WATER DEMAND ANALYSIS

Prepared for

SUMMERS ESTATES WINES

Site Address:
1171 Tubbs Lane
Calistoga, CA 94515

September 17, 2014
RSA Project # 4114023.0

1515 Fourth Street, Napa, CA 94559 (707) 252-3301 Ph. (707) 252-4966 Fax

TABLE OF CONTENTS

ATTACHMENTS

I. Executive Summary

The Summers Estates Wines project will produce a net reduction in annual water demand from 3.9 million gallons per year to 3.5 million gallons per year. Reductions in demand are due to reuse of treated process wastewater for vineyard irrigation, change in use for existing residence and removal of vineyards.

Demand Type	Existing Demand [gal/yr]	Proposed Demand [gal/yr]
Landscape Irrigation (WELO methodology)	114,000	131,000
Domestic (Wastewater Generation per Napa County Code)	64,000	24,000
Winery Process Water	250,000	500,000
Vineyard	3,490,000	3,360,000
Vineyard Irrigation with Treated Process Wastewater	-	-500,000
Totals (Gallons per Year)	**3,918,000**	**3,515,000**
Totals (Acre Feet per Year)	**12.0**	**10.8**

II. Purpose

This report is a project specific analysis of the water demand for Summers Estates Wines located at 1171 Tubbs Lane in Calistoga. It is intended to supplement the Napa County Water Availability Analysis - Phase One Study as included in Attachment 4. The APN for the property is 017-160-015. The properties current use is as a winery. The owner is proposing to increase production at the winery from 50,000 gal/year to 100,000 gal/year. This report will evaluate the existing and proposed water demand

III. Methodology

The water demand for the Summers Estates Wines project was analyzed by evaluating the existing and proposed demand for domestic use, winery process water, vineyard irrigation and landscape irrigation.

Domestic Use

Domestic wastewater volumes were used to determine the domestic water usage. Domestic water consumed is considered insignificant and irrigation water is analyzed separately so domestic water usage can be reasonably based on projected wastewater volumes.

The domestic wastewater volume was determined using the Napa County regulation for Design, Construction, and Installation of Alternative Sewage Treatment Systems (ASTS) – Table 4. The residential domestic wastewater volume is based on the number of bedrooms in the residence, in this case two and typical Napa County daily flow of 120 gallons/day/bedroom.

The winery domestic wastewater volume is determined by the number of staff and visitors on site; 15 gallons per day are allocated to each employee and 3 gallons per day are allocated to each visitor for tastings and 10 gallons per day if meals will be served to visitors during events.

A peaking factor of 2 was used to convert peak flows to average flows. This was based on a ratio of 2:25 to 1 for Maximum daily flow to average flow from Table 4.7, Water Supply and Pollution Control, Viessman and Hammer.

See the Wastewater flow tables in Attachment 1 for additional information regarding wastewater flows.

Winery Process Water

The process wastewater annual demand was based on the Napa County accepted standard of 5 gallons of wastewater per gallon of wine.

Vineyard Irrigation

The water demand for irrigation was analyzed based on accepted Napa County standards. The vineyard irrigation demand was determined by the methodology used in the Phase I water study. The demand of 0.5 acre-ft per year per acre of vineyard was used for typical vineyard irrigation. An additional demand of 0.25 acre-ft per year applies when irrigation is used for frost or heat protection. Refer to the Vineyard Area exhibits in Attachment 2.

Landscape Irrigation

The landscape irrigation was analyzed based on the methodology established in the Napa County Water Efficient Landscape Ordinance (WELO). The methodology evaluates specific plant species water demand in different regions of California based on field observations. The different species are then rated in for different categories according to their water demand. The ratings are very low (VL), Low (L), moderate (M), and high (H) demand. These ratings correspond to a water demand as a percentage of the total annual rainfall (ET_o) in the project area. The percentages are as follows:

Rating	Proposed Demand
VL	<10% ET_o
L	10% – 30% ET_o
M	40% – 60% ET_o
H	70% – 90% ET_o

Not all plant types will fit into these categories. In the WELO application turf grasses were listed separately and were given a demand equal to 80% of ET_o.

