2017. UPDATED AND IN 2017 TO REFLECT THE PROJECT AND TO REFLECT THE LATEST AVAILABLE DATA. CONTACT ALISON SWARTZ, INC. FOR MORE INFORMATION REGARDING THE ACCURACY OF THE DATA. 2. AERIAL PHOTOGRAPHY WAS OBTAINED FROM THE SAN FRANCISCO ESTUARY RESTORATION AND RECONSTRUCTION ACT DATA ARCHIVE. DATED 2010. 3. GROUND WATER DATA WAS OBTAINED FROM THE SAN FRANCISCO ESTUARY RESTORATION AND RECONSTRUCTION ACT DATA ARCHIVE. DATED 2010. 4. THE PROJECT LIES WITHIN AN UNDEVELOPED RURAL ZONING AREA. THE PROJECT SITE IS NOT LOCATED IN A SPECIAL FLOOD HAZARD AREA.

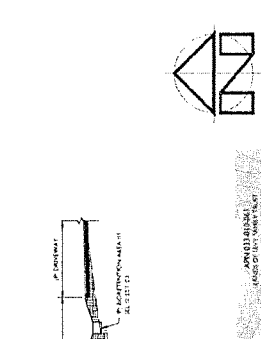


PROJECT INFORMATION:
 PROJECT OWNER & APPLICANT:
 KITOKO VINEYARDS LLC
 301 ATLAS PEAK ROAD
 NAPA, CA 94558
 SITE ADDRESS:
 301 ATLAS PEAK ROAD
 NAPA, CA 94558
 ASSESSOR'S PARCEL NUMBER:
 033-010-034
 PARCEL SIZE:
 29 ± ACRES
 PROJECT SIZE:
 3 ± ACRES
 ZONING:
 AGRICULTURAL WATERSHED (AM)
 DOMESTIC WATER SOURCE:
 WELL
 FIRE PROTECTION WATER SOURCE:
 STORAGE TANK
 WASTEWATER DISPOSAL:
 ON-SITE TREATMENT AND DISPOSAL

SHEET INDEX:
 C1 COVER SHEET AND OVERALL SITE PLAN
 C2 CONCEPTUAL PLAN AND PROFILE
 C3 CONCEPTUAL WINERY SITE PLAN AND PROFILE
 C4 IMPERVIOUS SURFACE EXHIBIT
 C5 5"ORM WATER CONTROL PLAN

FLOOD HAZARD NOTE:
 THE PROJECT LIES WITHIN AN UNDEVELOPED RURAL ZONING AREA. THE PROJECT SITE IS NOT LOCATED IN A SPECIAL FLOOD HAZARD AREA.

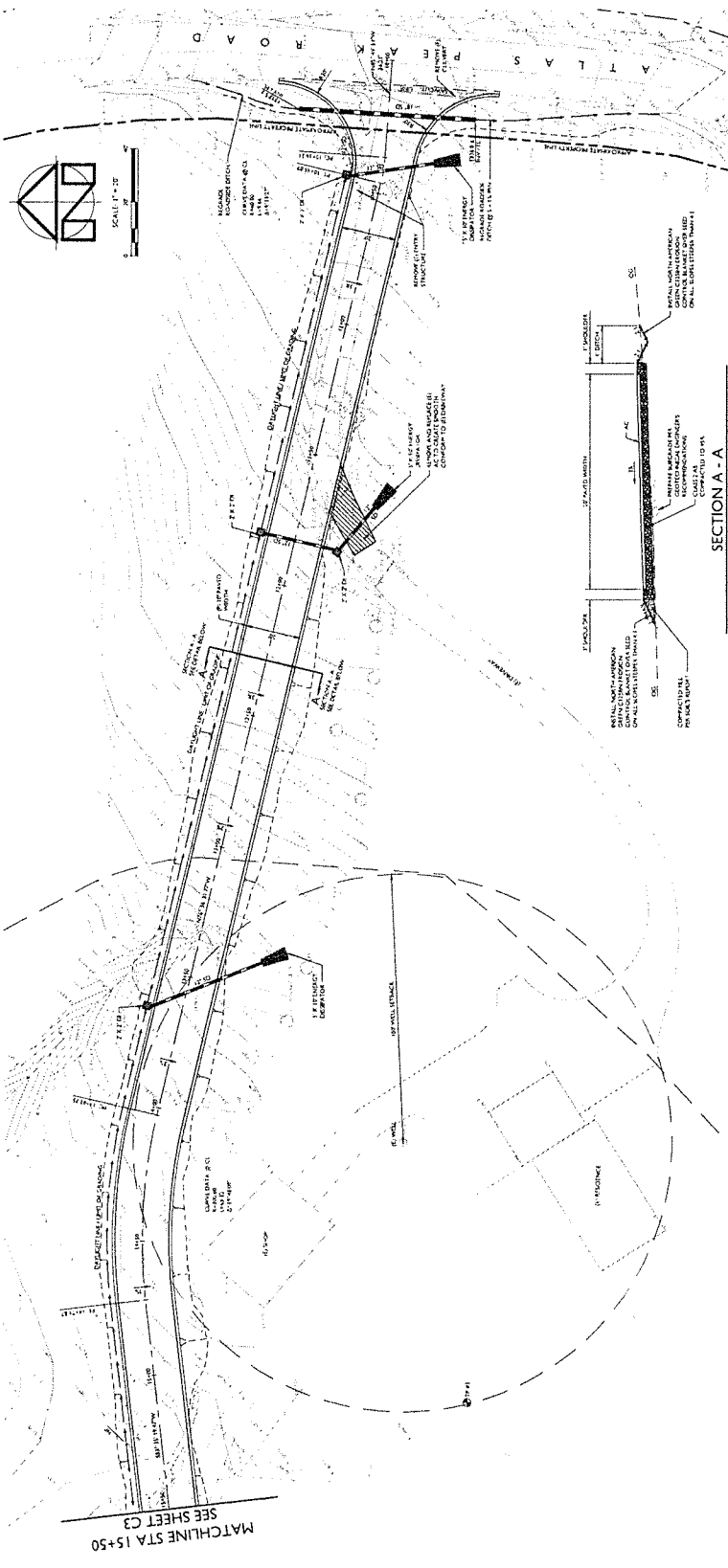
NOTES:
 1. FIELD BACKGROUND RESEARCH, EXISTING TOPOGRAPHIC, GEODESIC, AND PHOTOGRAPHIC DATA WAS TAKEN FROM THE PMP BY ALISON SWARTZ, INC. DATED MARCH 31, 2017. UPDATED AND IN 2017 TO REFLECT THE PROJECT AND TO REFLECT THE LATEST AVAILABLE DATA. CONTACT ALISON SWARTZ, INC. FOR MORE INFORMATION REGARDING THE ACCURACY OF THE DATA. 2. AERIAL PHOTOGRAPHY WAS OBTAINED FROM THE SAN FRANCISCO ESTUARY RESTORATION AND RECONSTRUCTION ACT DATA ARCHIVE. DATED 2010. 3. GROUND WATER DATA WAS OBTAINED FROM THE SAN FRANCISCO ESTUARY RESTORATION AND RECONSTRUCTION ACT DATA ARCHIVE. DATED 2010. 4. THE PROJECT LIES WITHIN AN UNDEVELOPED RURAL ZONING AREA. THE PROJECT SITE IS NOT LOCATED IN A SPECIAL FLOOD HAZARD AREA.



