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Water Availability Analysis

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Napa County Planning, Building
& Environmental Services



ANNUAL GROUNDWATER RECHARGE RATE

CHANTICLEER WINERY
4 VINEYARD VIEW DRIVE
YOUNTVILLE, CA 94599

APN 034-150-026



PROPERTY OWNER:

George Grodahl
4 Vineyard View Drive
Yountville, CA 94599

Project# 4112060.0

January 8, 2016



INTRODUCTION

This report determines the annual groundwater recharge rate for the proposed Chanticleer Winery property. The property is located at 4 Vineyard View Drive in Yountville, parcel number 034-150-026. The parcel is +/- 40 acres and has slopes ranging from 0 - 40%. The parcel has been divided into three areas, impervious, agricultural and woodland areas.

METHODOLOGY

The groundwater recharge rate has been determined by examining the annual rainfall, runoff and species specific evapotranspiration during winter months. The Annual Precipitation Chart and Watershed Types and Factors page in the Napa County Road and Street Standards were used to determine the annual rainfall amount and site runoff volumes. It was determined that the average annual rainfall amounts to 26 inches per year.

The runoff volumes were determined by calculating the site specific runoff coefficient. The runoff coefficients were calculated using aerial images to view the terrain and the county topography to estimate the slopes in each area.

The evapotranspiration losses were calculated using the Water Use Classifications of Landscape Species (WUCOLS) methodology for the woodland and agricultural areas. Only evapotranspiration from the winter was considered, as it is assumed that evapotranspiration in summer will be from irrigation water.

The groundwater recharge rate was calculated as the difference of the total annual rainfall and losses from the stormwater runoff and evapotranspiration. Refer to attached calculations.

$$\text{Average Recharge Rate} = \text{Average Rainfall} - \text{Runoff} - \text{Evapotranspiration}$$

CONCLUSION

The Chanticleer Winery property has an annual rainfall of 26 inches per year, equating to 86.8 acre-feet per year for the entire site.

Total evapotranspiration volume lost to woodland and agricultural areas on-site is 12.9 acre-feet per year. The stormwater runoff from the site totals 47.6 acre-feet per year. The total average evapotranspiration and runoff from the site is 60.5 acre-feet per year.

The average annual groundwater recharge is 26.4 acre-feet per year for the 40.07 acre site. This equates an annual groundwater recharge rate of 0.66 acre-feet per acre per year.



**Chanticleer Winery
Groundwater Recharge Rate**

Site Description	Hydrologic Soil Group	Area (ac)	Total Annual Rainfall (in/yr)	Total Rainfall (ft ³ /yr)
Impervious Area	B	3.83	26	361,475
Woodland Area	C	28.17	26	2,658,685
Agricultural Area	A/B/D	8.07	26	761,647
Total		40.07	26	3,781,807

Site	Evapotranspiration (ET _d)										Total Landscape Evapotranspiration (ft ³ /yr)
	January (ET _d) (in)	February (ET _d) (in)	March (ET _d) (in)	October (ET _d) (in)	November (ET _d) (in)	December (ET _d) (in)	Total ET _d (in)	Landscape Coefficient (K _c)	Landscape Evapotrans. (ET _d) (in) = Total ET _d x K _c		
Impervious Area	0	0	0	0	0	0	0	0	0.00	0.00	0
Woodland Area	1.03	1.53	2.93	3.53	1.64	1.17	11.83	0.44	5.21	532,269	
Agricultural Area	1.03	1.53	2.93	3.53	1.64	1.17	11.83	0.08	0.95	27,724	
Total										559,993	

Site	Runoff	
	Run-Off Coefficient (C)	Total Runoff (ft ³ /yr)
Impervious Area	0.90	325,328
Woodland Area	0.52	1,382,516
Agricultural Area	0.48	365,590
Total		2,073,434

Site	Groundwater Recharge Rate					
	Total Rainfall (ft ³ /yr)	Total Crop Evapotranspiration (ft ³ /yr)	Total Runoff (ft ³ /yr)	Total Stormwater loss on site (ft ³ /yr)	Groundwater Recharge Rate (ft ³ /yr)	Groundwater Recharge Rate (ac-ft/ac/yr)
Impervious Area	361,475	0	325,328	325,328	36,148	0.22
Woodland Area	2,658,685	532,269	1,382,516	1,914,785	743,900	0.61
Agricultural Area	761,647	27,724	365,590	393,314	368,332	1.05
Total	3,781,807	559,993	2,073,434	2,633,427	1,148,380	0.66

