

ONSITE WASTEWATER DISPOSAL FEASIBILITY STUDY

FOR THE

HUDSON VINEYARDS WINERY

LOCATED AT:
5398 Carneros Highway
Napa, CA 94559
NAPA COUNTY APN 047-070-016

PREPARED FOR:
Hudson Vineyards
Care of: Lee Hudson
5398 Carneros Highway
Napa, CA 94559
Telephone: (707) 255-1455

PREPARED BY:



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Job Number: 13-150
First Submittal: May 30, 2014
Revision #1: October 22, 2014



Michael R. Muelrath R.C.E. 67435 10/22/2014
Date

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INTRODUCTION

Hudson Vineyards is applying for a Use Permit to construct and operate a new winery at 5398 Carneros Highway in Napa County, California. The subject property, known as Napa County Assessor's Parcel Number 047-070-016, is located along the north side of Carneros Highway (State Route 12 / 121) approximately 0.75 miles west of the intersection of Duhig Road and Carneros Highway.

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

- Wine Production:
 - 80,000 gallons of wine per year
 - Crushing, fermenting, aging and bottling

- Employees:
 - 10 full time employees
 - 6 part time employees

- Marketing Plan:
 - Daily Tours and Tastings by Appointment
 - 120 visitors per day maximum
 - 85 visitors per day average
 - Smaller Private Promotional Tastings with Meals
 - 6 per month
 - 24 guests maximum
 - Food prepared in onsite kitchen
 - Medium Private Promotional Tastings with Meals
 - 7 times per year
 - 50 guest maximum
 - Food prepared in onsite kitchen
 - Larger Private Marketing Events
 - 3 per year
 - 150 guests maximum
 - Food prepared offsite by catering company
 - Portable toilets brought in for guest use

Existing structures on the property include a single family residence, a farm operations building and several agricultural buildings that support the existing vineyard and farm operations. All domestic wastewater from these buildings is collected in septic tank located near the residence and disposed of in a leach field located downhill from the residence. Please see the Hudson Vineyards Winery Use Permit Conceptual Site Plan for approximate locations.

Hudson 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 process and sanitary wastewater flows and outlines the conceptual design of an onsite wastewater disposal system.

SOILS INFORMATION

The United States Department of Agriculture Soil Conservation Service Soils Map for Napa County shows several soil types mapped on the parcel including Bale clay loam, 0 to 2 percent slopes, Diablo Clay, 5 to 9 percent slopes, Diablo Clay, 9 to 15 percent slopes, Forward gravelly loam, 9 to 30 percent slopes, Haire clay loam, 2 to 9 percent slopes and Haire clay loam, 9 to 15 percent slopes.

A site specific soils analysis was conducted during two site evaluations performed by Napa County and Bartelt Engineering on May 8, 2002 and September 9, 2002. The site evaluations consisted of the excavation and observation of twelve test pits in the area southwest of the planned winery site. The test pits generally revealed variable depths of soil ranging from 16 inches to 42 inches with the upper horizon having a USDA soil texture classification of clay loam, sandy clay loam and silty clay loam. The limiting conditions that were observed were the presence of mottling which indicates a potentially elevated seasonal groundwater level, unacceptable soil structure (cemented and bedrock) and high clay content subsoils.

A third site evaluation was performed on October 7, 2014 by Applied Civil Engineering Incorporated. The findings of the third site evaluation were similar to those of the previous site evaluations which included the clay loam topsoils ranging from 24 inches to 29 inches in depth overlying cemented soils and rock below.

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

PREDICTED WASTEWATER FLOW

The onsite wastewater disposal system will be designed for the peak winery process wastewater flow and the peak sanitary wastewater flow from the proposed winery. The other existing structures on the property will continue to be served by the existing septic system.

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 60 day crush period. Using these assumptions, the average and peak winery process wastewater flows are calculated as follows:

$$\text{Annual Winery Process Wastewater Flow} = \frac{80,000 \text{ gallons wine}}{\text{year}} \times \frac{6 \text{ gallons wastewater}}{1 \text{ gallon wine}}$$

Annual Winery Process Wastewater Flow = 480,000 gallons per year

$$\text{Average Daily Winery Process Wastewater Flow} = \frac{480,000 \text{ gallons}}{\text{year}} \times \frac{1 \text{ year}}{365 \text{ days}}$$

Average Daily Winery Process Wastewater Flow = 1,312 gallons per day (gpd)

$$\text{Peak Winery Process Wastewater Flow} = \frac{80,000 \text{ gallons wine}}{\text{year}} \times \frac{1.5 \text{ gallons wastewater}}{1 \text{ gallon wine}} \times \frac{1 \text{ year}}{60 \text{ crush days}}$$

Peak Winery Process Wastewater Flow = 2,000 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. For marketing events that will have meals prepared onsite in the commercial kitchen we have assumed 15 gallons of wastewater per guest, similar to a restaurant. Based on these assumptions, the peak winery sanitary wastewater flows are calculated as follows:

Employees

Peak Sanitary Wastewater Flow = 16 employees X 15 gpd per employee

Peak Sanitary Wastewater Flow = 240 gpd

Daily Tours and Tastings

Peak Sanitary Wastewater Flow = 120 visitors per day X 3 gallons per visitor

Peak Sanitary Wastewater Flow = 360 gpd

Smaller Private Marketing Events with Meals Prepared Onsite:

Peak Sanitary Wastewater Flow = 24 guests X 15 gallons per guest

Peak Sanitary Wastewater Flow = 360 gpd

Medium Private Marketing Events with Meals Prepared Onsite:

Peak Sanitary Wastewater Flow = 50 guests X 15 gallons per guest

Peak Sanitary Wastewater Flow = 750 gpd

Larger Private Marketing Events with Catered Meals:

Peak Sanitary Wastewater Flow = 150 guests X 5 gallons per guest

Peak Sanitary Wastewater Flow = 750 gpd

Total Peak Winery Sanitary Wastewater Flow

As previously noted, all events with more than 50 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 private event for 50 people and is calculated as follows:

Total Peak Winery Sanitary Wastewater Flow = 240 gpd + 360 gpd + 750 gpd

Total Peak Winery Sanitary Wastewater Flow = 1,350 gpd

RECOMMENDATIONS

Based on the anticipated wastewater flows, the proposed site layout and the finding of 24 to 29 inches of clay loam soil in the vicinity of Test Pits #13, #14, #15 and #17 we recommend that the process and sanitary wastewater generated at the proposed winery be kept separate for treatment and disposal. The sanitary wastewater should be pretreated and disposed of onsite in a subsurface drip type septic system and the process wastewater should be pre-treated and disposed of via irrigation in the onsite vineyard area. This dual system will allow for a smaller subsurface drip system than if the two waste streams were combined. Furthermore, using the treated winery process wastewater for irrigation will offset groundwater demand and result in greater operational flexibility compared to utilizing the domestic waste subsurface drip disposal system for winery process wastewater disposal.

The conceptual design of the two wastewater disposal systems are outlined in the following sections of this report.

Sanitary Wastewater Disposal Via Subsurface Drip Disposal Field

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. In accordance with Table 9 of Napa County's "Regulations for Design, Construction, and Installation of Alternative Sewage Treatment Systems" we have used a hydraulic loading rate of 0.6 gpd per square foot based on the findings of sandy clay loam soils in the planned disposal field area. 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:

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

$$\text{Require Disposal Field Area} = \frac{1,350 \text{ gpd}}{0.6 \text{ gpd per square foot}}$$

Required Disposal Field Area = 2,250 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 2,250 square feet of subsurface drip disposal field in the vicinity of Test Pits #13 through #17. The conceptual layout of the disposal field is shown on the Hudson Vineyards Winery Use Permit Conceptual Site Plan in Appendix 2.