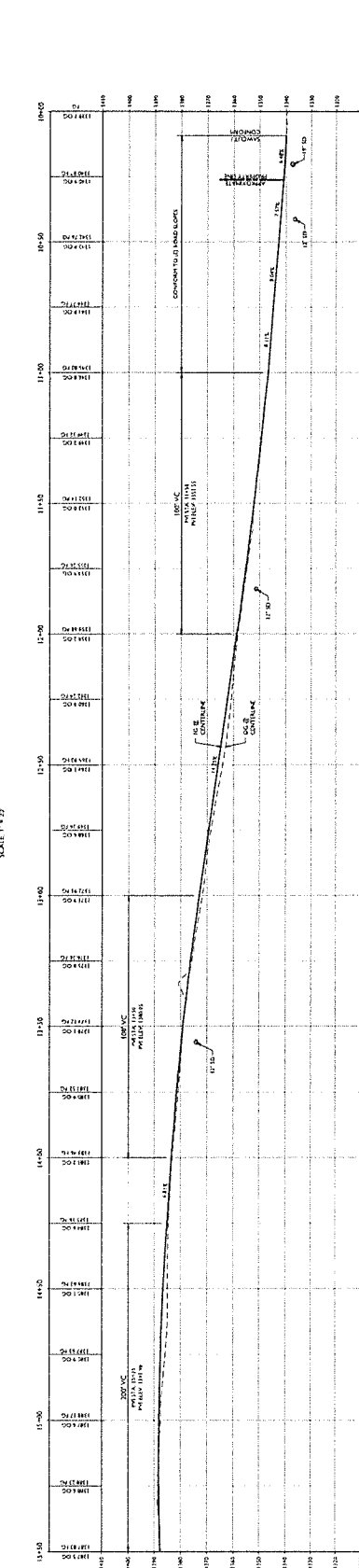
NOTE:
 THESE PLANS AND SPECIFICATIONS CONTAIN THE DESIGN AND CONSTRUCTION OF THE PROJECT. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE SPECIFICATIONS AND NOTES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.

GRADING QUANTITIES:
 SITE GRADING: 1,000 ± CY (EST.)
 C&G: 1,000 ± CY (EST.)
 TOTAL: 2,000 ± CY (EST.)

TEST P.T. NOTES:
 1. THE TEST P.T. NOTES ARE TO BE USED TO VERIFY THE ACCURACY OF THE DATA. 2. THE TEST P.T. NOTES ARE TO BE USED TO VERIFY THE ACCURACY OF THE DATA. 3. THE TEST P.T. NOTES ARE TO BE USED TO VERIFY THE ACCURACY OF THE DATA. 4. THE TEST P.T. NOTES ARE TO BE USED TO VERIFY THE ACCURACY OF THE DATA.



DRIVEWAY PLAN
 STA 10+00 TO STA 15+50
 SCALE 1" = 40'



DRIVEWAY PROFILE
 STA 10+00 TO STA 15+50
 SCALE 1" = 10'



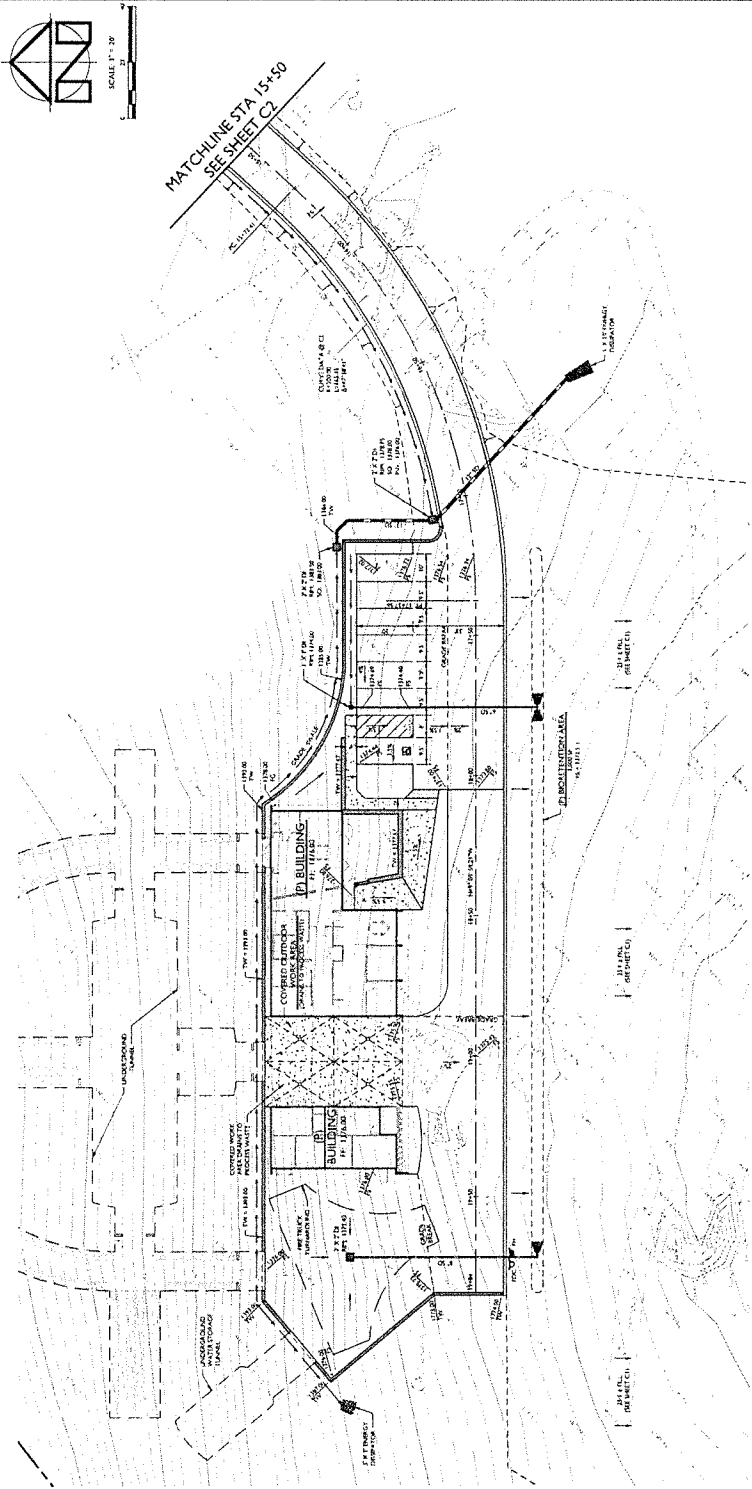
APPLIED
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KITOKO VINEYARDS WINERY
USE PERMIT CONCEPTUAL SITE PLANS
CONCEPTUAL WINERY SITE PLAN AND PROFILE STA 15+50 TO STA 20+00