Woodland Area

WATERSHED TYPES AND FACTORS

WATERSHED TYPES AND FACTORS				
Run-off Producing Features	Extreme	High	Normal	Low
Relief	0.28 – 0.38 Steep, rugged terrain, with average slopes above 30%	0.27 0.20 – 0.28 Rolling, with average slopes of 10 to 30%	0.14 – 0.20 Rolling, with average slopes of 5 to 10%	0.08 – 0.14 Relatively flat land, with average slopes of 0 to 5%
Soil Infiltration	0.12 – 0.16 No effective soil cover either rock or thin soil mantle of negligible infiltration capacity.	0.10 0.08 – 0.12 Slow to take up water; clay or shallow loam soils of low infiltration capacity imperfectly or poorly drained.	0.06 – 0.08 Normal; well drained light and medium textured soils sandy loams, silt, and silt loams.	0.04 – 0.06 Slow to take up water; clay or shallow loam soils of low infiltration capacity imperfectly or poorly drained.
Vegetation Cover	0.12 – 0.16 No effective plant cover; bare or very sparse cover.	0.08 – 0.12 Poor to fair; clean cultivation crops or poor natural cover; less than 20% of drainage area under good cover.	0.06 – 0.08 Fair to good; about 50% of area in good grassland or woodland; not more than 50% of area in cultivated crops.	0.05 0.04 – 0.06 Good to excellent; about 90% of drainage area in good grassland, woodland, or equivalent crop.
Surface	0.10 – 0.12 Negligible; surface depressions, few and shallow; drainage ways steep and small; no marshes.	0.10 0.08 – 0.10 Low well-defined system of small drainage ways; no ponds or marsh.	0.06 – 0.08 Normal; considerable surface depression storage; lakes, ponds, and marshes.	0.04 – 0.06 High; surface storage high; drainage system not sharply defined; large floodplain storage or large number of ponds or marshes.

THE RUNOFF FACTOR IS DETERMINED BY THE SUM OF THE FACTORS FOR RELIEF INFILTRATION, COVER, AND SURFACE. NOT APPLICABLE TO BUILT UP AREAS.

FIGURE 3

Total C = 0.27 + 0.10 + 0.05 + 0.10 = 0.52

Agricultural Area

WATERSHED TYPES AND FACTORS

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THE RUNOFF FACTOR IS DETERMINED BY THE SUM OF THE FACTORS FOR RELIEF INFILTRATION, COVER, AND SURFACE. NOT APPLICABLE TO BUILT UP AREAS.

FIGURE 3

Total C = 0.20 + 0.10 + 0.08 + 0.10 = 0.48

TABLE 1. Crop coefficients used in daily modeling of soil water processes in vineyards, oak trees and grasslands

Vineyards		Oak trees		Grasslands	
Period	K _c	Period	K _c	Period	K _c
3/1-4/15	0.10	3/1-3/31	0.5	3/1-3/15	0.90
4/16-4/30	0.20	4/1-10/1	0.6	3/16-4/30	0.95
5/1-5/15	0.25	10/2-11/25	0.5	5/1-5/15	0.25
5/16-5/31	0.30	11/26-2/28	0.4	5/16-6/15*	0.10
6/1-6/15	0.35			6/16*-10/13	0.00
6/16-6/30	0.40			10/14-10/31	0.25
7/1-9/30	0.50			11/1-2/28	0.75
10/1-10/15	0.30				
10/16-10/31	0.20				
11/1-11/15	0.15				
11/16-11/30	0.05				
12/1-2/28	0.01				

Sources: Allen et al. 1998 (grasses and trees); Caprile 2007 (vineyards).

* Variable date depending on available soil moisture.

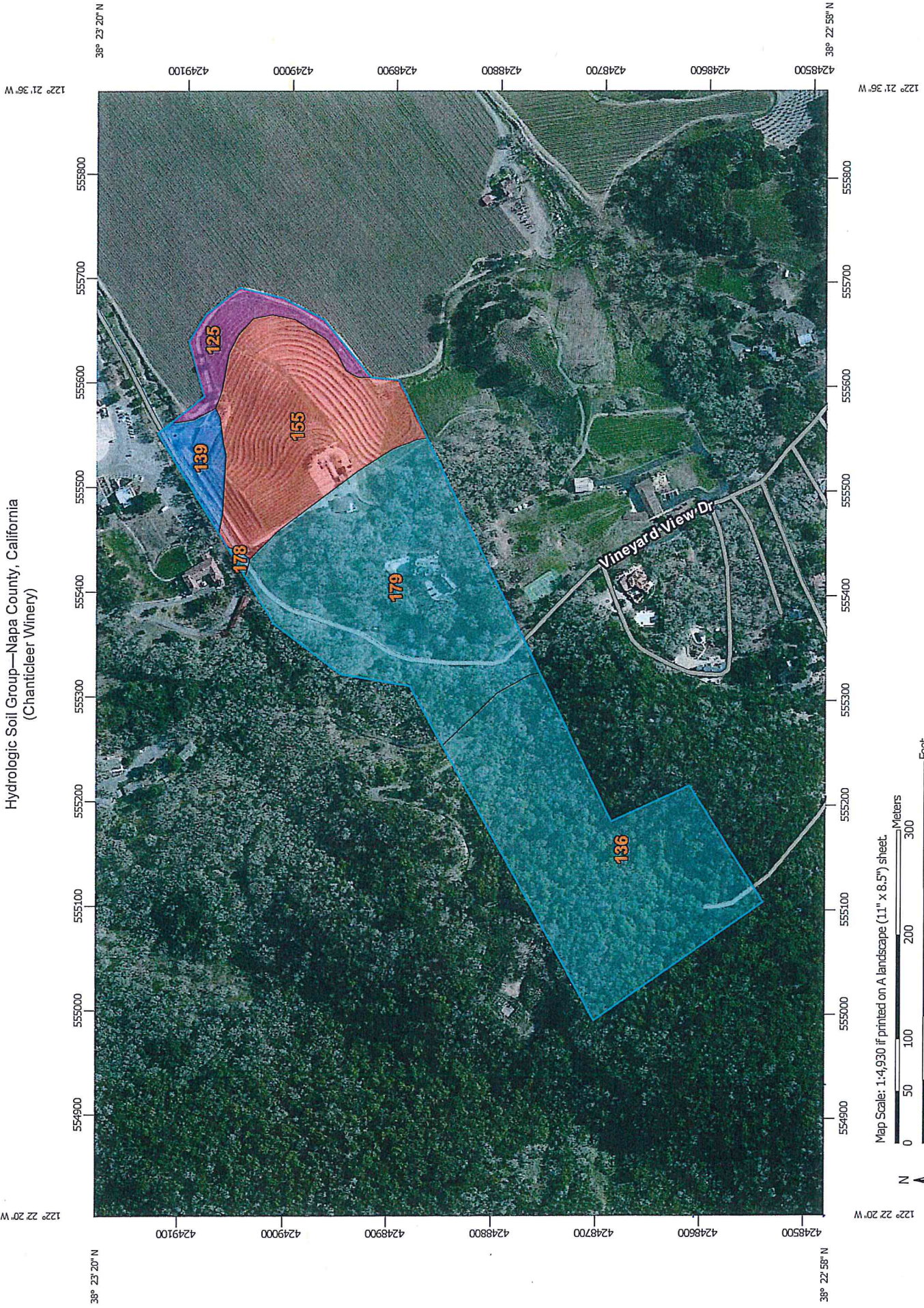
Oak Trees - weighted average for October to March

