“G”

Water Availability Analysis

Dakota Shy Winery, Use Permit Major Modification
Application No. P19-00131-MOD
Planning Commission Hearing, February 17, 2021

BARTELT ENGINEERING

WATER AVAILABILITY ANALYSIS FOR THE DAKOTA SHY WINERY 771 SAGE CANYON ROAD, NAPA COUNTY, CA APN 030-120-024

As required by Napa County Planning, Building & Environmental Services (PBES), this study outlines the availability of groundwater for an existing winery located at 771 Sage Canyon Road, Napa County, CA.

PROJECT DESCRIPTION

It is our understanding that Dakota Shy Winery is proposing to increase both the wine production limit from 14,000 gallons per year to 20,000 gallons per year and the number of private tours and tastings visitors from 20 per day to 48 per day. The approved marketing plan events are also being proposed to be modified at this time. The Applicant intends to add one (1) Large Event at the winery per year for 125 guests. Refer to Use Permit #P14-00335-UP and #P14-00336-VAR for additional information on approved uses. The project further proposes to keep an existing olive orchard that was approved to be removed and replaced with vineyard under #P14-00335-UP. This analysis evaluates the available water for the subject parcel to support the proposed project per Napa County PBES guidelines.

Table 1 summarizes the approved and proposed staffing plan:

TABLE 1: STAFFING PLAN SUMMARY

Description	Number of Employees	
	Approved	Proposed
Full-time Employees	6	7
Part-time Employees	2	0
Harvest/Seasonal Employees	2	3

Table 2 summarizes the approved and proposed marketing plan:

TABLE 2: MARKETING PLAN SUMMARY

Description	Number of Guests		Event Staff	Frequency
	Approved	Proposed		
Tour & Tasting Visitors	20 per day	48 per day	0 per day	Daily
Wine Club / Release Events	40 per day	40 per event	3 per event	2 per year
Large Event	NA	125 per event	6 per event	1 per year

EXHIBITS

The USGS "Topographic Site Location Information" included in the Use Permit Modification Application package shows the project site and approximate property line locations. Information regarding the location of the existing well and structures are shown on the Use Permit Modification Drawings and the attached "Well Location Exhibit". All exhibits and drawings mentioned above were prepared by Bartelt Engineering.

WATER USE CRITERIA

TABLE 3: GROUNDWATER OVERVIEW	
Parcel Zoning	Agricultural Watershed (AW)
Project Parcel Location	All Other Areas
Parcel Size	6.0 ± acres
Water Use Criteria	Parcel specific
Well and Spring Interference	No
Groundwater/Surface Water Interaction	No
Screening Tier	Tier 1

As summarized in Table 3 Groundwater Overview, the subject parcel is located in the Agricultural Watershed (AW) Zoning District. Per the PBES Water Availability Analysis (WAA)-Guidance Document dated May 12, 2015, the water use criteria for a parcel located in "All Other Areas" that are not designated as a groundwater deficient area without any well or spring interference must follow Tier 1 requirements.

SOURCE WATER INFORMATION

The subject parcel contains two (2) groundwater wells. A description of each water source is summarized below:

- The existing domestic (winery) well is located near the winery building on the southerly side of the subject parcel and is used for domestic, fire, and process water uses.

- The existing irrigation well is located near Sage Canyon Road on the northeasterly side of the subject parcel near the property line and is currently used for irrigation water uses only.

Changes to the existing water sources are not being proposed at this time. Refer to the Technical, Managerial and Financial (TMF) Capacity worksheet for additional information on the existing water system and proposed modifications included with the Use Permit Modification Application.

Well Description

The existing domestic (winery) well was drilled by McClean & Williams, Inc. in 2014 and has a recorded state well number of e0239406. The domestic well has a reported completion depth of 380 feet with a 69 foot cement annular seal. Static water was observed at 54 feet below ground surface at the time of drilling.

Information regarding the existing irrigation well is unknown at this time.