The water demand was calculated using a reference ET_o for St. Helena California of 44.1 in/yr. The area and demand of landscaping are multiplied together then divided by a minimum irrigation efficiency of 71% to find the total irrigation water demand. Refer to the Landscape Areas Exhibit in Attachment 3 for the landscape demands and areas.

IV. Analysis

Domestic Use

The project proposes to convert the existing residence into a tasting room. The existing residence is a two bedroom home. Per Napa County standards the domestic wastewater flow for the residence is 120 gallon per day per bedroom. Therefore, the existing residence generates 240 gallons per day or 42,800 gallons per year after peaking factor of 2 is applied. In addition to the residential domestic flows, the existing winery employees and visitation create additional domestic wastewater demand. The existing winery is permitted for 12 visitors a day and six employees. Also the winery has 8 events per year with 30 guests at each event. These additional winery domestic flows generate 19,740 gallons per year. The total existing domestic wastewater flow for the winery is 63,540 gallons per year.

The proposed domestic wastewater flows will be reduced from the existing condition because the residential flow will be eliminated. The winery domestic flows will not change significantly from the existing to the proposed condition because, the number of employees and events have not changed. The only change will come from the winery's additional visitors. The proposed water demand for the winery domestic wastewater is 24,120 gallons per year.

Winery Process Water

The proposed use permit modification for the Summers Estates Wines project will increase wine production from 50,000 gallons per year to 100,000 gallons per year. Based on the Napa County accepted standard of 5 gallons of wastewater per one gallon of wine, the existing winery's process water demand is 250,000 gallons per year. After the increase in production the proposed water demand would be 500,000 gallons per year.

Vineyard Irrigation

The water demand for the vineyard irrigation is given in the Phase I study as 0.5 ac-ft per year per acre. Irrigation water is not used for frost or heat protection. The existing winery has 21.3 acres of vineyards. Therefore, the demand for the existing vineyard is 10.7 ac-ft/yr or 3,490,000 gallons per year.

The proposed winery project will remove 0.7 acres of vineyard to allow construction of a barrel storage building. With the removal of vineyard, the proposed water demand for the vineyard will be 10.3 af/yr or 3,360,000 gallons per year.

In addition to removing vineyard the proposed project will also use the 500,000 gallons of treated process wastewater to irrigate the vines in order to further reduce the water demand for vine irrigation. The demand from wells for vineyard irrigation will be 2,860,000 gallons per year, a reduction of 530,000 gallons per year.

Landscape Irrigation

The water demand for landscaping around the facility was analyzed using the WELO methodology. The landscaping was broken into 5 distinct categories: Lawns, Flower Beds, Natural grasses, Oleander, and Trees. The lawns make up the majority of the water demand for irrigation. According to the WELO methodology, turf grasses need to receive 80 % of the ET_o. The lawns make up an area of 3,100 square feet and require 96,000 gallons per year. The 400 square feet of flower beds, which are mostly roses, were classified as having a moderate demand. They require 60% of the ET_o. This corresponded to a total demand of 9,000 gallons per year. The 200 square foot tree box in the parking lot is also classified as having moderate demand and requires 5,000 gallons per year. The 300 square feet of oleander around the facility is classified as having a low water demand. It requires 30% of the ET_o. This corresponds to a demand of 4,000 gallons per year. The total irrigation water demand for the existing conditions is 114,000 gallons.

The proposed irrigation demand incorporates all the existing landscape area with the addition of landscape areas being proposed by the winery project. The proposed project plans to construct an additional 300 square feet of flower beds near the proposed barrel storage building. These flower beds were assigned the moderate demand rating. The additional flower beds will require an additional 7,000 gallons per year. The total demand for all flower beds will be 16,000 gallons per year. In addition, the project proposes 900 square feet of natural grasses along the walkway that joins the existing residence to the proposed barrel building. These natural grasses are classified as having a low water demand. They require 30% of the ET_o. The natural grasses will have a demand of 10,000 gallons per year. With the existing demand and the additional proposed landscaping, the total irrigation water demand for the proposed conditions is 131,000 gallons.