Time Period	# of Days	K _c	Days * K _c	
3/1-3/31	31	0.5	15.5	
10/01	1	0.6	0.6	Weighted K _c =
10/2-11/25	55	0.5	27	80.7/182 = 0.44
11/26-2/28	95	0.4	37.6	
Totals=	182		80.7	

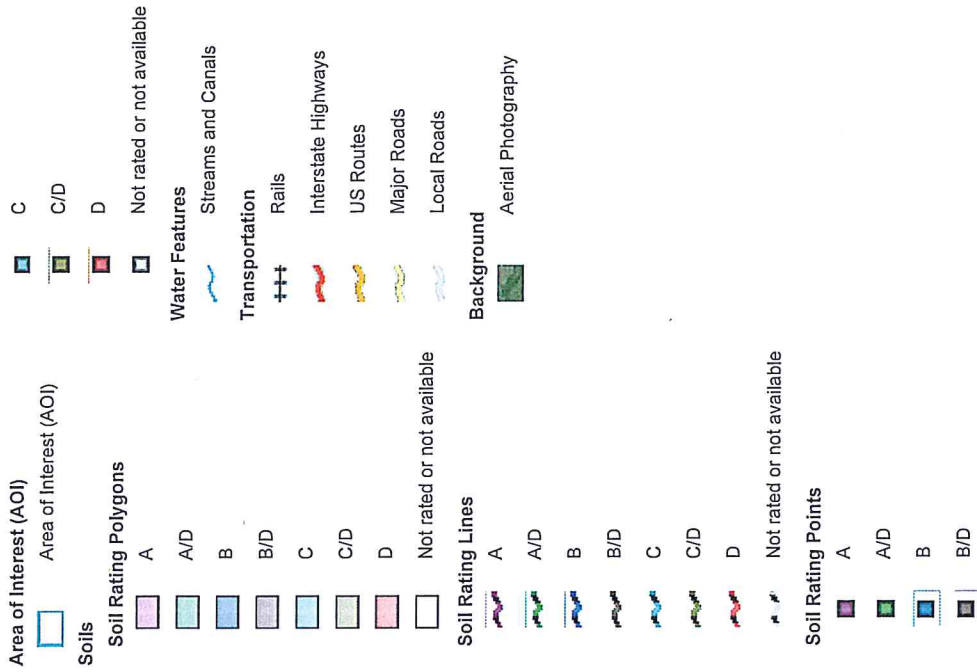
Vineyard - weighted average for October to March

Time Period	# of Days	K _c	Days * K _c	
3/1-4/15	31	0.1	3.1	
10/1-10/15	15	0.3	4.5	
10/16-10/31	16	0.2	3.2	
11/1-11/15	15	0.15	2.25	Weighted K _c =
11/16-11/30	15	0.05	0.75	14.7/182 = 0.08
12/1-2/28	90	0.01	0.9	
Total=	182		14.7	

Hydrologic Soil Group—Napa County, California
(Chanticleer Winery)



MAP LEGEND



MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Napa County, California
 Survey Area Data: Version 8, Sep 23, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 4, 2012—Feb 17, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Napa County, California (CA055)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
125	Cortina very stony loam, 0 to 5 percent slopes	A	1.4	4.6%
136	Felton gravelly loam, 30 to 50 percent slopes	C	11.3	36.1%
139	Forward gravelly loam, 9 to 30 percent slopes	B	1.0	3.2%
155	Kidd loam, 15 to 30 percent slopes	D	6.6	21.2%
178	Sobrante loam, 5 to 30 percent slopes	C	0.1	0.2%
179	Sobrante loam, 30 to 50 percent slopes	C	10.8	34.6%
Totals for Area of Interest			31.3	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