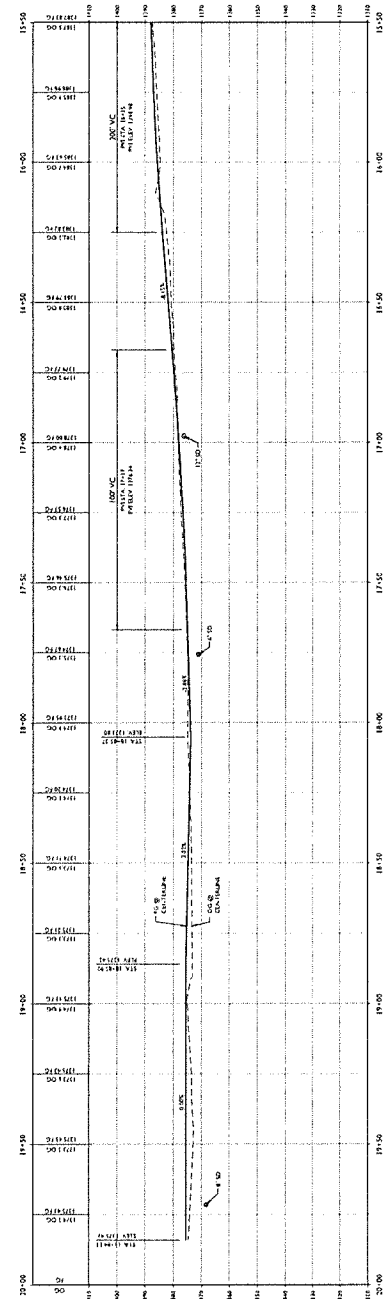
SEAL: REGISTERED PROFESSIONAL ENGINEER
STATE OF ARIZONA
NO. 12345
EXPIRES: 12/31/2025

DESIGNED BY: [Name]
CHECKED BY: [Name]
DATE: SEPTEMBER 12, 2017
REVISIONS: [Table]

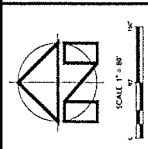
JOB NUMBER: 171017
PROJECT: KITOKO VINEYARDS
SHEET NUMBER: C3 OF 5



CONCEPTUAL WINERY SITE PLAN
SCALE: 1" = 32'



DRIVEWAY PROFILE
STA 15+50 TO STA 20+00
SCALE: 1" = 12'

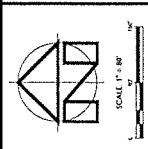


KITOKO VINEYARDS WINERY
USE PERMIT CONCEPTUAL SITE PLANS
IMPERVIOUS SURFACE EXHIBIT



DESIGN BY: NEW/ADD
CHECKED BY: PNH
DATE: SEPTEMBER 13, 2017
LEGEND: BY:

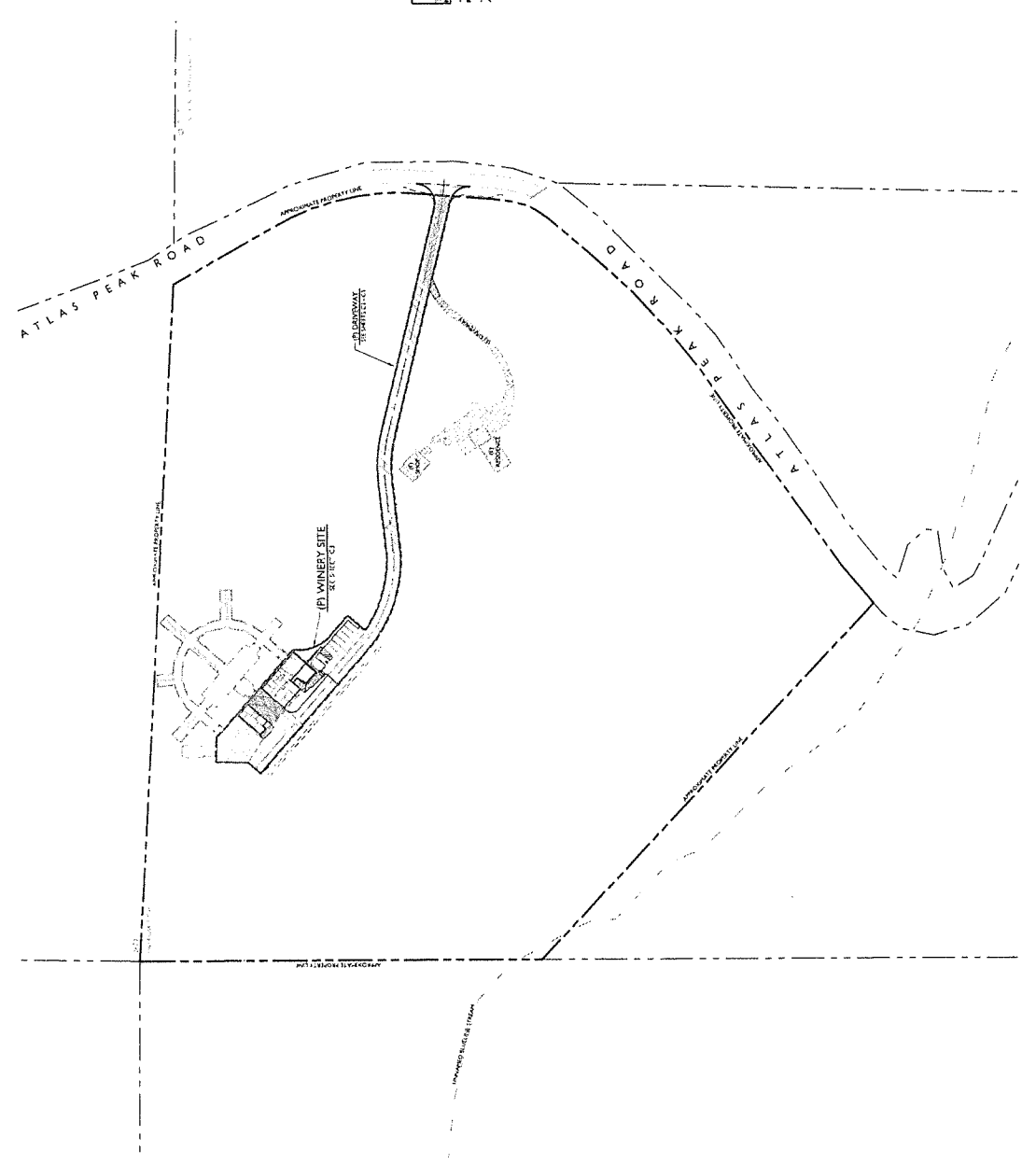
JOB NUMBER: 17110
FILE: P17110CONCING
ORIGINAL SIZE: 14" X 14"
SHEET NUMBER: C4
of 5



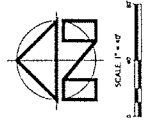
IMPERVIOUS SURFACE SUMMARY

REPORT	IMPERVIOUS SURFACE	RECALCULATED	TOTAL IMPERVIOUS SURFACE
DATE	ACRES	ACRES	ACRES
10/13/17	1.14	1.14	1.14
<p>NOTE: THIS SUMMARY IS BASED ON THE INFORMATION PROVIDED IN THE PERMIT APPLICATION AND DOES NOT REPRESENT A FIELD SURVEY. THE CLIENT IS RESPONSIBLE FOR VERIFYING THE ACCURACY OF THE INFORMATION PROVIDED.</p>			

