“I”

Wastewater Feasibility Study

Black Sears Winery, Major Modification P15-00201 and RSS Exception
Planning Commission Hearing, February 22, 2017

APPLIED
CIVIL ENGINEERING
INCORPORATED

June 2, 2015

Job No. 13-156

Kim Withrow, REHS
Environmental Health Division
Napa County Planning, Building and Environmental Services Department
1195 Third Street, Suite 210
Napa, CA 94559

Re: Onsite Wastewater Disposal Feasibility Study for the
Black Sears Winery Use Permit Modification Application
2600 Summit Lake Drive, Napa County, California APN 018-060-066
P06-01275-UP

Dear Ms. Withrow:

At the request of Black Sears Winery we have evaluated the process and sanitary wastewater flows associated with the proposed Use Permit Modification. We have also analyzed the capacity of the existing process and sanitary wastewater system serving the winery facility to determine if it is adequate to serve the proposed changes in use.

It is our understanding that Black Sears Winery is currently permitted to produce 20,000 gallons of wine per year and to have four employees. No changes to the maximum permitted production capacity or employee levels are being proposed. The goal of this Use Permit Modification is to establish a small marketing plan that will allow the following activities:

Description	# of Guests	Frequency
Tours and Tasting Visitors	16	Daily
Marketing Events with Catered Meal	30	10 per year
Harvest Party Events	50	2 per year

The remainder of this letter describes the existing process and sanitary wastewater disposal systems, their design capacity, peak flows associated with the proposed changes in use and our analysis and recommendations related to the system's capability to handle the anticipated wastewater flows.

Existing Septic Systems

The winery facility is serviced by two septic systems. There is the primary system that serves the winery buildings and crush pad area (process and domestic waste) and a second system that serves the caves (process waste only). Below is a summary of each system.

Primary Septic System

According to the Septic System Inspection Report by Jim Clifton dated 12/1/2014 the existing primary winery process and sanitary wastewater disposal system consists of a standard gravity distribution leach field with a total of 665 lineal feet of leach line trenches. The trenches have 18 inches of gravel and 18 inches of cover and therefore provide 3 square feet of sidewall area per lineal foot of trench for a total of 1,995 square feet of sidewall area. A core hole observed by Napa County in the vicinity of the existing septic system on June 9, 1999 indicates 72 inches of acceptable soil with an assigned perc range of 3 to 6 inches per hour which corresponds to a hydraulic loading rate of 1/3 gpd per sf of sidewall area.

It is noted that approximately 88 lf of the existing system is located within the required 100' setback to the existing cave and thus those portions of the leach field will have to be removed to bring it into compliance with today's code requirements. The remaining 577 lineal feet of leach line can still be used.

Based on these parameters the design capacity for the portion of the existing septic system located outside of the cave setback is calculated as follows:

$$\text{Design Capacity} = 577 \text{ lineal feet} \times \frac{3 \text{ square feet}}{\text{lineal foot}} \times \frac{1 \text{ gpd}}{3 \text{ square feet}}$$

Design Capacity =577 gallons per day

The leach field is located approximately 100 feet northeast of winery building and crush pad on a gently sloping hillside as shown on the Black Sears Winery Wastewater Disposal Feasibility Exhibit (attached). Winery process wastewater is collected in two existing septic tanks with 1,500 and 1,200 gallon capacities. Domestic waste from the winery buildings is collected in an existing 810 gallon septic tank located at the north end of the winery building, adjacent to the 1,500 gallon process waste septic tank. Wastewater effluent from the three tanks flows via gravity to the leach field.

The existing septic system was inspected by Jim Clifton in December 2014 and was found to be in good condition as described in the attached inspection report forms.

Cave Septic System

According to records on file with Napa County the existing cave wastewater disposal system consists of a standard gravity distribution leach field with a total of 200 lineal feet of leach line trenches. County permit records indicate that the system was designed to handle 222 gallons per day of winery process wastewater from the cave barrel washing operations.

The leach field is located approximately 150 feet northeast of cave portal in the trees just outside of the vineyard as shown on the Black Sears Winery Wastewater Disposal Feasibility Exhibit (attached). Winery process waste from the cave is collected in an existing 1,500 gallon septic tank located approximately 30 feet southwest of the leach field. Wastewater effluent from the septic tank flows via gravity to the leach field. This septic system meets all current code requirements and thus its design capacity is equal to the original design capacity of 222 gpd.

Proposed Process Wastewater Design Flows

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 20,000 gallon production capacity and the expectation that both white and red wine will be produced at the winery, we have assumed a conservative 30 day crush period. Using these assumptions, the annual, average daily and peak winery process wastewater flows are calculated as follows:

$$\text{Annual Winery Process Wastewater Flow} = \frac{20{,}000 \text{ gallons wine}}{\text{year}} \times \frac{6 \text{ gallons wastewater}}{1 \text{ gallon wine}}$$

Annual Winery Process Wastewater Flow = 120,000 gallons per year

$$\text{Average Daily Process Wastewater Flow} = \frac{120{,}000 \text{ gallons wastewater}}{\text{year}} \times \frac{1 \text{ year}}{365 \text{ days}}$$

Average Daily Winery Process Wastewater Flow = 328 gallons per day

$$\text{Peak Winery Process Wastewater Flow} = \frac{20{,}000 \text{ gallons wine}}{\text{year}} \times \frac{1.5 \text{ gallons wastewater}}{1 \text{ gallon wine}} \times \frac{1 \text{ year}}{30 \text{ crush days}}$$

Peak Winery Process Wastewater Flow = 1,000 gallons per day (gpd)

Proposed Sanitary Wastewater Design Flows

The peak sanitary wastewater flow from the winery is calculated based on the number of winery employees, the number of daily visitors for tastings and the number of guests attending scheduled marketing events. In accordance with Table 4 of the Napa County "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 tastings. Table 4 does not specifically address design wastewater flows for guests at marketing events. Since the applicant is proposing that food will be catered and prepared offsite we have conservatively assumed 5 gallons of wastewater per guest at marketing events. Based on these assumptions, the peak winery sanitary wastewater flows are calculated as follows:

Employees

Peak Sanitary Wastewater Flow = 4 employees X 15 gpd per employee
Peak Sanitary Wastewater Flow = 60 gpd

Daily Tastings

Peak Sanitary Wastewater Flow = 16 visitors per day X 3 gallons per visitor
Peak Sanitary Wastewater Flow = 48 gpd

