“H”

Septic Feasibility Report

Vincent Arroyo Winery Major Modification P16-00327
Planning Commission Hearing November 15, 2017

DELTA CONSULTING & ENGINEERING
OF ST. HELENA

SEPTIC FEASIBILITY REPORT

FOR THE

VINCENT ARROYO WINERY
USE PERMIT MODIFICATION

PROJECT LOCATED AT

2361 GREENWOOD AVENUE
CALISTOGA, CA 94515

COUNTY: NAPA
APN: 017-230-020

INITIAL SUBMITTAL: JUNE 8, 2016

PREPARED FOR REVIEW BY:

NAPA COUNTY PLANNING, BUILDING
AND ENVIRONMENTAL SERVICES
1195 THIRD STREET
NAPA, CA 94559

1104 ADAMS STREET, SUITE 203 – ST. HELENA, CALIFORNIA 94574
707-963-8456 TELE + WWW.DELTACIVIL.COM + 707-963-8528

TABLE OF CONTENTS

I. INTRODUCTION

Vincent Arroyo Winery is applying to the County of Napa for a Use Permit Modification to increase wine production from 20,000 gallons of wine per year to 70,000 gallons of wine per year and increase their employment and visitation capacity. This report has been prepared to evaluate the feasibility of treating and disposing the additional wastewater flows generated by the proposed increase in production and marketing.

Vincent Arroyo Winery's current marketing plan allows the following uses:

- Production Capacity: 20,000 Gallons / Year
- Employees: 4 full-time/part-time
- Daily Visitors: 30/day
- Marketing Events:
    - Open House: 1/year with 200 guests (Event Uses Portable Toilets & Off-Site Catering)
    - Winemaker Dinner: 1/year with 130 guest (Event Uses Portable Toilets & Off-Site Catering)

Vincent Arroyo Winery wishes to modify their use permit to allow the following:

- Production Capacity: 70,000 Gallons / Year
- Employees: 10 full-time/part-time
- Daily Visitors: 50/day
- Marketing Events:
    - Marketing Events: 12/year with 20 guests
    - Open House: 3/year with 200 guests (Event Uses Portable Toilets & Off-Site Catering)
    - Winemaker Dinners: 4/year with 130 guests (Event Uses Portable Toilets & Off-Site Catering)
    - Harvest Party: 1/year with 100 guests (Event Uses Portable Toilets & Off-Site Catering)

Additional wastewater sources on the parcel consist of a main residence and guest cottage. Wastewater from all existing sources are currently treated by separate septic tanks and combined in a pump tank for conveyance to a gravity dispersal via trenches located in the vineyards adjacent to the winery building. The system was inspected by McCollum General Engineering on May 4, 2016, to evaluate the existing condition of the system. Based on the inspection, the existing wastewater treatment system is in good working condition. Please see Appendix 1 for a copy of the septic inspection report.

With this feasibility study, Vincent Arroyo Winery proposes to either modify the existing system to accommodate additional flows or install a new winery process wastewater treatment system and continue to use the existing system for all sources of domestic wastewater. The following sections provide a description of the existing system and the various options to treat and disperse wastewater on the parcel.

II. SITE EVALUATION

A site evaluation was conducted by Delta Consulting & Engineering and witnessed by Peter Ex from Napa County Environmental Health Division on May 13, 2016. The site evaluation excavated four (4) test pits to analyze the in-situ soils and their ability to accommodate a new wastewater treatment system. Soils consisted of a mixture between sandy loam and sandy clay loam soils. The sandy loam and sandy clay loam varies in depth from 48"-54" below the surface in the areas explored on-site. Mr. Ex noted minor evidence of mottling in certain pits at a depth of 54 inches. Based on these findings, the site was determined to have adequate soil to treat

wastewater from the proposed development. The site evaluation report denoting the test pit locations and soil findings is on file at Napa County and can be found in Appendix 2 of this report.

III. EXISTING WASTEWATER FLOWS AND TREATMENT SYSTEMS

A. WASTEWATER GENERATION

Domestic Wastewater

The existing conventional wastewater treatment system currently processes DW from two existing residential structures and the winery. Additionally, DW is generated by employees and visitors from the existing winery building. Based on Napa County Guidelines and Regulations[1], the total peak daily design flow from the two residential structures and the winery building are:

Residential:	
Main residence	2 Bedrooms = 300 gallons per day
Guest cottage	2 Bedrooms = 300 gallons per day
Peak Daily Flow:	600 gallons per day

Winery:	
Employees (Max):	4 x 15 gallons/day = 60 gallons per day
Visitors (Max):	30 x 3 gallons/day = 90 gallons per day
Peak Daily Flow:	150 gallons per day

Based on these estimates, the peak DW generated on the parcel is 750 gallons per day (GPD).

Process Wastewater

Vincent Arroyo Winery is currently permitted to produce 20,000 gallons of wine per year. Following Napa County Guidelines and Regulations, the estimated peak day PW design flow is:

Napa County Method
(1.5 x 20,000 gallons) / 45-day crush = 667 GPD

The total existing wastewater flow contributing to the existing system is estimated at 1,417 GPD.

B. EXISTING WASTEWATER TREATMENT SYSTEM

At peak season, the existing conventional wastewater treatment system is treating and disposing of approximately 1,417 GPD from the two residential structures and winery as described above. The existing conventional wastewater treatment system consists of two septic tanks, one lift station tank, a distribution box, and approximately 440 linear feet of conventional leach field. The flow chart in Figure 1 below details the existing conventional wastewater treatment system:

[1] Napa County Regulations for Design, Construction, and Installation of Alternative Sewage Treatment Systems, Appendix 1, Table 4, 2006.

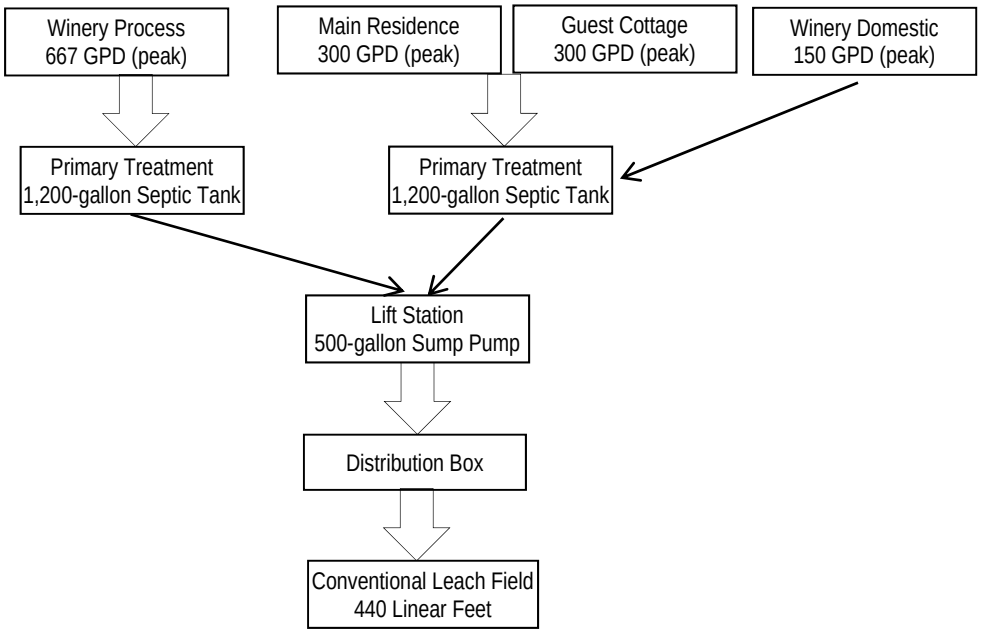


Figure 1: Existing Wastewater Treatment System Schematic

System Component Description

Each 1,200-gallon concrete septic tank provides primary settling to remove heavy solids from the wastewater. After primary treatment, both wastewater sources are routed to a common 500-gallon concrete lift station tank. Due to flat topography, the wastewater must be pumped from the lift station up into a distribution box prior to entering the leach lines. The distribution box equally distributes wastewater between two leach lines totaling 440 linear feet. The leach lines consist of 3" diameter Hancore PVC Pipe installed in gravel trenches in the vineyards adjacent to the south side of the winery building. The existing wastewater treatment system was inspected and mapped by McCollum General Engineering to determine if it was feasible for continued use by the winery and residences on the parcel. The inspection showed the leach lines to be in good working condition and recommended only minor improvements to the existing tanks. Based on the inspection, the existing system can treat and infiltrate the current peak demand of 1,417 GPD. Please see Appendix 1 for the septic inspection report.

IV. PROPOSED WASTEWATER FLOWS AND TREATMENT OPTIONS

A. WASTEWATER GENERATION

Domestic Wastewater

The DW generated at the Vincent Arroyo Winery is dependent on both the existing residential structures and the daily number of proposed employees and visitors present at the winery. The proposed marketing plan presented in the introduction determines the maximum number of guests the winery wishes to serve in one day, as well as the maximum number of permanent and temporary employees that the winery needs to

functionally operate. In terms of wastewater generation, this yields the maximum number of people that will be contributing to the daily peak wastewater flow rate. Based on the proposed marketing plan and Napa County Regulations[2], the following estimates for DW design flows are:

Residential:		
Main residence	2 Bedrooms =	300 gallons per day
Guest cottage	2 Bedrooms =	300 gallons per day
Peak Daily Flow:		600 gallons per day

Winery:		
Employees (Max):	10 x 15 gallons/day =	150 gallons per day
Daily Visitors (Max):	50 x 3 gallons/day =	150 gallons per day
Marketing Event (Max):	20 x 5 gallons/day =	100 gallons per day
Peak Daily Flow:		400 gallons per day

Total Peak Daily Flow: 1,000 gallons per day

The residential domestic wastewater remains the same at 600 GPD. The winery domestic wastewater is increased from 150 GPD to 400 GPD. The total proposed design domestic wastewater flow on the parcel is estimated to be 1,000 GPD.

Portable toilets and off-site catering will be provided for all large marketing events as noted in the introduction.

Process Wastewater

The estimated PW generated at the Vincent Arroyo Winery is dependent on the proposed annual production of wine. The production plan, presented in the introduction of this report, notes that the winery proposes to produce 70,000 gallons of wine per year. Based on the proposed production level and Napa County Guidelines, the following estimates the peak day PW design flows:

Napa County Method
(1.5x 70,000 gallons) / 60-day crush = 1,750 GPD

The total design process wastewater flow is 1,750 GPD.

B. TREATMENT OPTIONS

Option #1 – Connect DW to Existing System, Install New PW Pressure Distribution System

1. Connect DW to Existing System
   This option proposes DW from the winery and two existing residences will continue to use the existing conventional leach field. The two existing residences will remain connected to the existing 1,200-gallon concrete septic tank. The DW flows from the winery will be re-routed and isolated to the existing 1,200-gallon concrete PW septic tank or a new 1,200-gallon concrete septic tank will be installed. If a new 1,200-gallon concrete tank is installed, the existing 1,200-gallon concrete PW septic tank will be

[2] Napa County Regulations for Design, Construction, and Installation of Alternative Sewage Treatment Systems, Appendix 1, Table 4, 2006.

destroyed or abandoned per Napa County Guidelines. With either option, a new PW septic tank will be installed as part of the new PW system described below.