Required Reserve Area – Winery and Other Existing Uses

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 septic system that serves the existing residence and farm operations center the proposed reserve area must accommodate that system’s reserve area requirements as well. According to the property owner, the existing residence has a total of two bedrooms and there are four employees that use the restroom in the farm operations center building.

The design flow for the reserve area is 1,350 gpd for the winery sanitary wastewater plus 300 gallons per day for the two bedroom residence and 60 gpd for the four employees at the farm operations center for a total of 1,710 gpd. Based on these design parameters, the required reserve area is calculated as follows:

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

$$\text{Require Reserve Field Area} = 200\% \times \frac{1,710 \text{ gpd}}{0.6 \text{ gpd per square foot}}$$

Required Reserve Area = 5,700 square feet

Available Reserve Area

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 5,700 square feet of subsurface drip disposal field in the vicinity of Test Pits #13 through #17 as shown on the Hudson Vineyards Winery Use Permit Conceptual Site Plan in Appendix 2.

Pretreatment and Septic Tank Capacity

Pretreatment must be provided to treat the winery 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 will review options and select a suitable pretreatment system designed to meet this requirement prior to application for a sewage permit for the winery sanitary wastewater disposal system. Septic tanks will be sized in accordance with the requirements of the selected pretreatment system.

Process Wastewater Disposal Via Irrigation

Pretreatment

Based on the winery's planned production level and waste flows 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 propose that disposal of the treated winery process wastewater be via irrigation of the onsite vineyard. The existing vineyard on the winery property totals approximately 97 acres. For the purpose of this study we have assumed that the winery process wastewater will be applied to only 40 acres of vineyard. This is a conservative assumption to simplify this analysis as much more vineyard is available outside of the required stream and well setbacks. The final irrigation area will be determined and incorporated into the final design with the installation permit application.

In order to accommodate differences in the timing of wastewater generation, irrigation demand, and limitations on wet weather application of treated wastewater 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 calculations assumes a monthly winery process wastewater generation rate and a monthly vineyard irrigation schedule based on our past experience with projects of this type. The water balance further assumes that during the summer the treated wastewater will be used to offset the irrigation needs of the vineyard and in the winter application of treated winery process wastewater will be very limited (0.8" maximum per month) to prevent runoff. In the event that winter application is not possible due to extended wet weather patterns winery operations will have to be adjusted to work within the capacity of the storage tanks or the tanks will need to be emptied by hauling waste to an approved offsite disposal location. The water balance calculations show that the proposed land application area is large enough to accept all of the wastewater generated each month throughout the year without carry over (see Appendix 3). To provide operational flexibility, we recommend that the storage tank have a minimum capacity of approximately 20,000 to 30,000 gallons so that approximately two weeks' worth of flow can be contained to allow flexibility in irrigation scheduling during the harvest period.

All application of treated winery process wastewater must comply with the requirements of the Napa County Process Wastewater Guidelines for Surface Drip Irrigation.

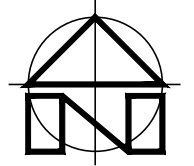
CONCLUSION

It is our opinion that the proposed winery sanitary wastewater disposal needs can be served by an engineered subsurface drip type onsite wastewater disposal system and the winery process wastewater can be pretreated and disposed of via irrigation within the onsite vineyard area. Full design calculations and construction plans should be prepared in accordance with Napa County standards at the time of building permit application.

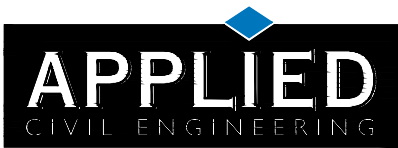
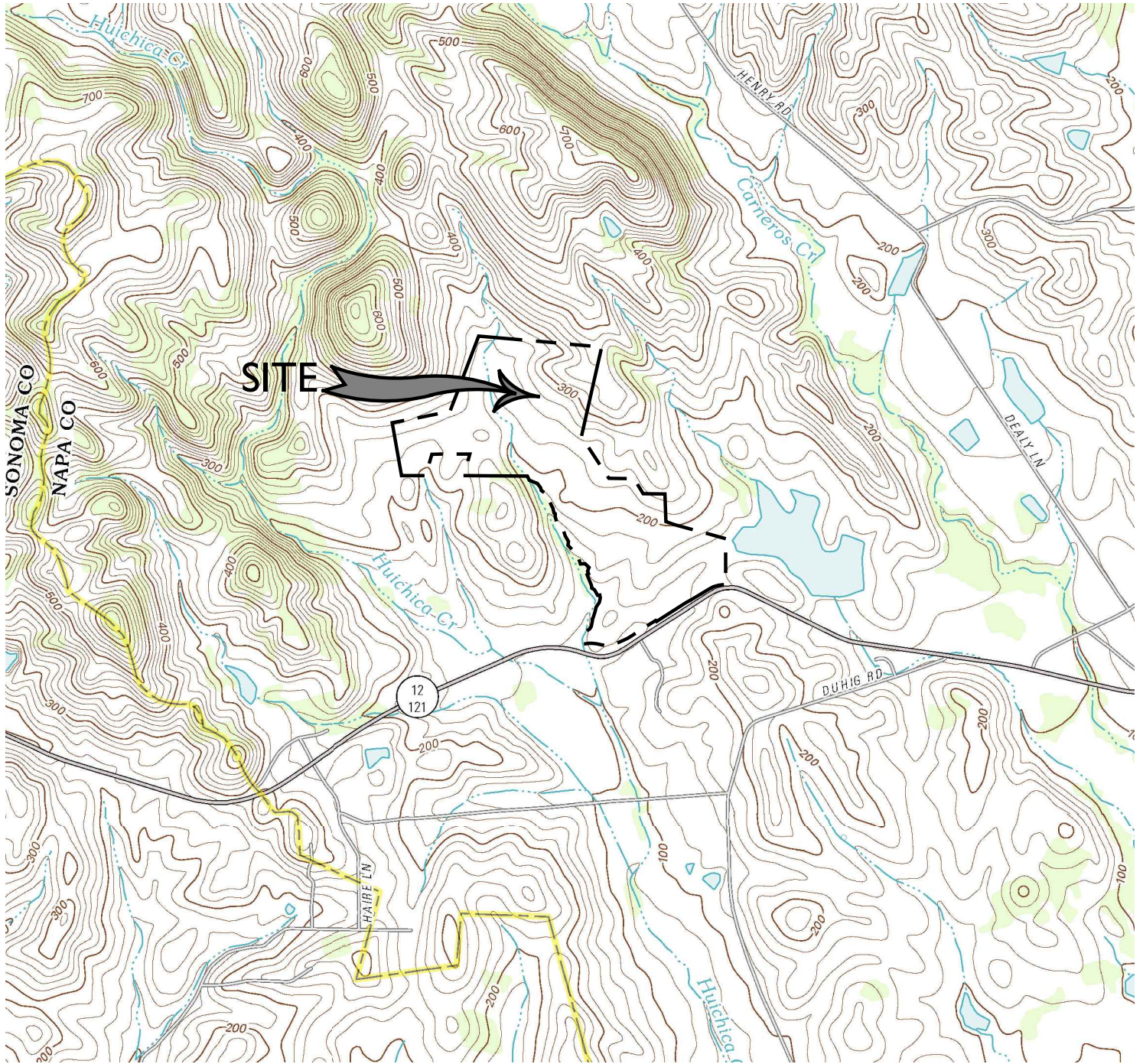
APPENDIX I: Site Topography Map