Marketing Events (10 per year)

Peak Sanitary Wastewater Flow = 30 guests X 5 gallons per guest
Peak Sanitary Wastewater Flow = 150 gpd

Harvest Party Events (2 per year)
Peak Sanitary Wastewater Flow = 50 guests X 5 gallons per guest
Peak Sanitary Wastewater Flow = 250 gpd

Total Peak Winery Sanitary Wastewater Flow

In order to manage the peak sanitary wastewater flows to the disposal field portable toilets will be used for all events. Therefore, the worst case peak winery sanitary wastewater flow is calculated based on 4 employees and 16 visitors for tours and tastings. The peak flow for this scenario is calculated as follows:

Total Peak Winery Sanitary Wastewater Flow = 60 gpd + 48 gpd

Total Peak Winery Sanitary Wastewater Flow = 108 gpd

Combined Peak Winery Wastewater Flow

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

Combined Peak Winery Wastewater Flow = 1,000 gpd + 108 gpd

Combined Peak Winery Wastewater Flow = 1,108 gpd

Proposed Design Flow vs Existing Capacity

It is our understanding based on conversations with the winery owner that a very limited amount of water is used in the caves and that most winery operations, including barrel washing, occur at the winery building and crush pad area. Therefore, it is our recommendation that the primary septic system be sized to handle the entire winery process and domestic wastewater design flow without accounting for the additional capacity that is available at the cave septic system since it receives a very limited amount of wastewater.

The predicted Combined Peak Winery Wastewater Flow for the proposed operational characteristics (1,108 gpd) is greater than the design capacity of the existing primary wastewater disposal field (577 gpd).

Recommendations

In order to provide additional capacity to accommodate the proposed changes in use we recommend that capacity of the existing primary leach field be increased to meet the combined process and domestic waste flows.

We propose that the capacity of the existing system be increased by modifying the effective sidewall area in the existing leach line trenches. This can be accomplished by excavating above each trench to expose the top of the gravel layer, removing the perforated pipe and installing an additional 12 inches of gravel material with the perforated pipe embedded in the upper 6 inches of new gravel material. This will maintain the required 36 inches of acceptable soil below trench bottom since the bottom of the trench will not be affected. Additionally, the excavated soil and additional topsoil will need to be placed over the entire leach field area to provide the required 12 inches of cover over the gravel in the trenches. This will result in a total gravel depth of 30 inches which equates to 5 square feet of sidewall area. Furthermore, additional leach line length totaling 88 feet will need to be added to replace the portions of the leach lines that will be removed to meet the 100' cave setback requirement. The new leach line will have a trench section similar to the modified existing leach lines. This will result in a total of 3,325 square feet of sidewall area for the 665 feet of modified and new leach lines.

The design capacity for the modified primary system is calculated based on the original design criteria including a soil loading rate of 1 gallon per day per three square feet of trench sidewall area and a total effective trench sidewall area of 5 square feet per lineal foot of trench as follows:

$$\text{Design Capacity} = 665 \text{ lineal feet} \times \frac{5 \text{ square feet}}{\text{lineal foot}} \times \frac{1 \text{ gpd}}{3 \text{ square feet}}$$

Design Capacity = 1,108 gallons per day

The design capacity of the expanded septic system matches the anticipated peak wastewater flow for proposed conditions. See the Black Sears Winery Wastewater Disposal Feasibility Exhibit (attached) for an illustration of the proposed leach line modifications.

Septic Tank Capacity

The total required septic tank capacity based on a minimum hydraulic retention time for peak flows of three days is 324 gallons for sanitary waste and 3,000 gallons for process waste. The existing 810 gallon septic tank provides adequate volume for the sanitary was flows. One of the existing process waste septic tanks is located within the 100' cave setback and will have to be demolished. The remaining 1,500 gallon process waste septic tank should be supplemented by

adding one new 1,500 gallon septic tank in series with the existing tank to provide a total volume of 3,000 gallons.

Reserve Area

Napa County code requires that an area be set aside to accommodate a future onsite wastewater disposal system in the event that the primary system fails or the soil in the primary area is otherwise rendered unsuitable for wastewater disposal. Since there is not a reserve area already designated for the existing main residence septic system the proposed reserve area must accommodate that system's reserve area requirements as well. According to the Applicant there are a total of three potential bedrooms in the existing residence.

The design flow for the reserve area is 1,108 gpd for the winery process and sanitary wastewater plus 450 gallons per day for the residence for a total of 1,558 gpd.

Given the relatively shallow acceptable soil depths encountered during our Site Evaluation on March 13, 2015 (E15-00140) we recommend that the reserve area be designated as a subsurface drip type disposal field. Per Napa County requirements the reserve area for subsurface drip disposal fields must be 200% of the size of the calculated disposal field area. Based on these design parameters, the required reserve area is calculated as follows:

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

$$\text{Require Reserve Field Area} = 200\% \times \frac{2{,}150 \text{ gpd}}{0.6 \text{ gpd per square foot}}$$

Required Reserve Area =7,167 square feet

Based on the site plan and Napa County GIS topographic data, we have determined that there is enough area to set aside for an additional 8,000 square feet of subsurface drip disposal field in the vicinity of Test Pits #1, #2, #3 & #4 as shown on the Black Sears Winery Wastewater Disposal Feasibility Exhibit (attached).

Pretreatment and Septic Tank Capacity

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

Summary

The calculations presented above illustrate that the wastewater flows associated with the proposed Use Permit Modification will exceed the capacity of the existing wastewater system. However, by removing leach line from the cave setback, installing new leach line, increasing the effective sidewall area for the existing leach lines and installing a new process waste septic tank the proposed wastewater design flows can be accommodated.

Full design specifications for the required improvements must be prepared for County review and permitting after the subject Use Permit Modification is approved and before any work is started.

We trust that this provides the information you need to process the subject Use Permit Modification. Please feel free to contact us at (707) 320-4968 if you have any questions.