Well Yield Information

A yield test was performed on the domestic well by McClean & Williams, Inc. on March 5, 2016. Prior to the start of the yield test, static water level was recorded at 26 feet below surface. A sustained yield of 20 gpm was recorded after eight (8) hours of continuous pumping. Static water levels recovered to 52 feet below surface after nine (9) hours of rest.

Water System Classification

The water system at Dakota Shy Winery is permitted as a state regulated Public Water System (PWS)[1] and classified as a transient non-community (TNC) public water system because it serves less than five (5) connections, serves less than 25 yearlong residents[2], and serves 25 people per day at least 60 days per year, but does not serve 25 or more of the same people for at least 6 months out of a year. The water system classification will not change as part of this Use Permit Modification Application.

Neighboring Water Source(s)

Based on review of neighboring property records at Napa County PBES and discussions with PBES staff, potential well interference may occur with an existing well located on APN 030-120-031. Due to the low pumping rate of the subject parcel domestic well and a separation distance of 430±, pumping of the domestic winery well is not anticipated to negatively impact the neighboring well; therefore, a well inference analysis is not being performed.

Refer to the attached "Well Location Map" prepared by Bartelt Engineering for the location of the existing onsite wells and neighboring wells.

Water Quality

Raw water was collected from the domestic well and analyzed by Analytical Sciences, an accredited lab located in Petaluma, CA per the California Code of Regulations Title 22. In general, the results do not show any primary constituents testing above the maximum contaminant level. Elevated Iron and Manganese levels above the secondary standard contaminant level were also reported. Water quality results are on file with Napa County PBES as part of the Public Water System Permit with the State of California Drinking Water Program.

[1] The public water system source code number is 2800064; refer to the public water system permit for additional information.
[2] Yearlong resident is considered an individual served by the water system for 183 or more days annually.

GROUNDWATER SUBAREA

According to the Napa County Watershed Information & Conservation Council (WICC), the subject parcel is primarily located within the Napa Valley Floor – St. Helena groundwater subarea with a portion of the subject parcel also located within the Eastern Mountains groundwater subarea. The Napa Valley Floor – St. Helena groundwater subarea consists of 12,274± acres and the Eastern Mountains groundwater subarea consists of 80,577± acres.

WATERSHED INFORMATION

The subject parcel is located within the Lower Reach of the Conn Creek Watershed which is not considered a municipal watershed. The Conn Creek-Lower Reach Watershed consists of 5,219± acres.

GEOLOGICAL FEATURES

According to the Soil and Geology Map located on the WICC website, the subject parcel and surrounding areas appear to be underlain with the following:

- Surficial-Terrace Deposits
- Sonoma Volcanic-Sedimentary Deposits
- Late Tertiary Assemblages-Andesitic to Basaltic Lava Flows

WATER DEMAND

Estimated Water Use

The total water demand for the existing and proposed uses for the project is calculated based on the *Guidelines for Estimating Residential and Non-residential Water Use* from the WAA Guidance Document (2015), project wastewater flowrates[3], and the estimated landscape irrigation water usage[4]. The existing and proposed water demands are summarized below:

The Existing Water Demand = 0.53 acre-feet per year

The Proposed Water Demand = 0.72 acre-feet per year

Refer to the attached tables for additional information.

The proposed water demand is anticipated to increase slightly as a result of an increase in wine production and private visitation.

[3] Refer to the Onsite Wastewater Dispersal Feasibility Study for Dakota Shy Winery prepared by Bartelt Engineering for additional information on wastewater calculations.

[4] Site landscape irrigation information (which includes the winery, residences, and olive orchard) was provided by the owner and is based on the number of irrigation emitters and the irrigation schedule.

The owner has also provided water meter data for the domestic (winery) well from December 1, 2017 through December 1, 2020. Based on the data, the winery uses between 163,750± gallons and 203,100± gallons per year, or 0.50 acre-feet to 0.62 acre-feet per year. The owner has also provided an estimate of 29,000 gallons per year, or 0.09 acre-feet per year, for landscape irrigation of the olive trees and site/residential landscape. The landscape irrigation estimate is based on the number of irrigation emitters installed and the operating irrigation schedule. All landscape irrigation water is supplied from the irrigation well. Based on the available water meter reading provided by the owner, the actual water used by the winery and for irrigation is within the range of the calculated value.