As the existing lift station tank and distribution box are in good functional condition and will remain in use. The existing conventional leach lines have capacity to accommodate 1,417 GPD of combined DW and PW. As the PW will be isolated and treated/distributed via a new treatment system, the existing distribution system has excess capacity due to remove the 667 GPD of peak PW. With the removal of the PW and the increase of DW to 1,000 GPD, the existing distribution system will see a demand reduction of 417 GPD from 1,417 GPD to 1,000 GPD. Therefore, the existing leach lines will be adequate to accommodate the increased DW flows.

2. Install New PW Pressure Distribution System

The primary option for the treatment and dispersal of PW from the winery will be a pressure distribution system. The new PW system will be designed using the estimated peak flow rate of 1,750 GPD. The PW will proceed through primary and secondary treatment prior to entering a dosing tank for pressure distribution via trenches in the vineyards. The main goal of the treatment system will be the reduction of Total Suspended Solids (TSS) and Bio-Chemical Oxygen Demand (BOD) to below 350 mg/L and 300 mg/L, respectively, from the wastewater before disbursement. The sections below detail the proposed components of the wastewater treatment system.

3. Primary Treatment - 4,000 Gallon Septic Tank

In advanced PW treatment systems, the primary treatment system is used to remove heavy solids from the wastewater stream. Generally, screening at the source is a key component of removing grape seeds, skins, and sediment present in raw PW prior to primary settling; if not, they can disrupt the efficiency of downstream treatment components. The primary septic tank is sized to provide approximately 2.0 days of storage during peak loading conditions and will be fitted with an effluent filter to prevent solids larger than 1/32" from entering the downstream treatment equipment. Based on the daily peak flow of 1,750 gallons, the 4,000-gallon septic tank will provide approximately 2.3 days of storage.

4. Secondary Treatment – Aeration and Filtration

After removal of heavy solids through screening and primary treatment process, PW effluent will enter the secondary treatment phase. The expected BOD and TSS concentrations of the combined wastewater entering the secondary treatment system are estimated to be 5,000 mg/L and 500 mg/L, respectively. Secondary Treatment shall consist of additional above ground tanks for nutrient and pH balance and below ground tanks for aeration, secondary settling, media filtration, and dosing. The Secondary Treatment system is required to reduce BOD and TSS concentrations below 300 mg/L prior to entering the dosing tank for the Pressure Distribution System.

5. 4,000 Gallon Aeration Tank

Process wastewater from the primary septic tank will flow into a single aeration tank. The aeration tank is a critical part of the treatment process. In it dissolved oxygen is supplied to the native bacteria in the wastewater which in turn, reduces the BOD concentration. The aeration tank must be sized to provide adequate hydraulic retention time for biological activity to take place (8-24 hours). The amount of oxygen to be supplied is a function of the loading and concentration by the proposed reduction in BOD through this stage of treatment.

The 4,000-gallon tank will provide a hydraulic retention time of approximately 2.3 days at peak loading

conditions. The aeration system proposes to reduce the BOD concentration from 5,000 mg/L to 500 mg/L. Because most aerators give their oxygen supply in pounds of oxygen (lbs O_2), the desired reduction in BOD5 must be converted from mg/L to lbs O_2 in order to select the appropriate aerator configuration. The conversion is shown below:

BOD (lbs/day) = (Daily Flow MGD) x (BOD mg/L) x (Conversion Constant 8.34 lbs/gal)
BOD (lbs/day) = (0.00175 MGD) x (5,000 - 500 mg/L) x (8.34 lbs/gal)
BOD (lbs/day) = 65.7 lbs/day

From the calculation shown above, approximately 65.7 lbs O_2 / day is required for the desired reduction in BOD. The aerator configuration must be carefully selected to ensure that treatment goals are reached. For this project, the aeration is proposed to be provided by an Orenco pump system fitted with Mazzei injectors and mixing nozzles. With this system, the Orenco pump circulates wastewater through a pipe within the tank. The Mazzei injector creates a vacuum which draws air into this pipe to aerate the mixture. The Mazzei mixing nozzle is installed on the pipe outlet at the bottom of the tank and mixes the air / water mixture throughout the aeration tank.

It is assumed that there will be no reduction of TSS in the aeration tank. A summary of the wastewater strength characteristics after the aeration tank is shown below:

BOD = 500 mg/L
TSS = 300 mg/L

Wastewater from the aeration tank will flow via gravity to the secondary settling tank.

6. Nutrient Addition and pH Balance

Process wastewater is characterized by low pH and nitrogen concentrations. Optimal levels of both constituents are important in order for the biological processes to reduce BOD in the aeration stage of treatment. At Vincent Arroyo Winery, it is anticipated that magnesium hydroxide and liquid urea will be required to facilitate optimal pH and nitrogen concentrations, respectively. The above noted substances will be added to the wastewater in the aeration tank. The substances will be stored in above ground holding tanks not to exceed 500 gallons. The equipment and chemicals for this treatment process are typically provided, operated, and monitored by Heritage Systems, Inc., a water and wastewater quality contracting firm located in Napa, California.

7. 4,000 Gallon Secondary Settling Tank

Secondary settling is an important part of any treatment system that involves secondary aeration. The aerators in the aeration tank keep solids suspended in solution as the air bubbles are forced through the wastewater. The secondary settling (stilling) tank allows suspended solids of large mass to settle out of solution prior to entering the filtration system. Secondary settling basins are typically sized to provide 2 days of hydraulic retention time. The 4,000-gallon tank for secondary settling will provide approximately 2.3 days of hydraulic retention time. There will be no baffle, and the tank will be fitted with an effluent filter sized to screen solids larger than 1/64" in diameter. The secondary settling tank is expected to reduce the TSS by 20% through gravitational settling and filter screening. The settling tank is expected to provide an additional 10% reduction in BOD, as biological processes will continue to take place in the tank. A summary of the estimated wastewater strength characteristics after this stage of treatment are shown below:

BOD = 450 mg/L
TSS = 240 mg/L

Wastewater from the secondary settling tank will flow via gravity to the re-circulation tank for further treatment.

8. 2,000 Gallon Re-Circulation Tank

The 2,000-gallon re-circulation tank is a primary component of the Orenco Advantex filtration system. It utilizes a pump system to circulate aerated wastewater through the Advantex filters and provides surge protection to protect the filters from overloading. According to the manufacture's specifications, the re-circulation tank must be sized to provide storage volume of least 80% of the peak daily flow rate. Based on these specifications, the minimum required tank size is 1,400 gallons. However, a 2,000-gallon re-circulation tank is selected to provide additional storage and surge protection.

9. Orenco Advantex Filtration System

To further reduce wastewater strength, an additional stage of biological treatment, used in conjunction with the re-circulation tank, will be added to system. The Advantex textile filter, manufactured by Orenco Systems, is a fixed media filter designed to reduce BOD and TSS in the effluent. Properly sized Orenco Advantex units can reduce up to 90% of the BOD and TSS present in wastewater.

To maximize the treatment process and prevent fouling in the filter, Orenco recommends that a peak daily load of 0.08 pounds of BOD per square foot of filter area per day (lbs/ft^2/day) should not be exceeded. In order to calculate the expected load to the filter, the daily flow rate and influent BOD concentration must be known. It is estimated that the effluent from the secondary settling tank will have BOD concentration of 450 mg/L. The conversion to pounds of BOD is estimated using the equation described in the aeration tank section above. The ratio between the actual and recommended BOD loading provides the minimum filter area required.

Organic Loading Rate
BOD (lbs/day) = (0.00175 MGD) x (450 mg/L) x (8.34 lbs/gal)
BOD (lbs/day) = 6.6 lbs/day

Minimum Filter Area (ft^2) = Peak Daily Load lbs BOD/day / 0.08 lbs BOD/ft^2/day
Minimum Filter Area (ft^2) = 6.6 lbs BOD/day / 0.08 lbs BOD/ft^2/day
Minimum Filter Area (ft^2) = 82.5 ft^2

For this system, one AX-100 filter is recommended. Each AX-100 unit provides 100 ft^2 of filter area. Because the AX-100 provides 17.5 ft^2 above the minimum filter area, it is assumed that the system will provide a 90% reduction in BOD and TSS under normal operating conditions.

A summary of the estimated wastewater strength characteristics after this stage of treatment are shown below:

BOD = 45 mg/L
TSS = 24 mg/L

At this point in the treatment process, the BOD and TSS constituents will be below the required threshold of 300 mg/L and 350 mg/L and be dispersed into the pressure distribution leach field. The treated wastewater will gravity flow into the dosing tank for dispersal to the pressure distribution leach field.

10. 3,000 Gallon Minimum Dosing Tank

The dosing tank stores treated wastewater prior to distribution to the proposed dispersal field. At minimum, the tank must be sized to store 1.5 times the peak daily flow rate. The minimum tank size for the wastewater system is 2,625 gallons. A minimum 3,000-gallon underground tank equipped with duplex pumps is proposed for this project.

11. Pressure Distribution Field

A new pressure distribution (PD) wastewater system will be used to infiltrate treated process wastewater on-site. Based on the site evaluation report, the PD field will be located over test pits #1 and #2 with a limiting soil depth of 54". Based on the Sandy Loam and Sandy Clay Loam found in the test pits for the primary field, an application rate of 0.8 gal/ft^2/day was used to design the total area required for the primary dispersal area. A 24" undisturbed soil depth below trench credit will be used based on the pre-treatment steps described above. A 30" deep trench with an 18" gravel section and 12" trench backfill to grade is proposed.

To determine the total length of PD trench required, the peak daily flow rate of 1,750 gallons is divided by the application rate of 0.8 gal/ft^2/day. This results in a minimum dispersal sidewall area of 2,188 ft^2. This must be divided by the effective infiltrative surface area (EISA) of the trench. The EISA is calculated as two times the depth of trench below the top of the distribution lateral. With a total proposed gravel section depth of 18", there will be 16" of gravel below the top of the distribution lateral. Therefore, the EISA is 2.67 ft^2/ft. Dividing 2,188 ft^2 by 2.67 ft^2/feet results in a minimum distribution lateral length of 820 linear feet (LF). Flat topography allows for the use of a minimum 5-foot trench spacing. The proposed pressure distribution system shall consist of 9 lines at 92 feet each for a total length of 828 LF.

The wastewater system is also required to have a reserve area in the event that the primary system fails. The reserve area for the pressure distribution leach field system must be 100% of the primary area. The reserve field will be located over test pits #3 and #4 with a limiting soil depth of 48". Based on the Sandy Clay Loam and Sandy Loam found in the test pits for the reserve field, an application rate of 0.8 gal/ft^2/day was used to design the total area required for the reserve field. The reserve area will utilize the same design as described above, but must install 6" of soil cover due to the reduced soil depth. A 7,400 ft^2 reserve area is provided for the proposed wastewater system.