Sincerely,

Applied Civil Engineering Incorporated

By:

Michael R. Muelrath

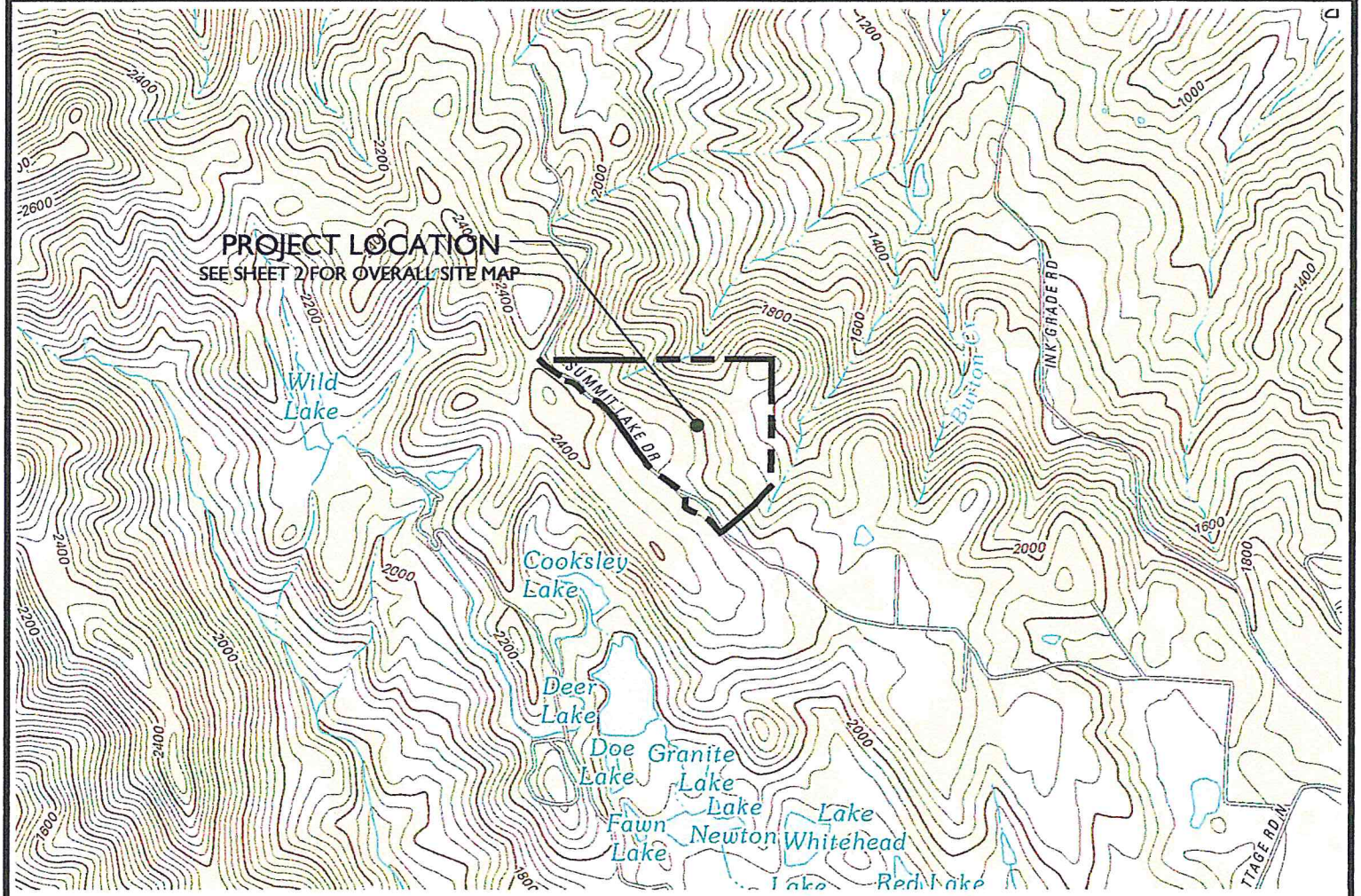
Michael R. Muelrath RCE 67435
Principal

Copy:

Jerre Sears, Black Sears Winery (via email)
Ashley Jambois, Black Sears Winery (via email)
Jon Webb, Albion Surveys (via email)

Attachments:

Black Sears Winery Wastewater Disposal Feasibility Exhibit
Septic System Inspection Report by Jim Clifton



LOCATION MAP

SCALE: 1" = 2,000'

NOTES:

1. TEST PITS ONE THROUGH FOUR (TP #1 - TP #4) WERE EXCAVATED BY JIM CLIFTON AND WERE WITNESSED BY MIKE MUELRATH OF APPLIED CIVIL ENGINEERING INCORPORATED AND REBECCA SETLIFF OF THE NAPA COUNTY PLANNING, BUILDING AND ENVIRONMENTAL SERVICES DEPARTMENT - ENVIRONMENTAL HEALTH DIVISION ON MARCH 13, 2015 .

2. FADED BACKGROUND REPRESENTS EXISTING TOPOGRAPHIC FEATURES. TOPOGRAPHIC INFORMATION FOR SHEETS 2 THORUGH 4 WAS OBTAINED FROM THE NAPA COUNTY GEOGRAPHIC INFORMATION SYSTEM (GIS) DATABASE. TOPOGRAPHIC INFORMATION FOR SHEET 5 WAS OBTAINED FROM THE "MAP OF TOPOGRAPHY OF A PORTION OF THE LANDS OF SEARS" PREPARED BY ALBION SURVEYS, INC., DATED JULY 17, 2014, REVISED AUGUST 8, 2014. APPLIED CIVIL ENGINEERING INCORPORATED ASSUMES NO LIABILITY REGARDING THE ACCURACY OR COMPLETENESS OF THE TOPOGRAPHIC INFORMATION.

3. AERIAL PHOTOGRAPHS WERE OBTAINED FROM THE SAN FRANCISCO ESTUARY INSTITUTE (SFEI) SAN FRANCISCO BAY AREA ORTHOPHOTOS DATABASE, DATED JUNE 2014 AND MAY NOT REPRESENT CURRENT CONDITIONS.

4. ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM) MAP NUMBER 06055C0275E, EFFECTIVE SEPTEMBER 26, 2008 THE PROJECT SITE IS NOT LOCATED IN A SPECIAL FLOOD HAZARD AREA.