SITE TOPOGRAPHY MAP

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



SCALE: 1" = 2,000'



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NAPA, CA 94559
APN 047-070-016

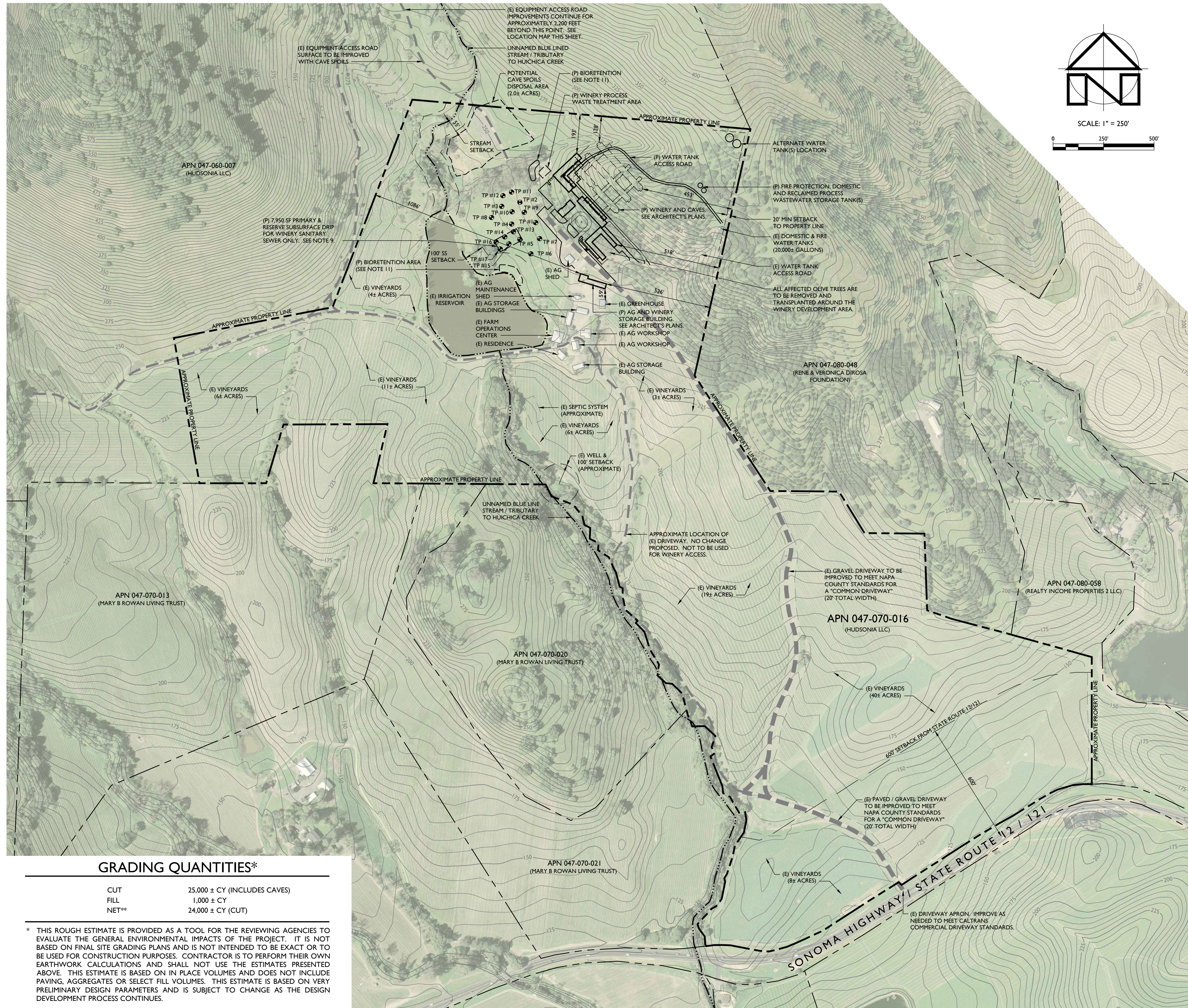
JOB NO. 13-150

MAY 2014

APPENDIX 2: Hudson Vineyards Winery Use Permit Conceptual Site Plan
Reduced to 8.5" x 11"

HUDSON VINEYARDS WINERY

USE PERMIT CONCEPTUAL SITE PLANS



GRADING QUANTITIES*

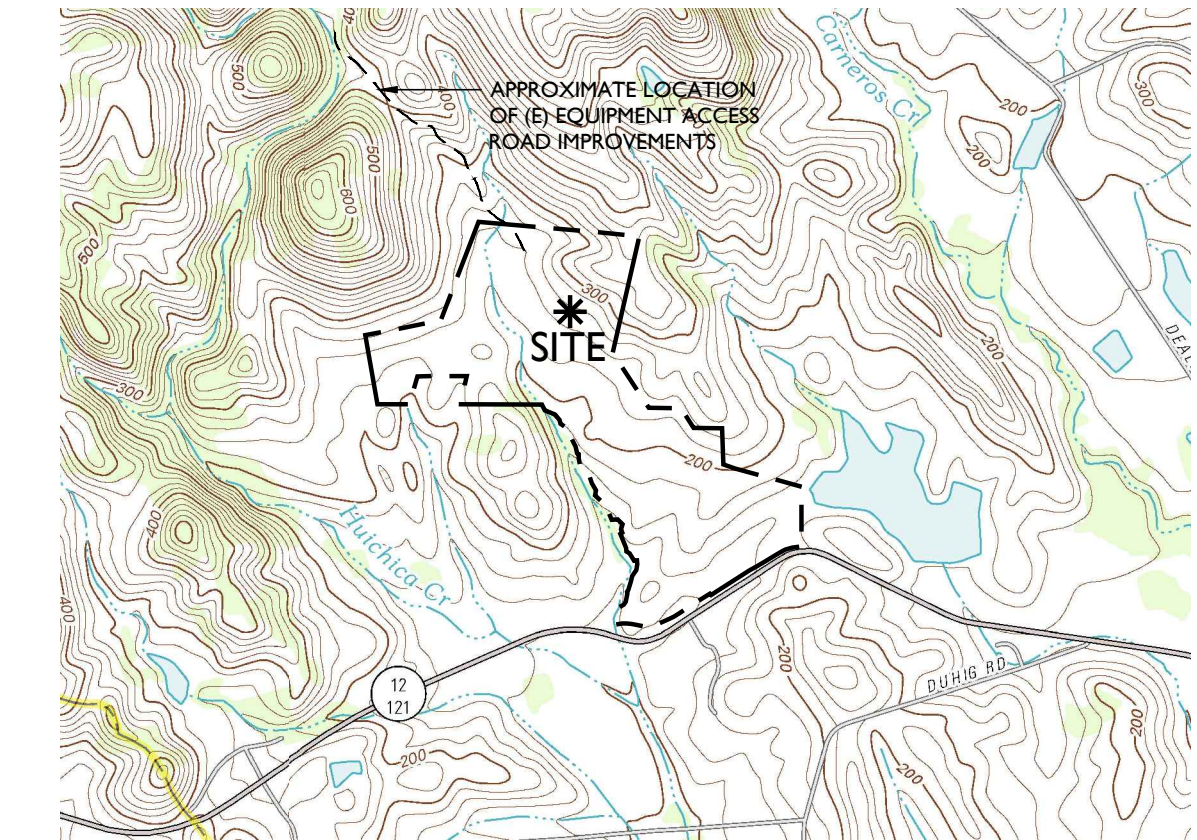
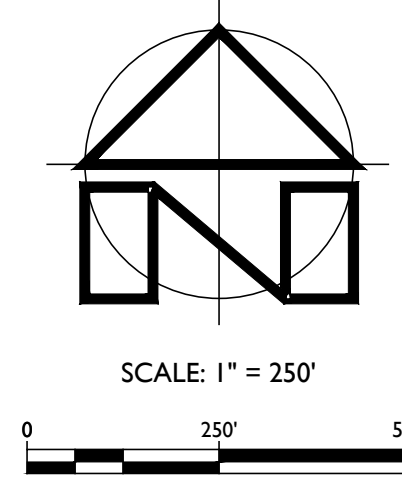
CUT	25,000 ± CY (INCLUDES CAVES)
FILL	1,000 ± CY
NET**	24,000 ± CY (CUT)

