Water Availability Analysis

Piazza Del Dotto Winery & Caves
7466 St. Helena Hwy
Yountville, CA
APN 031-120-035

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Dave del Dotto

Prepared by:

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Executive Summary

Piazza Del Dotto Winery proposes to increase water use for winery production, staffing, visitation, and a minor amount of landscaping. Increases in water use are offset by reductions in other uses resulting in a net decrease in groundwater use (Table 3) from an existing 11.02 acre-ft/yr to proposed 9.73 acre-ft/yr. This water demand will be met by pumping Well 1 to supply water required for all uses other than irrigating the southernmost vineyard block which will utilize Well 20. This WAA includes both Tier 1 and a Tier 3 analyses. A Tier 2 analysis is not required; overall water use will decrease owing to a substantial reduction in vineyard irrigation rate.

The Tier 1 analysis focuses on water use calculations and a hydrogeologic analysis of groundwater recharge. This WAA also incorporates a recently completed lot line adjustment. The Tier 1 analysis indicates that the estimated average annual recharge scaled to the parcel area is 9.84 acre-feet/year and the proposed groundwater use (9.73 acre-feet/year) is 99% of average annual recharge.

The project well is located approximately 1,300 feet from Lincoln Creek at its closest point. The project well meets Tier 3 WAA criteria for a "low capacity well" pumping at 20 gpm, has a 57-foot concrete seal, is perforated beginning 116 feet bgs, and is > 1,000 feet from the streambed of Lincoln Creek. The project well is drilled entirely within the Sonoma Volcanics bedrock aquifer and given the short seasonal period of hydraulic connectivity between Lincoln Creek and the alluvial aquifer underlying it and given the relationship between groundwater elevation in the Sonoma Volcanics aquifer relative to the elevation of the streambed of Lincoln Creek, we believe that operation of the project well will not substantially affect streamflow within Lincoln Creek or the Napa River downstream.

Introduction

Piazza del Dotto Winery & Caves (PDD) is seeking permits from County of Napa to increase water use for winery production, staffing, visitation, and a minor amount of landscaping at 7466 St. Helena Hwy., Yountville (APN 031-120-035). This parcel is located approximately 1.5 miles north of central Yountville in Napa County in the Napa River watershed within the "Valley Floor" aquifer-zone of Napa County and the Napa Valley Groundwater Sub-basin (Figure 1).

This Water Availability Analysis (WAA) includes Tier 1 and Tier 3 analyses. The Tier 1 analysis replaces a prior Tier 1 analysis by Guadalupe Chavarria, PE, owing to unfortunate circumstances whereby he cannot represent his analysis (he is deceased). The new Tier 1 analysis incorporates changed conditions including a lot line adjustment and changes in water use. The Tier 3 analysis was previously prepared by OEI to supplement the previous Tier 1 analysis.

This Water Availability Analysis (WAA) was developed based on the guidance provided in the Napa County Department of Planning, Building, & Environmental Services' (PBES) Water Availability Analysis Guidance Document formally adopted by the Napa County Board of Supervisors in May 2015 and by subsequent guidance provided by PBES.

Limitations

Groundwater systems of Napa County and the Coast Range are typically complex, and available data rarely allows for more than general assessment of groundwater conditions and delineation of aquifers. Hydrogeologic interpretations are based on the drillers' reports made available to us through the California Department of Water Resources, available geologic maps and hydrogeologic studies, and professional judgment. This analysis is based on limited available data and relies significantly on interpretation of data from disparate sources of disparate quality. Existing and proposed future water use on and near the project site is estimated based on information received from the applicant and on regionally appropriate water duties for the observed and expected uses.

This analysis has been performed to evaluate conformance to County guidelines regarding potential surface water-groundwater interaction (Tier 3 WAA). Although the character of the aquifer can be reasonably inferred and details of the well construction (depth, screened interval, casing diameter) of the project well can be specified, there is always some uncertainty regarding actual aquifer conditions.