Additionally, the existing wastewater treatment system that treats the proposed domestic waste is required to have a reserve area in the event the existing treatment system fails. The reserve area for the domestic waste will be a pressure distribution leach field system as described above and will be located over test pit #2 with the proposed domestic wastewater flow of 1,000 GPD. Utilizing the same methodology in determining the total length of PD trench required, the peak daily flow rate of 1,000 gallons is divided by the application rate of 0.8 gal/ft^2/day resulting in a minimum dispersal area of 1,250 ft^2. With a total proposed gravel section of 18", there will be 16" of gravel below the top of the distribution lateral resulting in an EISA of 2.67 ft^2/ft. Dividing 1,250 ft^2 by 2.67 ft^2/ft results in 468 LF with a minimum 5-foot trench spacing. In the event the reserve area is needed, the proposed pressure

distribution system for the domestic waste shall consist of 5 lines at 94 feet each for a total length of 470 LF which covers approximately 3,900 ft^2.

Please see the Wastewater Field Exhibit located in Appendix 4 for a site map showing the location of the proposed pressure distribution system. Please see Figure 2 below for a schematic layout of the PW treatment system.

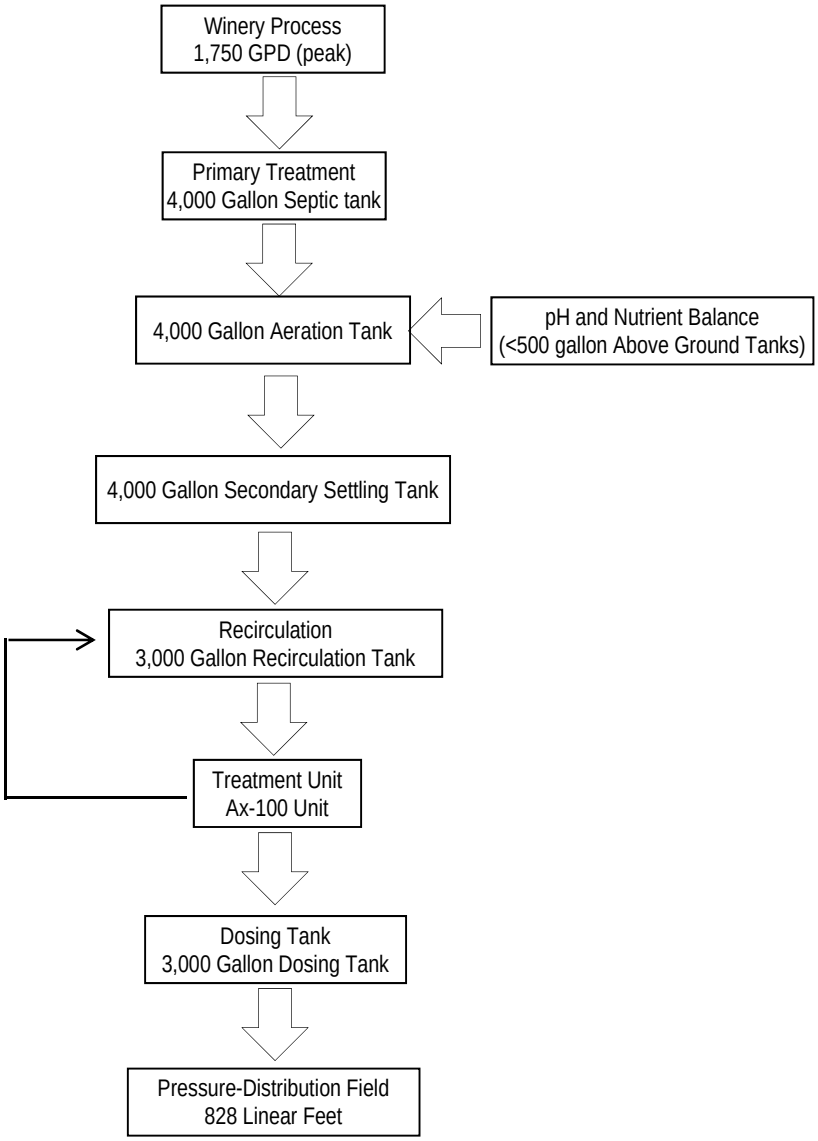


Figure 2: Proposed PW WWTS Schematic

Option #2 – Connect DW to Existing System, Install New PW Sub-Surface Drip System

1. Connect Domestic Wastewater to Existing System
   The domestic wastewater will continue to use the existing conventional system as previously discussed.

2. Install New PW Sub-Surface Drip System
   In this option, the PW will be dispersed to land with a sub-surface drip (SSD) system. In a SSD, the BOD and TSS must be reduced below 30 mg/L respectively prior to distribution through drip lines. The pre-treatment process is nearly identical to the PW system described above, but with an additional stage of filtration to reduce the BOD and TSS to below 30 mg/L.

   The sections below detail the proposed additional pre-treatment components and SSD field.

3. 3,000 Gallon Re-Circulation Tank
   An additional 3,000-gallon re-circulation tank will be used to circulate PW through the secondary stage of Advantex filtration.

4. Orenco Advantex Filtration System
   The secondary stage of Advantex Treatment will follow the same design parameters as the first, including the use of an additional 3,000-gallon re-circulation tank. Effluent concentrations from the last stage of treatment described in Option #1 are used as the starting point (effluent from the recirculation tank). Utilizing the same procedure described above, the minimum square footage required for the Advantex Filtration Unit can be determined as follows:

   Organic Loading Rate
   BOD (lbs/day) = (0.00175 MGD) x (45 mg/L) x (8.34 lbs/gal)
   BOD (lbs/day) = 0.66 lbs/day

   Minimum Filter Area (ft^2) = Peak Daily Load lbs BOD/day / 0.08 lbs BOD/ft^2/day
   Minimum Filter Area (ft^2) = 0.66 lbs BOD/day / 0.08 lbs BOD/ft^2/day
   Minimum Filter Area (ft^2) = 8.2 ft^2

   Through the secondary stage treatment, an additional 8.2 ft^2 of filter area is required to meet the lower discharge constituent levels. The smallest unit manufactured by Orenco is the AX-20 which provides 20 ft^2 of filter area. Therefore, an additional to the AX-100, an AX-20 will be installed to the secondary stage of treatment.

   A summary of the estimated wastewater strength characteristics after this stage of treatment are shown below:

   BOD = 4.5 mg/L
   TSS = 2.4 mg/L

   The BOD and TSS constituents are now below the required threshold of 30 mg/L and can be dispersed into the SSD field. Treated wastewater will flow via gravity from the final stage of secondary treatment to the 3,000 gallon dosing tank to distribute water to the SSD field.

5. Sub-Surface Drip Field

A SSD system will be used to disperse treated PW on-site. The new SSD field will be located over test pits #1 and #2. Based on the Sandy Clay Loam found in the test pits, an application rate of 0.6 gal/ft^2/day was used to design the total area required for the primary dispersal area.

To determine the required dispersal area, the peak daily flow rate of 1,750 gallons is divided by the application rate of 0.6 gal/ft^2/day. This results in a minimum dispersal area of 2,920 ft^2. The flat topography on-site allows for a minimum drip line spacing of 2 feet. The minimum required length drip lines are 1,460 LF. The proposed SSD system shall consist of 12 lines at 122 feet each for a total length of 1,464 LF.

The wastewater system is also required to have a reserve area in the event that the primary system fails. The reserve area for the SSD system must be 200% of the primary area. The reserve field will be located over test pits #3 and #4 with a limiting soil depth of 48". Based on the Sandy Clay Loam found in the test pits for the reserve field, an application rate of 0.6 gal/ft^2/day was used to design the total area required for the reserve field. A 6,000 ft^2 200% reserve area is provided for the proposed wastewater system.

Additionally, the existing wastewater treatment system that treats the proposed domestic waste is required to have a reserve area in the event the existing treatment system fails. The reserve area for the domestic waste will be a sub-surface drip system as described above and will be located over test pit #4 with the proposed domestic wastewater flow of 1,000 GPD. The required dispersal area is determined by dividing the peak daily flow rate of 1,000 gallons by the application rate of 0.6 gal/ft^2/day. This results in 1,667 ft^2 with a minimum drip line spacing of 2 feet due to the flat topography on-site. The minimum required length drip lines are 833 LF. In the event the reserve area is needed, the proposed sub-surface drip system for the domestic waste shall consist of 9 lines at 93 feet each for a total length of 837 LF which covers approximately 2,450 ft^2.

Please see the Wastewater Field Exhibit located in Appendix 4 for the location of the proposed SSD system.

Option #3 – Connect to and Expand Existing Conventional System

System Description

In order to continue using the existing system for the increased flows, the tank system must be upgraded and the conventional leach field expanded. The settling tank system for the DW would be upgraded as described in Option #1 above. A new 5,000 gallon settling tank would be installed for PW generated by the winery. After primary settling, both PW and DW would flow into a new 5,000 gallon lift station tank to pump wastewater to a new distribution box system. The distribution box system would evenly spread wastewater between all required leach lines.

Adding new conventional leach lines without a soil cap requires a minimum 60" depth of acceptable soil. Per the site evaluation report, minor evidence of mottling was found at 54" and below, thus the limiting acceptable soil depth to 54". To evaluate whether the mottling is an indication of groundwater at 54", a wet weather monitoring system would need to be installed and monitored for one year (longer if historical annual averages are not met). If there are no signs of groundwater above 60", additional conventional leach lines

could be added to the system to accommodate the increased wastewater flows. The proposed primary and reserve areas would be centered over all four test pits inspected during the site evaluation performed by this office.

V. CONCLUSION

Based on the field work and preliminary design analysis performed in this report, the Vincent Arroyo Winery project is feasible with regard to wastewater dispersal. The parcel is more than adequate to support the project from a wastewater treatment perspective. See Appendix 4 for the proposed sizes and location of the primary and reserve areas for the various systems described above. Detailed calculations and construction plans will be submitted to the Napa County Environmental Health Division for approval prior to the construction of the final treatment and dispersal system.

VI. APPENDIX

1 Septic Inspection Report
2 Site Evaluation Report
3 Wastewater Flow Generation Calculations
4 Wastewater Field Exhibit

APPENDIX 1:
SEPTIC INSPECTION REPORT

McCollum

General Engineering Contractor

P.O. Box 2223

Yountville, CA 94599

Phone: 707.252.6220

Fax: 707.224.1753

MGECONSTRUCTION@YAHOO.COM

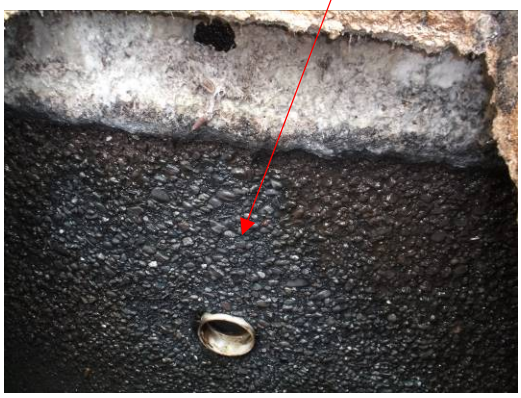
Delta Engineering
RE: Vincent Arroyo Winery

As instructed by Delta Engineering, McCollum General Engineering (M.G.E.) conducted an investigation of the existing septic system located at 2361 Greenwood Ave, Calistoga CA. The following information was collected during a one day investigation (05/04/2016).