IMPERVIOUS SURFACE AREA: 1.14 ACRES
 WHEAT COLLECTING AREA: 0.00 ACRES
 WHEAT DELIGHTING AREA: 0.00 ACRES

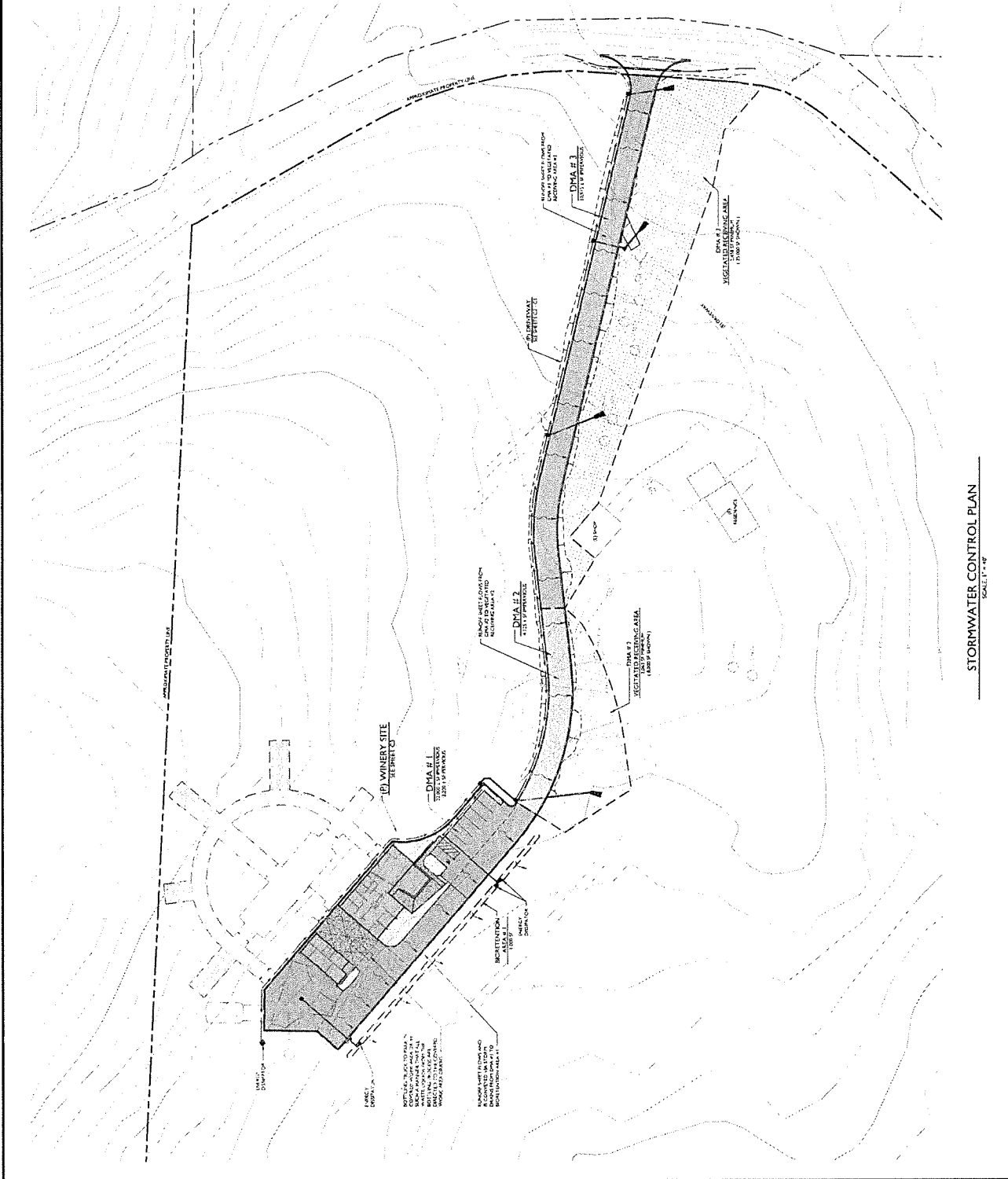


IMPERVIOUS SURFACE EXHIBIT
SCALE: 1" = 80'



LEGEND:

STEEP FLOW DIRECTION	VEGETATED RECEPTION AREA (COLOR VARIANTS BY DHA)	PERVIOUS AREA (COLOR VARIANTS BY DHA)	IMPERVIOUS AREA (COLOR VARIANTS BY DHA)
[Symbol]	[Symbol]	[Symbol]	[Symbol]



APPENDIX 3: Water Storage Tank Water Balance Calculations

Irrigation Storage Tank Water Balance

Month	Beginning Balance	Process Wastewater	Land Application Capacity	Ending Balance
January	0	12,000	43,444	0
February	0	12,000	43,444	0
March	0	12,000	43,444	0
April	0	9,600	43,444	0
May	0	9,600	43,444	0
June	0	12,000	43,444	0
July	0	24,000	43,444	0
August	0	31,200	43,444	0
September	0	40,800	43,444	0
October	0	40,800	43,444	0
November	0	24,000	43,444	0
December	0	12,000	43,444	0
		240,000	521,326	

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 another source.

Winery Process Wastewater Generation Analysis

Annual Wine Production	40,000 gallons
Wastewater Generation Rate	6 gallons per gallon of wine
Annual Wastewater Generation	240,000 gallons
Crush Season Length	45 days
Wastewater Generated During Crush	1.5 gallons per gallon of wine
Peak Wastewater Generation Rate	1,333 gallons per day

Month	Percentage of Annual Total	Monthly Flow (gallons)	Average Flow (gpd)
January	5.0%	12,000	387
February	5.0%	12,000	429
March	5.0%	12,000	387
April	4.0%	9,600	320
May	4.0%	9,600	310
June	5.0%	12,000	400
July	10.0%	24,000	774
August	13.0%	31,200	1,006
September	17.0%	40,800	1,360
October	17.0%	40,800	1,316
November	10.0%	24,000	800
December	5.0%	12,000	387
Total	100.0%	240,000	

Notes:

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

Land Application Schedule Analysis

Total acres of land application area 2 acres

Application Rate 0.8 inches / month January through December

Land Application Schedule					
Month				Non-Seasonal Irrigation Application (gallons)	Total (gallons)
January				43,444	43,444
February				43,444	43,444
March				43,444	43,444
April				43,444	43,444
May				43,444	43,444
June				43,444	43,444
July				43,444	43,444
August				43,444	43,444
September				43,444	43,444
October				43,444	43,444
November				43,444	43,444
December				43,444	43,444
Total				521,326	521,326

Notes:

1. No crop in dispersal area therefore analysis conservatively based on infiltration only.

2. 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.

APPENDIX 4: Site Evaluation Report and Test Pit Map

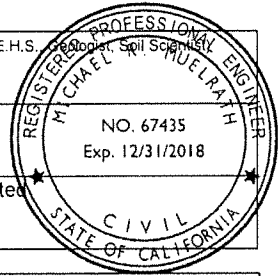
Please attach an 8.5" x 11" plot map showing the locations of all test pits triangulated from permanent landmarks or known property corners. The map must be drawn to scale and include a North arrow, surrounding geographic and topographic features, direction and % slope, distance to drainages, water bodies, potential areas for flooding, unstable landforms, existing or proposed roads, structures, utilities, domestic water supplies, wells, ponds, existing wastewater treatment systems and facilities.