* THIS ROUGH ESTIMATE IS PROVIDED AS A TOOL FOR THE REVIEWING AGENCIES TO EVALUATE THE GENERAL ENVIRONMENTAL IMPACTS OF THE PROJECT. IT IS NOT BASED ON FINAL SITE GRADING PLANS AND IS NOT INTENDED TO BE EXACT OR TO BE USED FOR CONSTRUCTION PURPOSES. CONTRACTOR IS TO PERFORM THEIR OWN EARTHWORK CALCULATIONS AND SHALL NOT USE THE ESTIMATES PRESENTED ABOVE. THIS ESTIMATE IS BASED ON IN PLACE VOLUMES AND DOES NOT INCLUDE PAVING, AGGREGATES OR SELECT FILL VOLUMES. THIS ESTIMATE IS BASED ON VERY PRELIMINARY DESIGN PARAMETERS AND IS SUBJECT TO CHANGE AS THE DESIGN DEVELOPMENT PROCESS CONTINUES.

** EXCESS SOIL WILL BE PLACED IN THE CAVE SPOILS DISPOSAL AREA SHOWN ON THIS PLAN. EXISTING RANCH ACCESS ROADS AND / OR WILL BE HAULED OFFSITE TO AN APPROVED LOCATION. OFFSITE LOCATION MUST BE APPROVED BY NAPA COUNTY PRIOR TO EXPORTING OF SOIL.

OVERALL SITE PLAN

SCALE: 1" = 250'



LOCATION MAP

SCALE: 1" = 2,000'

PROJECT INFORMATION

PROPERTY OWNER & APPLICANT:

HUDSONIA LLC
5398 SONOMA HIGHWAY
NAPA, CA 94559

SITE ADDRESS:

5398 SONOMA HIGHWAY
NAPA, CA 94559

ASSESSOR'S PARCEL NUMBER:

047-070-016

PARCEL SIZE:

166.82± ACRES

PROJECT SIZE:

7.0± ACRES

ZONING:

AGRICULTURAL WATERSHED (AW)

DOMESTIC WATER SOURCE:

PRIVATE WELL

FIRE PROTECTION WATER SOURCE:

STORAGE TANK

WASTEWATER DISPOSAL:

ONSITE TREATMENT AND DISPOSAL

NOTES:

- TEST PITS ONE THROUGH EIGHT (TP #1 - TP #8) WERE EXCAVATED BY HUDSON VINEYARDS ON MAY 8, 2002 AND WERE WITNESSED BY REPRESENTATIVES OF BARTELT ENGINEERING AND A REPRESENTATIVE OF THE NAPA COUNTY PLANNING, BUILDING AND ENVIRONMENTAL SERVICES DEPARTMENT - ENVIRONMENTAL HEALTH DIVISION.
- TEST PITS NINE THROUGH TWELVE (TP #9 - TP #12) WERE EXCAVATED BY HUDSON VINEYARDS ON SEPTEMBER 9, 2002 AND WERE WITNESSED BY REPRESENTATIVES OF BARTELT ENGINEERING AND A REPRESENTATIVE OF THE NAPA COUNTY PLANNING, BUILDING AND ENVIRONMENTAL SERVICES DEPARTMENT - ENVIRONMENTAL HEALTH DIVISION.
- TEST PITS THIRTEEN THROUGH SEVENTEEN (TP #13 - TP #17) WERE EXCAVATED BY HUDSON VINEYARDS ON OCTOBER 7, 2014 AND WERE WITNESSED BY MIKE MUELRATH OF APPLIED CIVIL ENGINEERING AND VERONICA BATESON OF THE NAPA COUNTY PLANNING, BUILDING AND ENVIRONMENTAL SERVICES DEPARTMENT - ENVIRONMENTAL HEALTH DIVISION.
- FADED BACKGROUND REPRESENTS EXISTING TOPOGRAPHIC FEATURES. TOPOGRAPHIC INFORMATION FOR WAS 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.
- AERIAL PHOTOGRAPH WAS OBTAINED FROM THE NAPA COUNTY GEOGRAPHIC INFORMATION SYSTEM (GIS) DATABASE AND ARE DATED APRIL 9, 2011.
- CONTOUR INTERVAL: FIVE (5) FEET, HIGHLIGHTED EVERY TWENTY FIVE (25) FEET
- BENCHMARK: NAVD 88
- THE PROPERTY LINES SHOWN ON THESE PLANS DO NOT REPRESENT A BOUNDARY SURVEY. THEY ARE APPROXIMATE AND ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY.
- ACCORDING TO FEMA FIRM COMMUNITY PANEL 06055C0495E THE SUBJECT PARCEL IS DETERMINED TO BE OUTSIDE OF THE 500 YEAR FLOOD BOUNDARY. SEE FEMA FIRM COMMUNITY PANEL 06055C0495E FOR MORE INFORMATION.
- WINERY PROCESS WASTEWATER WILL BE TREATED AND APPLIED TO THE VINEYARD AREAS. REFER TO THE ONSITE WASTEWATER DISPOSAL FEASIBILITY STUDY FOR THE HUDSON VINEYARDS WINERY FOR ADDITIONAL DETAILS.
- EXISTING SEPTIC SYSTEM LOCATION IS APPROXIMATE BASED ON COUNTY RECORDS.
- TOTAL BIORETENTION AREA SHALL BE 5,300 SF MINIMUM. IT IS EXPECTED THAT A MAJORITY OF THE BIORETENTION AREA CAN BE ACCOMMODATED IN THE LANDSCAPING AROUND THE FACILITY WHICH HAS NOT YET BEEN DESIGNED. THE TWO ADDITIONAL AREAS SHOWN ON THIS MAP WILL ONLY BE USED FOR BIORETENTION IF NEEDED TO SUPPLEMENT LANDSCAPE BIORETENTION AREAS.