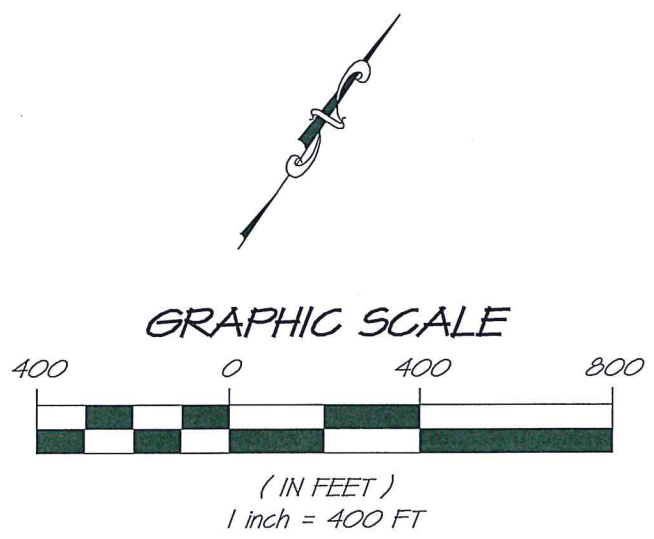
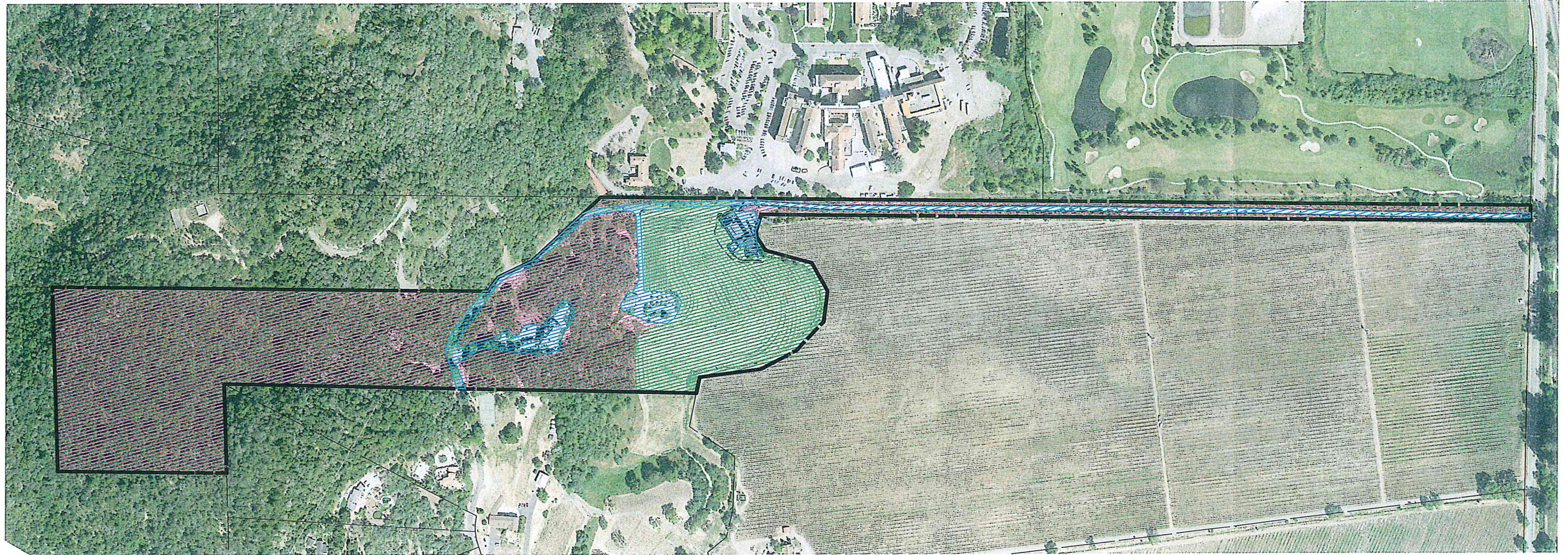
Rating Options




Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

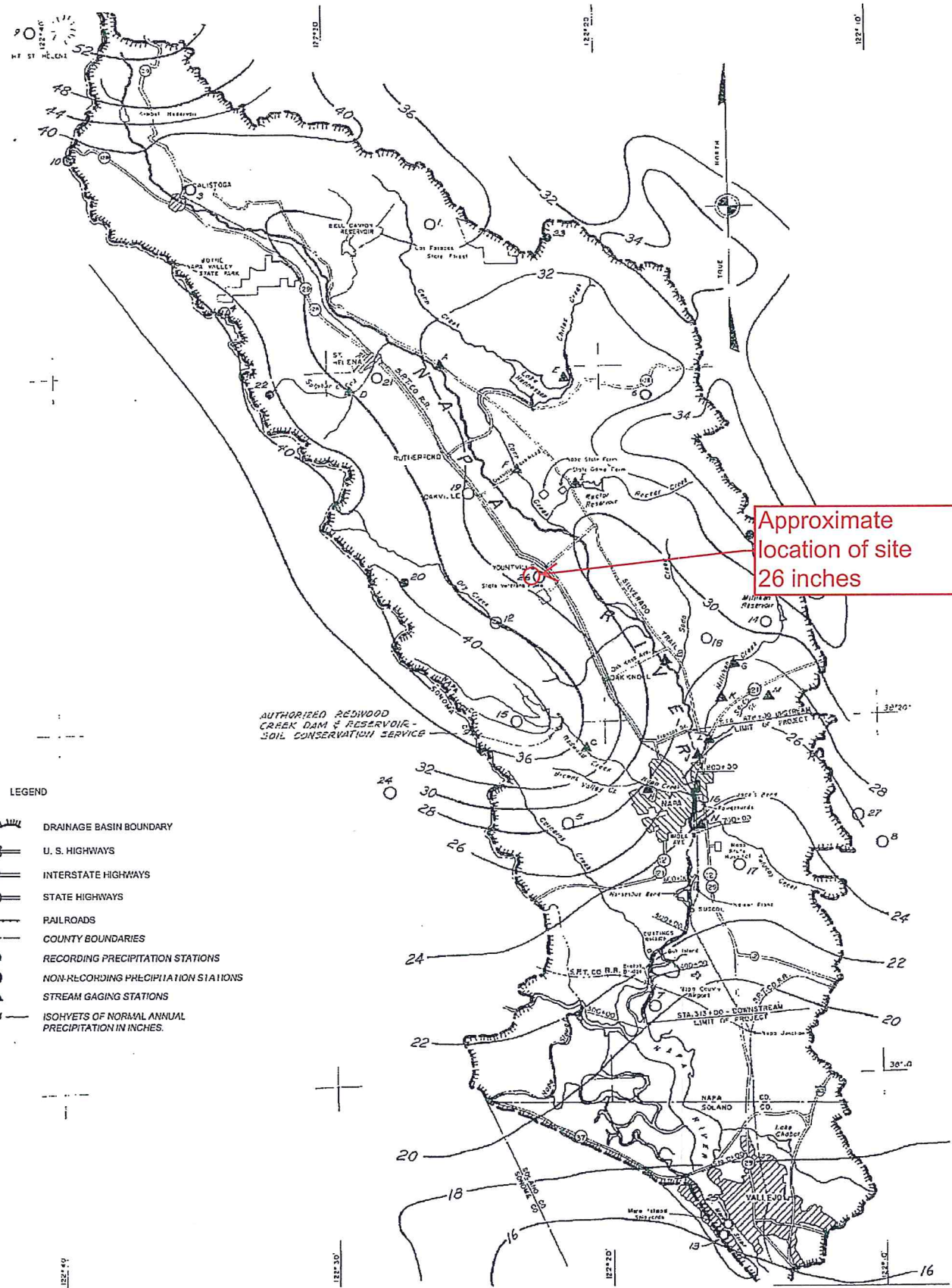
CHANTICLEER GROUNDWATER RECHARGE EXHIBIT



-  IMPERVIOUS AREA = 3.83
-  AGRICULTURAL AREA = 8.07
-  WOODLAND AREA = 28.17

RSA+ 1515 FOURTH STREET
NAPA, CALIF. 94559
OFFICE | 707 | 252.3301
+ www.RSAcivil.com +

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Approximate
location of site
26 inches

- LEGEND
- DRAINAGE BASIN BOUNDARY
 - U. S. HIGHWAYS
 - INTERSTATE HIGHWAYS
 - STATE HIGHWAYS
 - RAILROADS
 - COUNTY BOUNDARIES
 - RECORDING PRECIPITATION STATIONS
 - NON-RECORDING PRECIPITATION STATIONS
 - STREAM GAGING STATIONS
 - ISOHYETS OF NORMAL ANNUAL PRECIPITATION IN INCHES.

PRECIPITATION CHART LOWER COUNTY

FLOOD CONTROL
GENERAL DESIGN MEMORANDUM
NAPA RIVER CHANNEL IMPROVEMENTS
NAPA COUNTY, CALIFORNIA
HYDROLOGY AND HYDRAULIC ANALYSIS
NORMAL ANNUAL PRECIPITATION AND
HYDROLOGIC INDEX MAP
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO, CORPS OF
ENGINEERS

TO ACCOMPANY REPORT
DATED 12 March 75

FILE NO.
50-47-1



A Tradition of Stewardship
A Commitment to Service

Department of Public Works

1195 Third Street, Suite 201
Napa, CA 94559-3092
www.co.napa.ca.us/publicworks

Main: (707) 253-4351
Fax: (707) 253-4627

Donald G. Ridenhour, P.E.
Director

WATER AVAILABILITY ANALYSIS - PHASE ONE STUDY

Introduction: As an applicant for a permit with Napa County, It has been determined that Chapter 13.15 of the Napa County Code is applicable to approval of your permit. One step of the permit process is to adequately evaluate the amount of water your project will use and the potential impact your application might have on the static groundwater levels within your neighborhood. The public works department requires that a Phase 1 Water Availability Analysis (WAA) be included with your application. The purpose of this form is to assist you in the preparation of this analysis. You may present the analysis in an alternative form so long as it substantially includes the information required below. Please include any calculations you may have to support your estimates.

The reason for the WAA is for you, the applicant, to inform us, to the best of your ability, what changes in water use will occur on your property as a result of an approval of your permit application. By examining the attached guidelines and filling in the blanks, you will provide the information we require to evaluate potential impacts to static water levels of neighboring wells.

Step #1:

Provide a map and site plan of your parcel(s). The map should be an 8-1/2"x11" reproduction of a USGS quad sheet (1:24,000 scale) with your parcel outlined on the map. Include on the map the nearest neighboring well. The site plan should be an 8-1/2"x11" site plan of your parcel(s) with the locations of all structures, gardens, vineyards, etc in which well water will be used. If more than one water source is available, indicate the interconnecting piping from the subject well to the areas of use. Attach these two sheets to your application. If multiple parcels are involved, clearly show the parcels from which the fair share calculation will be based and properly identify the assessor's parcel numbers for these parcels. Identify all existing or proposed wells

Step #2: Determine total parcel acreage and water allotment factor. If your project spans multiple parcels, please fill a separate form for each parcel.