V. Conclusion

The proposed project for Summers Estates Wines will result in a net reduction in annual water demand from 3.9 million gallons per year to 3.5 million gallons (12.0 to 10.8 acre feet) per year.

ATTACHMENT 1

Domestic Water Demand – Wastewater Flows

Attachment 1 - Domestic Water Demand

Summers Estates Wines - Existing Wastewater Flows

Use	Source	Number	Projected Peak Flow (gpd)	Total Flow No Event Day (gpd)	Total Flow Event Day 8 Events per year (gpd)	Annual Average Flow 50% of Peak (gpy)
WINERY	Full-time employees	2	15	30	30	5475
	Part-time employees	2	15	30	30	5475
	Harvest employees	2	15	30	30	900
	Visitors	12	3	36	36	6570
	Private Event w/ meals (catered)	30	10	0	300	1200
	Event Staff	2	15	0	30	120
Winery Subtotals				**150**	**480**	**19740**
Residence (# bedrooms)		2	120	**240**	**240**	**43800**
Grand Total				**390**	**720**	**63540**

Summers Estates Wines - Projected Wastewater Flows

Use	Source	Number	Projected Peak Flow (gpd)	Total Flow No Event Day (gpd)	Total Flow Event Day 8 Events per year (gpd)	Annual Average Flow 50% of Peak (gpy)
WINERY	Full-time employees	2	15	30	30	5475
	Part-time employees	2	15	30	30	5475
	Harvest employees	2	15	30	30	900
	Visitors	20	3	60	60	10950
	Private Event w/ meals (catered)	30	10	0	300	1200
	Event Staff	2	15	0	30	120
Winery Subtotals				150	480	
Grand Total				**150**	**480**	**24120**

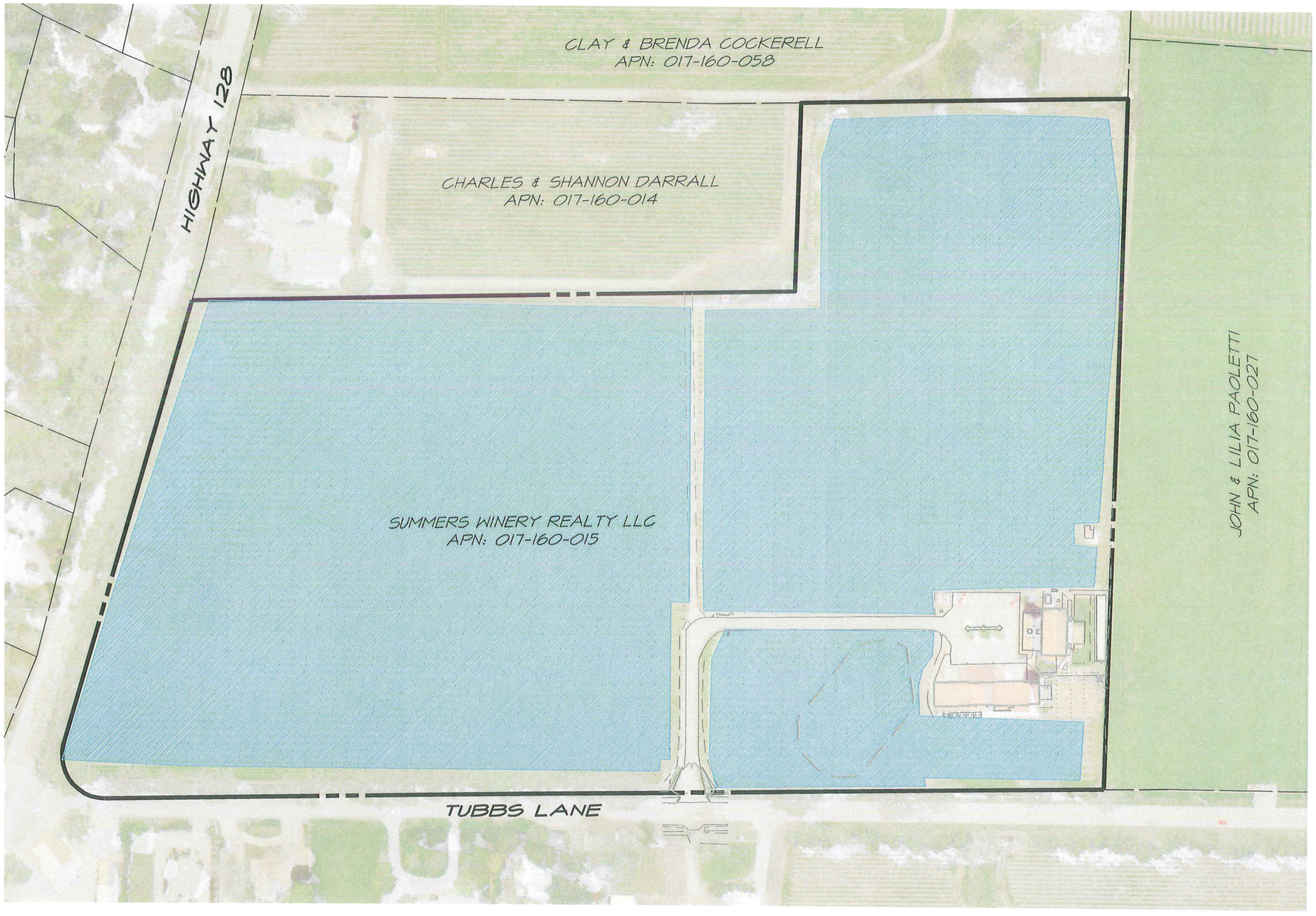
Notes:

1. 365 days of operation and visitors
2. 60 days of harvest
3. 8 events per year
4. Annual Average Flow = 50% of peak projected flow. Reference Viessman and Hammer, Water Supply and Pollution Control, Table 4.7 - Maximum Daily Flow to average flow ratio of 2.25:1. A ratio of 2:1 was conservatively adopted.

ATTACHMENT 2

Vineyard Area Exhibits

SUMMERS ESTATE WINES
EXISTING VINEYARD AREA
CALISTOGA CALIFORNIA



EXISTING VINEYARD AREA = 21.3 ACRES

GRAPHIC SCALE

150 0 150 300

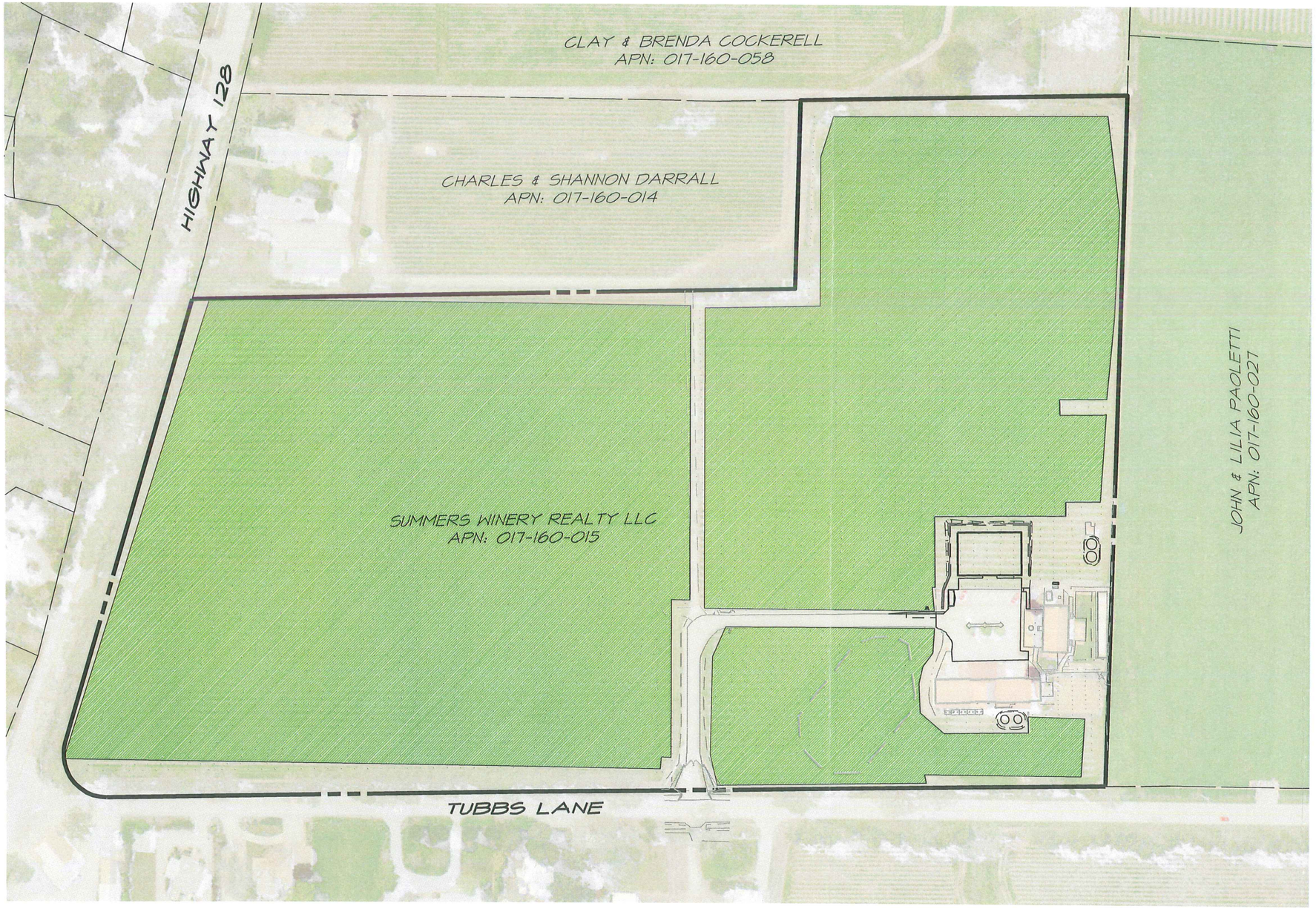
(IN FEET)
1 inch = 150 FT

CONSULTING CIVIL ENGINEERS
RIECHERS & SPENCE ASSOCIATES
1515 Fourth Street
Napa, Calif. 94559
v 707.252.3301
f 707.252.4966

