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2024 Water Availability Analysis -
P22-00212-ECP
(includes original 2022 WAA)

ATTACHMENT 8D:

Sebastien Marineau-Mes Vineyard Water Availability Analysis (WAA)

Includes: Attachment D Form

June 13, 2022

REVISED June 25, 2024

Property Owner:

Sebastien Marineau-Mes
619 Diamond St
San Francisco, CA 94114

Prepared By:

Sarah Pistone, CPESC #9225
HDVine LLC
Santa Rosa, CA 95403

Site Map:

See attached Water Availability Map

Background:

The subject site is located at 4000 Silverado Trail, Calistoga, CA, 94515, APN 021-010-077. Parcel size is 5.67 (based on Adobe Associates, Inc., Lot Line Adjustment Map, May 25, 2021). The parcel contains about $\frac{3}{4}$ ac of existing vineyard. The central portion of the parcel is planned for a residence. The upland portion of the site is steepest at the top (eastern) end. Vegetation was heavily impacted by the 2020 Glass Fire. Soils in the project area are 109, Boomer gravelly loam, volcanic bedrock, which is described as well-drained soils on uplands derived from weathered mixed igneous rocks (HSG=C) [2]. Plant cover is typically Douglas-fir, ponderosa pine, black oak, manzanita, poison oak, and madrone. The closest blueline stream is Dutch Henry Creek, located about 650 ft west of the development area.

The Napa County Electronic Document Retrieval site was reviewed for well log files for the subject site and adjacent parcels within the 500 ft radius. Wells within the 500 ft radius were identified for the neighboring parcel about 440 ft to the north (APN 021-010-076), see WAA Vicinity Map. Many electronic well documents were reviewed for neighboring parcels, but no other wells were identified within the 500 ft radius. Any wells outside the 500 ft radius depicted on the WAA map should be considered *approximate* locations for schematic purposes only.

Parameters of wells pertinent to this project review are summarized in TABLE 1.

TABLE 1 Well Information

APN	Year	Status	WH Elev ft asl	Casing Diam. in	Flow Rate GPM	Annular Seal ft: type	Total Depth ft bg	Screened Interval ft bg
021-010-077	2012	In use "Upper Well" (future vineyard & residence)	318	5	22.5 ¹	0-50: cement	340	200 – 220 and 260 – 340
021-010-077	2001	In use "Lower Well" (existing residence)	303	6	10 ²	0-24: cement	340	120 – 300 and 320 – 340
021-010-076	2014	In use (existing residence)	314	5	13 ³	0-5: cement 5-22: bent. chips	100	30 – 80
¹ Well pump test by Ray's Well Testing Service Inc., 8/11/21 ² Well pump test by McLean & Williams, 8/14/13 ³ Air Lift test at time of drilling by McLean & Williams, 4/10/01								

Due to the proximity of one neighboring well, a review of potential drawdown impacts was conducted. The Water Availability Analysis (WAA) Guidance Document (Adopted May 12, 2015), presents results that show wells pumping less than 30 gpm for periods less than 24-consecutive hours will likely have negligible drawdown at distances beyond 25 ft in a confined aquifer (pg 35).

A recent well test (by Ray's Well Testing Service Inc., 8/11/21) recorded a stabilized flow rate of 22.5 GPM for the subject site's "Upper Well" that is proposed for use in the new vineyard. No irrigation sets would exceed a maximum duration of 8 – 10 consecutive hours in any 24 hr period. As such, the project well meets the criteria stated in the WAA guidance document (pumping less than 30 gpm for less than 24-hrs) and no neighboring wells are less than 25 ft away. Given the construction of the wells on and off-site as well as operating constraints, no measurable drawdown is expected at neighboring wells as a result of project well use parameters.

Overland flow sheets to the west and discharges to the roadside ditch along the eastern side of Silverado Trail. The closest blueline stream is Dutch Henry Creek (notated as Biter Creek on some maps, which merges with Dutch Henry Creek upstream of the project area), located about 650 ft west of the subject site, which is within the 1500 ft radius.

Per the WAA Guidance Document, very low flow wells (up to 10 GPM) may be 500 ft or more away from a surface water channel (see **TABLE 2**). Although the "Upper Well" was tested at 22.5 GPM in 2021, the operational yield of the well will not exceed 3 GPM, based on proposed water uses (see **TABLE 4**).

Furthermore, there are several items which further limit any negative impacts to surface waters:

1. The project well (aka "Upper Well") does not meet the WAA definition of a *moderate to high pumping capacity well* (casing diameter greater than 6 in and capable of producing more than 30 GPM).
2. Annular seal of at least 50 ft
3. Uppermost perforations are 200 ft below grade (100+ ft deeper than recommended)
4. The hydraulic conductivity of the aquifer (ash, volcanic rock) is likely quite low (<0.5 ft/day), which indicates a lower potential zone of influence for the pumping well.

Reference table from WAA Guidance Document included below (**TABLE 2**).

Based on the operational yield of the well and other construction and geological factors, there is not potential for negative impact to surface waters. To further assure low draw on the well, a mechanical flow control valve will be installed, per attached wellhead schematic and flow control valve specification sheet.

TABLE 2 WAA Guidance Document Table, Well Distance Standards and Construction Assumptions; Very low capacity pumping rates (i.e., less than 10 gpm), constructed in unconsolidated deposits in the upper part of the aquifer system (unconfined aquifer conditions).

Aquifer Hydraulic Conductivity (ft/day)	Acceptable Distance from Surface Water Channel			Minimum Surface Seal Depth (feet)	Depth of Uppermost Perforations (feet)
	500 feet	1000 feet	1500 feet		
80	✓			50	100
50	✓			50	100
30	✓			50	100
0.5	✓			50	100

Water Supply Capacity:

The water supply well ("Upper Well") for the proposed new vineyard has a measured flow rate of 22.5 gpm. The proposed use of the well is for a single-family residence, pool, and the new vineyard. The existing vineyard is irrigated by a separate existing well ("Lower Well"). No pond, spring, or surface water use is proposed on-site. All groundwater uses on the parcel are considered in this analysis ("Lower Well" and "Upper Well").