1. The septic tank and process waste tanks were located, opened, pumped and visually inspected. Septic tank is pre fab concrete with concrete access lids. The inlet T, outlet T and baffle wall are in place. The process waste tank is pre fab concrete with metal risers and metal access lids. The inlet T, outlet T and baffle wall are in place. The interior of the tank has erosion throughout the concrete walls. There is concrete debris in the bottom of the outlet side of the tank. The tanks are located in the gravel driveway next to the winery. Tanks are in stressed condition.

Tank locations.

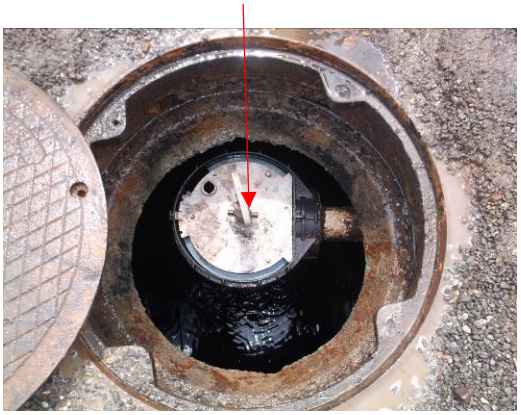
Erosion at interior of PW tank.



Debris in bottom of PW tank outlet.

Septic tank lid. 12” of soil cover.

PW tank. Outlet filter.



2. The pump tank was located, opened, manually pumped and visually inspected. Pump tank is pre fab concrete with a metal access riser and lid. The pump line has steel and plastic components. The steel parts have erosion and should be changed to PVC. The pump is sitting in a plastic box. The electric splice box for the pump tank is miss-marked “water” and has exposed wires sitting in water. There is 10” of soil cover over the box. There is no tight seal at the exposed wire penetration through riser for the electrical components that run the pump and floats.

Tank location.

Erosion on fittings. Pump in plastic basin.

Electric box marked “water”.

Electrical box. Wires standing in water.

Penetration point not water tight.

Metal riser and lid.

3. Leach lines were probed, rodded and potholed for location and depth. The leach field is located in the vineyard. The outlet pump line from the pump tank pumps into a two outlet distribution box. The distribution box is concrete and has no soil cover over the access lid. There is some debris in the D-box. The leach field consist of two 220' 3" Hancore PVC leach lines. The leach lines have ten to twelve inches of soil cover. The gravel section is clean and free of debris. The leach lines are clear of obstructions and excepting water freely.

Distribution box no soil cover.

Distribution box. Soil debris.

Leach line location.

3" Hancore PVC leach line.

Leach line free of obstructions.

MGE replaced all access lids at the septic tank and secured. Potholes were backfilled and covered in the leach field area.

In summary the existing septic system is operating correctly. Water enters the septic tank and process waste tank from the inlet T, settles solids, passes through the baffle wall and exits the tank through the outlet T. Water flows from the tank outlet to a combined pump tank. The pump tank pumps to a two outlet D-box. There are two 220' 3" Hancore PVC leach lines in the field. The leach lines and gravel sections are clear of debris and obstructions and accepting water freely.

Septic systems will process water differently depending on household water usage, cleaning chemicals, number of residents and daily flows. (Please see attachment for proper septic system operation and maintenance.)

Recommended upgrades:

1. Install traffic rated risers on septic tank.
2. Install Zabel filter on the septic tank outlet.
3. Replace electrical box with a traffic rated junction box marked "electrical".
4. Repair water tight penetration points in the pump tank access riser.

Budget $6,850.00 To be performed on a time and material basis.

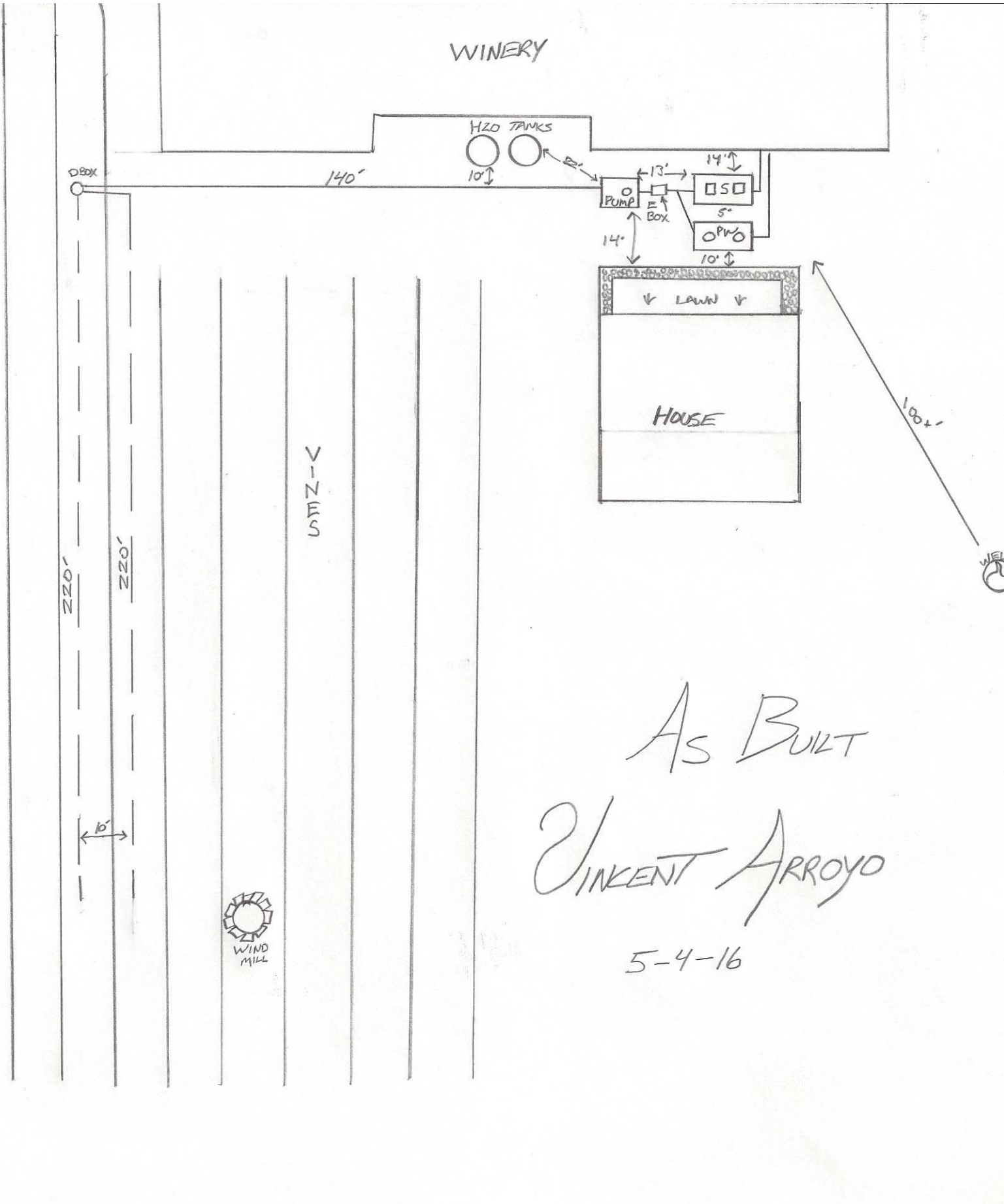
Please call if you have any questions.

Sincerely,
Gary L. McCollum
COWA/NAWT Certified Onsite
Waste Water Inspector/Installer

Company Disclaimer

Based on what we were able to observe and our experience with onsite wastewater technology, we submit this Onsite Wastewater Treatment System Inspection Report based on the present condition of the onsite wastewater treatment system. McCollum General Engineering has not been retained to warrant, guarantee, or certify the proper functioning of the system for any period of time in the future. Because of the numerous factors (usage, soil characteristics, previous failures, etc.) which may effect the proper operation of a wastewater treatment system, this report shall not be construed as a warranty by our company that the system will function properly for any particular owner or buyer. McCollum General Engineering DISCLAIMS ANY WARRANTY, either expressed or implied, arising from the inspection of the wastewater treatment system or this report. We are also not ascertaining the impact the system is having on the environment.

County parcel map with approximant septic location



As Built

Vincent Arroyo

5-4-16

EXISTING INDIVIDUAL SEPTIC SYSTEM INSPECTION REPORT FORM FOR NAPA COUNTY

PROPERTY OWNER: *Vincent Arroyo Winery* DATE: *5/04/2016*
ADDRESS: *2361 Greenwood Ave* A.P.N. *017-230-020*

PRIMARY TREATMENT SEPTIC TANK
Distance from closest well:
This parcel *100+'* Adjacent parcel *100+'*
Distance from foundation: *10'*
Distance from property line: *100+'*
Material-tank *Concrete* Lid *Concrete*
Number of compartments: *Two*
Total Capacity: *1500gal.*

Date tank was last pumped: *5/04/2016*
Pumped by: Dependable
Pre-fab tank or poured in place (describe):
Pre fab Concrete
Inside Length 8' Width 5' Depth 5'

SECONDARY TREATMENT-DISPOSAL FIELD (if other than leach field, describe below)
Distance from closest well:
this parcel *100+'* Adjacent parcel *100+'*
Distance from foundation: *15'*
Distance to property line: *100+'*
Number of lines: *Two*

Total length on leach line: *240'*
Total effective sidewall: 480'
Amount of filter Material: *14"* Type of pipe: *3" Hancore*
Below pipe: *12"* Type of filter material: N/A
Above pipe: 2" Depth of cover over rock: 10"-*12"*
Trench Width: 18" Depth: 27-29"

GENERAL INFORMATION
Is the house/structure presently occupied? *N/A* How many bedrooms? N/A
If commercial use, how many employees (FT / PT)? 5 How many units served by this system? *Two*
Any other septic systems of the property? *No* If yes, how many? 0

CONDITION OF SYSTEM
Make a statement of the condition of the septic tank and interior surfaces, including baffles and fittings. How was this determined? *Septic tank was located, pumped and visually checked. Inlet and outlet T's are in place. Tank Baffle wall is in place. There is 12' of cover over the access lids.* Note: If tank is over five years old, it must be inspected (pumping is required to allow inspection).

Make a statement on the condition of the sump/pump (if applicable), including size, alarm, structure, etc. *Pump tank was located, pumped and visually checked. Inlet and outlet T's are in place. Tank Baffle wall is in place. There is erosion at the steel fittings in pump line.*

Make a statement on the condition of the distribution box, leaching line, etc. How was the length and location of the disposal field determined? *There is one D-box. There are two 3" Hancore leach lines in the field totaling 240'. Lines are free of obstructions.*
Note: Information on disposal field must be determined by physically locating each line by exposing the ends. All distribution boxes must be uncovered and inspected.

Gary L McWilliams
(Licensed Contractor)

Preventive Maintenance for Homes with Onsite Wastewater Collection and Treatment Systems

DO'S AND DON'TS FOR INSIDE THE HOUSE

There are a number of do's and don'ts that will help ensure a long life and minimal maintenance for your system. As a general rule, nothing should be disposed into any wastewater system that hasn't first been ingested, other than toilet tissue, mild detergents, and wash water. Here are some additional guidelines.