ESTIMATED GROUNDWATER RECHARGE

Water flowing into the ground consists primarily of recharge from precipitation, surface water seepage, and artificial recharge. Water flowing out of the ground primary involves extraction from wells, spring discharge, and evapotranspiration. In Napa County, precipitation has been established as the primary source of groundwater (Kunkel and Upson, 1960). Direct infiltration from rainfall is likely to be the most significant factor for groundwater recharge. Without having site recorded data showing the change in groundwater, this analysis models groundwater recharge as a percent of rainfall. The amount of rainfall that is estimated to recharge groundwater is impacted by a number of factors. Some of these factors include location, precipitation, soil properties, and underlain geological materials.

Precipitation

Precipitation, or rainfall, data used in this analysis is taken from the PRISM Climate Group at Oregon State University and the National Climate Data Center (NCDC). The PRISM Climate Group provides spatial climate datasets for selected 800 meter or 400 kilometer (km) resolution grid cell(s). The average annual recorded rainfall from 1981-2010 (30-year normals) for the project location selected from one (1) 800 meter resolution cell is 34.8 inches. Refer to the attached Table III – Rainfall for additional information.

Average rainfall data from PRISM recorded over the past ten (10) years provides more recent rainfall data and shows variation between drier and wetter years. The 10-year average (2007 to 2017) from a 400 km resolution meter grid cell, which includes the project location, is 31.7 inches. Based on rainfall data, it appears rainfall outside of the normal trend occurred in 2013 (a drought year) and 2010 (a very wet year). A typical dry year occurred in 2007 with 19.3 inches of recorded rainfall and a typical wet year occurred in 2017 with 46.7 inches of recorded rainfall. Refer to the attached Table III – Rainfall for additional information.

Sub Watershed Comparison for Estimating Recharge Rate

Groundwater recharge for the subject parcel is estimated by comparing the recharge rate as a percentage of precipitation to the results from the "Updated Hydrogeologic Conceptualization and Characterization of Conditions" (Luhdhorff & Scalmanini, 2013). This analysis uses the larger data set average of 30-year normal precipitation values for estimating groundwater recharge.

The Napa River watershed water balance was conducted at several subareas throughout Napa Valley. The subject parcel is primarily located within the Napa River watershed St. Helena subarea. Data for this subarea was collected from 1940 to 1994 on a monthly time-step basis at stream gauging stations. The Napa River watershed water balance analysis included precipitation, Napa River stream flow, soil infiltration (included precipitation minus runoff), and evapotranspiration (ET) for various types of land use. The estimated groundwater recharge is represented by the difference between infiltration and ET.

The results from the water balance analysis, shown in *Table 8-9 Summary of Water Balance Model Results* (Luhdhorff & Scalmanini, 2013), concluded that 14% of precipitation is available for groundwater recharge in the St. Helena sub-watershed. The volume of rainwater that is estimated to be available for groundwater recharge is calculated below:

Annual recharge (acre-feet) = Subject Parcel Area (acres) x Precipitation (ft) x Recharge rate

= 6.0 acres x (34.8 in x 1 ft/12 in) x 14%

= 2.4 acre-feet

The estimated available water for the subject parcel is calculated to be 2.4 acre-feet per year.

CONCLUSION

The above analysis shows that the groundwater demand from the proposed project is less than the subject parcel water allotment and the estimated available water for the subject parcel satisfies the Tier 1 Water Use Criterion of the Napa County Water Availability Analysis.