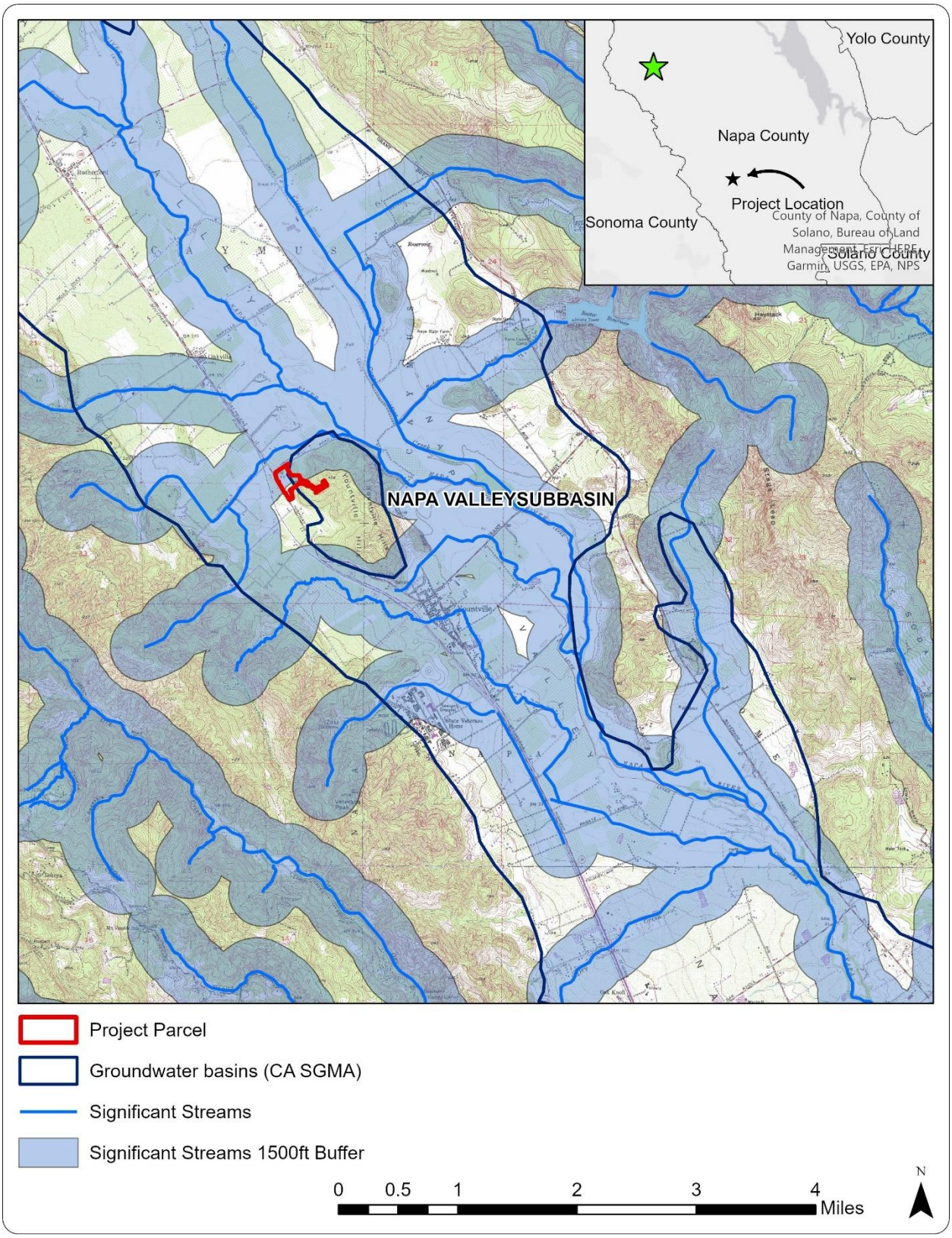

Figure 1: Project location map.