The applicant will plant about 1.09 total acres of vines on a 6 ft x 4 ft spacing, which is the same spacing as the existing vineyard. The same vineyard manager will farm the existing and proposed vineyard, so water use assumptions are the same for all vines. Irrigation estimates are detailed in **TABLE 3** and total on-site groundwater use is summarized in **TABLE 4**.

TABLE 3 CURRENT and FUTURE Vineyard Irrigation Estimates

Variable	Units	Current VB	Future VB	Total VB		
VB net	ac	0.75	1.09	1.84		
row spacing	ft	6		-		
vine spacing	ft	4		-		
Vines per Acre	vines/ac	1815		-		
TOTAL Vines	vines	1,361	1,978	3,340		
long-term	gal/vine/yr	55		-		
establish	gal/vine/yr	75		-		
long-term	af/yr	0.23	0.33	0.56	0.3	af/acre/yr
establish	af/yr	0.31	0.46	0.77	0.4	af/acre/yr

TABLE 4 Total On-Site Groundwater Usage Estimates

	Current Water Use AF/yr	Future Water Use AF/yr	Operation Days	Peak Daily Demand (gal/day)	Operating Yield (GPM)
Residential	-	0.50	140	1,164	0.8
Guest House	-	0.10	140	233	0.2
Pool	-	0.05	140	116	0.1
Landscaping	-	0.43	140	1,001	0.7
Vineyard	0.23	0.56	140	1,312	0.9
Total	0.23	1.64		3,826	2.7

Future vineyard usage assumes a covered pool and about ½ ac of landscaping. Current water usage is estimated at 0.23 AF/yr with a total future water usage of about 1.64 AF/yr (**TABLE 4**). The “Lower Well” (10 GPM) and “Upper Well” (22.5 GPM), which are equivalent to about 16 AF/yr and 36 AF/yr, respectively, have more than enough capacity to support the proposed irrigation and domestic water uses for the site. As a conservative measure, storage was not considered and a 140 operation days were assumed for all water usages, which will inflate the estimated peak daily demand and operational yield of the well. As such, the yield to support all proposed water uses on-site is less than 3 GPM.

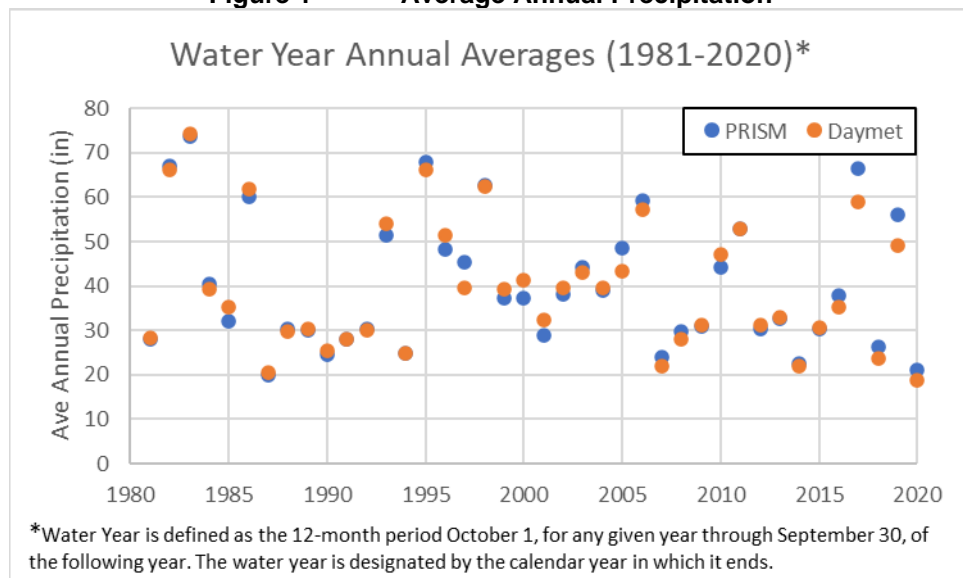
Aquifer Recharge:

Recharge was based on a parcel analysis where the proposed project is to be installed (APN 021-010-077, 5.67 ac). The property is zoned “AW” and the project area is located fully within the “Valley Floor” region. Following the Napa BOS determination in spring 2022, all Napa Valley regions must adhere to a 0.3 AF/ac/yr limitation on water use. For this project, the 5.67 ac parcel results in a 1.7 AF/ac/yr allotment.

Recharge based on precipitation data used rainfall data downloaded from DayMet [4] and PRISM [3] for the pixel that contained the subject site from 1980 to 2021 (Figure 1). Annual averages were calculated based on the “Water Year”, which is defined by the USGS as the 12-month period October 1, for any given year through September 30, of the following year. The water year is designated by the calendar year in which it ends. The Water Year was chosen for this methodology based on two primary reasons:

1. From a Hydrologic Perspective, it makes sense to use water years (Oct – Sep), rather than calendar years, since it represents the accumulation of precipitation in a given rainy season. Similarly, the water year also represents precipitation that is available for recharge preceding the irrigation season.
2. From a practical perspective, in the Napa Valley Region, the water year data would be mostly complete at the start of the irrigation season (typ. May-Sep), since precipitation during the latter months of the water year is not typical. One would have data from the preceding rainy season, and may be able to make irrigation adjustments accordingly, whereas the calendar year precipitation data would obviously be incomplete.

Figure 1 Average Annual Precipitation



Based on available data, the most recent 10-yr's of data from PRISM and DayMet were used to calculate average precipitation as well as maximum and minimum precipitation.