DON'T flush dangerous and damaging substances into your wastewater treatment system. (Please refer to the "Substitutes for Household Hazardous Waste," on page 4) Specifically, do not flush . . .

- Excessive amounts of bath or body oils
- Water softener backwash
- Flammable or toxic products
- Household cleaners, especially floor wax and rug cleaners
- Chlorine bleach, chlorides, and pool or spa products
- Pesticides, herbicides, or agricultural chemicals or fertilizers

DON'T use special additives that are touted to enhance the performance of your tank or system. Additives can cause major damage to your drainfield and other areas in the collection system. The natural microorganisms that grow in your system generate their own enzymes that are sufficient for breaking down and digesting nutrients in the wastewater.

DO use your trash can to dispose of substances that cause maintenance problems and/or increase the need for septage pumping. Dispose of the following with your trash:

- Egg shells, cantaloupe seeds, gum, coffee grounds, tea bags, chewing tobacco, cigarette butts
- Paper towels, newspapers, sanitary napkins, diapers, kitty litter, candy wrappers
- Cooking grease
- Rags, large amounts of hair

DO collect grease in a container and dispose with your trash. And avoid using garbage disposals excessively. Compost scraps or dispose with your trash, also. Food byproducts accelerate the need for septage pumping and increase maintenance.

DO'S AND DON'TS FOR INSIDE THE HOUSE

DON'T leave interior faucets on to protect water lines during cold spells. A running faucet can easily increase your wastewater flow by 1,000 to 3,000 gallons per day and hydraulically overload your system. Instead, properly insulate or heat your faucets and plumbing.

DON'T use excessive amounts of water. Using 50 gallons per person per day is typical. If your household does not practice any of the "water conserving tips" below, you may be using too much water.

DO conserve water:

- Take shorter showers or baths with a partially filled tub. Be cautious about excessive use of large soaking tubs.
- Don't let water run unnecessarily while brushing teeth or washing hands, food, dishes, etc.
- Wash dishes and clothes when you have a full load.
- When possible, avoid doing several loads in one day.
- Use water saving devices on faucets and showerheads.
- When replacing old toilets, buy low-flush models.

DON'T ignore leaky plumbing fixtures; repair them. A leaky toilet can waste up to 2,000 gallons of water in a single day. That's 10-20 times more water than a household's typical daily usage. Leaky plumbing fixtures increase your water bill, waste natural resources, and overload your system.

DO keep lint out of your wastewater treatment system by cleaning the lint filters on your washing machine and dryer before every load. Installing a supplemental lint filter on your washing machine would be a good precautionary measure. (This normally takes just a few minutes. Lint and other such materials can make an extreme difference in the frequency and cost of pumping out your primary treatment tank.)

DO'S AND DON'TS FOR INSIDE THE HOUSE

DO use substitutes for household hazardous waste. Replace the following hazardous products with products that are less environmentally harmful. The hazardous cleaners are listed below, followed by the suggested substitute.

Ammonia-based cleaners: Sprinkle baking soda on a damp sponge. For windows, use a solution of 2 tbs. white vinegar to 1 qt. water. Place the mixture into a spray bottle.

Disinfectants: Use borax: 1/2 cup in a gallon of water; deodorizes also.

Drain decloggers: Use a plunger or metal snake, or remove and clean trap.

Scouring cleaners & powders: Sprinkle baking soda on a damp sponge or add 4 tbs. baking soda to 1 qt. warm water. Or use Bon Ami; it's cheaper and won't scratch.

Carpet/upholstery cleaners: Sprinkle dry cornstarch or baking soda on, then vacuum. For tougher stains, blot with white vinegar in soapy water.

Toilet cleaners: Sprinkle on baking soda or Bon Ami, then scrub with a toilet brush.

Furniture/floor polishes: To clean, use oil soap and warm water. Dry with soft cloth. Polish with 1 part lemon juice and 2 parts oil (any kind), or use natural products with lemon oil or beeswax in mineral oil.

Metal cleaners: Brass and copper: scrub with a used half of lemon dipped in salt. Stainless steel: use scouring pad and soapy water. Silver: rub gently with toothpaste and soft wet cloth.

Oven cleaners: Quickly sprinkle salt on drips, then scrub. Use baking soda and scouring pads on older spills.

Laundry Detergents: Choose one with a zero phosphate content or use soap flakes with 1/3 cup of washing soda. (Before switching, wash clothes in pure washing soda to remove residues.)

DO'S AND DON'TS FOR OUTSIDE THE HOUSE

DON'T dig without knowing the location of your wastewater treatment system. As much as possible, plan landscaping and permanent outdoor structures before installation. But easily removable items, such as bird baths and picnic tables, are OK to place on top of your system.

DON'T drive over your tank or any buried components in your system, unless it's been equipped with a special traffic lid. If the system is subject to possible traffic, put up a barricade or a row of shrubs.

DON'T dump RV waste into your wastewater treatment system and tanks. It will increase the frequency of required septage pumping. When dumped directly into the pumping vault, RV waste clogs or fouls equipment, causing undue maintenance and repair costs. (Some RV waste may contain chemicals that are toxic or that may retard the biological digestion occurring within the tank.)

DON'T ever connect rain gutters or storm drains to the sewer or allow surface water to drain into it. And don't discharge hot tub water into your system. The additional water will increase costs, reduce the capacity of the collection and treatment systems, and flood the drainfield. It can also wash excess solids through the tank.

DO keep the tank access lid secure to the riser at all times. If bolts are lost or damaged, call Orenco Systems immediately for replacement: 1-800-348-9843.

DON'T enter your tank. Any work to the tank should be done from the outside. Gases that can be generated in the tank and/or oxygen depletion can be fatal.

OUTSIDE THE HOUSE

DO make arrangements with a reliable service person to provide regular monitoring and maintenance. Place the service person's phone number on or in your control panel!

DO keep a file copy of your service provider's sludge and scum monitoring report and pumpout schedule. This information will be beneficial for real estate transactions or regulatory visits.

DO keep an "as built" system diagram in a safe place for reference.

Napa County Guidelines

Disposal Field Landscaping Guidelines

Although the question of 'what do I plant over my disposal field?' arises often, there are few hard and fast answers as to what can be planted, because every drain field is unique. Plants can help your disposal field to function at its best by removing moisture and nutrients from the soil. Plant cover is also important to reduce soil erosion. At a minimum the disposal field should be planted with a dense cover of grass to provide theses important benefits.

The best choices for planting over disposal fields include shallow-rooted herbaceous plants, such as flowering perennials and annuals, turfgrass and many ground covers that are not excessively water loving.

Trees and shrubs are much riskier choices for planting on disposal fields. The woody roots of these plants are more likely to clog and damage drain lines. Be especially careful of water loving trees like willows, poplars and redwoods. Some smaller and less-aggressive woody species may be suitable for planting over the disposal field. Some possibilities include fibrous rooted shrubs such as boxwood or holly or small trees such as dogwoods. Be sure not to plant small trees and shrubs directly over a leach line.

Irrigation is one of the most important things to consider when landscaping your disposal field. Do not install subsurface drip or sprinklers on the disposal field. Water any vegetation minimally by hand or with a surface drip system.

The following plant list has been provided for guidance only. Please consult with a landscaper or local nursery for drought tolerant plants with non-invasive root systems.

Plant List

	Common Name	*Color*	*Height*
Herbaceous Plants			
Achillea species	Yarrow	Y, W, R	12”
Arctotheca calendula	Cape Weed	Y	6”
Artemisia schmidtiana	Silver Mound	X	2’
Centaurea cyanus	Bachelor’s Button	B, P, R. W	1’- 2’
Cosmos bipinnatus	Cosmos: Dazzler	R	3’ – 6’
Cosmos bipinnatus	Cosmos: Radiance	Y	3’ – 6’
Cosmos sulphureus	Yellow cosmos	Y	3’ – 4’
Diplacus species	Monkey Flower	Many	1’ – 3’
Dietes iridioides	Fortnight Lily	W	4’
Erigeron karvinskianus	Fleabane	W, P	1’ – 2’
Eschscholtzia californica	California Poppy	O, R	1’ – 2’
Festuca ovina glauca	Blue fescue	X	12”
Hemerocallis species	Daylillies	Many	1’ – 6’
Lantana montevidensis	Trailing Lantana	R	1’ – 2’
Lobularia maritima	Sweet Alyssum	W	6” – 12”
Myosotis sylvatica	Forget-Me-Not	B	6” – 12”
Oenothera species	Mexican Evening Primrose	R, W, Y	1’ –2’
Santolina species	Santolina	Y, W	1’ – 3’
Stachys byzantina	Lamb’s Ears	Pur	12”
Tropaeolum majus	Nasturtium	O, R, Y, W	12”
Verbena species	Verbena	Varies	1’ – 3’
Zauschneria californica	California Fuchsia	R	1’ – 2’
Bulbs			
Amaryllis belladonna	Naked Lady	P	3’
Crocosmia crocosmiiflora	Montbretia	R	2’
Iris species	Iris	Many	1’ – 2’
Narcissus species	Daffodil	Y, W	1’ – 2’
Tulip species	Tulip	Many	1’ – 2’
Succulents and Herbs			

Many varieties to choose from; very drought tolerant			
Woody Ground Covers			
Arctostaphylos uva-ursi	Ground cover manzanita	W	1’ – 2’
Baccharis pilularis	Coyote Bush	W	1’ – 2’
Ceanothus species	Various prostrate forms	B	1 ‘ –2’
Cotoneaster species	Various prostrate forms	R	6” – 12”
Juniperus species	Various prostrate forms	X	1’ – 2’
Rosmarinus officinalis	Prostrate Rosemary	B	1 ‘ – 2’

Colors Key: B = Blue; O = Orange; P = Pink; Pur = Purple; W = White; Y = Yellow; X = Non-flowering

DELTA CONSULTING & ENGINEERING
OF ST. HELENA

APPENDIX 2:
SITE EVALUATION REPORT

Napa County Department of Environmental Management

SITE EVALUATION REPORT

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 #:	E16-00286
APN:	017-230-020
(County Use Only) Reviewed by:	Date:

PLEASE PRINT OR TYPE ALL INFORMATION

Property Owner Vincent Arroyo Winery: Vincent & Marjorie Arroyo	☐ New Construction ☐ Addition ☐ Remodel ☐ Relocation ☒ Other: Winery production increase from 20,000 to 70,000
Property Owner Mailing Address 2361 Greenwood Avenue	☐ Residential - # of Bedrooms: Design Flow : gpd
City: Calistoga State: CA Zip: 9415	☒ Commercial – Type: Sanitary Waste: gpd Process Waste: 1,750 gpd
Site Address/Location 2361 Greenwood Avenue Calistoga, CA 94515	☐ Other: Sanitary Waste: gpd Process Waste: gpd

Evaluation Conducted By:

Company Name DELTA CONSULTING & ENGINEERING	Evaluator's Name Andrew Simpson, P.E.	Signature (Civil Engineer, R.E.H.S., Geologist, Soil Scientist)
Mailing Address: 1104 ADAMS STREET, SUITE 203		Telephone Number 707/963-8456
City: ST. HELENA State: CA Zip: 94574		Date Evaluation Conducted 05/13/2016