Determine the allowable water allotment for your parcels:

Parcel Location Factors

The allowable allotment of water is based on the location of your parcel. There are 3 different location classifications. Valley floor areas include all locations that are within the Napa Valley, Pope Valley and Carneros Region, except for areas specified as groundwater deficient areas. Groundwater deficient areas are areas that have been determined by the public works department as having a history of problems with groundwater. All other areas are classified as Mountain Areas.

Please underline your location classification below (Public Works can assist you in determining your classification if necessary):

Valley Floor	1.0 acre feet per acre per year
Mountain Areas	0.5 acre feet per acre per year
MST Groundwater Deficient Area	0.3 acre feet per acre per year

Assessor's Parcel Number(s)	Parcel Size (A)	Parcel Location Factor (B)	Allowable Water Allotment (A) X (B)
034-150-026	40 ac	1.0 (Valley Floor)	40 acre feet per year

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Step #3:

Using the guidelines in Attachment A, tabulate the existing and projected future water usage on the parcel(s) in acre-feet per year (af/yr). Transfer the information from the guidelines to the table below.

EXISTING USE:		PROPOSED USE:	
Residential	<u>1.05</u> af/yr	Residential	<u>1.05</u> af/yr
Farm Labor Dwelling	_____ af/yr	Farm Labor Dwelling	_____ af/yr
Winery	_____ af/yr	Winery	<u>0.22</u> af/yr
Commercial	_____ af/yr	Commercial	_____ f/yr
Vineyard*	<u>3.42</u> af/yr	Vineyard*	<u>3.42</u> af/yr
Other Agriculture	_____ af/yr	Other Agriculture	_____ af/yr
Landscaping	<u>0.13</u> af/yr	Landscaping	<u>0.29</u> af/yr
Other Usage (List Separately):		Other Usage (List Separately):	
<u>Employees</u>	_____ af/yr	<u>Employees</u>	<u>0.03</u> af/yr
<u>Visitors</u>	_____ af/yr	<u>Visitors</u>	<u>0.03</u> af/yr
<u>Events</u>	_____ af/yr	<u>Events</u>	<u>0.01</u> af/yr

TOTAL:	<u>4.60</u> af/yr	TOTAL:	<u>5.05</u> af/yr	TOTAL:	
	<u>1,500,000</u> gallons**	TOTAL:	<u>1,650,000</u> gallons**		


Is the proposed use less than the existing usage? Yes No Equal

Step #4:

Provide any other information that may be significant to this analysis. For example, any calculations supporting your estimates, well test information including draw down over time, historical water data, visual observations of water levels, well drilling information, changes in neighboring land uses, the usage if other water sources such as city water or reservoirs, the timing of the development, etc. Use additional sheets if necessary.

See attached sheet:

Conclusion: Congratulations! Just sign the form and you are done! Public works staff will now compare your projected future water usage with a threshold of use as determined for your parcel(s) size, location, topography, rainfall, soil types, historical water data for your area, and other hydrogeologic information. They will use the above information to evaluate if your proposed project will have a detrimental effect on groundwater levels and/or neighboring well levels. Should that evaluation result in a determination that your project may adversely impact neighboring water levels, a phase two water analysis may be required. You will be advised of such a decision.

Signature:  Date: 3-13-2015 Phone: (707) 252-3301



Residential – Primary and Secondary Residence – 0.75 + 0.3	= 1.05 af/yr
Vineyard – Irrigation only – (0.5af/ac-yr * 6.84 acres of vineyard) (see attached exhibit)	= 3.42 af/yr
Winery – Process Water – (2.15af/100,000 gal wine * 10,000 gal)	= 0.22 af/yr
Landscaping – Existing 41,000 gallons/year	= 0.13 af/yr
Landscaping – Proposed 95,000 gallons/year	= 0.29 af/yr

Winery Domestic Water

FT Employees – (2 @ 15gpd x 300 days/yr)	= 9,000 gpy
Harvest Employees – (2 @ 15gpd x 30 days/yr)	= 900 gpy
Visitors – (10 @ 3gpd x 365 days/yr)	= 10,950 gpy
Food & Wine Pairing Events – (25 @ 10gpd x 12 days/yr)	= 3,000 gpy
Total = 23,850 gpy	

Existing = (Residential + Vineyard + Landscaping) = (1.05 + 3.42 + 0.13) = **4.60 ac-ft/yr**

Proposed = (Residential + Vineyard + Winery + Landscaping + Employees + Visitors + Events)
= (1.05 + 0.22 + 3.42 + 0.29 + 0.03 + 0.03 + 0.01) = **5.05 ac-ft/yr**

Note 1: 50,000 gallons/yr of treated process wastewater will be used to irrigate 0.55 acres of vineyard.

Note 2: Landscape water demand from WELO analysis. (See attached exhibit.)