TABLE 5 Average Annual Precipitation based on Water Year

Water Year	PRISM in	DayMet in
2011	53	53
2012	30	31
2013	33	33
2014	23	22
2015	30	31
2016	38	35
2017	66	59
2018	26	24
2019	56	49
2020	21	19
AVE	37	
MAX	66	
MIN	19	

Average Water Year rainfall across both datasets was 37 in/yr. A recharge volume was calculated for the parcel based on the property acreage (5.67 acres) and an infiltration rate of 14%, based on results for the “Napa River at St Helena Watershed” region, in which the subject site is located [5].

$$(5.67 \text{ acres}) * (37 \text{ in/yr}) * (\text{ft}/12 \text{ in}) * (14\%) = \underline{2.45 \text{ AF/yr}}$$

Total future groundwater usage (including future residential development and future vineyard) is about 1.64 AF/yr (**TABLE 4**), which results in a net positive water balance of about 0.8 AF/yr.

No alternative water sources are required for this project.

References:

1. *Custom Soil Resource Report for Napa County, California*, Sebastien Marineau-Mes, from USDA NRCS Web Soil Survey, May 2022
2. Lambert, G., Kashiwagi, J. et al., Soil Survey of Napa County, California, USDA in cooperation with UC Agricultural Experiment Station, August 1978
3. *PRISM Time Series Data by Location*, <https://prism.oregonstate.edu/explorer/>
4. Thornton; M.M.; R. Shrestha; Y. Wei; P.E. Thornton; S. Kao; and B.E. Wilson. 2020. Daymet: Daily Surface Weather Data on a 1-km Grid for North America; Version 4. ORNL DAAC; Oak Ridge; Tennessee; USA. <https://daymet.ornl.gov/single-pixel/>
5. Updated Hydrogeologic Conceptualization and Characterization of Conditions, Prepared for Napa County, by Luhdorff & Scalmanini Consulting Engineers & MBK Engineers, January 2013
6. USGS California Department of Water Resources and CA Division of Mines map and information sources from 1900-1960, isohyetal_cnty.shp from Napa County GIS Data Catalog.

Attachments:

WAA Vicinity Map
Attachment D, form
Wellhead Schematic
Flow Control Valve Specification Sheet
"Upper Well" Flow Test and Well Log
"Lower Well" Flow Test and Well Log
"Neighbor Well", 021-010-076 Well Log

ATTACHMENT 8D:**Sebastien Marineau-Mes Vineyards
Water Availability Analysis (WAA)**

*Includes: Attachment D Form
June 3, 2022*

Property Owner:

Sebastien Marineau-Mes
619 Diamond St
San Francisco, CA 94114

Prepared By:

Sarah Pistone, CPESC #9225
HDVine LLC
2778 Royal Oak Pl
Santa Rosa, CA 95403

Site Map:

See attached Water Availability Map

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The Napa County Electronic Document Retrieval site was reviewed for well log files for the subject site and adjacent parcels within the 500 ft radius. Wells within the 500 ft radius were identified for the neighboring parcel about 440 ft to the north (APN 021-010-076), see WAA Vicinity Map. Many electronic well documents were reviewed for neighboring parcels, but no other wells were identified within the 500 ft radius. Any wells outside the 500 ft radius depicted on the WAA map should be considered *approximate* locations for schematic purposes only.

Parameters of wells pertinent to this project review are summarized in

TABLE 1.

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021-010-076	2014	In use (existing residence)	314	5	13 ³	0-5: cement 5-22: bent. chips	100	30 – 80
¹ Well pump test by Ray's Well Testing Service Inc., 8/11/21 ² Well pump test by McLean & Williams, 8/14/13 ³ Air Lift test at time of drilling by McLean & Williams, 4/10/01								

Due to the proximity of one neighboring well, a review of potential drawdown impacts was conducted. The Water Availability Analysis (WAA) Guidance Document (Adopted May 12, 2015), presents results that show wells pumping less than 30 gpm for periods less than 24-consecutive hours will likely have negligible drawdown at distances beyond 25 ft in a confined aquifer (pg 35).

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Overland flow sheets to the west and discharges to the roadside ditch along the eastern side of Silverado Trail. The closest blueline stream is Dutch Henry Creek (aka Biter Creek, which merges with Dutch Henry Creek upstream of the project area), located about 650 ft west of the subject site, which is within the 1500 ft radius. Per the WAA Guidance Document, potential impacts to nearby surface waters were evaluated. There are several items which support a lesser distance from the surface channel, since there is a low likelihood of any negative impacts to surface waters:

1. The project well (aka "Upper Well") does not meet the WAA definition of a *moderate to high pumping capacity well* (casing diameter greater than 6 in and capable of producing more than 30 GPM).
2. Annular seal of at least 50 ft
3. Uppermost perforations are 100+ ft deeper than recommended
4. The hydraulic conductivity of the aquifer (ash, volcanic rock) is likely quite low (<0.5 ft/day), which indicates a lower potential zone of influence for the pumping well.

Reference table from WAA Guidance Document included below (TABLE 2).

TABLE 2 WAA Guidance Document Table, Well Distance Standards and Construction Assumptions; Low capacity pumping rates (i.e., between 10 gpm and 30 gpm), constructed in unconsolidated deposits in the upper part of the aquifer system (unconfined aquifer conditions).

Aquifer Hydraulic Conductivity (ft/day)	Acceptable Distance from Surface Water Channel			Minimum Surface Seal Depth (feet)	Depth of Uppermost Perforations (feet)
	500 feet	1000 feet	1500 feet		
80			✓	50	150
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Water Supply Capacity:

The water supply well ("Upper Well") for the proposed new vineyard has a measured flow rate of 22.5 gpm. The proposed use of the well is for a single-family residence, pool, and the new vineyard. The existing vineyard is irrigated by a separate existing well ("Lower Well"). No pond, spring, or surface water use is proposed on-site. All groundwater uses on the parcel are considered in this analysis ("Lower Well" and "Upper Well").