ATTACHMENTS

Topographic Site Location Map

Well Location Exhibit

Table I – Existing Water Demand

Table II – Proposed Water Demand

Table III – Rainfall

Table IV – Winery Process and Domestic Water Demand Calculations

Dakota Shy Water Use, Monthly Readings and Annual Totals

REFERENCES

Brownstein Hyatt Farber Schreck. (2011, August 25). Water Supply Assessment for the Napa Pipe Project Napa County, California.

DHI Water Environment. (2005 - Version 1, November 30). Napa County Baseline Data Report. Chapter 16. Groundwater Hydrology.

Johnson, A. (1967). Specific Yield - Completion of Specific Yields for Various Materials. California Department of Water Resources. Geological Survey Water Supply Paper 1662-D.

Luhdhorff & Scalmanini. (2014). Water Availability Analysis for the Wools Ranch Winery Project, Napa County.

Luhdhorff & Scalmanini Consulting Engineers and MBK Engineers. (January 2013). *Updated Hydrogeological Conceptualization and Characterization of Conditions Prepared for Napa County.*

Napa County. (2015, May 12). Water Availability (WAA) - Design, Construction and Guidance Document.

Napa County Watershed Information & Conservation Council (WICC). (n.d.). Retrieved from www.napawatershed.org

National Climate Data Center (NCDC). (1995). Retrieved from www.worldclimate.com

PRISM Climate Group, Oregan State University. (2014). Retrieved from http://prism.oregonstate.edu

Santa Rosa Plan Basin Advisor Panel. (2014). Santa Rosa Watershed Groundwater Management Plan.

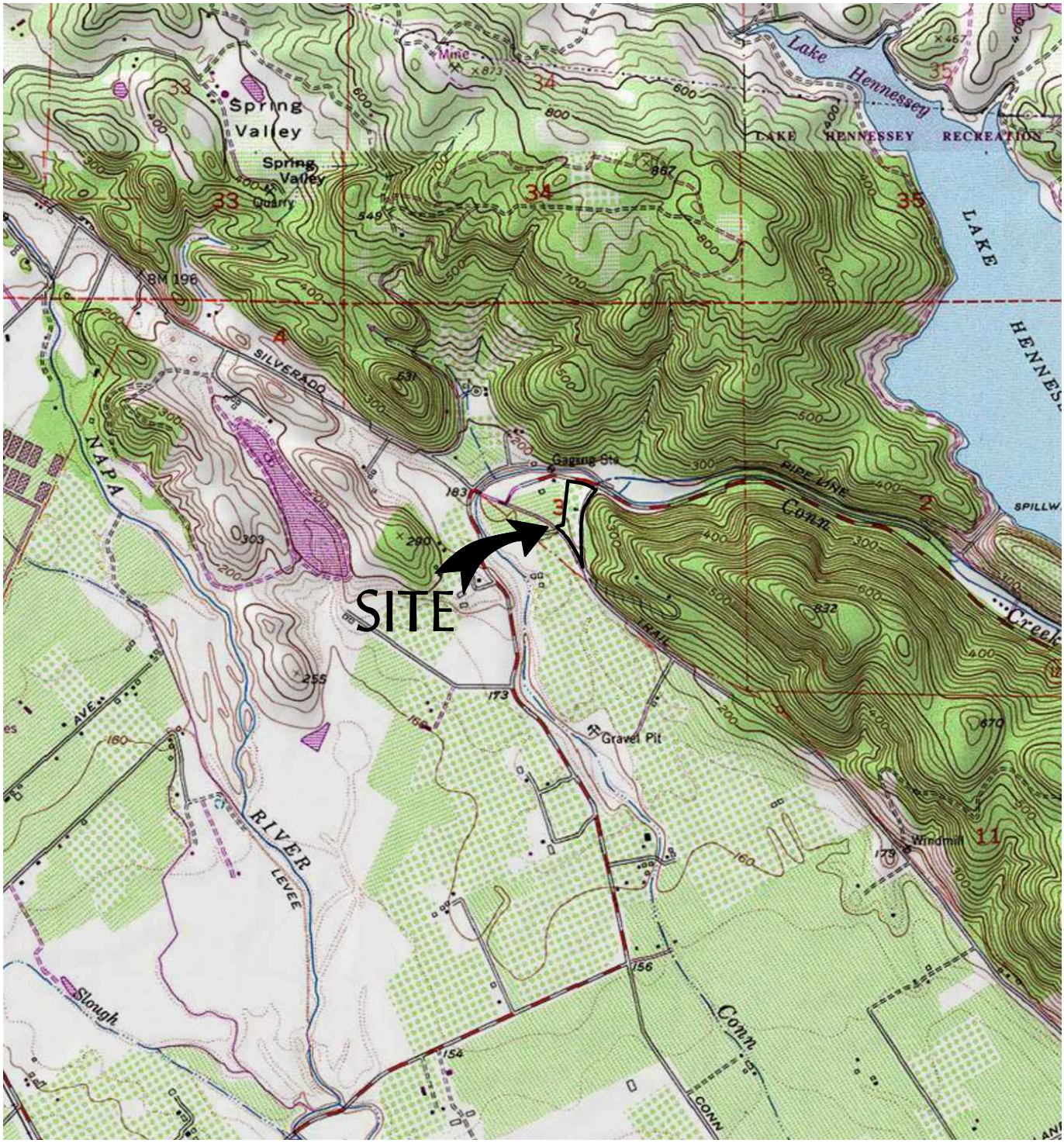
Stamski, R. (2007). Geologic map and map database of eastern Sonoma and western Napa Counties, California. U.S. Geological Survey Scientific Investigations Map 2956.