CHANTICLEER WINERY
VINEYARD AREA EXHIBIT
YOUNTVILLE CALIFORNIA



Vineyard Area
= 6.84 ac



GRAPHIC SCALE



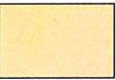

(IN FEET)
1 inch = 200 FT



1515 Fourth Street
Napoo, Calif. 94559
v 707.252.3501
f 707.252.4966

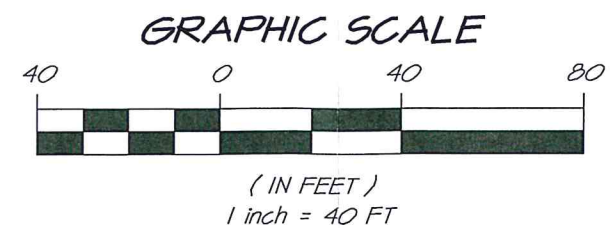
CHANTICLEER WINERY EXISTING LANDSCAPE AREAS YOUNTVILLE CALIFORNIA



Legend	Landscape Type	Area	Water Demand	Water Use [gal/yr] $\left(\frac{(0.62) [Area \times Demand]}{Efficiency} \right)$
	Natural Grasses	2,300 sq. ft	30% ETo = 0.3(44.3) = 13.3	27,000 gal/yr
	Trees & Shrubs	600 sq. ft	60% ETo = 0.6(44.3) = 26.6	14,000 gal/yr
Total	Combined	2,900 sq. ft		41,000 gal/yr



Given:

ETo = 44.3 in/yr (Yountville Reference)
Irrigation Efficiency = 71% (min)
Conversion Factor = 0.62



CHANTICLEER WINERY PROPOSED LANDSCAPE AREAS YOUNTVILLE CALIFORNIA



Legend	Landscape Type	Area	Water Demand	Water Use [gal/yr] $\left(\frac{(0.62) [Area \times Demand]}{Efficiency} \right)$
	Lawn	300 sq. ft	80% ETo = 0.8(44.3) = 35.4	9,000 gal/yr
	Trees & Shrubs	3,700 sq. ft	60% ETo = 0.6(44.3) = 26.6	86,000 gal/yr
Total	Combined	4,000 sq. ft		95,000 gal/yr

Given:

ETo = 44.3 in/yr (Yountville Reference)
Irrigation Efficiency = 71% (min)
Conversion Factor = 0.62

GRAPHIC SCALE

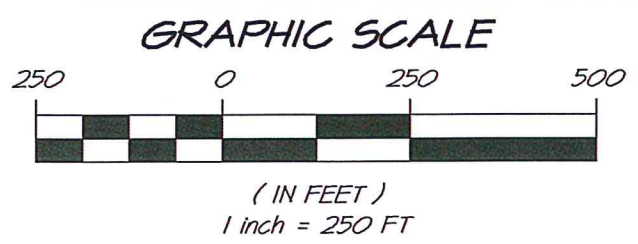
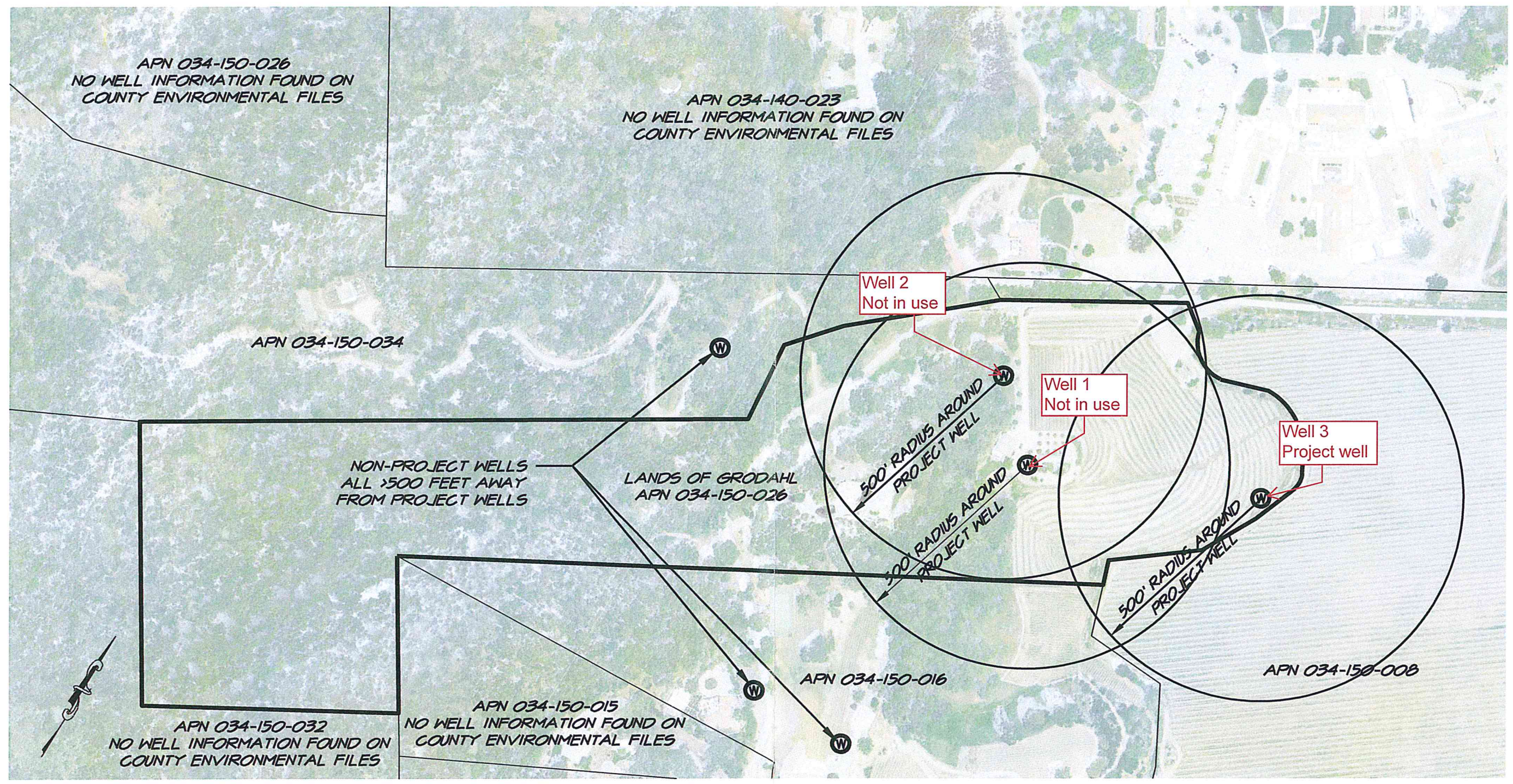