Permit #: OE17-00068	
APN: 033-010-034	
(County Use Only) Reviewed by:	Date:

PLEASE PRINT OR TYPE ALL INFORMATION

Property Owner Kitoko Vineyards LLC	<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 3201 Atlas Peak Road	<input type="checkbox"/> Residential - # of Bedrooms: Design Flow: gpd
City State Zip Napa CA 94558	<input checked="" type="checkbox"/> Commercial – Type: Winery Sanitary Waste: 300 +/- gpd Process Waste: 1,500 +/- gpd
Site Address/Location 3201 Atlas Peak Road Napa, CA 94558	<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) 
Mailing Address: 2074 West Lincoln Avenue		Telephone Number (707) 320-4968
City State Zip Napa CA 94558	Date Evaluation Conducted May 11, 2017	

Primary Area

Expansion Area

Acceptable Soil Depth: 24 to 36 inches TP: 3, 5, 6, 8, 9, 10 & 11
 Soil Application Rate (gal. /sq. ft. /day): 0.6
 System Type(s) Recommended: Pretreatment and Subsurface Drip
 Slope: 10-15% Distance to nearest water source: 100'+
 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)

Acceptable Soil Depth: 24 to 36 inches TP: 3, 5, 6, 8, 9, 10 & 11
 Soil Application Rate (gal. /sq. ft. /day): 0.6
 System Type(s) Recommended: Pretreatment and Subsurface Drip
 Slope: 10-15% Distance to nearest water source: 100'+
 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:
 This site evaluation was performed to locate an area to install a new septic system to serve a winery that is being planned for the property as well as to document reserve area for the existing residence.
 The main constraints in the areas tested are the property line setbacks, well setback, blue line stream setback and relatively shallow acceptable soil depths. A subsurface drip type septic system with pretreatment is recommended for the sanitary waste. Process waste can be handled similarly if space allows or it can be treated and re-used for irrigation.
 We recommend an upslope diversion above Test Pits 5 & 8 to intercept runoff and percolation from uphill.

Test Pit #1

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-6	A	0-15	SCL	MSB	S	FRB	SS	CF/CM	CF	NONE
6+		>50								

Acceptable soil depth = 6"

Test Pit #2

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-12	A	0-15	SCL	MSB	S	FRB	SS	CF/CM	CF	NONE
12+		>50								

Acceptable soil depth = 12"

Test Pit #3

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-24	A	15-30	SCL	MSB	S	FRB	SS	CF/CM	CF	NONE
24+		>50								

Acceptable soil depth = 24"

Test Pit #4

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-6	A	0-15	SCL	MSB	S	FRB	SS	CF/CM	CF	NONE
6+		>50								

Acceptable soil depth = 6"

Test Pit #5

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-24	C	0-15	SCL	MSB	S	FRB	SS	CF/FM	CF	NONE
24+		>50%								

Acceptable soil depth = 24"

Note: Water seeping in at 24"

Test Pit #6

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-36	C	0-15	SCL	MSB	S	FRB	SS	CF/FM	CF	NONE
36+		>50%								

Acceptable soil depth = 36"

Test Pit #7

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-18	C	0-15	SCL	MSB	S	FRB	SS	CF/FM	CF	NONE
18+		>50%								

Acceptable soil depth = 18"

Test Pit #8

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-32	C	0-15	SCL	MSB	S	FRB	SS	CF/CM	CF/FM	NONE
32+		>50%								

Acceptable soil depth = 32"

Test Pit #9

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-36	C	0-15	SCL	MSB	S	FRB	SS	CF/CM	CF	NONE
36+		>50%								

Acceptable soil depth = 36"

Test Pit #10

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-24	C	0-15	SCL	MSB	S	FRB	SS	CF/CM	CF/FM	NONE
24+		>50%								

Acceptable soil depth = 24"

Test Pit #11

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-27	C	0-15	SCL	MSB	S	FRB	SS	CF/CM	CF/FM	NONE
27+		>50%								

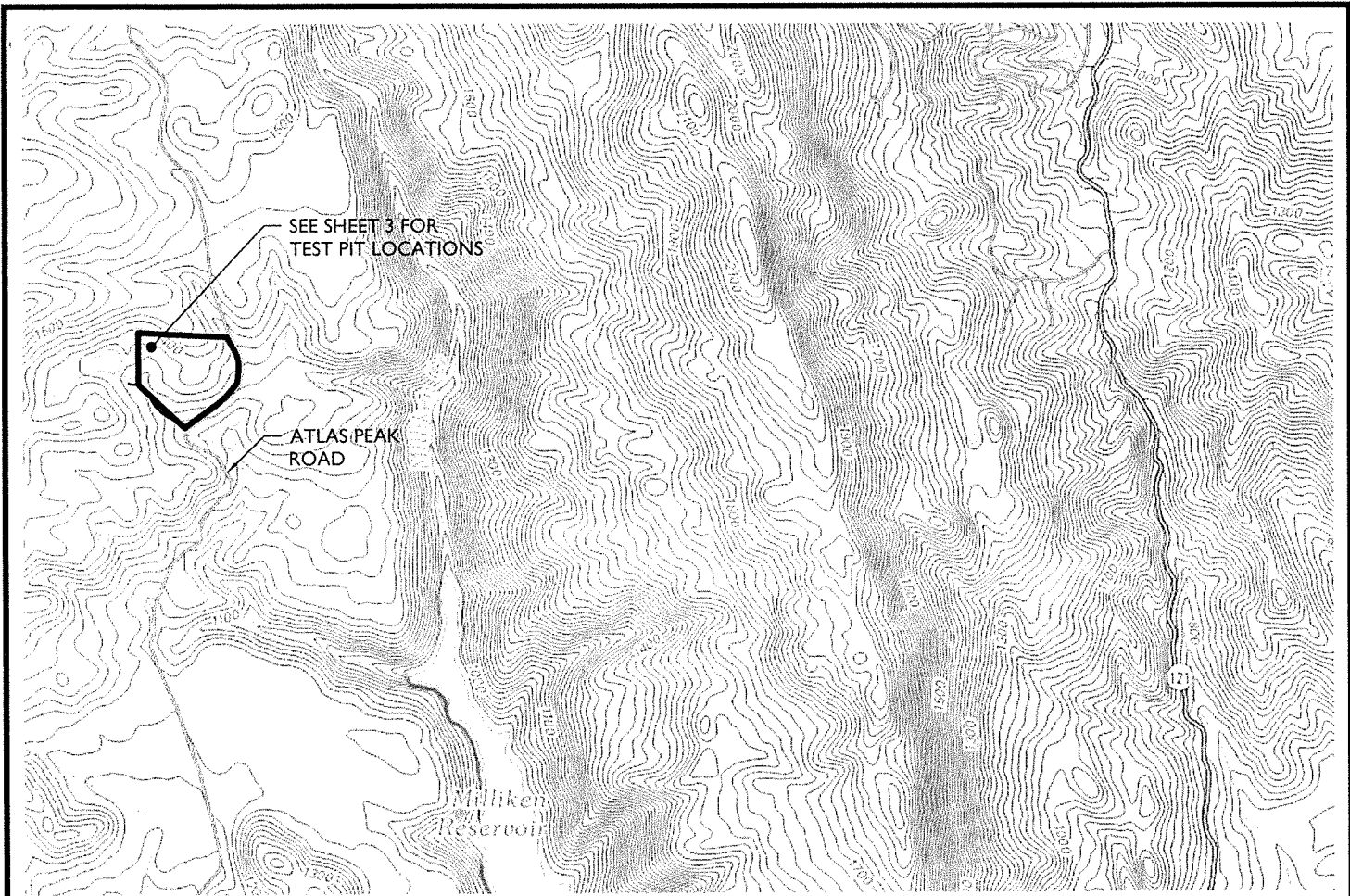
Acceptable soil depth = 27"

LEGEND

Boundary	Texture	Structure	Consistence			Pores	Roots	Mottling
			Side Wall	Ped	Wet	Quantity:	Quantity:	Quantity:
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 PI=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	F=Few C=Common M=Many <u>Size:</u> VF=Very Fine F=Fine M=Medium C=Coarse VC=Very Coarse	F=Few C=Common M=Many <u>Size:</u> F=Fine M=Medium C=Coarse VC=Very Coarse ExC=Extremely Coarse	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