5. CONTOUR INTERVAL: SHEET 2: TWENTY FIVE (25) FEET
   SHEETS 3 & 4: FIVE (5) FEET, HIGHLIGHTED EVERY TWENTY FIVE (25) FEET
   SHEET 5: ONE (1) FOOT, HIGHLIGHTED EVERY FIVE (5) FEET

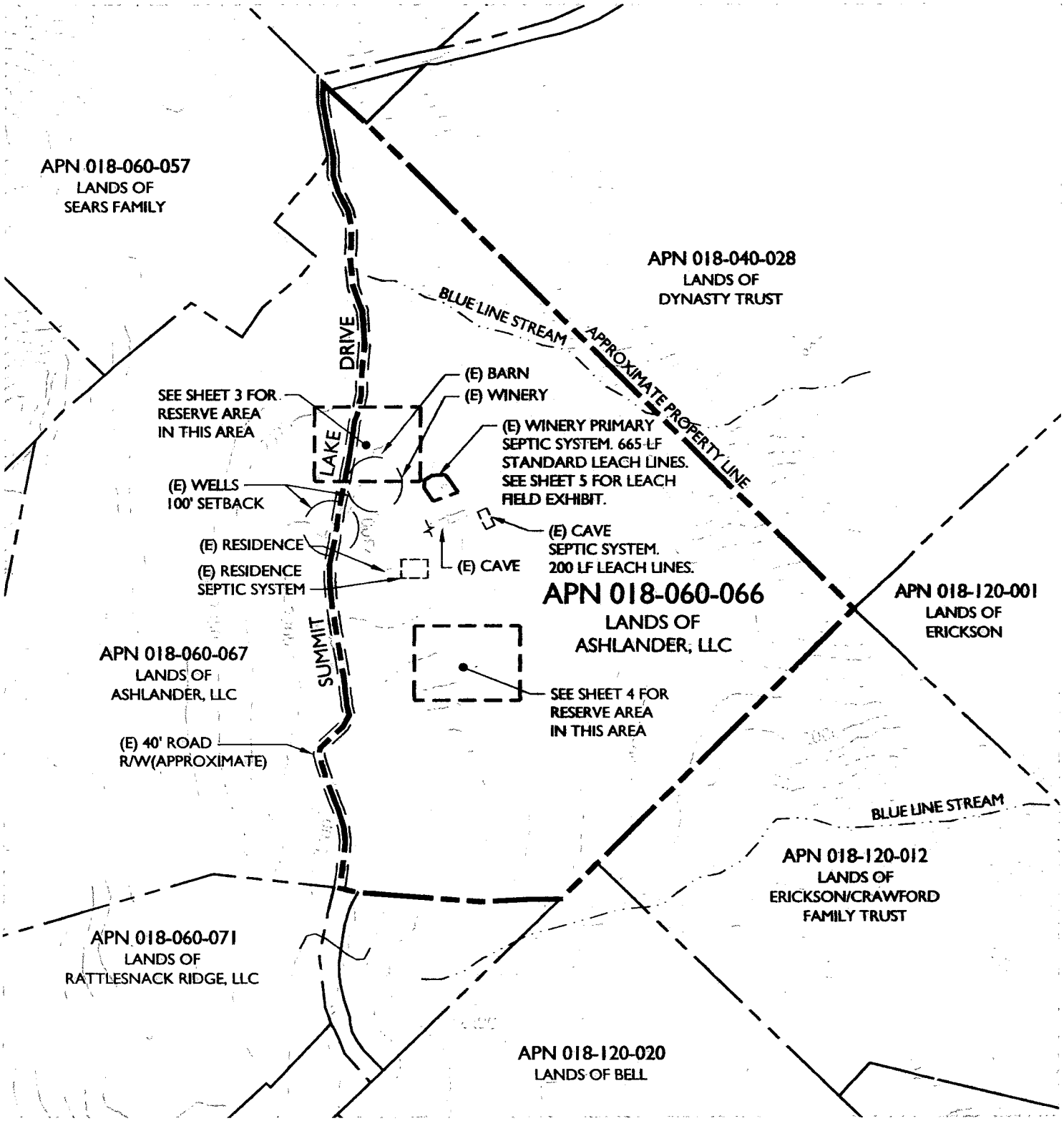
6. VERTICAL DATUM: SHEETS 2 THROUGH 4: NAVD 88
   SHEET 5: ASSUMED

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

BLACK SEARS WINERY WASTEWATER DISPOSAL FEASIBILITY EXHIBIT

2600 SUMMIT LAKE DRIVE
ANGWIN, CA 94508
APN 018-060-066

SCALE: 1" = 2,000'



OVERALL SITE MAP

SCALE: 1" = 500'

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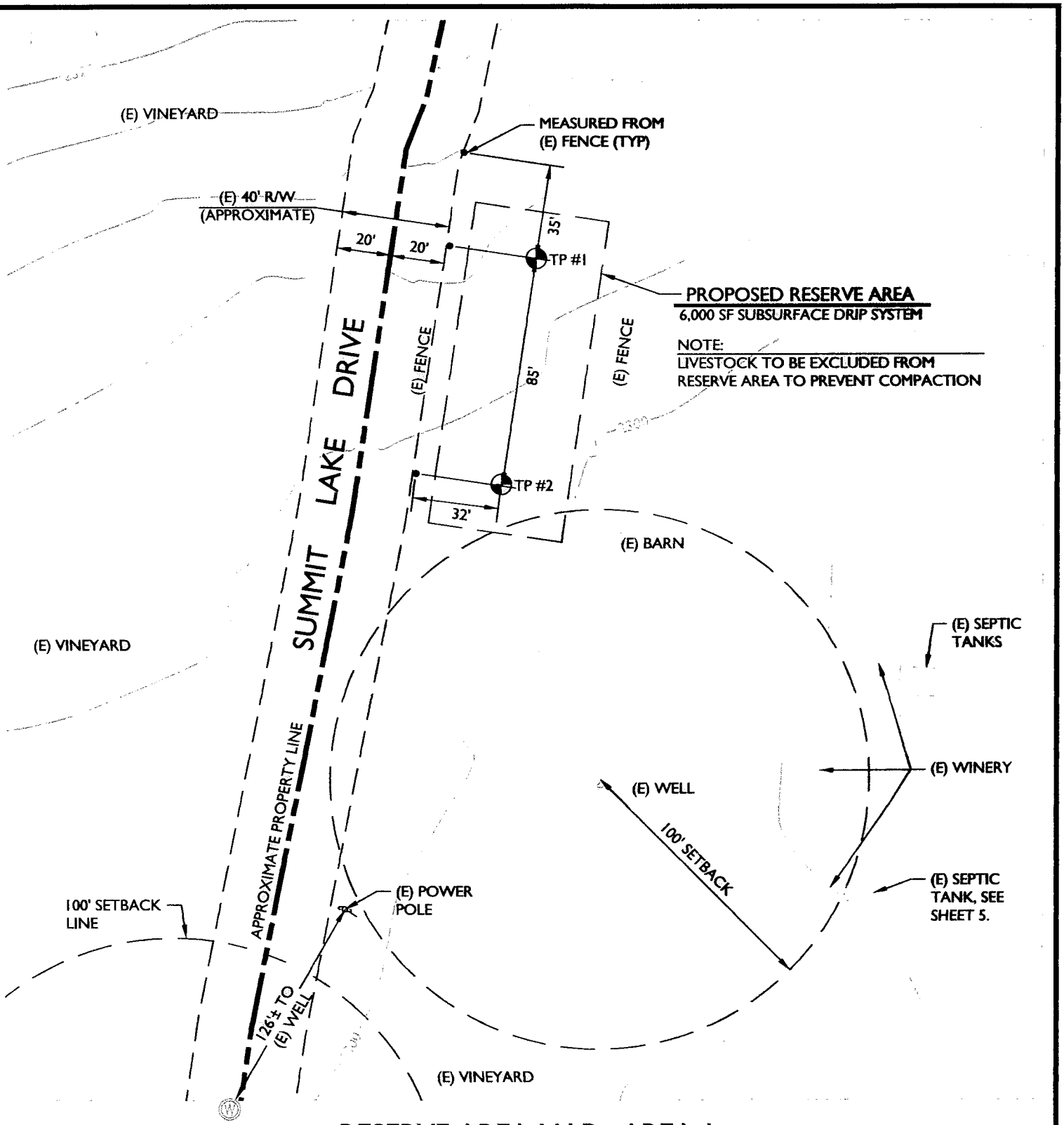
APN 018-060-066