The applicant will plant about 1.29 total acres of vines on a 6 ft x 4 ft spacing, which is the same spacing as the existing vineyard. The same vineyard manager will farm the existing and proposed posed vineyard, so water use assumptions are the same for all vines. Irrigation estimates are detailed in **TABLE 3** and total on-site groundwater use is summarized in **TABLE 4**.

TABLE 3 CURRENT and FUTURE Vineyard Irrigation Estimates

Variable	Units	Current VB	Future VB	Total VB		
VB net	ac	0.75	1.29	2.04		
row spacing	ft	6		-		
vine spacing	ft	4		-		
Vines per Acre	vines/ac	1815		-		
TOTAL Vines	vines	1,361	2,341	3,703		
long-term	gal/vine/yr	60		-		
establish	gal/vine/yr	80		-		
long-term	af/yr	0.3	0.4	0.7	0.3	af/acre/yr
establish	af/yr	0.3	0.6	0.9	0.4	af/acre/yr

TABLE 4 Total On-Site Groundwater Usage Estimates

	Current AF/yr	Future AF/yr
Residential	-	0.50
Pool	-	0.05
Landscaping	-	0.75
Vineyard	0.25	0.68
Total	0.25	1.98

Future vineyard usage assumes a covered pool and about ½ ac of landscaping. Current water usage is estimated at 0.25 AF/yr with a total future water usage of about 1.98 AF/yr (**TABLE 4**). The “Lower Well” (10 GPM) and “Upper Well” (22.5 GPM), which are equivalent to about 16 AF/yr and 36 AF/yr, respectively, have more than enough capacity to support the proposed irrigation and domestic water uses for the site.

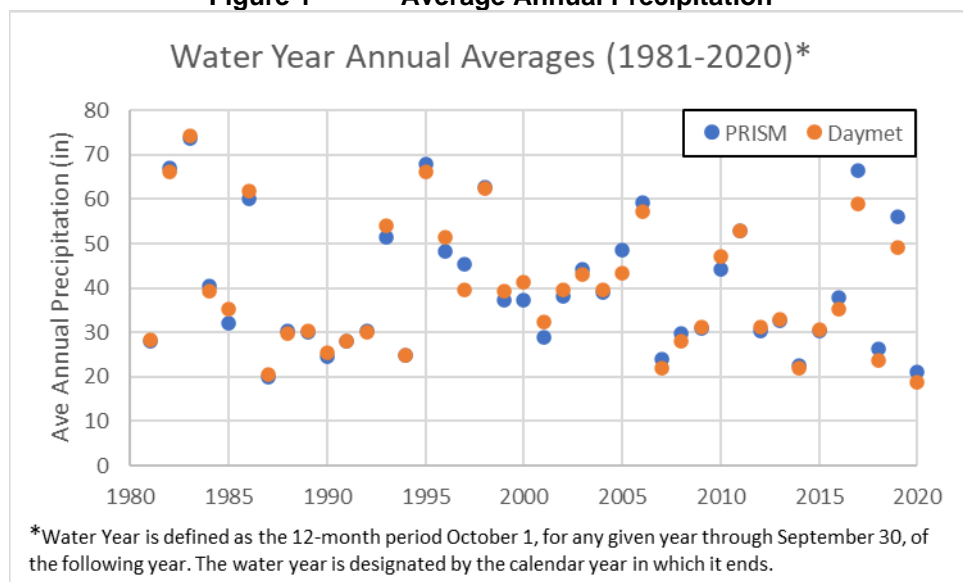
Aquifer Recharge:

Recharge was based on a parcel analysis where the proposed project is to be installed (APN 021-010-077, 5.67 ac). The property is zoned “AW” and the project area is located fully within the “Valley Floor” region for a Parcel Location Factor of 1.0 AF/ac/yr, which results in a water allotment of 5.67 AF/yr.

Recharge based on precipitation data used rainfall data downloaded from DayMet [4] and PRISM [3] for the pixel that contained the subject site from 1980 to 2021 (Figure 1). Annual averages were calculated based on the “Water Year”, which is defined by the USGS as the 12-month period October 1, for any given year through September 30, of the following year. The water year is designated by the calendar year in which it ends. The Water Year was chosen for this methodology based on two primary reasons:

1. From a Hydrologic Perspective, it makes sense to use water years (Oct – Sep), rather than calendar years, since it represents the accumulation of precipitation in a given rainy season. Similarly, the water year also represents precipitation that is available for recharge preceding the irrigation season.
2. From a practical perspective, in the Napa Valley Region, the water year data would be mostly complete at the start of the irrigation season (typ. May-Sep), since precipitation during the latter months of the water year is not typical. One would have data from the preceding rainy season, and may be able to make irrigation adjustments accordingly, whereas the calendar year precipitation data would obviously be incomplete.

Figure 1 Average Annual Precipitation



Based on available data, the most recent 10-yr of data from PRISM and DayMet were used to calculate average precipitation as well as maximum and minimum precipitation.

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AVE	37	
MAX	66	
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Average Water Year rainfall across both datasets was 37 in/yr. A recharge volume was calculated for the parcel based on the property acreage (5.67 acres) and an infiltration rate of 14%, based on results for the “Napa River at St Helena Watershed” region, in which the subject site is located [5].

$$(5.67 \text{ acres}) * (37 \text{ in/yr}) * (\text{ft}/12 \text{ in}) * (14\%) = \underline{2.45 \text{ AF/yr}}$$

Total future groundwater usage (including future residential development and future vineyard) is about 1.98 AF/yr (**TABLE 4**), which results in a net positive water balance of about 0.5 AF/yr.