JULY 2, 2014

4114023.0 Exh-Existing Vyd.dwg

SUMMERS ESTATE WINES
PROPOSED VINEYARD AREA
CALISTOGA CALIFORNIA



PROPOSED VINEYARD
AREA = 20.6 ACRES

GRAPHIC SCALE

150 0 150 300

(IN FEET)
1 inch = 150 FT

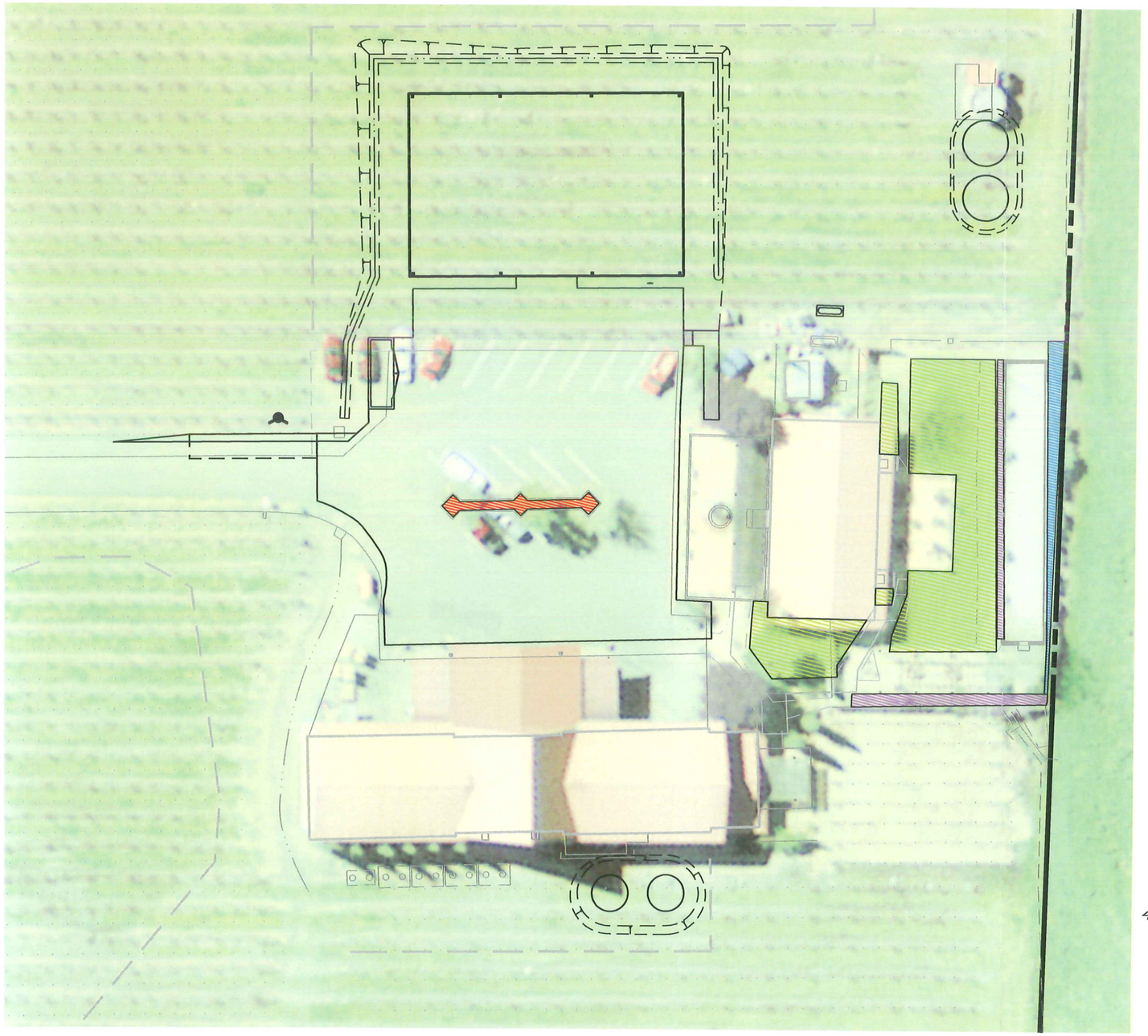
CONSULTING CIVIL ENGINEERS
RIECHERS SPENCE & ASSOCIATES
1515 Fourth Street
Napa, Calif. 94559
v 707.252.3301
f 707.252.4966

JULY 2, 2014
4114023.0 Exh-Proposed Vyd.dwg

ATTACHMENT 3

Landscape Areas and Irrigation Demand

SUMMERS ESTATE WINES
EXISTING LANDSCAPE AREAS
CALISTOGA CALIFORNIA



LEGEND	LANDSCAPE TYPE	AREA	WATER DEMAND	WATER USE [GAL/YR] = (0.62) [AREA x DEMAND] / EFFICIENCY
	LAWN	3,100 SF	80% ETo =0.8(44.1) = 35.3	96,000 GAL/YR
	FLOWER BED	400 SF	60% ETo =0.6(44.1) = 26.5	9,000 GAL/YR
	OLEANDER	300 SF	30% ETo =0.3(44.1) = 13.2	4,000 GAL/YR
	TREE BOX	200 SF	60% ETo =0.6(44.1) = 26.5	5,000 GAL/YR
TOTAL	COMBINED	4,000 SF		114,000 GAL/YR