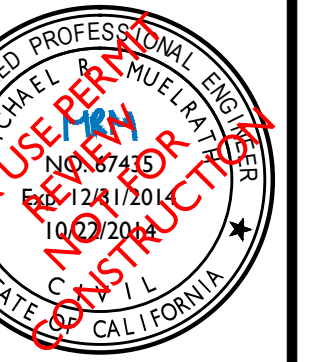
HUDSON VINEYARDS WINERY
USE PERMIT CONCEPTUAL SITE PLANS
OVERALL SITE PLAN

HUDSONIA LLC
5398 SONOMA HIGHWAY
NAPA, CA 94559
NAPA COUNTY APN 047-070-016

DATE: OCTOBER 22, 2014
JOB NUMBER: 13-150
FILE: 13-150CON_OSP.DWG
ORIGINAL SIZE: 24" X 36"
SCALE: AS NOTED
SHEET NUMBER:

CI
OF
1

APPLIED CIVIL ENGINEERING INCORPORATED
2074 West Lincoln Avenue
Napa, CA 94558
(707) 320-4968 (707) 320-2955 Fax
www.appliedcivil.com



DESIGNED BY: MRM
DRAWN BY: BT
CHECKED BY: MRM

APPENDIX 3: Water Storage Tank Water Balance Calculations

Irrigation Storage Tank Water Balance

Month	Beginning Balance	Process Wastewater	Land Application	Ending Balance
January	0	24,000	868,877	0
February	0	24,000	868,877	0
March	0	24,000	868,877	0
April	0	19,200	868,877	0
May	0	19,200	261,105	0
June	0	24,000	652,763	0
July	0	48,000	652,763	0
August	0	62,400	391,658	0
September	0	62,400	391,658	0
October	0	62,400	1,129,982	0
November	0	62,400	868,877	0
December	0	48,000	868,877	0
		480,000	8,693,188	

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	80,000 gallons
Wastewater Generation Rate	6 gallons per gallon of wine
Annual Wastewater Generation	480,000 gallons
Crush Season Length	60 days
Wastewater Generated During Crush	1.5 gallons per gallon of wine
Peak Wastewater Generation Rate	2,000 gallons per day

Winery Process Wastewater Generation Table			
Month	Percentage of Annual Total	Monthly Flow (gallons)	Average Flow (gpd)
January	5.0%	24,000	774
February	5.0%	24,000	857
March	5.0%	24,000	774
April	4.0%	19,200	640
May	4.0%	19,200	619
June	5.0%	24,000	800
July	10.0%	48,000	1,548
August	13.0%	62,400	2,013
September	13.0%	62,400	2,080
October	13.0%	62,400	2,013
November	13.0%	62,400	2,080
December	10.0%	48,000	1,548
Total	100.0%	480,000	

Notes:

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

APPENDIX 4: Site Evaluation Reports and Test Pit Map

NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
REQUEST FOR SITE EVALUATION INSPECTION

* Called Thurs 5/8/02 4:00 PM

ENVIRONMENTAL HEALTH DEPT. USE ONLY

FEE: 348.00
DATE: 4-29-02
RECEIPT: 226 26
BY: [Signature]

PARCEL NUMBER: 47-070-16
JOB ADDRESS: 5398 SOMOMA HWY
OWNER: HUDSON VINEYARDS
TEST CONDUCTED BY: BARTELT
NEXT RIGHT AFTER DEPOSA

TYPE OF TEST: FIELD ANALYSIS PERCOLATION TEST
To be run on Wed at 9:19 am/pm To be run on _____ from _____ am/pm to _____ pm

PURPOSE OF TEST: HOUSE: _____ WINERY: OTHER: _____
PROJECTED WASTEWATER FLOWS: NEED gpd

PERCOLATION TEST INSPECTION RESULTS

Pre-soak checked? yes _____ no _____ Length of pre-soak: _____
Checked by: _____ Date: _____
Rate at time of inspection: _____ Stabilized perc rate: _____
Gravel and Pipe Used? yes _____ no _____ If so, take the perc rate _____ x .6 = _____ in/hr

TYPE OF SYSTEM APPROVED

STANDARD SYSTEM

Acceptable soil to: 24" / Assigned perc range: 1-3 / 3-6 / 6-12
Depth of trenches: _____ / Rock under pipe: _____ / Cover over rock: _____
Lineal feet of leachline required: _____ / Plot plan received: NEED
Slope: _____ / Surface drainage problems: _____

Additional information: AREA DOES NOT MEET NAPA CO. GUIDELINES FOR WINERY WASTE SEPTIC SYSTEM DUE TO SOIL DEPTH.

SPECIAL DESIGN SYSTEM DUE TO THE FOLLOWING - Size constraints: _____
Perc rate too slow: _____ / Perc rate too fast: _____ / Steep slope: _____
Insufficient soil depth: / High seasonal groundwater: SOME MOTTLING
Acceptable soil for special design: 24" / Other problems: _____

E.H. Specialist [Signature] Date 5/8/02

FIELD ANALYSIS

TEXTURE (In the proposed trench zone)

Core Hole	CLAY CONTENT						Core Hole	SAND CONTENT						Core Hole	GRAVEL, COBBLE, STONE CONTENT					
	1	2	3	4	5	6		1	2	3	4	5	6		1	2	3	4	5	6
Low (<12)							High (>50)							Very High (>60)						
Mod (12-27)							Mod (20-50)	X	X	X	X	X	X	High (35-60)						
High (27-40)	X	X	X	X	X	X	Low (<20)							Mod (15-35)						
High (>40)														Low (<15)	X	X	X	X	X	X

STRUCTURE

SOIL DENSITY WHEN PICKED (Circle whether wet or dry)

Core Hole	1	2	3	4	5	6
pick sluffs or caves soil in						
pick bites and soil sluffs		X	X		X	X
pick bites/ little or no soil sluffs	X			X		

CONSISTENCE (Circle w or d)

Core Hole	1	2	3	4	5	6
Easy						
Moderate		X	X		X	X
Hard	X			X		

STRUCTURE

Core Hole	1	2	3	4	5	6
Granular						
Blocky		X	X		X	X
Prism						
Platy						
Massive						
Cemented	X			X		

MODIFIER CHARACTERISTICS

- GRAVELLY LOAM / DIABLO CLAY
 1) Soil Survey Name: HAIRE CLAY LOAM / BALE CLAY LOAM
 2) Horizon Boundaries: Diffuse _____ Gradual X Abrupt _____
 3) Topography: Concave (VALLES) X Convex _____ / Aspect: S
 4) Vegetation: Type GRASSES Condition: DRY

CORE HOLE RECORD

HOLE #1	EST. PERC
0 to 10" SANDY CLAY LOAM	1-3
10" CEMENTED CLAY	41
Roots:	
Color: <u>bright</u> / dull	
Water Table:	
Dug: <u>easy</u> / hard / dusty / smear	
Acceptable Soil To: <u>10"</u>	

HOLE #2	EST. PERC
0 to 24" SANDY CLAY LOAM	1-3
24" to 30" CEMENTED SAND	41
30" to 40" CEMENTED CLAY	41
Roots:	
Color: <u>bright</u> / dull	
Water Table: <u>24"</u>	
Dug: <u>easy</u> / hard / dusty / smear	
Acceptable Soil To: <u>24"</u>	

HOLE #3	EST. PERC
0 to 20" SAME AS #2	1-3
20" to 22" CEMENTED CLAY	41
22" to 24" CEMENTED CLAY	41
24" to 40" CEMENTED CLAY	41
Roots:	
Color: <u>bright</u> / dull	
Water Table: <u>26"</u>	
Dug: <u>easy</u> / hard / dusty / smear	
Acceptable Soil To: <u>26"</u>	

CORE HOLE RECORD

HOLE #4	EST. PERC
0 to SAME AS #1	
Roots:	
Color: <u>bright</u> / dull	
Water Table:	
Dug: <u>easy</u> / hard / dusty / smear	
Acceptable Soil To:	