SCALE: 1" = 500'



RESERVE AREA MAP- AREA 1

SCALE: 1" = 50'

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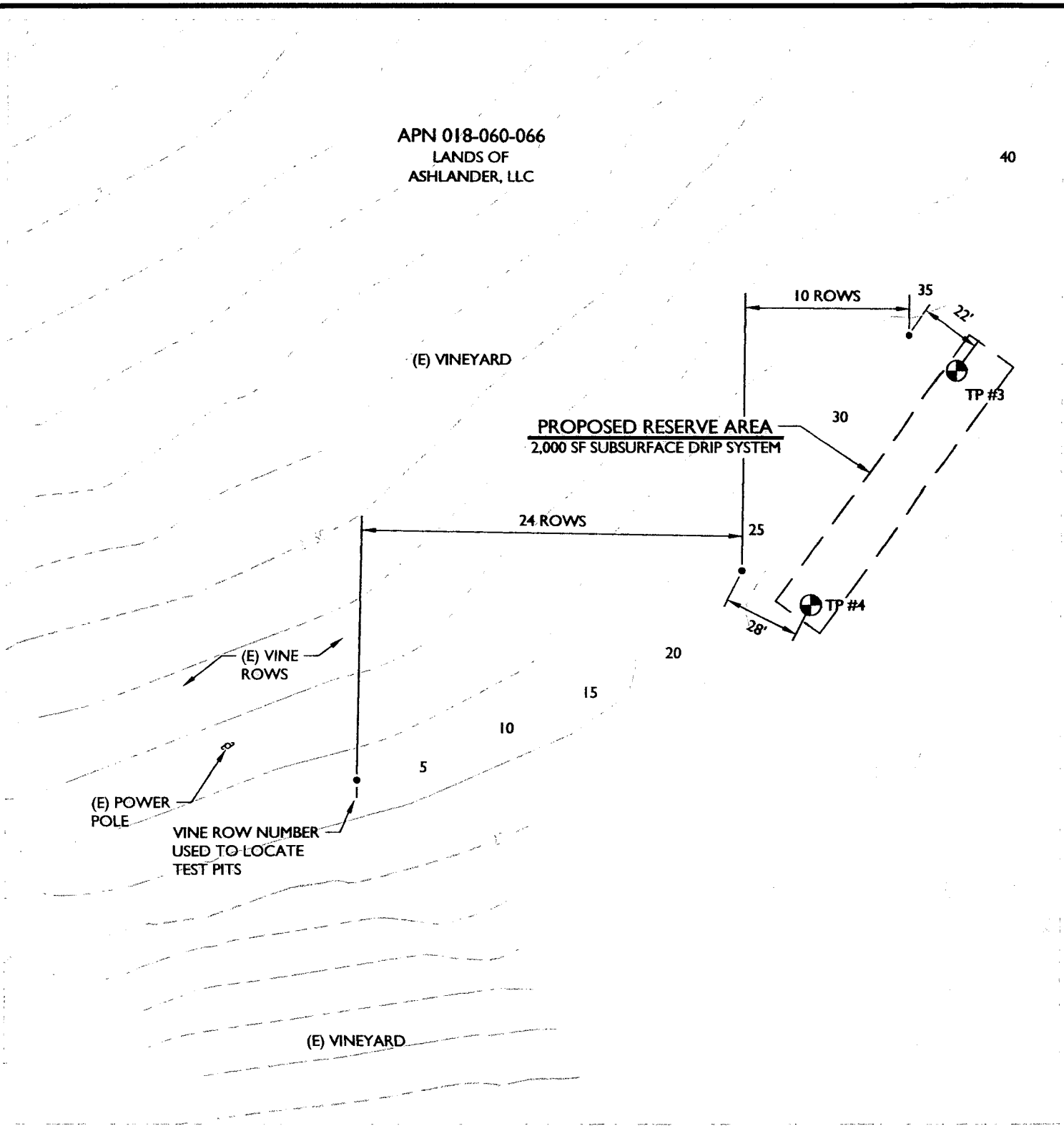
SCALE: 1" = 50'



RESERVE AREA MAP- AREA 2

SCALE: 1" = 50'