Drought years are included in average precipitation of 37 in/yr, with the lowest value in the past 10 years in water year 2020 (19 in/yr). Annual rainfall would have to drop below 16 in/yr to result in a net neutral water balance for this project site. In a scenario where precipitation falls below 30 in/yr then irrigation water would be curtailed accordingly, for example using the 2020 data:

$$(5.67 \text{ acres}) * (19 \text{ in/yr}) * (\text{ft}/12 \text{ in}) * (14\%) = \underline{1.3 \text{ AF/yr}}$$

As such, landscaping and vineyard irrigation could be curtailed to a total of 0.75 AF/yr to result in a net neutral water balance. The reduced water usage is reasonable from a vineyard management perspective. The Napa County Form D, “Phase I Water Availability Analysis” references vineyard irrigation usage down to 0.2 AF/acre/year, which would result in 0.4 AF/yr for vineyard and 0.35 AF/yr for landscaping. Please note that all future residential water uses are estimated as final construction plans are in process. No alternative water sources are required for this project. Recharge calculations for the parcel are the primary constraint for this project; groundwater usage is well below the calculated Water Allotment for the subject site (5.67 AF/yr).

References:

1. *Custom Soil Resource Report for Napa County, California*, Sebastien Marineau-Mes, from USDA NRCS Web Soil Survey, May 2022
2. Lambert, G., Kashiwagi, J. et al., *Soil Survey of Napa County, California*, USDA in cooperation with UC Agricultural Experiment Station, August 1978
3. *PRISM Time Series Data by Location*, <https://prism.oregonstate.edu/explorer/>
4. Thornton; M.M.; R. Shrestha; Y. Wei; P.E. Thornton; S. Kao; and B.E. Wilson. 2020. Daymet: Daily Surface Weather Data on a 1-km Grid for North America; Version 4. ORNL DAAC; Oak Ridge; Tennessee; USA. <https://daymet.ornl.gov/single-pixel/>
5. Updated Hydrogeologic Conceptualization and Characterization of Conditions, Prepared for Napa County, by Luhdorff & Scalmanini Consulting Engineers & MBK Engineers, January 2013
6. USGS California Department of Water Resources and CA Division of Mines map and information sources from 1900-1960, isohyetal_cnty.shp from Napa County GIS Data Catalog.

Attachments:

WAA Vicinity Map
 Attachment D, form
 "Upper Well" Flow Test and Well Log
 "Lower Well" Flow Test and Well Log
 Neighbor, 021-010-076 Well Log

Attachment D

PHASE I WATER AVAILABILITY ANALYSIS

File #: P ____ - ____ - ____ Owner: Sebastien Marineau-Mes Parcel #: 021 - 010 - 077

This form is intended to help those who must prepare a Phase I Water Availability Analysis. **The Department will not accept an analysis that is not on this form.**

BACKGROUND: A Phase I Water Availability Analysis is done in order to determine what changes in water use will occur on a property as a result of the project. Staff uses this information to determine whether the project may have a adverse effect on groundwater levels. If it may, additional information will be required. You will be advised if additional information is needed.

PERSONS QUALIFIED TO PREPARE: Any person that can provide the needed information

PROCEDURE:

STEP 1: Prepare and attach to this form 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 shown

STEP 2: Determine the allowable groundwater use allotment for your parcel(s).

Total size of parcel(s)	<u>5.67</u>	acre(s)
Multiply by parcel location factor	x <u>1.0</u>	acre-foot per acre per year (see back)
Allowable groundwater allotment	= <u>5.67</u>	acre-foot per year

STEP 3: Determine the estimated water use for all vineyards on your parcel(s) currently and after the planned conversion; actual water usage figures may be substituted for the current usage estimate (please indicate if this is done). Estimate future use for both the vineyard establishment period and thereafter

Current Usage:

Number of <u>planted</u> acres	<u>0.75</u>	acres
Multiply by number of vines/acre	x <u>1,815</u>	vines per acre
Multiply by gallons/vine/year	x <u>60</u>	gallons of water per vine per year
Divide by 325,821 gallons/af	= <u>0.25</u>	af of water per yr used for vineyard irrigation

Future Usage:

Number of <u>planted</u> acres	(NEW) <u>2.04</u>	acres (7.3 ac > 5%; 0.75 ac <5%)
Multiply by number of vines/acre	x <u>1,815</u>	vines per acre
Multiply by gallons/vine/year	x <u>60</u>	gallons of water per vine per year (long-term)
	<u>80</u>	gallons of water per vine per year (establish)
Divide by 325,821 gallons/af	= <u>0.68</u>	af of water per yr used (vineyard long-term)
	<u>0.91</u>	af of water per yr used (vineyard establish)

STEP 4: Using the guidelines on the next page, actual water usage figures, and/or detailed water use projections, tabulate the existing and projected future water usage on the parcel(s) in acre-foot per year (af/yr) {1 af = 325,821 gallons}.

Existing Usage:

Residential	_____	af/yr
Farm Labor Dwelling	_____	af/yr
Winery	_____	af/yr
Commercial	_____	af/yr
Vineyard(long-term)	<u>0.25</u>	af/yr

Future Usage:

Residential	<u>0.50</u>	af/yr
Farm Labor Dwelling	_____	af/yr
Winery	_____	af/yr
Commercial	_____	af/yr
Vineyard(long-term)	<u>0.68</u>	af/yr

	(establish)	_____af/yr
Other Agriculture	_____af/yr	
Landscaping	_____af/yr	
Other Usage	_____af/yr	
TOTAL	0.5	af/yr

	(establish)	_____af/yr
Other Agriculture	_____af/yr	
Landscaping	0.75	af/yr
Other Usage	0.05	af/yr
TOTAL	1.98	af/yr

STEP 5: Attach all supporting information that may be significant to this analysis including but not limited to all water use calculations for the various uses listed

Parcel Location Factors

The allowable allotment of water is based on the location of your parcel. Valley floor areas include all locations on the floor of the Napa Valley and Carneros Basin except for groundwater deficient areas. Groundwater deficient areas are areas that have been determined by the Department of Public Works as having a history of problems with groundwater. All other areas are classified as Mountain Areas. Public Works can assist you in determining your classification.