United States Geological Survey (USGS). (1960). Geology and Ground Water in the Napa and Sonoma Valleys, Napa and Sonoma Counties, California. *US Geological Survey Water Supply Paper 1495*.

TOPOGRAPHIC SITE LOCATION INFORMATION

USGS 7.5 MINUTE QUADRANGLE "RUTHERFORD"

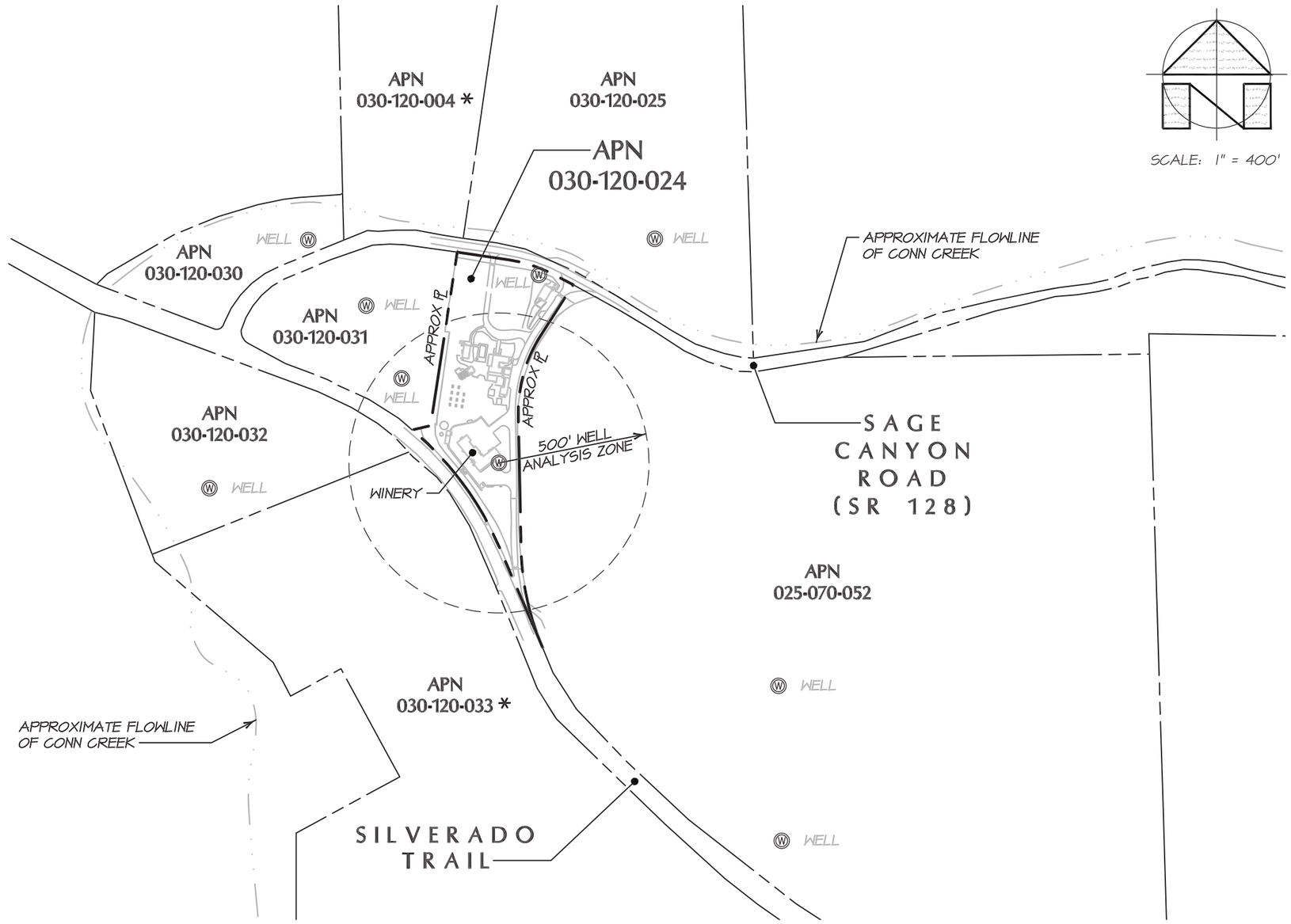
Scale: 1" = 2000'