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APN 018-060-066

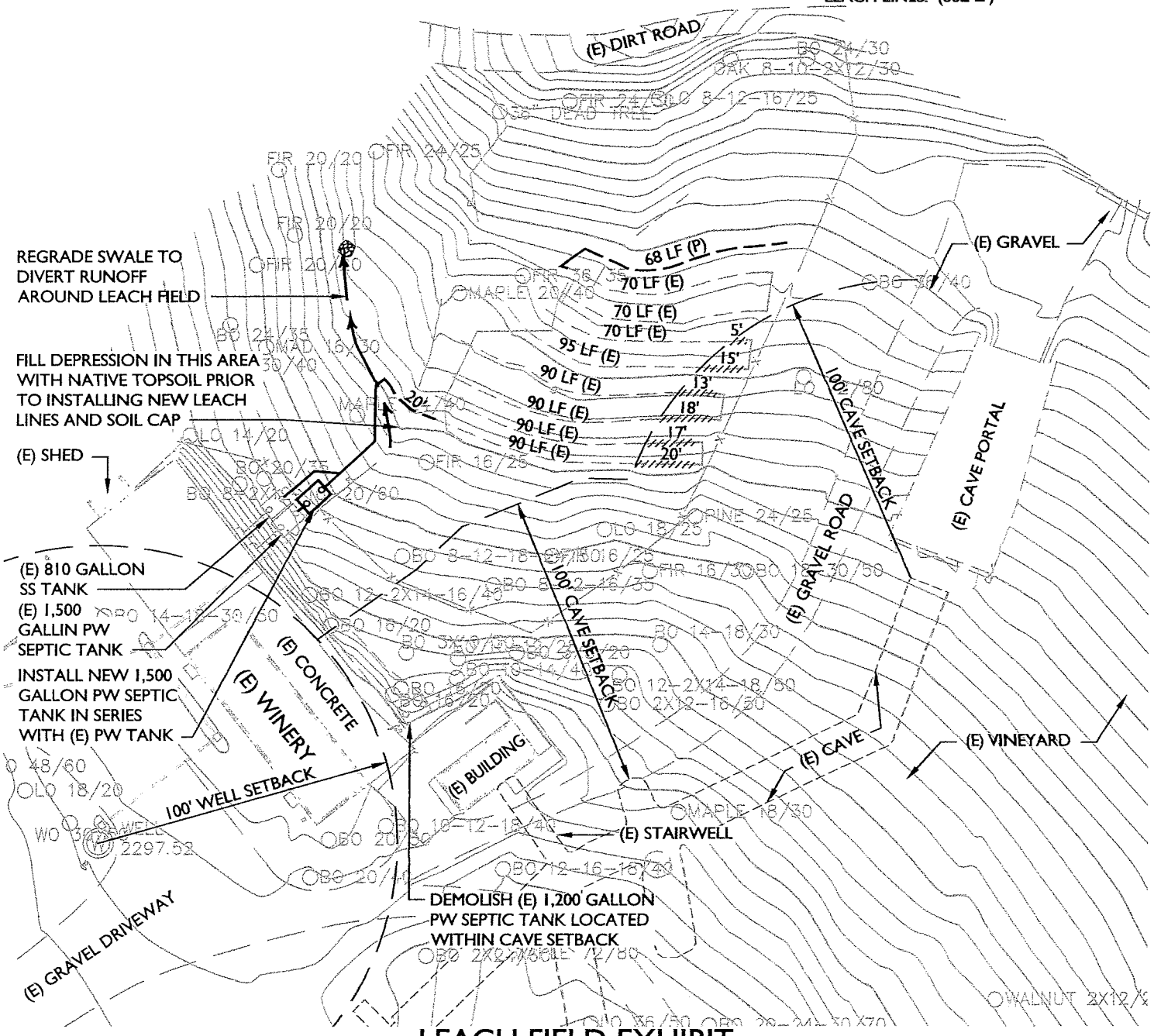
SCALE: 1" = 50'

LEGEND:

EXISTING LEACH LINES

PORTION OF EXISTING LEACH LINES TO BE REMOVED TO MEET 100' SETBACK TO CAVE (88± LF)

NEW LEACH LINES TO REPLACE REMOVED LEACH LINES. (88± LF)



LEACH FIELD EXHIBIT

SCALE: 1" = 50'

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BLACK SEARS WINERY WASTEWATER DISPOSAL FEASIBILITY EXHIBIT

2600 SUMMIT LAKE DRIVE
ANGWIN, CA 94508
APN 018-060-066

SCALE: 1" = 50'

JOB NO. 13-156 PAGE 5 OF 5 JUNE 2015

NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
EXISTING INDIVIDUAL SEPTIC SYSTEM INSPECTION REPORT FORM

PROPERTY OWNER Sears - Black DATE 12/1/2014
ADDRESS 7615 Summit Lake Dr. APN 019-060-006

PRIMARY TREATMENT-SEPTIC TANK

tank A
Distance to closest well: This parcel: 100+ Adjacent parcel: 100+
Date tank was last pumped 6/23/2014
Distance from foundation 5+' Pumped by Dependable Septic
Distance from property line 100+' Pre-fab tank or poured in place (describe)
Material-tank concrete lid concrete Number of compartments 2 in each
Inside length 8'6" width 4'6" depth 5'5 Total Capacity 1700

SECONDARY TREATMENT-DISPOSAL FIELD (if other than leach field describe below)

Distance to closest well: This parcel 100+' Adjacent parcel 100+'
Distance to property line 10+' Distance from foundation 10+'
Total length on leach line 665' Total effective sidewall 1995 sq ft
Type of filter material crushed Drain rock Amount of filter material: 18"
Type of pipe 3" Styrene Number of lines 8
Depth of cover over rock: 18" Above pipe: 2 Below pipe: 12
Trench width: 18" depth 30"

GENERAL INFORMATION winery

Is the ~~house/structure~~ presently occupied? ____ How many bedrooms? 11/07
If commercial use-how many employees (FT and PT) ____
How many units served by this system 1 winery
Any other septic systems on the property yes If yes, how many? 2

CONDITION OF SYSTEM

Make a statement on the condition of the septic tank and interior surfaces, including baffles and fittings. How was this determined? Note: If tank is over five years old, it must be inspected (pumping is required to allow inspection).
Baffles are good on all 3 tanks tanks also in reasonable condition
Make a statement on the condition of the sump/pump (if applicable), including size, alarm, structure, etc. 11/07

Make a statement on the condition of the distribution box, leaching lines, etc. How was the length and location of the disposal field determined_ no D-Box Leach lines are in good condition the first 2 lines have more dirt than the last 6

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.