Parcel Location Factors

Valley Floor	1.0 acre foot per acre per year
Mountain Areas	0.5 acre foot per acre per year
Groundwater Deficient Area (MST)	0.3 acre foot per acre per year

Guidelines For Estimating Water Usage:

Residential:

Single Family Residence	0.5 acre-foot per year
Farm Labor Dwelling	1.0 acre-foot per year (6 people)
Second Unit	0.4 acre-foot per year
Guest Cottage	0.1 acre-foot per year

Winery:

Process Water	2.15 acre-foot per 100,000 gal. of wine
Domestic and Landscaping	0.50 acre-foot per 100,000 gal. of wine

Commercial:

Office Space	0.01 acre-foot per employee per year
Warehouse	0.05 acre-foot per employee per year

Agricultural:

Vineyards	
Irrigation only	0.2 to 0.5 acre-foot per acre per year
Heat Protection	0.25 acre foot per acre per year
Frost Protection	0.25 acre foot per acre per year
Irrigated Pasture	4.0 acre-foot per acre per year
Orchards	4.0 acre-foot per acre per year
Livestock (sheep or cows)	0.01 acre-foot per acre per year

Landscaping:

Landscaping	1.5 acre-foot per acre per year
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Ray's Well Testing Service Inc.
 4853 Vine Hill Rd, Sebastopol Ca 95472
Phone 707 823 3191 **Fax** 707 317 0057 **Lic#** 903708

"Upper Well"

CUSTOMER INFORMATION

REPORT #: 8/11/21 By: Nick Brasesco	DATE OF TEST: 8/11/21
CUSTOMER NAME: Sebastien Marineau	CONTACT:
AGENT NAME:	CONTACT:
PROPERTY ADDRESS: 4000 Silverado Trail N, Calistoga Ca 94515	SENT TO: sebastien.marineau@gmail.com

WELL DATA

LOCATION OF WELL:	Upper Well
TYPE OF WELL:	Drilled
DEPTH OF COMPLETED WELL:	330 Feet. Per Pump Installer Records.
DIAMETER OF WELL CASING:	5" PVC
SANITARY WELL SEAL (PLATE SEAL AT OPENING OF WELL CASING):	Yes
ANNULAR SEAL (IN-GROUND SEAL OF BOREHOLE):	Unknown - Please Refer to well log
PUMP HP AND TYPE:	3 HP 230V 3PH Submersible, 1.5" tee, #8-4 cable, 18GS30
DEPTH OF PUMP SUCTION:	301 Feet. Per Pump Installer Records.

WATER PRODUCTION RESULTS

WATER LEVEL AT START (STATIC LEVEL):	37.2 Feet	FLOW RATE AT START:	25 GPM
FINAL PUMPING LEVEL:	75.2 Feet	FINAL FLOW RATE:	22.5 GPM
WATER LEVEL DRAWDOWN:	38 Feet	TOTAL LENGTH OF TEST:	2 Hours

CONSTANT PUMPING LEVEL INFORMATION

STABILIZED PUMPING LEVEL:	75.2 Feet	STABILIZED FLOW RATE (YIELD):	22.5 GPM
DURATION OF CONSTANT PUMPING LEVEL:	1 Hour	TOTAL YIELD:	1350 gallons

WATER SYSTEM INSPECTION

WELL PUMP	Functional	TECHNICAL INFO: 18GS30 . 9.3 Amps. Yaskawa Variable speed Pump Controller
ELECTRICAL	Functional	TECHNICAL INFO: 30 amp breaker
PRESSURE TANK	None	TECHNICAL INFO:
STORAGE TANK	None	TECHNICAL INFO:
BOOSTER PUMP	None	TECHNICAL INFO:

WATER QUALITY TESTING

THE FOLLOWING SAMPLES ARE BEING ANALYZED. PLEASE REFER TO FOLLOW-UP REPORT FOR RESULTS.		
Refer to Imboden Pump	DATED: -	TURNAROUND: -
	DATED:	TURNAROUND:
	DATED:	TURNAROUND:
	DATED:	TURNAROUND:

SEE NEXT PAGE FOR FURTHER INFORMATION...

DATE: 8/11/21

"Upper Well"

ADDRESS: 4000 Silverado Trail N, Calistoga Ca 94515

COMMENTS:

1. The recharge rate at the end of the test was 22.5 gallons per minute. This test may not represent the long term or seasonal yield.
2. The well pump was operated on temporary power during testing.

RECOMMENDATIONS:

PUMPING LOG:

Time:	Water Level:	Appearance	Sand	GPM
10:30AM	37.2'	Cloudy	No	25
10:40AM	65.2'	Clear	No	25
10:45AM	67.4'	Clear	No	25
11:00AM	71.4'	Clear	No	25
11:15AM	73.7'	Clear	No	25
11:30AM	75.2'	Clear	No	23
11:45AM	75.2'	Clear	No	22.5
12:15PM	75.2'	Clear	No	22.5
12:30PM	75.2'	Clear	No	22.5

Thank you for allowing us to do your well inspection!

APPROVED BY: NICK BRASESCO



Water levels and well depth are measured as feet below top of well casing unless otherwise noted.

All wells and springs are subject to seasonal and yearly changes in regards to water yield, production and quality. Wells may be influenced by creeks or other water sources and are likely to yield less water during dry months of the year; typically August, September, & October. We make no predictions of future water production or water quality.

This report is for informational use only and is in lieu of and supercedes any other representation or statements of the agent or employee of the company, and all other such representations or statements shall be relied upon at the customer's own risk. The data and conclusions provided herein are based upon the best information available to the company using standard and accepted practices of the water well drilling industry. However, conditions in water wells are subject to dramatic changes in short periods of time. Therefore, the data and conclusions are valid only as of the date of the test and should not be relied upon to predict either the future quantity or quality the well will produce. The company makes no warranties either expressed or implied as to future water production and expressly disclaims and excludes any liability for consequential or incidental damages arising out of the breach of any expressed or implied warranty of future water production or out of any further use of the report by the customer.