BARTELT ENGINEERING
CIVIL ENGINEERING · LAND PLANNING
1303 Jefferson Street, 200 B, Napa, CA 94559
www.barteltengineering.com
· Telephone: 707-258-1301 ·

Dakota Shy Winery
771 Sage Canyon Road
St. Helena, CA
APN 030-120-024

Job No. 14-02



NEIGHBORING
WELL LOCATION EXHIBIT

SCALE: 1" = 400'

NOTES:

* NO RECORDED WELL INFORMATION FOUND FOR THIS PARCEL.

WELL LOCATIONS ARE APPROXIMATE AND ARE BASED ON DATA OBTAINED FROM NAPA COUNTY ENVIRONMENTAL HEALTH DIVISION RECORDS. WELL LOCATION RECORDS VARY IN ACCURACY. LOCATION OF WELLS SHOULD BE FIELD VERIFIED.

BARTELT ENGINEERING
CIVIL ENGINEERING · LAND PLANNING
1303 Jefferson Street, 200 B, Napa, CA 94559
www.barteltengineering.com
· Telephone: 707-258-1301 ·

Dakota Shy Winery
771 Sage Canyon Road
St. Helena, CA 94574
APN 030-120-024
Job No. 14-02
January 2021
Sheet 1 of 1

DAKOTA SHY WINERY
Existing Water Demand
Table I

Winery Production Limit: 14,000 gallons/year

EXISTING WATER DEMAND		
Description	**Water Usage Rate[1]**	**Water Demand (acre-feet/year)**
Residential		
Primary Residence[3]	0.75 acre-feet/acre-year	-
Secondary Residence[3] or		
Farm Labor Dwelling	0.5 acre-feet/acre-year	-
Landscaping[4]		0.0890
Agricultural		
Vineyards		
Irrigation Only	0.48 acre-feet/acre-year	-
Heat Protection	0.25 acre-feet/acre-year	-
Frost Protection	0.25 acre-feet/acre-year	-
Irrigated Pastures	4 acre-feet/acre-year	-
Orchards	4 acre-feet/acre-year	-
Livestock (sheep or cows)	0.01 acre-feet/acre-year	-
Winery		
Process Water[2]	1.84 acre-feet/100,000 gallon of wine	0.2576
Domestic[2]	1.30 acre-feet/100,000 gallon of wine	0.1820
Landscaping	0.25 acre-feet/100,000 gallon of wine	-
Industrial		
Food Processing	31 acre-feet/employee-year	-
Printing/Publishing	0.6 acre-feet/employee-year	-
Commercial		-
Office Space	0.01 acre-feet/employee-year	-
Warehouse	0.05 acre-feet/employee-year	-
	Estimated Existing Water Demand (acre-feet/year):	**0.5286**
	Estimated Existing Water Demand (gallons/year):	**172,244**