A PLOT PLAN OF THE SEPTIC SYSTEM AND ALL OTHER IMPROVEMENTS MUST BE ATTACHED TO THIS REPORT-DISTANCE TO PONDS/STREAMS, WELLS, BUILDINGS, ETC. MUST BE SHOWN

Jon Clifton
(Licensed Contractor)

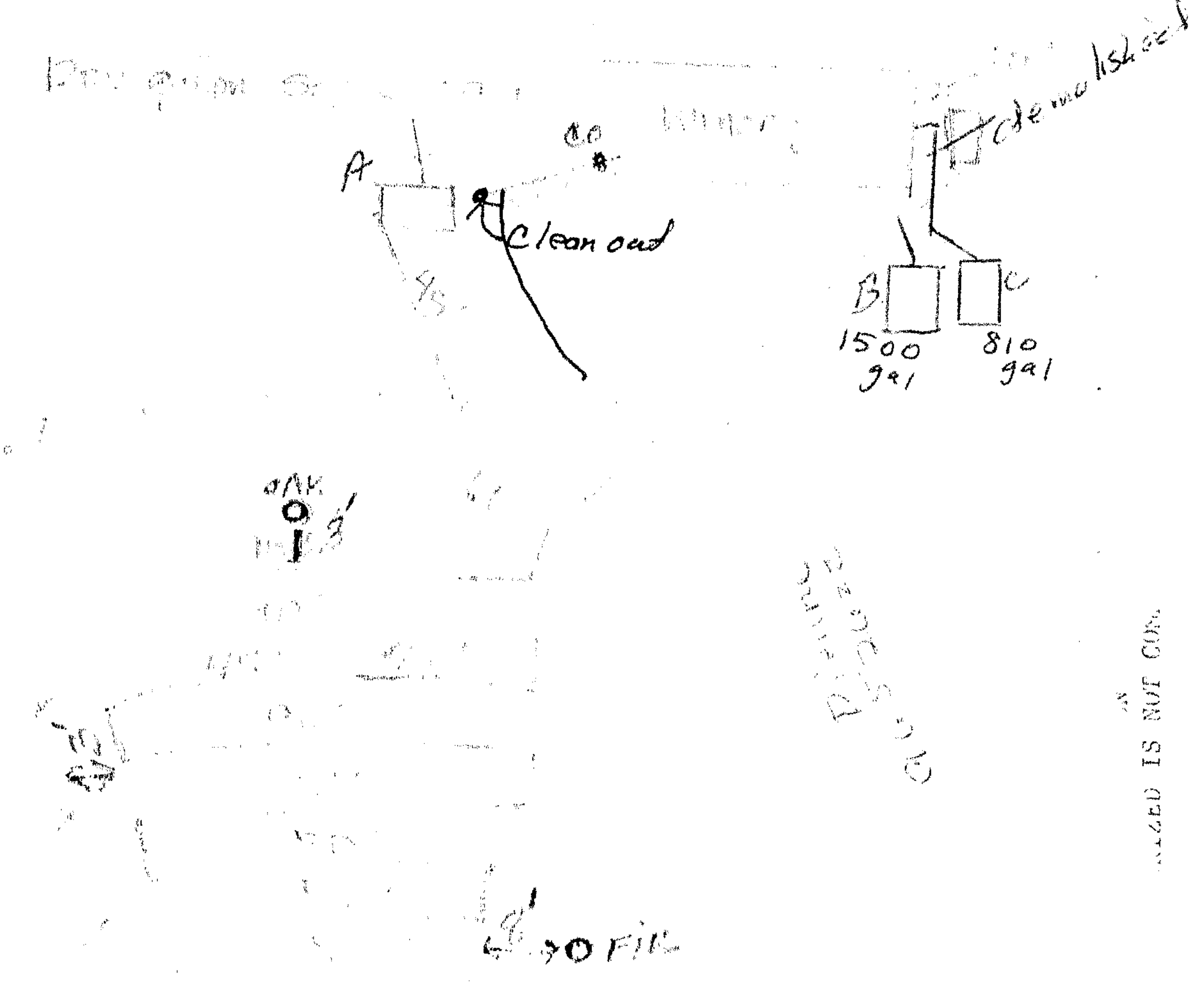
Note: In order to secure clearance of an individual sewage disposal system from the Department of Environmental Management, the system must be inspected by a licensed sewage contractor and the completed form returned to our office for evaluation. It should be accompanied by a plot plan showing the septic system, wells, buildings and

other improvements on the property and the 100% expansion area.

There are three Septic tanks
2 winery tanks 1200 + 1500 gals.
1 domestic tank 1200 gals
tank B is a 1500 gal Septic
" C is a ~~[redacted]~~ 810 gal Septic inside 8'6" +-
width 4'6" +-
depth 4'2" +-

The condition + location established by excavation
plot map "As Built 1988" is very ~~[redacted]~~ accurate