Primary Area	Expansion Area
Acceptable Soil Depth: 54 in. Test pit #'s: 1 & 2	Acceptable Soil Depth: 48 in. Test pit #'s: 3, & 4
Soil Application Rate (gal. /sq. ft. /day): 0.80	Soil Application Rate (gal. /sq. ft. /day): 0.80
System Type(s) Recommended: Pressure Distributed	System Type(s) Recommended: Pressure Distributed
Slope: <5 %. Distance to nearest water source: >100 ft.	Slope: <5 %. Distance to nearest water source: >100 ft.
Hydrometer test performed? No☒ Yes☐ (attach results)	Hydrometer test performed? No☒ Yes☐ (attach results)
Bulk Density test performed? No☒ Yes☐ (attach results)	Bulk Density test performed? No☒ Yes☐ (attach results)
Percolation test performed? No☒ Yes☐ (attach results)	Percolation test performed? No☒ Yes☐ (attach results)
Groundwater Monitoring Performed? No☒ Yes☐ (attach results)	Groundwater Monitoring Performed? No☒ Yes☐ (attach results)

Site constraints/Recommendations:

The purpose of the site evaluation report is to evaluate the feasibility of expanding the existing wastewater treatment system to increase the winery production from the existing 20,000 gallons per year to 70,000 gallons of wine per year. Due to the minor evidence of mottling of the soil at 54", County staff is requiring wet weather monitoring. As such, the process and domestic wastewater stream will be separated. The domestic waste shall continue to utilize the existing standard gravity leach field. The process wastewater shall be isolated from the domestic wastewater, treated to secondary levels, and disbursed via a pressure distribution system. The pre-treatment credit will be used for relief of the trench bottom separation from 36" to 24" with a corresponding trench depth of 30" and a 12" trench backfill to grade. The required length of trenches is 729 feet. The proposed pressure distribution system shall consist of eight lines at 98 feet each for a total length of 784 feet.

Test Pit # 1

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-45	C	5	SCL	S/G	SH	VFRB	SS	M/M	C/M	N/A
45-54	C	45	SL	S/G	SH	VFRB	SS	M/M	C/M/D	N/A
54+	C	45	SL	S/G	SH	VFRB	SS	M/M	C/M/D	F/F/FT

Test Pit # 2

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-50	C	5	SCL	S/G	SH	VFRB	SS	M/M	C/M	N/A
50-54	C	30	SCL	S/SB	SH	VFRB	SS	M/M	F/M	N/A
54+	C	30	SCL	S/SB	SH	VFRB	SS	M/M	F/M	F/F/FT

Test Pit # 3

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-16	D	10	SCL	S/SB	SH	VFRB	SS	M/M	C/M	N/A
16-30	C	20	SL	S/SB	SH	VFRB	SS	M/M	C/M	N/A
30-54	C	5	SCL	S/SB	SH	VFRB	SS	M/M	C/M	N/A
54+	C	10	SL	S/SB	SH	VFRB	SS	M/M	C/M	F/F/FT

Attach additional sheets as needed

Test Pit # 4

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-20	D	5	SCL	S/SB	S	VFRB	SS	C/M	C/M	N/A
20-48	C	5	SCL	S/SB	S	VFRB	SS	C/M	C/M	N/A
48+	C	15	SL	S/SB	S	VFRB	SS	C/M	C/M	F/F/FT

Test Pit #

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			

Test Pit #

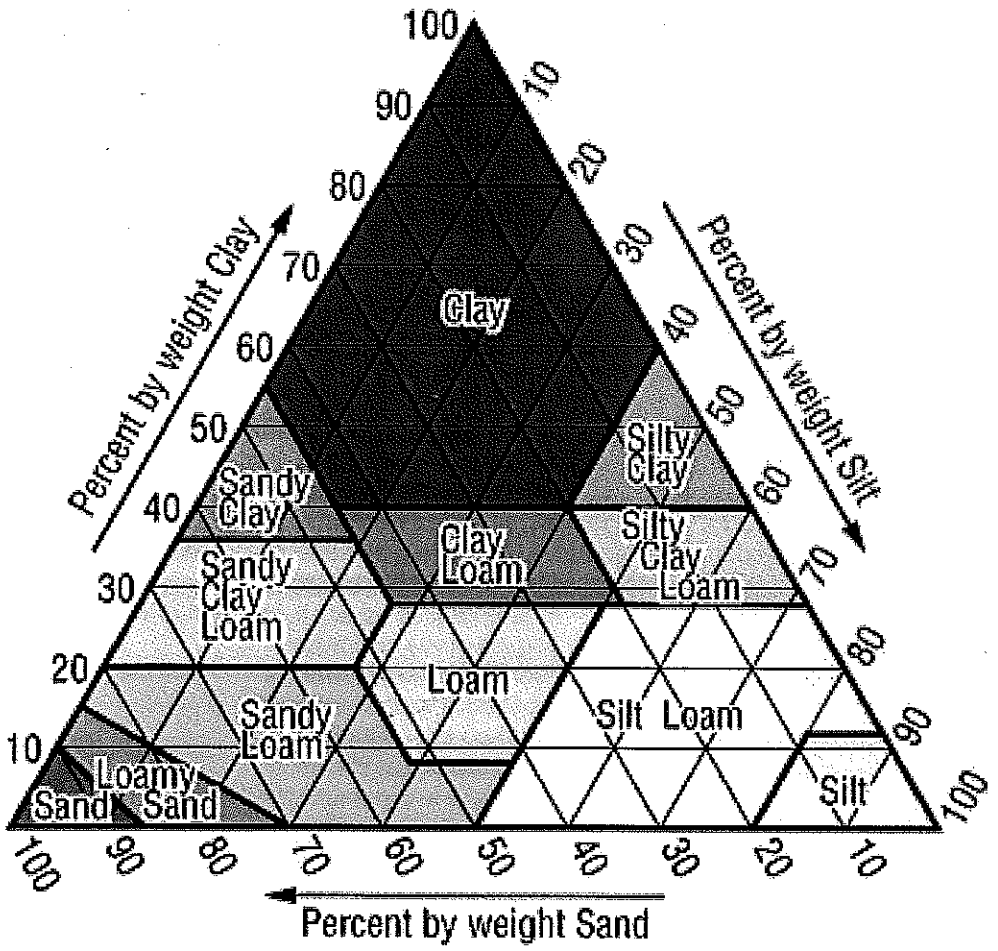
Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			

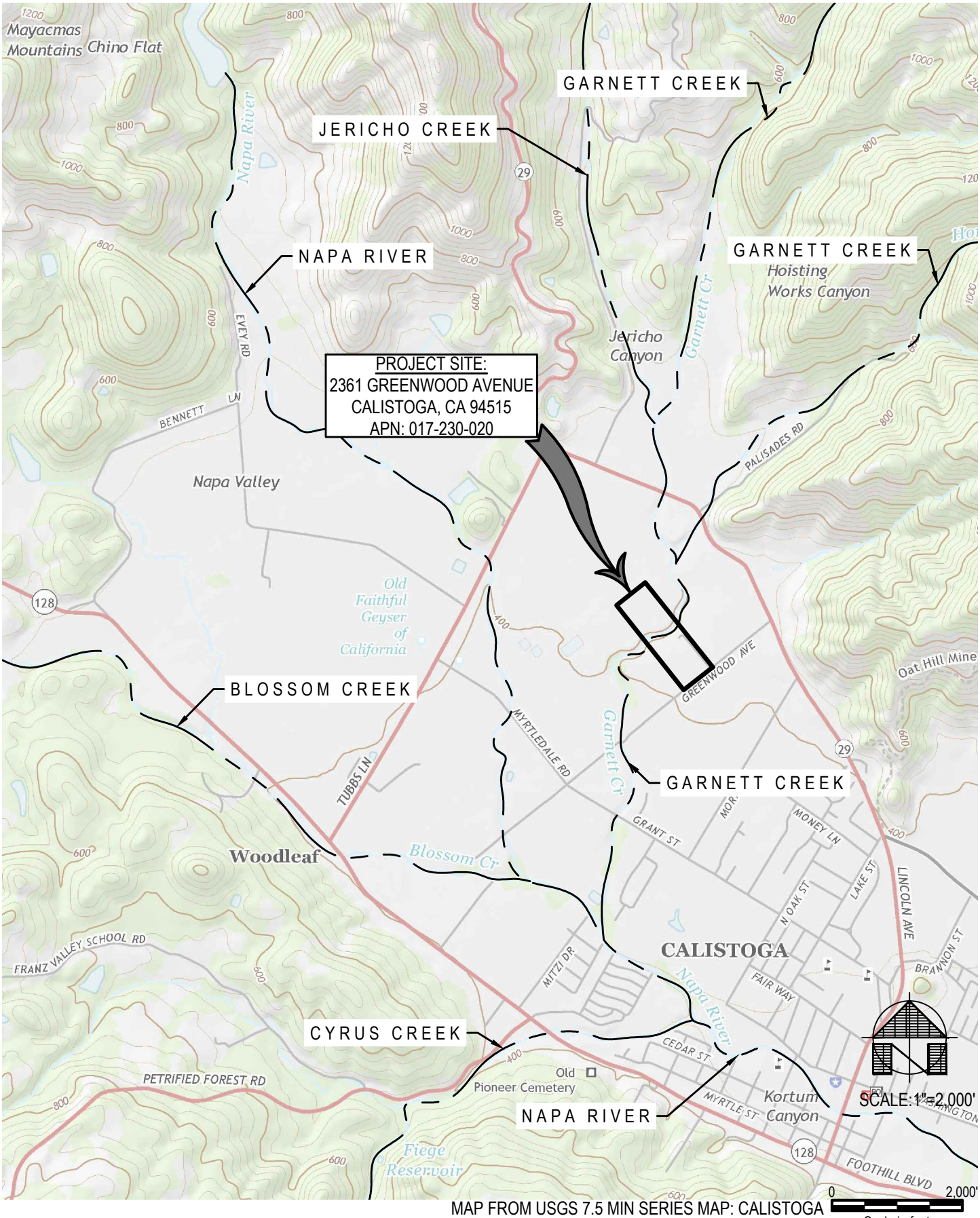
Attach additional sheets as needed

ABBREVIATIONS

Boundary	Texture	Structure	Consistence			Pores	Roots	Mottling
			Side Wall	Ped	Wet			
A=Abrupt <1"	**S**=Sand	**W**=Weak	**L**=Loose	**L**=Loose	**NS**=NonSticky	**Quantity:**	**Quantity:**	**Quantity:**
C=Clear 1"-2.5"	**LS**=Loamy Sand	**M**=Moderate	**S**=Soft	**VFRB**=Very Friable	**SS**=Slightly Sticky	**F**=Few	**F**=Few	**F**=Few
G=Gradual 2.5"-5"	**SL**=Sandy Loam	**S**=Strong	**SH**=Slightly Hard	**FRB**=Friable	**S**=Sticky	**C**=Common	**C**=Common	**C**=Common
D=Difuse >5"	**SCL**=Sandy Clay Loam	**G**=Granular	**H**=Hard	**F**=Firm	**VS**=Very Sticky	**M**=Many	**M**=Many	**M**=Many
	SC=Sandy Clay	**Pl**=Platy	**VH**=Very Hard	**VF**=Very Firm	**NP**=NonPlastic	**Size:**	**Size:**	**Size:**
	CL=Clay Loam	**Pr**=Prismatic	**ExH**=Extremely Hard	**ExF**=Extremely Firm	**SP**=Slightly Plastic	**VF**=Very Fine	**F**=Fine	**F**=Fine
	L=Loam	**C**=Columnar			**P**=Plastic	**F**=Fine	**M**=Medium	**M**=Medium
	C=Clay	**AB**=Angular Blocky			**VP**=Very Plastic	**M**=Medium	**C**=Coarse	**C**=Coarse
	SiC=Silty Clay	**SB**=Subangular Blocky				**C**=Coarse	**VC**=Very Coarse	**Contrast:**
	SiCL=Silty Clay Loam	**M**=Massive				**VC**=Very Coarse	**ExC**=Extremely Coarse	**Ft**=Faint
	SiL=Silt Loam	**SG**=Single Grain						**D**=Distinct
	Si=Silt	**C**=Cemented						**P**=Prominent