HOLE #5	EST. PERC
0 to 36" SANDY CLAY LOAM	1-3
36" to 48" MEDIUM SANDY CLAY LOAM	41
Roots:	
Color: <u>bright</u> / dull	
Water Table: <u>24"</u>	
Dug: <u>easy</u> / hard / dusty / smear	
Acceptable Soil To: <u>36"</u>	

HOLE #6	EST. PERC
0 to 42" LIGHT SANDY CLAY LOAM	1-3
42" to 57" CEMENTED CLAY	41
Roots:	
Color: <u>bright</u> / dull	
Water Table: <u>42"</u>	
Dug: <u>easy</u> / hard / dusty / smear	
Acceptable Soil To: <u>42"</u>	

7 0-10" POSSIBLE FILL, 10"-66" SANDY CLAY 1" # 0-24" SANDY CLAY LOAM 1-3
 TS/NJP/JP/ts SP-1 - 11-26-89 24"-30" CLAY 41 30-36" CEMENTED

NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
REQUEST FOR SITE EVALUATION INSPECTION

ENVIRONMENTAL HEALTH DEPT. USE ONLY

FEE: _____
DATE: Cont.
RECEIPT: 92-14042
BY: _____

PARCEL NUMBER: 47-070-16
JOB ADDRESS: 5398 Sonoma Hwy
OWNER: Hudson V yds
TEST CONDUCTED BY: BARTLET

TYPE OF TEST: FIELD ANALYSIS

PERCOLATION TEST _____

To be run on _____ at _____ am/pm

To be run on _____ from _____ am/pm to _____ pm

PURPOSE OF TEST: HOUSE: _____ WINERY: _____ OTHER: _____

PROJECTED WASTEWATER FLOWS: _____ gpd

PERCOLATION TEST INSPECTION RESULTS

Pre-soak checked? yes _____ no _____ Length of pre-soak: _____

Checked by: _____ Date: _____

Rate at time of inspection: _____ Stabilized perc rate: _____

Gravel and Pipe Used? yes _____ no _____ If so, take the perc rate _____ x .6 = _____ in/hr

TYPE OF SYSTEM APPROVED

STANDARD SYSTEM

Acceptable soil to: 36 / Assigned perc range: 1-3 / 3-6 / 6-12

Depth of trenches: _____ / Rock under pipe: _____ / Cover over rock: _____

Lineal feet of leachline required: _____ / Plot plan received: _____

Slope: 5% H Surface drainage problems: yes - mottling at horizon - divert

Additional information: Hole # 9 + 11 W/ French Drain

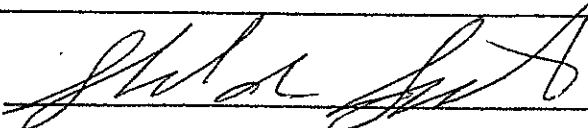
SPECIAL DESIGN SYSTEM DUE TO THE FOLLOWING - Size constraints:

Perc rate too slow: X / Perc rate too fast: _____ / Steep slope: _____

Insufficient soil depth: X / High seasonal groundwater: _____

Acceptable soil for special design: 36 / Other problems: _____

E.H. Specialist



Date

9/9/02

FIELD ANALYSIS

TEXTURE (In the proposed trench zone)

Core Hole	CLAY CONTENT						Core Hole	SAND CONTENT						Core Hole	GRAVEL, COBBLE, STONE CONTENT					
	1	2	3	4	5	6		1	2	3	4	5	6		1	2	3	4	5	6
Low (<12)							High (>50)							Very High (>60)						
Mod (12-27)							Mod (20-50)	X	X	X	X			High(35-60)						
High (27-40)							Low (<20)							Mod (15-35)	X	X	X	X		
High (>40)	X	X	X	X									Low (<15)							

Core Hole	SOIL DENSITY WHEN PICKED (Circle whether wet or dry)						Core Hole	CONSISTENCE (Circle w or d)					
	1	2	3	4	5	6		1	2	3	4	5	6
pick sluffs or caves soil in							Easy						
pick bites and soil sluffs							Moderate						
pick bites/ little or no soil sluffs	X	X	X	X			Hard	X	X	X	X		

STRUCTURE

Core Hole	1	2	3	4	5	6
Granular						
Blocky	X	X	X	X		
Prism						
Platy						
Massive						
Cemented						

MODIFIER CHARACTERISTICS

1) Soil Survey Name: _____

2) Horizon Boundaries: Diffuse _____ Gradual _____ Abrupt X

3) Topography: Concave _____ Convex _____ / Aspect: _____

4) Vegetation: Type Dry Grass Condition: _____

CORE HOLE RECORD

HOLE #9 EST. PERC

0 to 36" 1/8" +

S. CL / CL

36 to Vol. Ash / Tuffa <1"

_____ to _____

Roots: _____

Color: bright / dull

Water Table: 0

Dug: easy / hard / dusty / smear

Acceptable Soil To: 36"

CORE HOLE RECORD

HOLE #10 EST. PERC

0 to 25 1"

CL / SIL / CL

25 to Vol. Ash / Tuffa <1"

_____ to _____

Roots: _____

Color: bright / dull

Water Table: _____

Dug: easy / hard / dusty / smear

Acceptable Soil To: 25

CORE HOLE RECORD

HOLE #11 EST. PERC

0 to 38 1/8"

S. CL / CLAY

38 to Vol. Ash / Tuffa <1"

_____ to _____

Roots: _____

Color: bright / dull

Water Table: _____

Dug: easy / hard / dusty / smear

Acceptable Soil To: 38"

CORE HOLE RECORD

HOLE #12 EST. PERC

0 to 25 1/8"

S. CL / CLAY

25 to Vol. Rock _____

_____ to _____

Roots: _____

Color: bright / dull

Water Table: 0

Dug: easy / hard / dusty / smear

Acceptable Soil To: 25

CORE HOLE RECORD

HOLE #5 EST. PERC

_____ to _____

_____ to _____

_____ to _____

Roots: _____

Color: bright / dull

Water Table: _____

Dug: easy / hard / dusty / smear

Acceptable Soil To: _____

CORE HOLE RECORD

HOLE #6 EST. PERC

_____ to _____

_____ to _____

_____ to _____

Roots: _____

Color: bright / dull

Water Table: _____

Dug: easy / hard / dusty / smear

Acceptable Soil To: _____

Test Pit #13

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-24	C	0-15	CL	SSB	SH	F	SS	CF/CM/FC	FF	NONE
24-36					Cemented Sand / Rock					

Acceptable soil depth = 24"

Test Pit #14

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-24	C	0-15	CL	SSB	SH	F	SS	CF/CM/FC	FF	NONE
24-36					Cemented Sand / Rock					

Acceptable soil depth = 24"

Test Pit #15

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-24	C	0-15	CL	MSB	SH	F	SS	CF/FM	FF	NONE
24-36					Cemented Sand / Rock					

Acceptable soil depth = 24"

Test Pit #16

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-29	C	0-15	CL	MSB	SH	F	SS	CF/FM	FC	NONE
29-36					Cemented Sand / Rock					

Acceptable soil depth = 29"

Test Pit #17

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-27	C	0-15	CL	MSB	SH	F	SS	FF/CM/FC	FF	NONE
27-33					Cemented Sand / Rock					