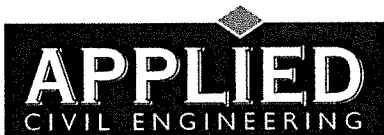


LOCATION MAP

SCALE: 1" = 2,000'

NOTES:

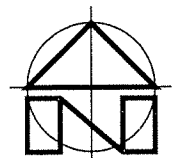
1. TEST PITS ONE THROUGH ELEVEN (TP #1 - TP #11) WERE EXCAVATED BY McCOLLUM GENERAL ENGINEERING AND WERE WITNESSED BY MIKE MUELRAETH OF APPLIED CIVIL ENGINEERING INCORPORATED AND REBECCA SETLIFF OF THE NAPA COUNTY PLANNING, BUILDING AND ENVIRONMENTAL SERVICES DEPARTMENT - ENVIRONMENTAL HEALTH DIVISION ON MAY 11, 2017.
2. FADED BACKGROUND REPRESENTS EXISTING TOPOGRAPHIC FEATURES. TOPOGRAPHIC INFORMATION ON SHEET 3 WAS TAKEN FROM THE "MAP OF TOPOGRAPHY OF A PORTION OF THE LANDS OF KITOKO VINEYARDS" PREPARED BY ALBION SURVEYS, INC., DATED MARCH 23, 2017, UPDATED APRIL 18, 2017. TOPOGRAPHIC INFORMATION ON SHEET 2 WAS TAKEN FROM THE NAPA COUNTY GEOGRAPHIC INFORMATION SYSTEM DATABASE. APPLIED CIVIL ENGINEERING INCORPORATED ASSUMES NO LIABILITY REGARDING THE ACCURACY OR COMPLETENESS OF THE TOPOGRAPHIC INFORMATION.
3. CONTOUR INTERVAL:
 SHEET 2: FIVE (5) FEET, HIGHLIGHTED EVERY TWENTY FIVE (25) FEET.
 SHEET 3: ONE (1) FOOT, HIGHLIGHTED EVERY FIVE (5) FEET.
4. BENCHMARK: NAVD 88
5. AERIAL PHOTOGRAPH WAS OBTAINED FROM THE SAN FRANCISCO ESTUARY INSTITUTE (SFEI) SAN FRANCISCO BAY AREA ORTHOPHOTOS DATABASE, DATED JUNE 2014 AND MAY NOT REPRESENT CURRENT CONDITIONS.
6. ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM) MAP NUMBER 06055C0440E, EFFECTIVE SEPTEMBER 26, 2008, THE PROJECT SITE IS NOT LOCATED IN A SPECIAL FLOOD HAZARD AREA.



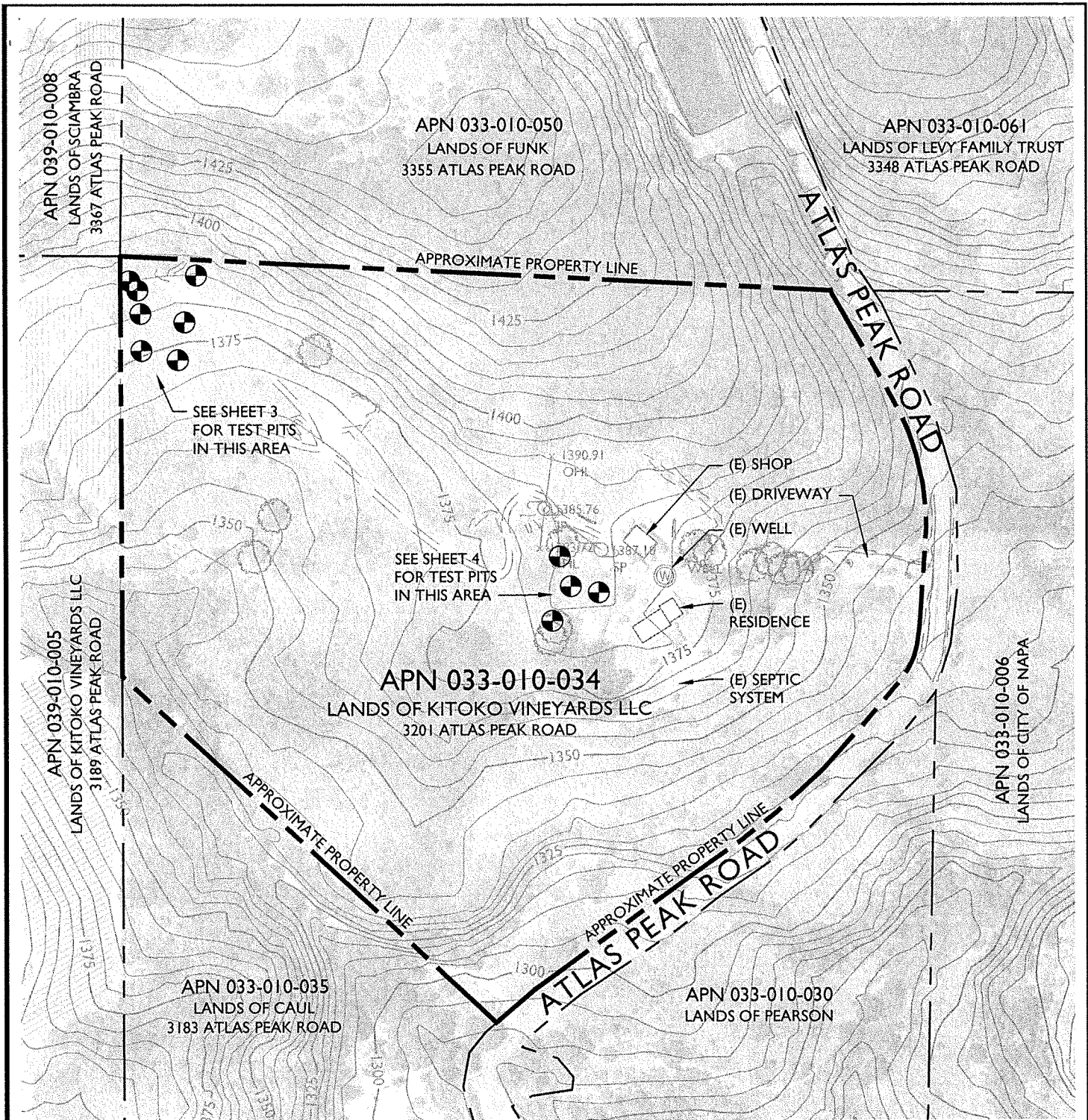
2074 West Lincoln Avenue
 Napa, CA 94558
 (707) 320-4968 (707) 320-2395 Fax
 www.appliedcivil.com

KITOKO VINEYARDS LLC

3201 ATLAS PEAK ROAD
 NAPA, CA 94558
 APN 033-010-034

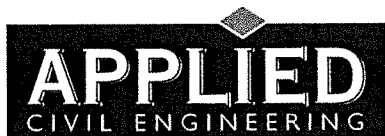


SCALE: 1" = 2,000'