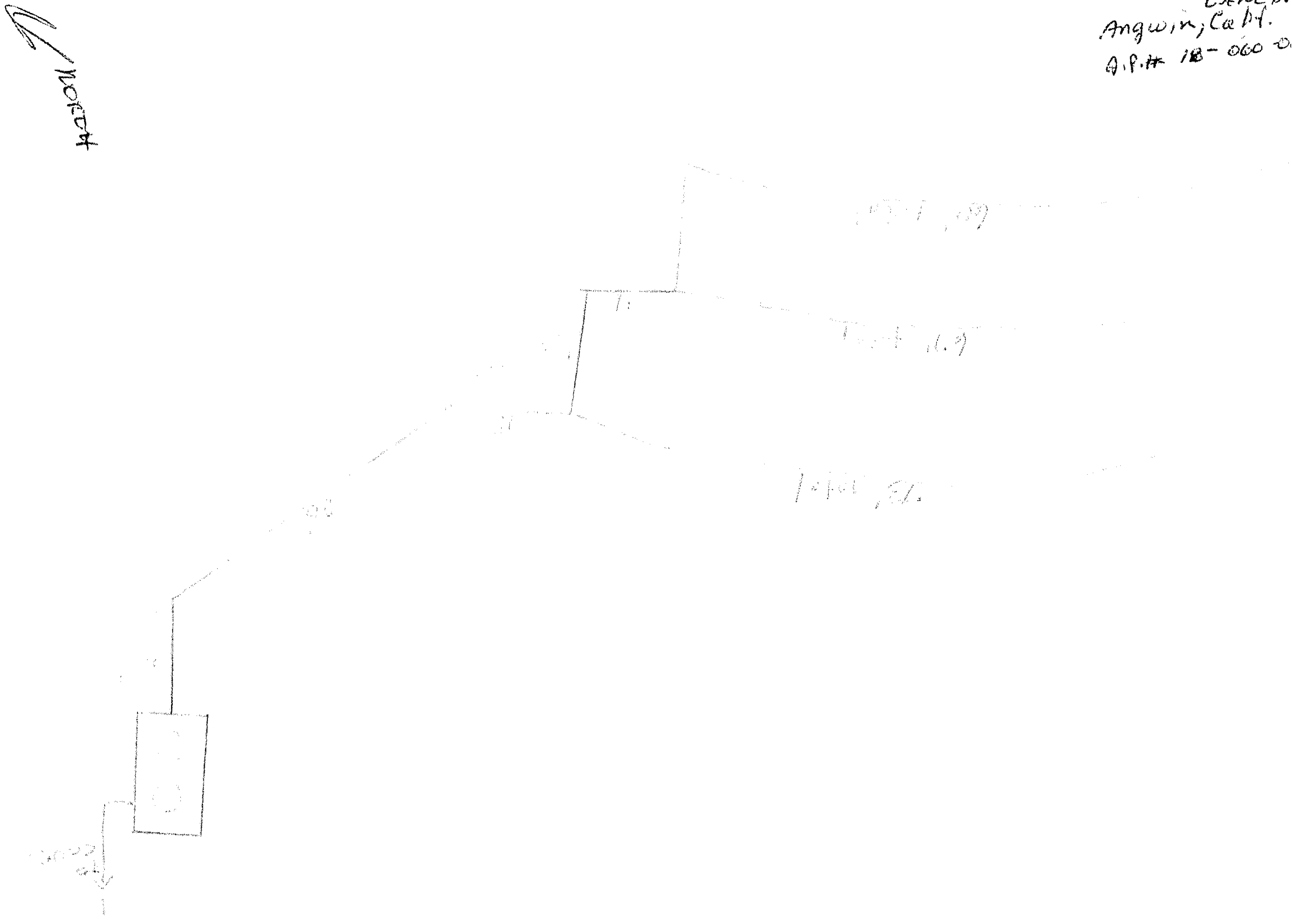
plot map included



12/3/2014

[illegible]IZED IS NOT COM[illegible]
Owner or Author

[illegible] Winery
2615 Summit Lake Dr
Angwin, Ca [illegible].
A.P.# 18-060-0[illegible]



SEARS BLACK WINERY
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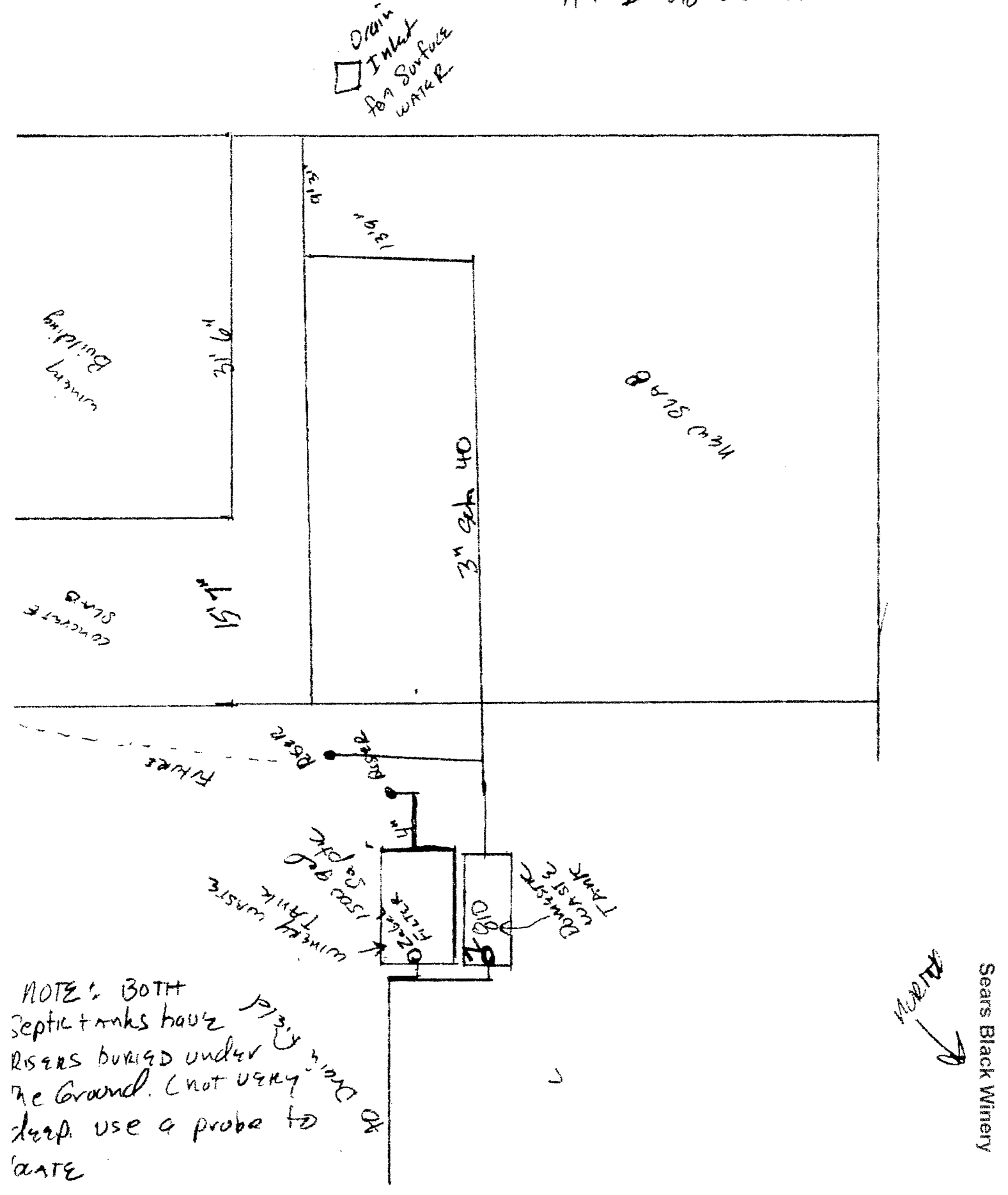
Angwin Calif
A.P. # 018-060-066



NOTE: BOTH Septic tanks have risers buried under the ground. (not ugly) deep use a probe to locate