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

recent test for
old shared well

"Lower Well"



Well Drilling & Pump Service
878 El Centro Ave. Napa Ca, 94558
Office 707-255-6450
Fax 707-255-6489
Lic. #396352

SINCE 1949

WELL INSPECTION REPORT FOR:

Attn: Fidelity National Title c/o Robert Pursell Date of test: August 14th, 2013

Upon your request, we have checked the well and/or pressure system at
4020 Silverado Trail - Southern Parcel (Well by vineyard)

Our findings are as follows:

WELL INFORMATION

Casing Size: 6" pvc well casing F480

Static Water Level: 67' from top of well casing at time of test

Well Depth: 327' Draw down during test: 132' from top of well casing

Total water draw down level at end of flow test 65'

How tested: Open discharge using existing pumping equipment in well

Well yield after test: 10 gallons per minute after 4 hours @ 132'

Well comments: Well was completed 04-10-2001 and estimated to yield 15 gpm.

WELL EQUIPMENT INFORMATION

Pump Make: Grundfos HP 1 1/2 Pump Setting: 315'

Type: Submersible Voltage: 230 Pipe Size: 1 1/4" galvanized

Pump Model: 10S15-21 Phase: 1 Wire Size: submersible pump cable #8-3/ wg

Pressure tank: Amtrol W.X.T. 302 85 gallon (Installed 06-19-2002) Tested ok

Comments: Well pump installed in 05-15-2001. Well pump equipped with a Pump Tec plus to protect equipment from dry run. Manufacturer date code on control box and Pump Tec are 2007.

WELL TEST INFORMATION

<u>TIME:</u>	<u>WATER LEVEL:</u>	<u>GPM:</u>	<u>COLOR:</u>	<u>PUMP AMPS</u>
12:15p.m.	67'	14	clear	9.8
12:25	94'	14	clear	9.8
12:35	109'	14	clear	9.8
12:45	117'	14	clear	9.8
12:55	124'	14	clear	9.7
01:00 Reduce flow to stabilize pumping level.				
01:05	130'	12	clear	10.2
01:10 Reduce flow to stabilize pumping level.				
01:15	130'	11	clear	10.3
01:20 Reduce flow to stabilize pumping level.				
01:25	131'	10	clear	10.3
04:15	132'	10	clear	10.4

Page #2 for 4020 Silverado Trail flow test and inspection

10 gallons per minute is the final well yield after 4 hours of continuous pumping. All measurements were taken to the top of wellhead using an electronic water level indicator 1-1/10th of an inch measurement.

FILTRATION

Amiad Brushaway 2" sediment filter 130 mesh. In line by well equip met

LAB- WORK AND BACTERIAL

A home 1, 3 and Irrigation sample were drawn and delivered to the lab, please see attachment (please see Arsenic levels are elevated)

RECOMMENDATIONS

Based on the wells history at time of well construction , well was heavily and water production diminish, we do not recommend a pumping rate greater than 5-7 gallons per minute for long periods of time to keep well healthy

FINAL COMMENTS

Please note that flow test results by McLean and Williams Inc. represents the well water yield and system condition for the time of the test only.

Thank you, *Gonzalo Salinas*

Gonzalo Salinas
McLean & Williams Inc.
Gonzalo.mwinc@sbcglobal.net

Pressure tanks

Well head

Screen filter

Well pump
control and
disconnect



STATE OF CALIFORNIA
WELL COMPLETION REPORT
Report to Jurisdiction Jurisdiction

No. **813797**

Well No. **4020** Date **4/6/01** Permitted **4/10/01**
County **Napa** Permit No. **95-11750** Permit Date **2/23/01**

WELL USE ONLY - DO NOT FILL IN
WELL NO. **4020**
LATITUDE **38° 12' 00" N** LONGITUDE **122° 25' 00" W**
SPRING/WEIR

GEOLOGIC LOG

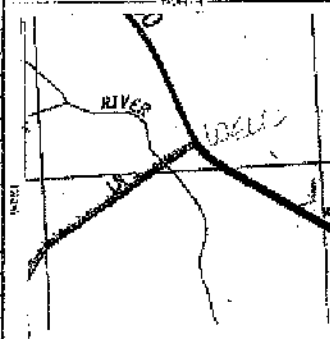
DEPTH (ft.)	DIAMETER (in.)	DESCRIPTION
0 - 2	12 1/4	topsoil
2 - 20	9 7/8	red clay & stringers black rock
20 - 30	9 7/8	red clay
30 - 50	9 7/8	black rock stringers red clay
50 - 70	9 7/8	red clay black & gray rock
70 - 90	9 7/8	black rock soft
90 - 110	9 7/8	black & red rock stringers green
110 - 150	9 7/8	red & black green rock fract
150 - 210	9 7/8	black gray & green rock soft
210 - 270	9 7/8	lt gray rock stringers black & lt green
270 - 310	9 7/8	lt gray & green rock soft
310 - 350	9 7/8	lt gray rock soft

WELL OWNER
Name **Steve Series**
Mailing Address **4020 Silverado Trail, Calistoga, CA 94515**
Address **4020 Silverado Trail, Calistoga, Napa**
County **Napa** APN Book **21** Page **010** Parcel **34**
Township **Range** Section **34**
Latitude **38° 12' 00" N** Longitude **122° 25' 00" W**

ACTIVITY (X)
☒ NEW WELL
☐ MODIFICATION
☐ TEST
☐ REPAIR
☐ OTHER (SPECIFY)

PLANNED USES (X)
☒ DOMESTIC
☐ IRRIGATION
☐ INDUSTRIAL
☐ OTHER (SPECIFY)

WATER LEVEL & YIELD OF COMPLETED WELL
DEPTH TO WATER (ft.) **75** DATE MEASURED **4/10/01**
WATER TYPE **15** TEST TYPE **at**
FLOW RATE (gpm) **2** TOTAL DEPTH (ft.) **300**
* This well is representative of a well's large area yield.