Notes:

1) Water usage rates referenced from *Appendix B: Estimated Water Use of Specified Land Use from Napa County WAA-Guidance Document (2015).*
2) Refer to the Onsite Wastewater Feasibility Study prepared by Bartelt Engineering for additional information on winery process and domestic water usage and Table IV.
3) The Primary and Secondary Residences are sourced from the City of Napa Municipal Water System and not from the onsite domestic winery well.
4) Residential landscape irrigation information was provided by the owner and is based on the number of irrigation emitters and irrigation schedule.

DAKOTA SHY WINERY
Proposed Water Demand
Table II

BARTELT ENGINEERING

Winery Production Limit: 20,000 gallons/year

PROPOSED WATER DEMAND			
Description		**Water Usage Rate[1]**	**Water Demand (acre-feet/year)**
Residential			
Primary Residence[2]	0.75	acre-feet/acre-year	-
Secondary Residence or Farm Labor Dwelling[2]	0.5	acre-feet/acre-year	-
Landscaping[4]			0.0890
Agricultural			
Vineyards			
Irrigation Only	0.48	acre-feet/acre-year	-
Heat Protection	0.25	acre-feet/acre-year	-
Frost Protection	0.25	acre-feet/acre-year	-
Irrigated Pastures	4	acre-feet/acre-year	-
Orchards	4	acre-feet/acre-year	-
Livestock (sheep or cows)	0.01	acre-feet/acre-year	-
Winery			
Process Water[3]	1.84	acre-feet/100,000 gallon of wine	0.3686
Domestic[3]	1.30	acre-feet/100,000 gallon of wine	0.2599
Landscaping	0.25	acre-feet/100,000 gallon of wine	-
Industrial			
Food Processing	31	acre-feet/employee-year	-
Printing/Publishing	0.6	acre-feet/employee-year	-
Commercial			-
Office Space	0.01	acre-feet/employee-year	-
Warehouse	0.05	acre-feet/employee-year	-
Estimated Proposed Water Demand (acre-feet/year):			**0.7175**
Estimated Proposed Water Demand (gallons/year):			**233,793**

Notes:

1) Water usage rates referenced from *Appendix B: Estimated Water Use of Specified Land Use from Napa County WAA-Guidance Document (2015) unless stated otherwise.*
2) The Primary and Secondary Residences are sourced from the City of Napa Municipal Water System and not from the onsite domestic winery well.
3) Refer to the Onsite Wastewater Feasibility Study prepared by Bartelt Engineering for additional information on winery process and domestic water usage and Table IV.
4) Residential landscape irrigation information was provided by the owner and is based on the number of irrigation emitters and irrigation schedule.

AVERAGE MONTHLY RAINFALL RATES	
Month	**PRISM Rainfall[1]** (inches)
September	0.3
October	1.7
November	3.9
December	6.9
January	6.7
February	7.0
March	4.9
April	2.0
May	1.0
June	0.2
July	0.0
August	0.1
TOTALS	**34.8**

10-YR AVERAGE RAINFALL	
Year	**PRISM Rainfall[2]** (inches)
2017	46.7
2016	41.6
2015	16.0
2014	38.2
2013	6.7
2012	43.9
2011	32.4
2010	49.3
2009	27.9
2008	26.6
2007	19.3
AVERAGE	**31.7**

Notes:

1) PRISM 30-year normall rainfall data from 1981-2010 from one (1) 800 m^2 spatial grid that emcompass the total project area; see http://prism.oregonstate.edu/
2) PRISM yearly rainfall data from 2007-2017 from one (1) 400 km spatial grid that encompasses the total project area; see http://prism.oregonstate.edu/

DAKOTA SHY WINERY
Proposed Winery Process and Domestic
Water Demand Calculations
Table IV

BARTELT ENGINEERING

WINERY PROCESS WATER USAGE

Winery Process Water Usage (harvest period)]	= Winery Process Wastewater Flow (gpd) x Harvest Period (days)					
	= 1,000 gpd	x	30 days	=	30,000 gallons	
Winery Process Water Usage (non-harvest period)]	= Winery Process Wastewater Flow (gpd) x Non-Harvest Period (days)					
	= 269 gpd	x	335 days	=	90,115 gallons	

Estimated Process Water Use (gallons/year) **= 120,115**
Estimated Process Water Use (acre-feet/year) **= 0.3686**

WINERY DOMESTIC WATER USAGE

Employee Water Usage	= (Employee gpd) x Average Working Days/Year					
Harvest	= 150 gpd	x	30 days	=	4,500 gallons/year	
Non-Harvest	= 105 gpd	x	261 days	=	27,405 gallons/year	
Tour & Tasting Visitor Water Usage	= Max Tour & Tasting gpd x Total Days/Year					
	= 144 gpd	x	362 days	=	52,128 gallons/year	
Wine Club / Release Events Water Usage	= Event Wastewater Flow x Number of Events/Year					
	= 165 gpd/event	x	2 events/year	=	330 gallons/year	
Large Events Water Usage	= Event Wastewater Flow x Number of Events/Year					
	= 315 gpd/event	x	1 events/year	=	315 gallons/year	

Estimated Domestic Water Use (gallons/year) **= 84,678**
Estimated Domestic Water Use (acre-feet/year) **= 0.2599**

Dakota Shy Water Use

Date	Meter	Gallons	Monthly Use	Notes
11/1/2017	810.27	81027		August filled 60,000 gal fire system; Sept about 11,000; October about 10,000.
12/1/2017	894.5	89450	8423	
1/1/2018	987.5	98750	9300	
2/3/2018	1089	108900	10150	
3/2/2018	1164	116400	7500	
4/12/2018	1302	130200	13800	
5/4/2018	1365	136500	6300	
6/1/2018	1429	142900	6400	
7/1/2018	1509	150900	8000	
8/6/2018	1574	157400	6500	
9/3/2018	1694	169400	12000	
10/1/2018	1996	199600	30200	
11/1/2018	2350	235000	35400	
12/1/2018	2451	245100	10100	
1/1/2019	2532	253200	8100	
2/1/2019	2647	264700	11500	Bottling
3/1/2019	2762	276200	11500	Bottling
4/1/2019	2882	288200	12000	Bottling and 2018 racking
5/1/2019	2982	298200	10000	2018 racking
6/3/2019	3077	307700	9500	Bottling and Racking
7/1/2019	3168	316800	9100	
8/1/2019	3259	325900	9100	
9/3/2019	3431	343100	17200	2018 Racking
10/3/2019	3653	365300	22200	Harvest
11/1/2019	4141	414100	48800	Harvest
12/2/2019	4381	438100	24000	
1/1/2020	4444	444400	6300	
2/1/2020	4506	450600	6200	
3/1/2020	4646	464600	14000	Bottling
4/1/2020	4738	473800	9200	Racking
5/1/2020	4891	489100	15300	Bottling and racking
6/1/2020	4987	498700	9600	
7/1/2020	5044	504400	5700	
8/1/2020	5181	518100	13700	Racking and blending
9/1/2020	5286	528600	10500	Racking and blending
10/1/2020	5566	556600	28000	Harvest
11/1/2020	5720	572000	15400	Harvest
12/1/2020	5797	579700	7700	

Annual Totals