U.S.D.A. SOIL CLASSIFICATION TRIANGLE





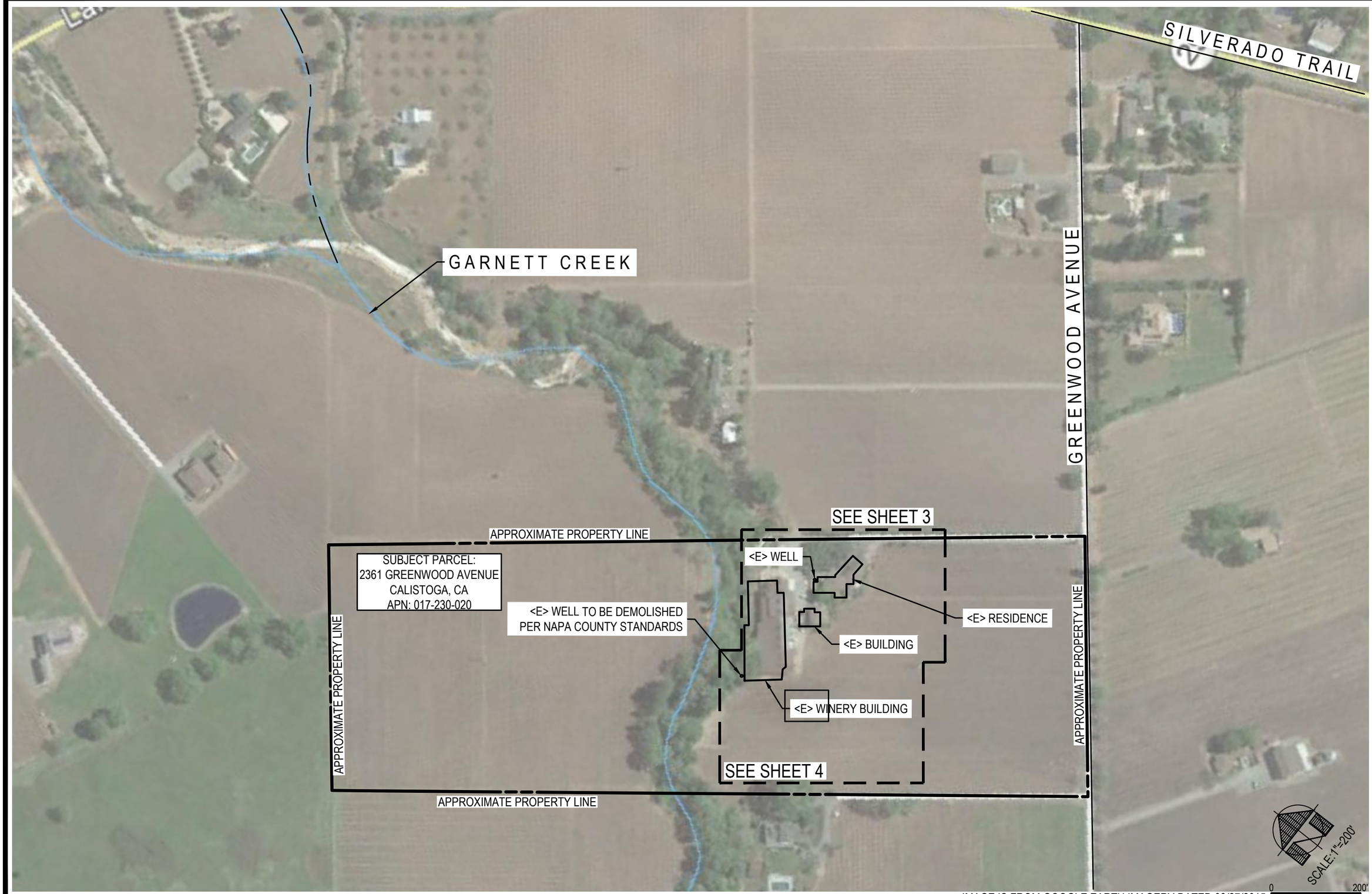
MAP FROM USGS 7.5 MIN SERIES MAP: CALISTOGA

SITE EVALUATION
VICINTY MAP

DELTA CONSULTING & ENGINEERING
OF ST. HELENA
1104 ADAMS STREET, SUITE 203 - ST. HELENA, CALIFORNIA 94574
707-963-8456 + 707-963-8528 FAX

DATE: 05/17/2016	JOB # P-105
SCALE: 1"=2,000'	APN: 017-230-020

SHEET 1 OF 4



OVERALL SITE PLAN

IMAGE IS FROM GOOGLE EARTH IMAGERY DATED 03/27/2015

SITE EVALUATION
OVERALL SITE PLAN

CALISTOGA CA

DELTA CONSULTING & ENGINEERING
OF ST. HELENA
1104 ADAMS STREET, SUITE 203 - ST. HELENA, CALIFORNIA 94574
707-963-8456 + 707-963-8528 FAX

DATE:	05/17/2016
SCALE:	1"=200'
JOB #:	P-105
APN:	017-230-020

TEST PIT LOCATION MAP

IMAGE IS FROM GOOGLE EARTH IMAGERY DATED 03/27/2015

SITE EVALUATION
TEST PIT LOCATION MAP

CALISTOGA CA

DELTA CONSULTING & ENGINEERING
OF ST. HELENA
1104 ADAMS STREET, SUITE 203 - ST. HELENA, CALIFORNIA 94574
707-963-8456 + 707-963-8528 FAX

DATE:	05/17/2016
SCALE:	1"=30'
JOB #:	P-105
APN:	017-230-020

MATCHLINE SEE TEST PIT LOCATION MAP - SHEET 3

APPROXIMATE 100' CREEK SETBACK

<E> WINERY

W

APPROXIMATE LOCATION OF <E> WELL TO BE DEMOLISHED PER NAPA COUNTY STANDARDS

<E> SEPTIC DISTRIBUTION BOX

<E> LEACH FIELD

225.0'

220.0'

VR #1

VR #2

VR #3

VR #4

VR #5

VR #6

VR #7

VR #8

VR #9

<E> VR

VR #10

VR #11

VR #12

VR #13

VR #14

VR #15

VR #16

VR #17

VR #18

VR #19

VR #20

TP#2
05/13/2016
54" SCL

TP#1
05/13/2016
54" SL

TP#4
05/13/2016
48" SCL

TP#3
05/13/2016
54" SCL

TP

Notes:

TP #1 AND #2 ARE BETWEEN VINEROWS #6 AND #7
TP #3 AND #4 ARE BETWEEN VINEROWS #11 AND #12.

SCALE:1"=30'

0 30'
Scale in feet

IMAGE IS FROM GOOGLE EARTH IMAGERY DATED 03/27/2015

TEST PIT LOCATION MAP

SITE EVALUATION
TEST PIT LOCATION MAP
CALISTOGA
CA

DELTA CONSULTING & ENGINEERING
OF ST. HELENA
1104 ADAMS STREET, SUITE 203 - ST. HELENA, CALIFORNIA 94574
707-963-8456 + 707-963-8528 FAX

DATE:	05/17/2016
SCALE:	1"=30'
JOB #:	P-105
APN:	017-230-020

DELTA CONSULTING & ENGINEERING
OF ST. HELENA

APPENDIX 3:
WASTEWATER FLOW GENERATION CALCULATIONS

Project: Vincent Arroyo Winery
Wastewater Generation
Issue Date: 6/08/16
Revision: -

DELTA CONSULTING & ENGINEERING
OF ST. HELENA

Wastewater Flow Generation

Process Wastewater

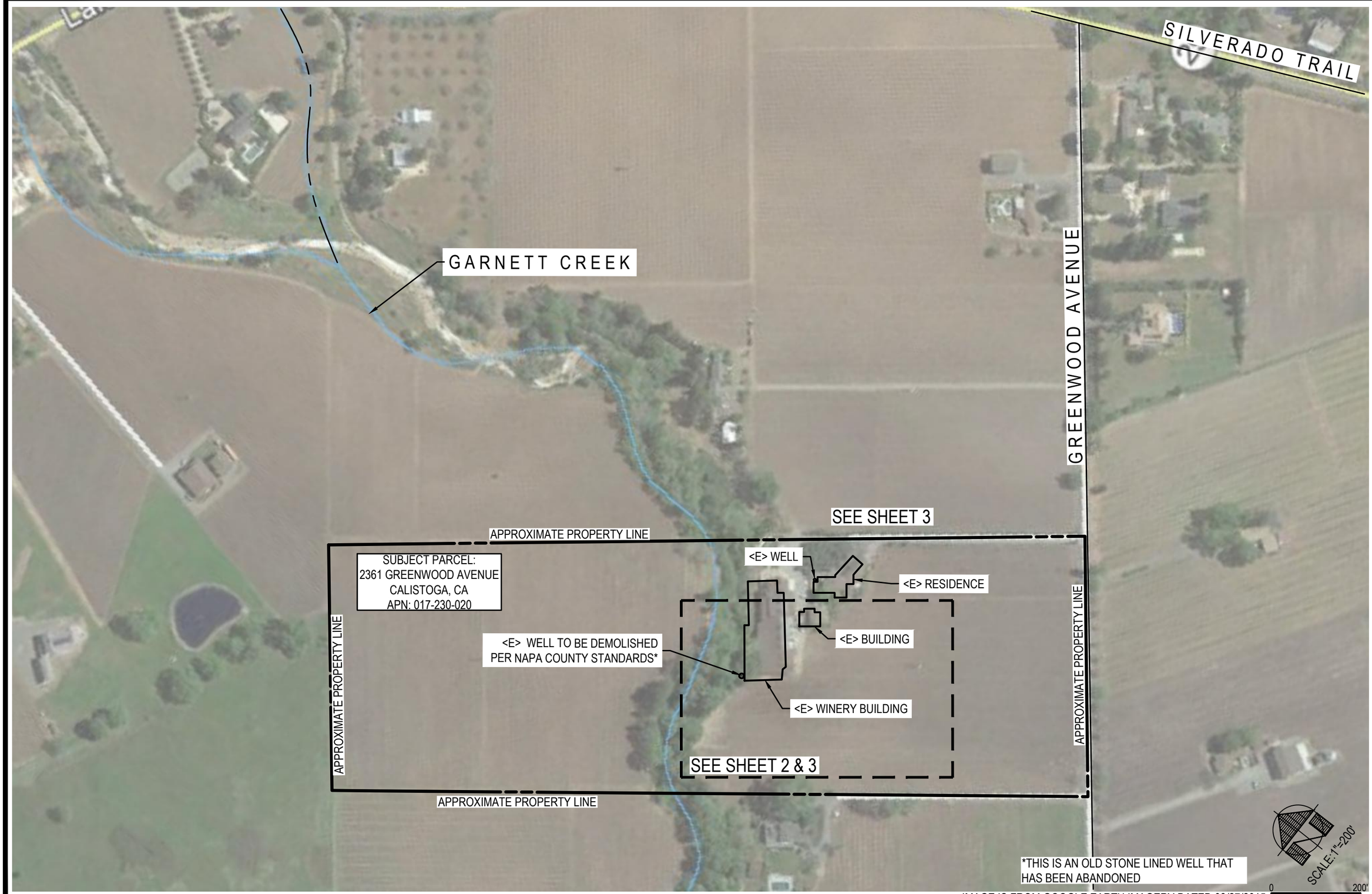
Winery Production (WP) =	29,167	cases/year
	70,000	gallons (2.4 gallons/case)