OVERALL SITE PLAN

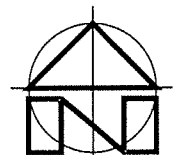
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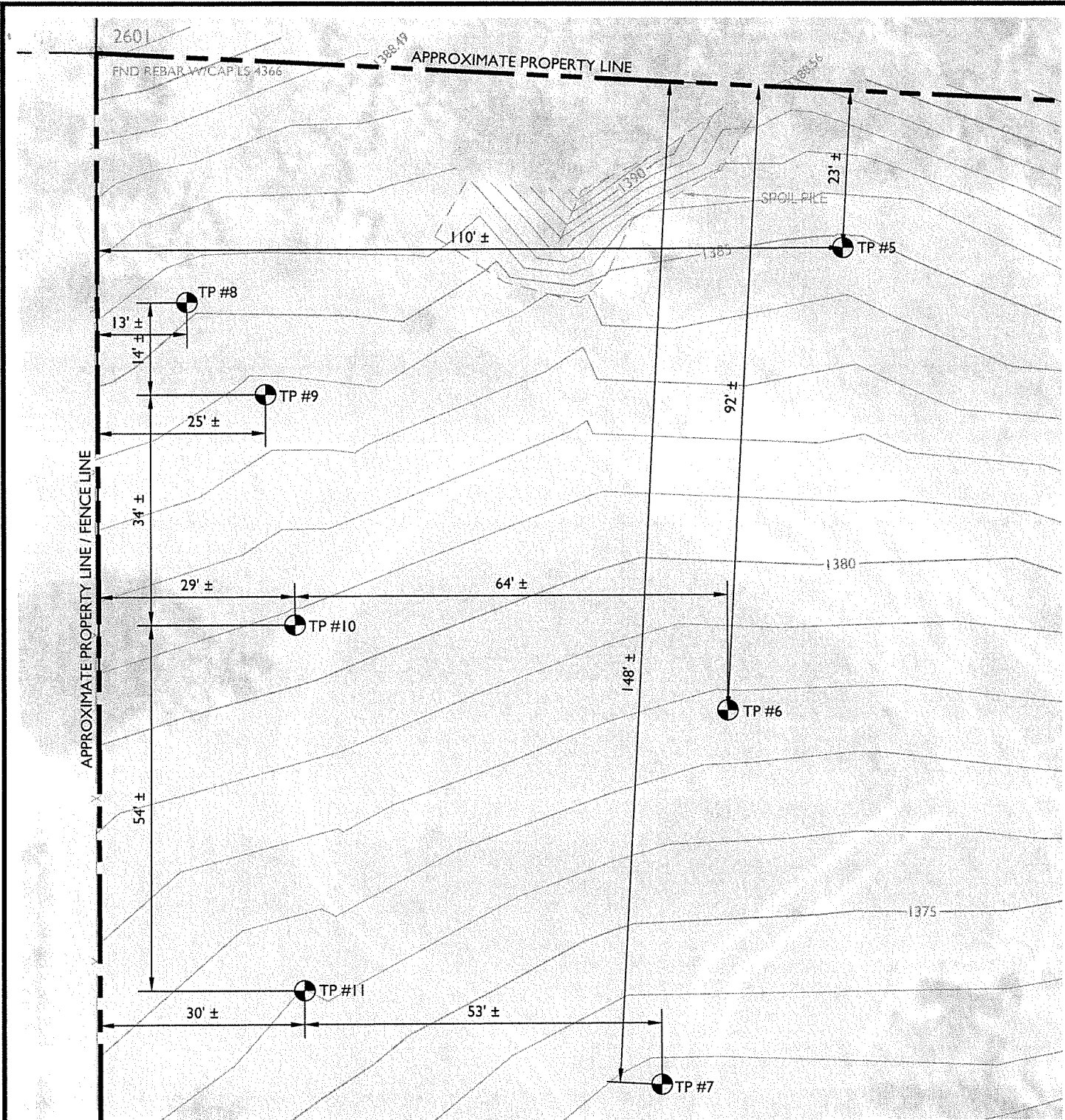
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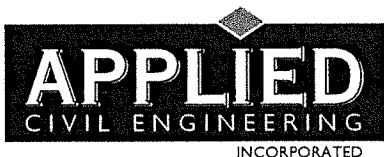


SCALE: 1" = 200'



TESP PIT MAP

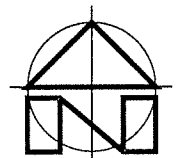
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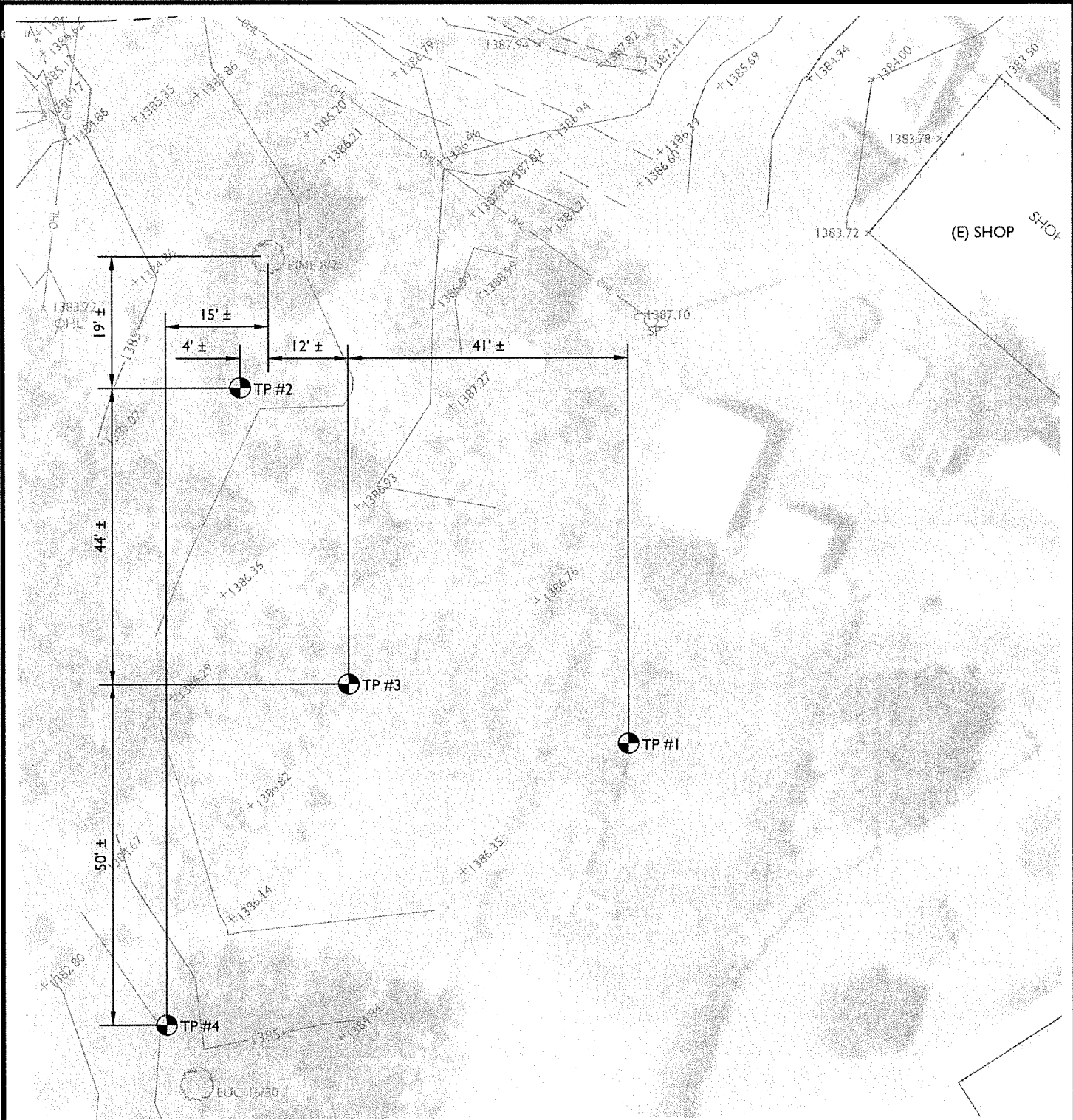
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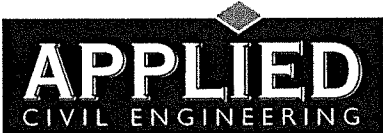