(IN FEET)
1 inch = 40 FT

CHANTICLEER WINERY

TIER 2 WATER AVAILABILITY ANALYSIS

WELL EXHIBIT



NOTE: NO NON-PROJECT WELLS WITHIN 500 FEET OF EXISTING PROJECT WELLS. TIER 2 WELL INTERFERENCE CRITERION IS PRESUMPTIVELY MET PER NAPA COUNTY WATER AVAILABILITY ANALYSIS (MARCH 2, 2015) SCREENING CRITERIA - TIER 2.

RSA⁺	1515 FOURTH STREET NAPA, CALIF. 94559 OFFICE 707 252.3301 + www.RSAcivil.com +
	est. 1980



WATER FEASIBILITY STUDY

CHANTICLEER WINERY
4 VINEYARD VIEW DRIVE
YOUNTVILLE, CALIFORNIA

APN 034-150-026

Prepared for:

George Grodahl
4 Vineyard View Drive
Yountville, CA 94559

#4112060.0
September 19, 2014



TECHNICAL CAPACITY

System Description

The owner is applying to the County of Napa for a Winery Use Permit that will allow operation of a 10,000 gallon per year winery. The Chanticleer Winery project is located at 4 Vineyard View Drive, Yountville, California. The APN is 034-150-026 and the parcel has an area of 40 +/- acres. The parcel is undeveloped woodland, range and vineyard. There is a main house and a guest house on the parcel. The main house is located on a knoll near the center of the parcel, and the guest house is located on a knoll on the northeast portion of the parcel. There is an existing barn which will be the site of the new winery. Two wells exist on the property near center of the parcel.

Two wells exist on the property, although one is not in use. Well 1 is east of the guest house and was drilled in 1998 by Pulliam Well Drilling. It has an annular seal of concrete to 22 feet and a 6" plastic casing to a depth of 500 feet. It is currently used for residential, irrigation, and fire protection. Well 2 is northwest of the guest house and was drilled in 2010 by Pulliam Well drilling. It has an annular seal of concrete to 52 feet and a 6" plastic casing to a depth of 500 feet. This well will be utilized for the 10,000 gallon per year winery.

The annual water usage for the entire property is estimated to be 1,337,000 gallons per year (4.1 acre-feet per year). See the Water Demand Analysis Report.

Well 2 will serve the winery. Water from well 2 will be filtered through a 5-micron filter and treated by ultra-violet light. No additional biological or chemical treatment will be performed on the well water unless quarterly testing results deem this treatment is necessary.

The winery will not require a public water system because it will serve less than 25 individuals daily, at least 60 days out of the year and will provide bottled water to customers and employees.

Projected Water Demand

The projected annual water demand including vineyard, winery, landscaping and residence is 1.4 MG, and the daily average demand is 3,800 gallons. Peak daily demand is estimated at 7,600 gallons per day being 200% of average daily demand.

Water Supply Capacity

The well drillers report for Well 1 estimates that the well can supply 70-gal/min after a 3 hour period. The well drillers report for Well 2 estimates that the well can supply 150-gal/min after a 2 hour period. The well driller's reports are on file at Napa County. Well 2 will be capable of supporting the proposed peak daily demand of 8,200-gal/day.

$$150 \text{ gpm} * 1440 \text{ min/day} = 216,000 \text{ gal/day} > 7,600 \text{ gal/day}$$

Source Adequacy

Well 2 is a Class 1A well with a 52 foot deep annular seal, and complies with Napa County Code 13.12.270.



MANAGERIAL

General

The owner of the water system will be the property owner of the parcel. The costs of operation will be covered in the winery operation costs. The owner will also hold the responsibility of water system manager for the property.

Operation and Maintenance

The following is a summary of the required Operations and Maintenance schedule:

Tasks	Frequency	Action
System Water Level	Daily	Visual Inspection
System Pressure and Conveyance	Daily	Visual Inspection
Water Tanks	Quarterly	Visual Inspection
Manually Operate Valves and Pumps	Quarterly	Operation

A certified distribution operator or treatment operator (T1 level or above) as specified by Chapter 13 of Title 22 CCR will be contracted by the owner and will be responsible for system repairs.

FINANCIAL

Below is a brief summary of the system's annual estimated financial capacity. Capital improvement costs, including installation of the treatment and distribution systems, are estimated to be a one-time expense of \$50,000, amortized over 20 years.

Capital Improvements: \$2,500

Power: \$2,000

Maintenance: \$2,500

Total: \$7,000

Projected Annual Gross Revenue: \$1,260,000 (Based on 4,200 cases at \$300/case)

Annual Operating Costs: \$1,008,000 (at 20% profit)

Percent of Total Operating Costs: 0.69%