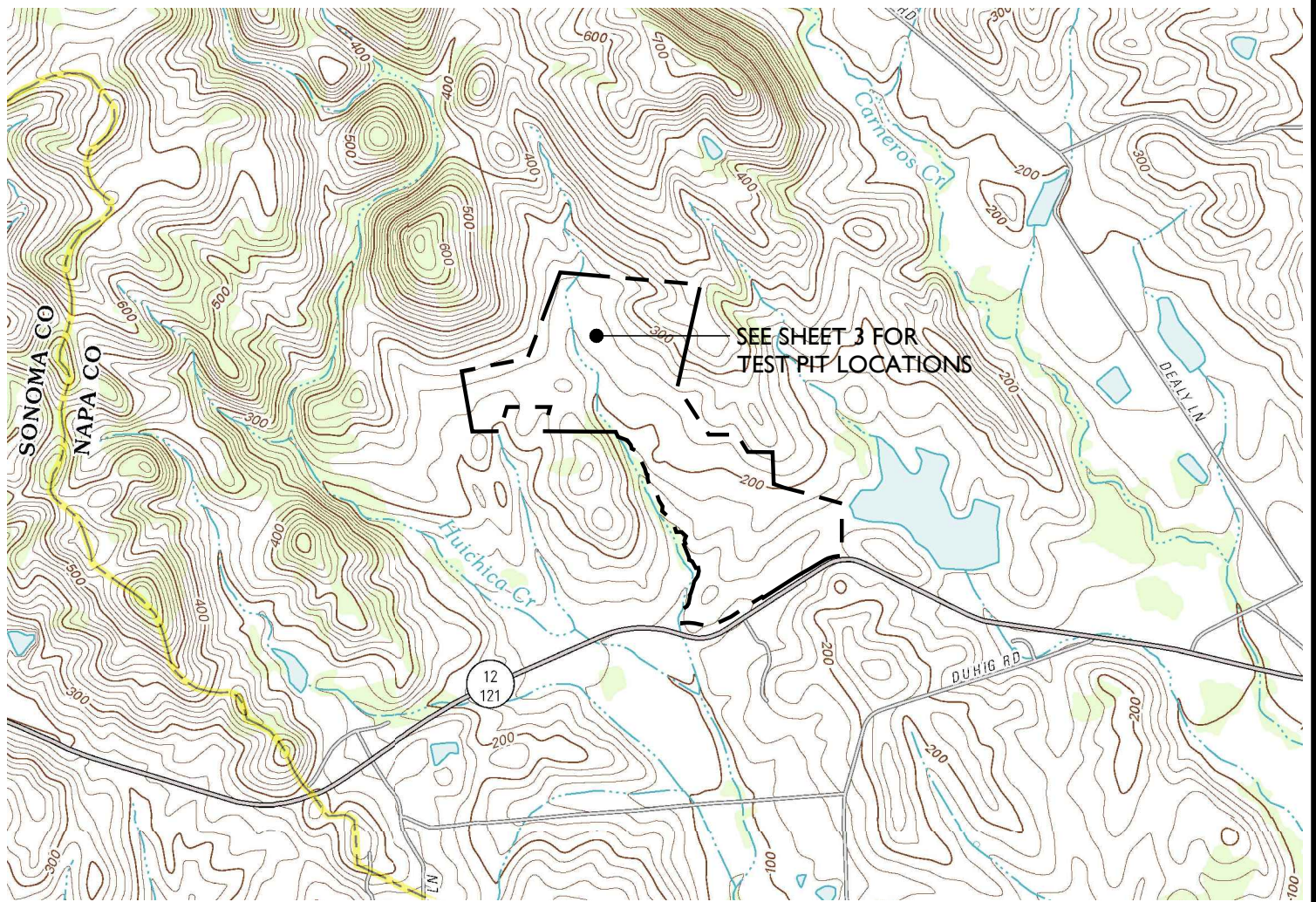
Acceptable soil depth = 27"

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 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	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

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'

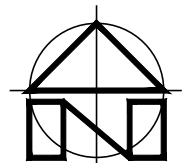
NOTES:

1. TEST PITS ONE THROUGH EIGHT (TP #1 - TP #8) WERE EXCAVATED BY HUDSON VINEYARDS ON MAY 8, 2002 AND WERE WITNESSED BY REPRESENTATIVES OF BARTELT ENGINEERING AND A REPRESENTATIVE OF THE NAPA COUNTY PLANNING, BUILDING AND ENVIRONMENTAL SERVICES DEPARTMENT - ENVIRONMENTAL HEALTH DIVISION.
2. TEST PITS NINE THROUGH TWELVE (TP #9 - TP #12) WERE EXCAVATED BY HUDSON VINEYARDS ON SEPTEMBER 9, 2002 AND WERE WITNESSED BY REPRESENTATIVES OF BARTELT ENGINEERING AND A REPRESENTATIVE OF THE NAPA COUNTY PLANNING, BUILDING AND ENVIRONMENTAL SERVICES DEPARTMENT - ENVIRONMENTAL HEALTH DIVISION.
2. TEST PITS THIRTEEN THROUGH SEVENTEEN (TP #13 - TP #17) WERE EXCAVATED BY HUDSON VINEYARDS ON OCTOBER 7, 2014 AND WERE WITNESSED BY MIKE MUELARTH OF APPLIED CIVIL ENGINEERING AND VERONICA BATESON OF THE NAPA COUNTY PLANNING, BUILDING AND ENVIRONMENTAL SERVICES DEPARTMENT - ENVIRONMENTAL HEALTH DIVISION.
3. AERIAL PHOTOGRAPH WAS OBTAINED FROM THE NAPA COUNTY GEOGRAPHIC INFORMATION SYSTEM (GIS) DATABASE AND IS DATED APRIL 9, 2011.
4. ACCORDING TO FEMA FIRM COMMUNITY PANEL 06055C0495E THE SUBJECT PARCEL IS DETERMINED TO BE OUTSIDE OF THE FEMA FLOOD BOUNDARIES. SEE FEMA FIRM COMMUNITY PANEL 06055C0495E FOR MORE INFORMATION.