GRAPHIC SCALE

40 0 40 80

(IN FEET)
1 inch = 40 FT

GIVEN:

ETo = 44.1 IN/YR (ST. HELENA REFERENCE)

IRRIGATION EFFICIENCY = 71% (MIN)

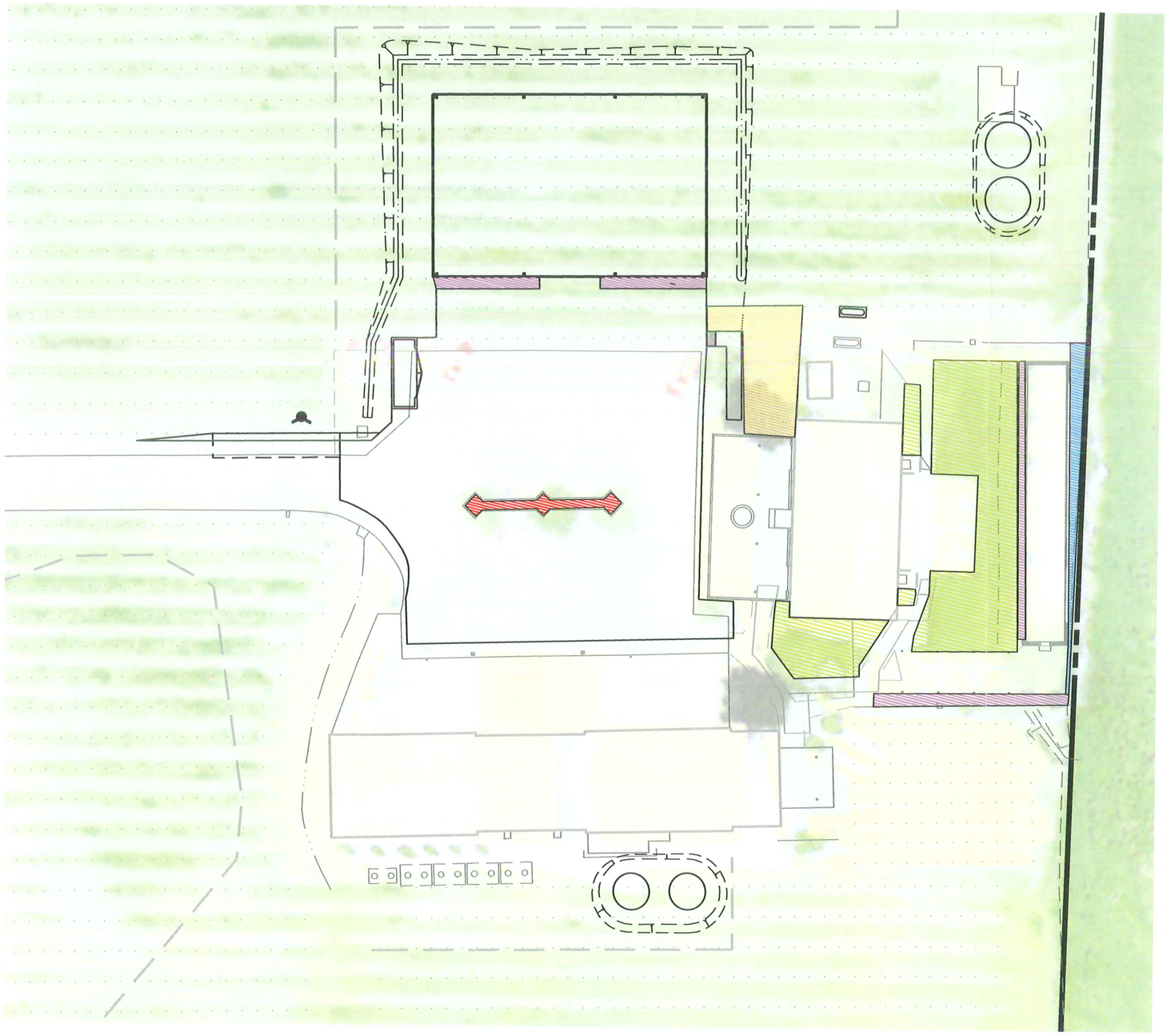
CONVERSION FACTOR = 0.62

CONSULTING CIVIL ENGINEERS
RIECHERS SPENCE ASSOCIATES
1515 Fourth Street
Napa, Calif. 94559
v 707.252.3301
f 707.252.4966

AUGUST 17, 2014

4114023.0 Exh-Exist Landscape.dwg

SUMMERS ESTATE WINES
PROPOSED LANDSCAPE AREAS
CALISTOGA CALIFORNIA



Legend	Landscape Type	Area	Water Demand	Water Use [gal/yr] $\left(\frac{(0.62)\,[\text{Area} \times \text{Demand}]}{\text{Efficiency}}\right)$
	Lawn	3,100 sq. ft	80% ETo =0.8(44.1) = 35.3	96,000 gal/yr
	Flower Bed	700 sq. ft	60% ETo =0.6(44.1) = 26.5	16,000 gal/yr
	Natural Grasses	900 sq. ft	30% ETo =0.3(44.1) = 13.2	10,000 gal/yr
	Oleander	300 sq. ft	30% ETo =0.3(44.1) = 13.2	4,000 gal/yr
	Tree Box	200 sq. ft	60% ETo =0.6(44.1) = 26.5	5,000 gal/yr
Total	Combined	5,200 sq. ft		131,000 gal/yr

Given:

ETo = 44.1 in/yr (St. Helena Reference)

Irrigation Efficiency = 71% (min)

Conversion Factor = 0.62

GRAPHIC SCALE

40 0 40 80

(IN FEET)
1 inch = 40 FT

CONSULTING CIVIL ENGINEERS
RIECHERS SPENCE ASSOCIATES
1515 Fourth Street
Napa, Calif. 94559
v 707.252.3301
f 707.252.4966

AUGUST 17, 2014
4114023.0 Exh-Prop Landscape.dwg