Napa County Method: Estimated Peak Process Flows

Theoretical Peak PW generated during Harvest Period=	105,000	gallons
Harvest Period=	60	days
Process Wastewater (Harvest Period) =	1,750	gallons per day

1104 Adams Street, Suite 203
St. Helena, California 94574
707-963-8456 + fax 963-8528

APPENDIX 4:
WASTEWATER FIELD EXHIBIT



OVERALL SITE PLAN

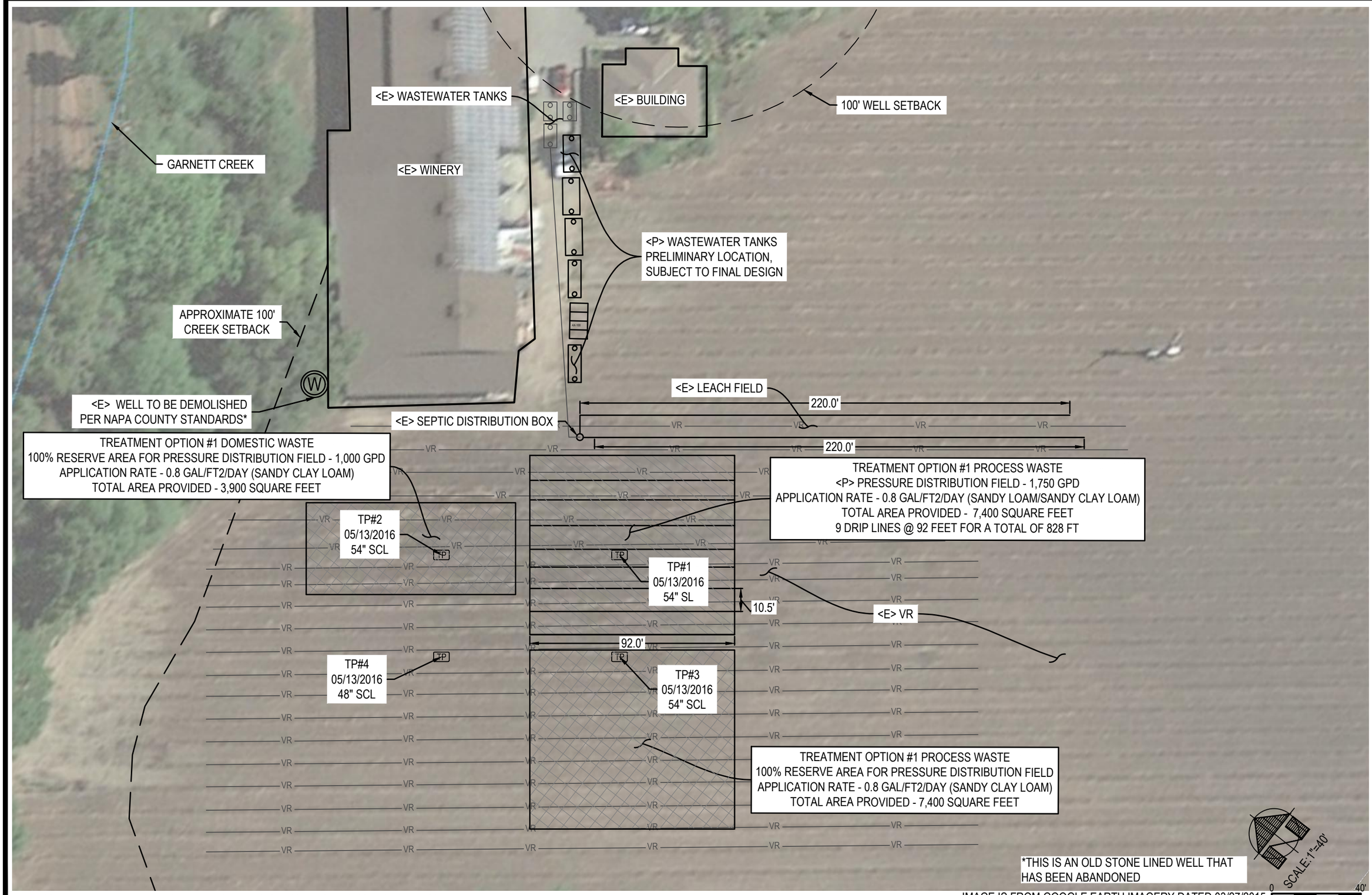
IMAGE IS FROM GOOGLE EARTH IMAGERY DATED 03/27/2015

SEPTIC FEASIBILITY
OVERALL SITE PLAN

CALISTOGA CA

DELTA CONSULTING & ENGINEERING
OF ST. HELENA
1104 ADAMS STREET, SUITE 203 - ST. HELENA, CALIFORNIA 94574
707-963-8456 + 707-963-8528 FAX

DATE:	06/08/2016
SCALE:	1"=200'
JOB #:	P-105
APN:	017-230-020



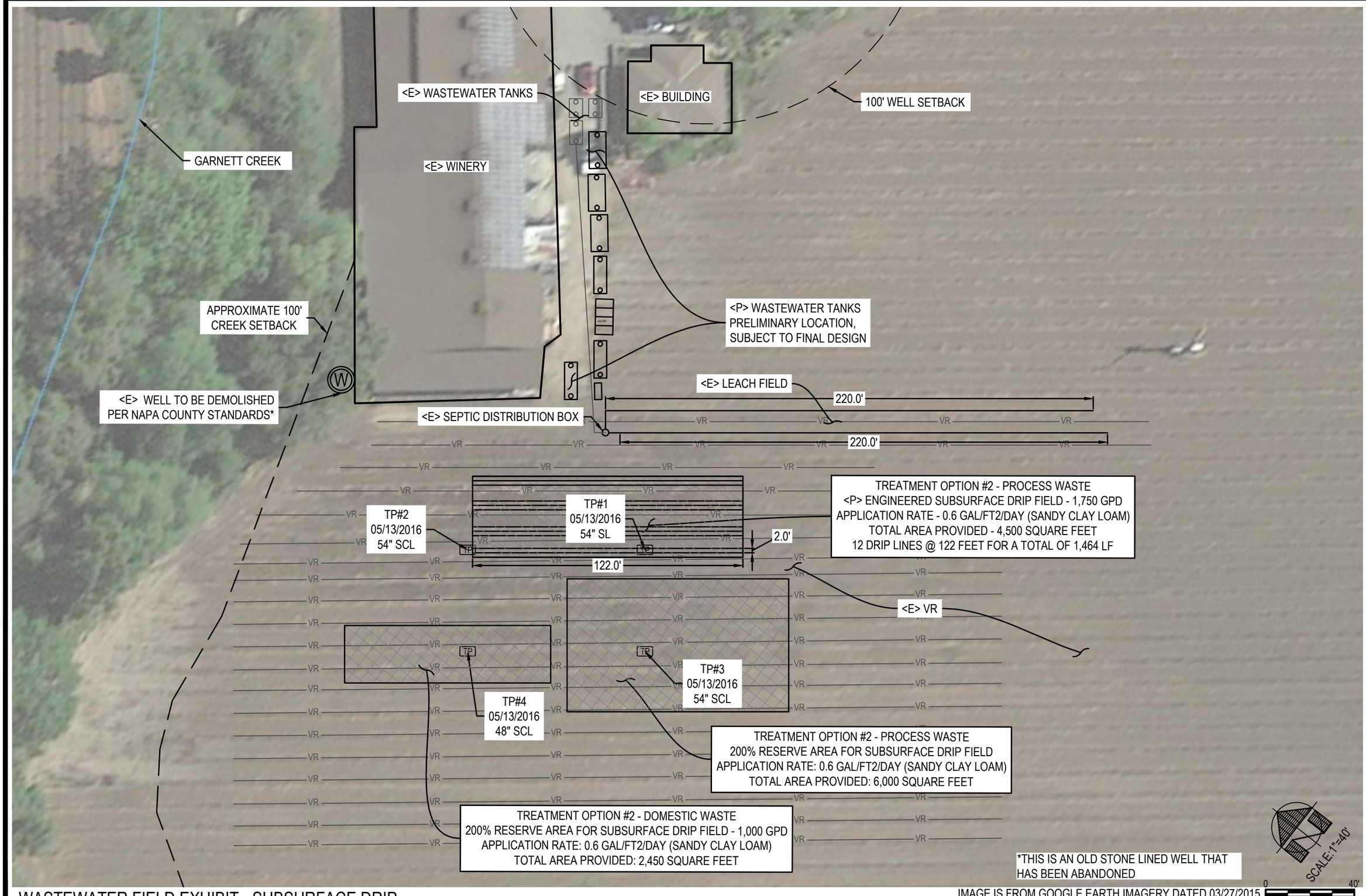
WASTEWATER FIELD EXHIBIT - PRESSURE DISTRIBUTION

IMAGE IS FROM GOOGLE EARTH IMAGERY DATED 03/27/2015

SEPTIC FEASIBILITY
WASTEWATER FIELD - PRESSURE DISTRIBUTION
CALISTOGA CA

DELTA CONSULTING & ENGINEERING
OF ST. HELENA
1104 ADAMS STREET, SUITE 203 - ST. HELENA, CALIFORNIA 94574
707-963-8456 + 707-963-8528 FAX

DATE:	06/08/2016
SCALE:	1"=40'
JOB #:	P-105
APN:	017-230-020



WASTEWATER FIELD EXHIBIT - SUBSURFACE DRIP

IMAGE IS FROM GOOGLE EARTH IMAGERY DATED 03/27/2015

SEPTIC FEASIBILITY
WASTEWATER FIELD - SUBSURFACE DRIP
CALISTOGA CA

DELTA CONSULTING & ENGINEERING
OF ST. HELENA
1104 ADAMS STREET, SUITE 203 - ST. HELENA, CALIFORNIA 94574
707-963-8456 + 707-963-8528 FAX

DATE:	06/08/2016
SCALE:	1"=40'
JOB #:	P-105
APN:	017-230-020