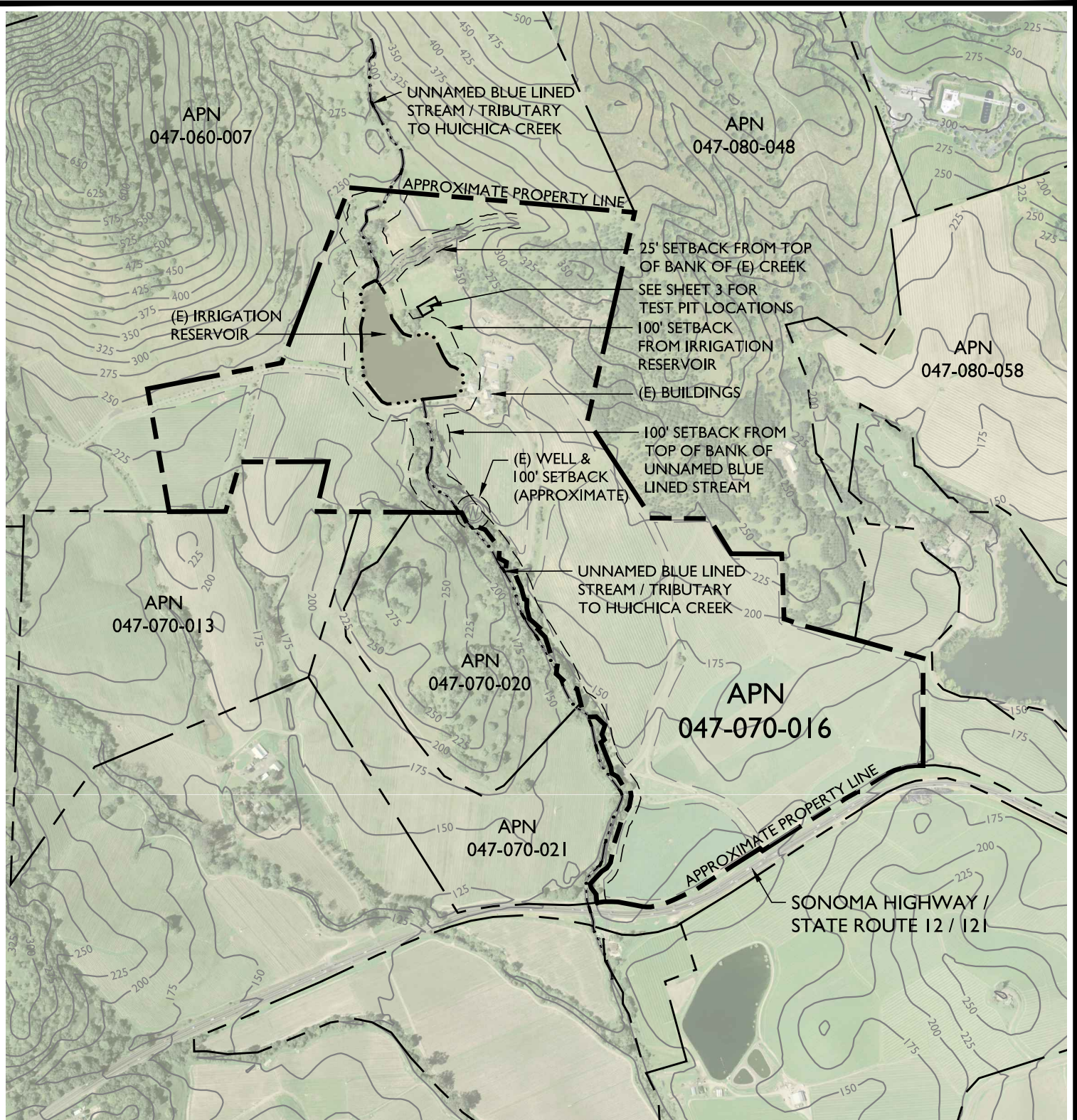


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HUDSON VINEYARDS
 5398 SONOMA HIGHWAY
 NAPA, CA 94559
 APN 047-070-016

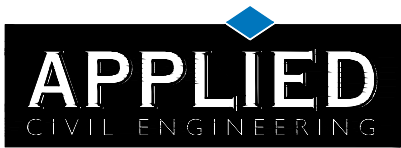


SCALE: 1" = 2,000'



OVERALL SITE PLAN

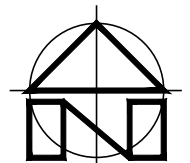
SCALE: 1" = 800'



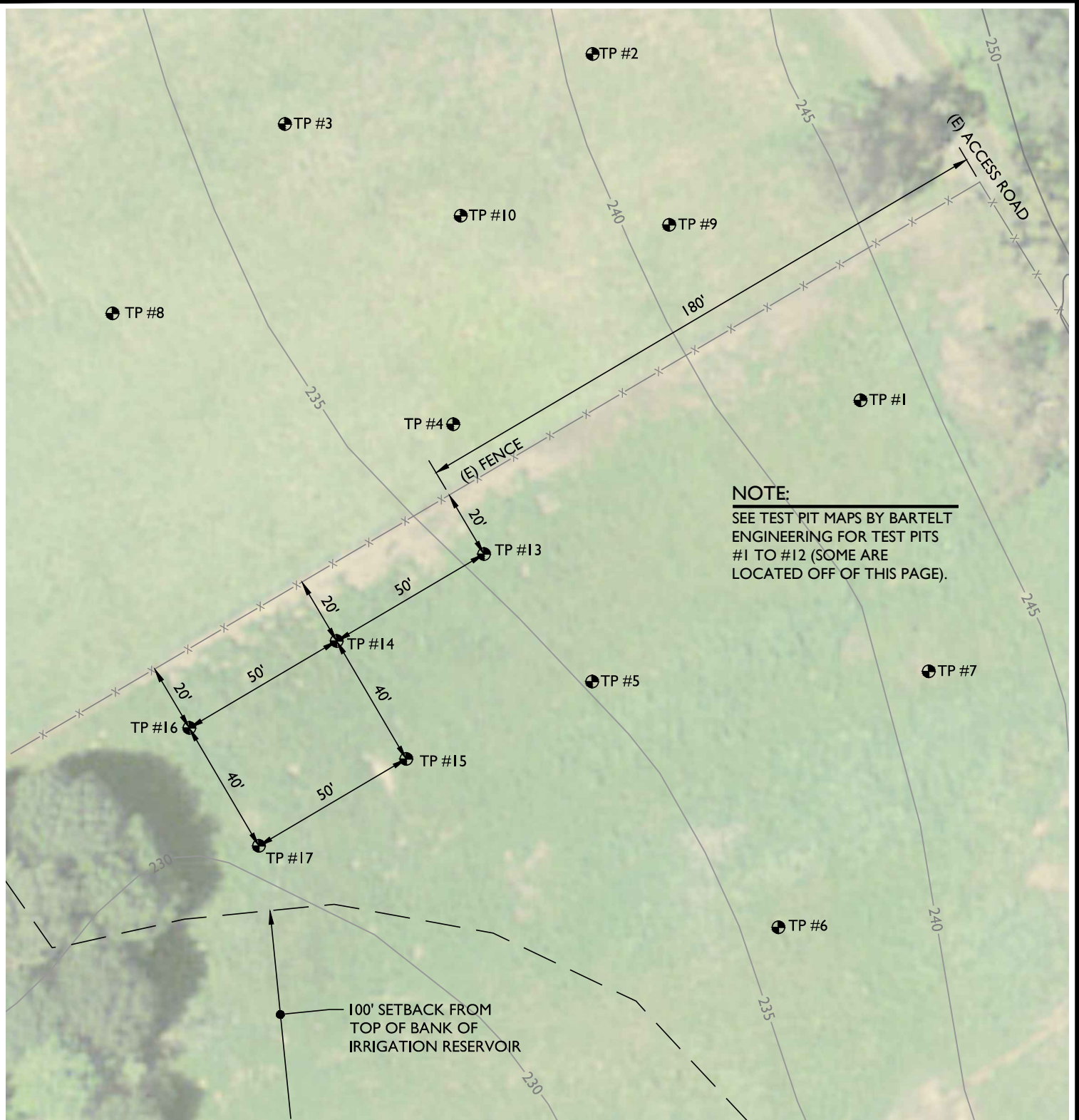
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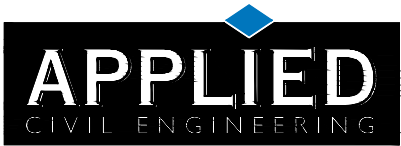


SCALE: 1" = 800'



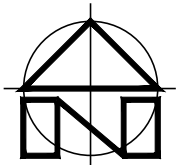
NOTE:
 SEE TEST PIT MAPS BY BARTELT
 ENGINEERING FOR TEST PITS
 #1 TO #12 (SOME ARE
 LOCATED OFF OF THIS PAGE).

TEST PIT MAP
 SCALE: 1" = 40'



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SCALE: 1" = 40'