SCALE: 1" = 20'



TESP PIT MAP

SCALE: 1" = 20'

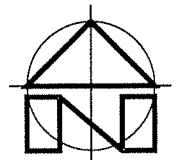


INCORPORATED

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KITOKO VINEYARDS LLC

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 NAPA, CA 94558
 APN 033-010-034



SCALE: 1" = 20'



Experience is the difference

May 26, 2017
File: 6442.01.04.2

Mr. Mike Muelrath
Applied Civil Engineering
2074 West Lincoln Ave.
Napa, CA 94558

Client:	Applied Civil Engineering	Sampled:	5/11/17
Project:	Not Stated	Received:	5/15/17
Project #:	9260.26	Reported:	5/26/17
Client Project #:	17-107		

Dear Mr. Muelrath:

This letter transmits the results of our laboratory testing performed for the subject project. We performed a Soil Texture Analysis by the Bouyoucos Hydrometry Method with the following results:

Size/Density	TP-6 0"-24.0"
+ #10 Sieve	7.8%
Sand	46.8 %
Clay	33.2 %
Silt	20.0%
Db g/cc	--

We trust this provides the information required at this time. Should you have further questions, please call.

Regards,

RGH GEOTECHNICAL

Sean Flinn
Lab Technician



Experience is the difference

May 26, 2017
File: 6442.01.04.2

Mr. Mike Muelrath
Applied Civil Engineering
2074 West Lincoln Ave.
Napa, CA 94558

Client:	Applied Civil Engineering	Sampled:	5/11/17
Project:	Not Stated	Received:	5/15/17
Project #:	9260.26	Reported:	5/26/17
Client Project #:	17-107		

Dear Mr. Muelrath:

This letter transmits the results of our laboratory testing performed for the subject project. We performed a Soil Texture Analysis by the Bouyoucos Hydrometry Method with the following results:

Size/Density	TP-8 0"-12.0"
+ #10 Sieve	21.6%
Sand	58.8 %
Clay	18.2 %
Silt	23.0%
Db g/cc	--

We trust this provides the information required at this time. Should you have further questions, please call.

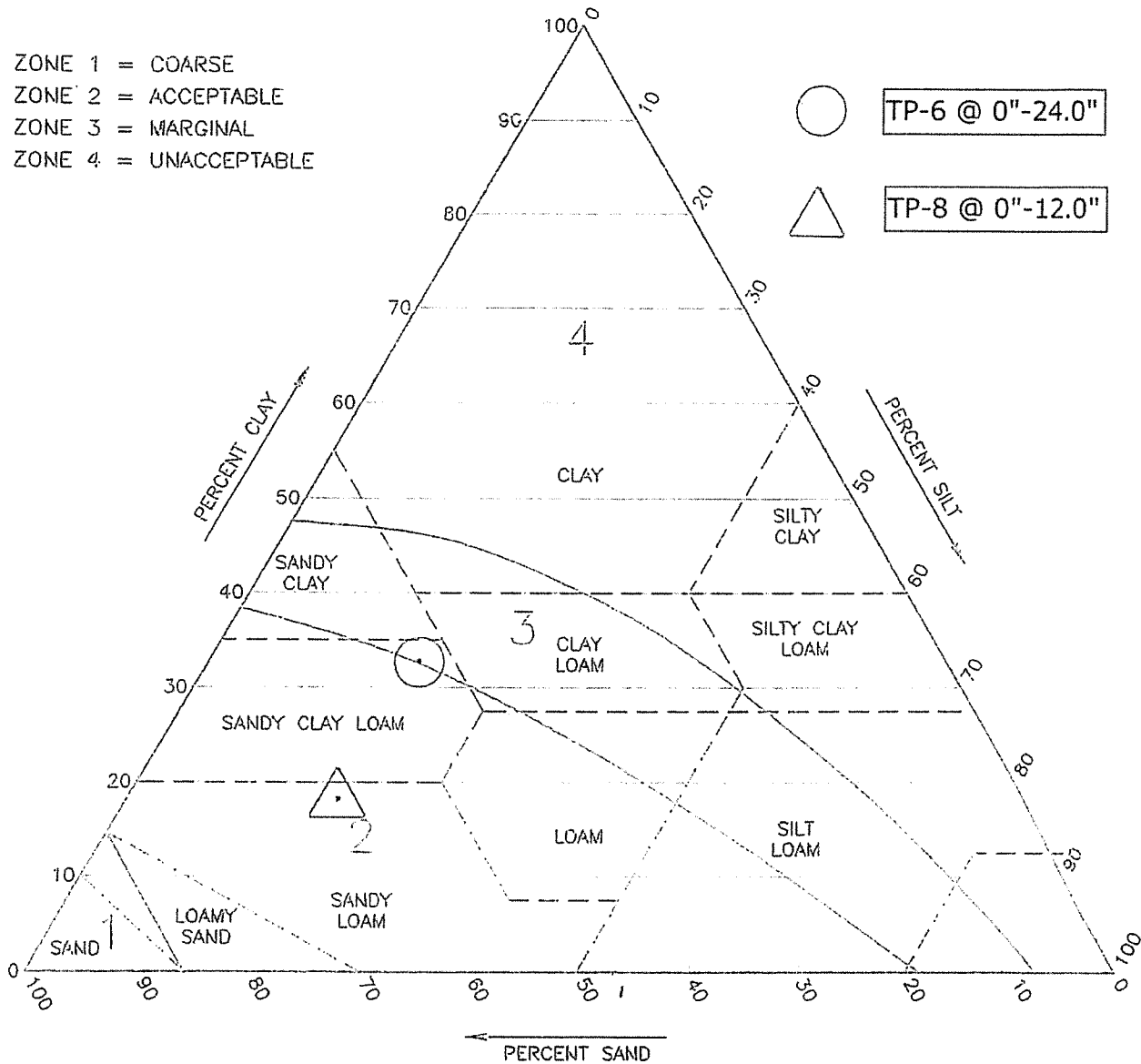
Regards,

RGH GEOTECHNICAL

Sean Flinn
Lab Technician

SOIL PERCOLATION SUITABILITY CHART

- ZONE 1 = COARSE
- ZONE 2 = ACCEPTABLE
- ZONE 3 = MARGINAL
- ZONE 4 = UNACCEPTABLE



Instructions:

1. Plot texture on triangle based on percent sand, silt, and clay as determined by hydrometer analysis.
2. Adjust for coarse fragments by moving the plotted point in the sand direction an additional 2% for each 10% (by volume) of fragments greater than 2mm in diameter.
3. Adjust for compactness of soil by moving the plotted point in the clay direction an additional 15% for soils having a bulk-density greater than 1.7 gm/cc.

Note:

For soils falling in sand, loamy sand or sandy loam classification bulk density analysis will generally not affect suitability and analysis not necessary.