ATTACHMENT 4

Napa County Water Availability Analysis – Phase One Study

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)
017-160-015	25.3	1.0	25.3

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	0.5 af/yr	Residential	-- af/yr
Farm Labor Dwelling	-- af/yr	Farm Labor Dwelling	-- af/yr
Winery	1.33 af/yr	Winery	2.65 af/yr
Commercial	-- af/yr	Commercial	-- f/yr
Vineyard*	10.7 af/yr	Vineyard*	10.3 af/yr
Other Agriculture	-- af/yr	Other Agriculture	-- af/yr
Landscaping	-- af/yr	Landscaping	-- af/yr
Other Usage (List Separately):		Other Usage (List Separately):	
_____	-- af/yr	_____	-- af/yr
_____	-- af/yr	_____	-- af/yr
_____	-- af/yr	_____	-- af/yr
TOTAL:	12.5 af/yr 4,070,000 gallons**	TOTAL: TOTAL:	13.0 af/yr TOTAL: 4,240,000 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.

Existing Use : Residence 0.5 af/yr = 0.5 af/yr
: Winery 50,000 gal/yr @ 2.65 af/yr/100,000gal = 1.33 af/yr
: Vineyard 21.3 ac @ 0.5 af/yr/ac = 10.7 af/yr
12.5 af/yr

Proposed Use : Winery 100,000 gal/yr @ 2.65 af/yr /100,000 gal = 2.65 af/yr
: Vineyard 20.6 ac @ 0.5 af/yr/ac = 10.3 af/yr
13.0 af/yr

Proposed demand will be reduced by use of treated process wastewater for vineyard irrigation.

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:** 7/03/14 **Phone:** 707 252-3301