DEPTH FROM SURFACE (ft.)	SORE HOLE DIA (in.)	CASTING (in.)				MATERIAL (in.)	INTERNAL DIAMETER (in.)	GAGE ON WALL (in.)	PISTON (in.)	DEPTH FROM SURFACE (ft.)	ANNULAR MATERIAL			
		TYPE	SIZE	WALL	PISTON						TYPE	SIZE	WALL	PISTON
0	12 1/4	12 1/4	X			P480	6"	200		0	24	X		
24	120	9 7/8	X			P480	6"	200		24	340		X	fine gravel
120	300		X			P480	6"	200						
300	320		X			P480	6"	200						
320	340		X			P480	6"	200						

Well water production at time of construction
15 gpm

APPENDICES (X)
☐ Design Log
☐ Well Construction Diagram
☐ Geophysical Log
☐ Soil/Water Chemical Analyses
☐ Other

CERTIFICATION STATEMENT
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.
NAME **McLean & Williams, Inc.**
FIRM **578 El Centro Ave., Napa, CA 94558**
DATE **6/19/01** SIGNATURE **[Signature]** JOB NO. **386352**
WELL NUMBER **813797** DATE **6/19/01** SIGNATURE **[Signature]**

IF ADDITIONAL SPACE IS REQUIRED, USE NEXT CONSECUTIVELY NUMBERED FORM

Owner's Well No. 1-2014

Date Work Began 2/21/2014, Ended 2/26/2014

Local Permit Agency Napa County Environmental Mgmt

Permit No. E14-00070 Permit Date 1/31/2014

STATE OF CALIFORNIA
WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. **e0204374**

DWR USE ONLY	
STATE W	
LATITUDE	LONGITUDE
APN/TRS/OTHER	

"Neighbor Well"
021-010-076

GEOLOGIC LOG

WELL OWNER

ORIENTATION (✓) ☒ VERTICAL ☐ HORIZONTAL ☐ ANGLE ☐ (SPECIFY)

Name Ryan Gregory

Mailing Address 1515 Fourth Street

Napa

CA 94559

CITY

STATE

ZIP

WELL LOCATION

Address 4020 Silverado Trail

City Napa CA

County Napa

APN Book 021 Page 010 Parcel 076

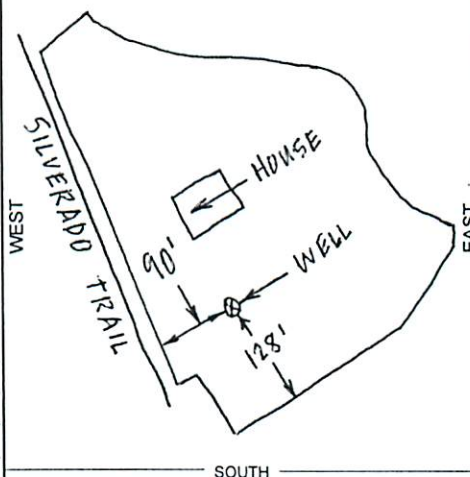
Township Range Section

Latitude

DEG. MIN. SEC.

LOCATION SKETCH

NORTH



SOUTH

Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

☒ NEW WELL

MODIFICATION/REPAIR

☐ Deepen

☐ Other (Specify)

☐ DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

PLANNED USES (✓)

WATER SUPPLY

☒ Domestic ☐ Public
☐ Irrigation ☐ Industrial

MONITORING ☐

TEST WELL ☐

CATHODIC PROTECTION ☐

HEAT EXCHANGE ☐

DIRECT PUSH ☐

INJECTION ☐

VAPOR EXTRACTION ☐

SPARGING ☐

REMEDIATION ☐

OTHER (SPECIFY)

RECEIVED

MAY - 2 2014

Napa County Planning, Building
& Environmental Services

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 30 (Ft.) BELOW SURFACE

1

DEPTH OF STATIC WATER LEVEL 24 (Ft.) & DATE MEASURED 2/26/2014

ESTIMATED YIELD 13 (GPM) & TEST TYPE AIR LIFT

TEST LENGTH 2 (Hrs.) TOTAL DRAWDOWN N/A (Ft.)

May not be representative of a well's long-term yield.

TOTAL DEPTH OF BORING 260 (Feet)
TOTAL DEPTH OF COMPLETED WELL 100 (Feet)

DEPTH FROM SURFACE Fl. to Fl.	BORE-HOLE DIA. (Inches)	CASING (S)					
		TYPE (✓)			MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS
		BLANK	SCREEN	CON- DUCTOR			
				FILL PIPE			SLOT SIZE IF ANY (Inches)
0 to 25	12						
25 to 260	9						
0 to 30		✓			PVC F480	5	SDR-21
30 to 80			✓		PVC F480	5	SDR-21 .032
80 to 100		✓			PVC F480	5	SDR-21

DEPTH FROM SURFACE Fl. to Fl.	ANNULAR MATERIAL			
	TYPE			
	CE- MENT (✓)	BEN- TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0 to 5	✓			CONCRETE
5 to 22		✓		CHIPS
22 to 260			✓	PEA GRAVEL

ATTACHMENTS (✓)

- ☐ Geologic Log
- ☐ Well Construction Diagram
- ☐ Geophysical Log(s)
- ☐ Soil/Water Chemical Analysis
- ☐ Other

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME HUCKFELDT WELL DRILLING, INC.

(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

2110 Penny Lane

ADDRESS

Napa

CITY

CA

STATE

94559

ZIP

Signed

WELL DRILLER/AUTHORIZED REPRESENTATIVE

03/07/14

DATE SIGNED

439-746

C-57 LICENSE NUMBER