Hydrogeologic Conditions

Surficial (and relatively shallow) alluvial materials comprise an unconfined aquifer understood to interact with surface water in stream channels on the floor of Napa Valley; in contrast, deeper volcanic and other bedrock aquifers that underlie the alluvial aquifer are typically confined or semi-confined aquifers that are believed to interact with surface water to a significantly lesser degree.

This project parcel is in the central portion of Napa Valley. The western portion of the project parcel lies on the valley floor and the eastern portion containing the project well in the Yountville Hills (Figures 1 and 2). Surficial geology at the project parcel is a combination of Holocene-aged alluvial fan levee deposits (Map unit Qhl) characteristic of the valley floor and Pleistocene-aged andesite lava flows of Stags Leap (map unit Psvasl; Figure 2) comprising the Yountville Hills and the bedrock underlying the alluvium of the valley floor in the region. The resistance to weathering and erosion of the volcanic rock relative to the surrounding alluvium is responsible for the presence of the local hill exposed over geologic time.

The alluvial deposits (Map Unit Qhl) are described as "Fan levee deposits - Sediments of late Holocene age deposited in topographic lows. Fine-grained alluvium with horizontal stratification [which] may have interbedded peat" (Wagner and Gutierrez, 2017). Although Quaternary alluvial units are considered to comprise the principal aquifer system in the Napa Valley, many production wells including the project well are screened partially or entirely within the deeper tertiary units including Tertiary Sedimentary rock, the Huichicha Formation, and Sonoma Volcanics (LSCE, 2013 and 2017). Based on geologic logs from wells it appears that volcanics underlie the surficial alluvium in the project area and wells in surficial alluvial deposits are often perforated (screened) in both the upper alluvial units as well as the lower volcanic units as is typical for wells in Napa Valley.

In addition to being mapped as the primary surficial geologic unit across the project parcel, bedrock underlying the alluvium is typically reported as "volcanic" in geologic logs for wells in the project area. These rocks are a unit of the Sonoma Volcanics and are specifically identified as the Andesite lava flow of Stag's Leap (Map Unit Psvasl) in more recent mapping by Wagner and Gutierrez (CGS, 2017) and the Basaltic to andesitic lava flows (Map unit Tsa) by Graymer et. al. (USGS, 2007). The Andesite of Staggs Leap is present in surficial geology in outcroppings on the margins of the floor of Napa Valley, as well as in the mountains to the east of Napa Valley. The geologic setting suggests that the project parcel and the terrain of the Napa Valley and uplands lying to the east is underlain by a contiguous assemblage of Sonoma Volcanics.

Based on our understanding and interpretation of local and regional hydrogeologic conditions, the primary aquifer for the project parcel and project recharge area used for the Tier 1 groundwater recharge analysis is an extensive fractured rock aquifer comprised of the Sonoma Volcanics that has a large area within which precipitation recharge occurs. At the regional scale, the Sonoma Volcanics along with other Tertiary-aged geologic units are a secondary aquifer unit adjacent and/or underlying the Napa Valley Groundwater Basin. This fractured bedrock aquifer (Sonoma Volcanics generally) likely receives recharge via direct percolation of rainfall along with

potential inflows from overlying alluvium in the project recharge area. The Sonoma Volcanics underlying the Napa Valley alluvium may also receive inflows from streambed infiltration from streams located along the margin of the Napa Valley as well as via mountain block recharge (LSCE, 2017).

The rocks of the Sonoma Volcanics generally have very low primary porosity, and groundwater is stored in fractures resulting in highly variable well production. The andesitic unit of the Sonoma Volcanics has been described as comprised of individual lava flows displaying great variability in thickness and texture over short distances (Weaver, 1949). Given this heterogeneity it can be expected that hydrogeologic conditions exhibit similar spatial variability. Yields in bedrock units of the Sonoma Volcanics are reported to range from zero to as high as several hundred gallons per minute (gpm) (LSCE 2013). Based on well records reviewed for prior WAA's in this aquifer, well bores typically intercept the fractured rock aquifer at an elevation between 0 and 100 ft above mean sea level (ft amsl).

Well Data

Well Completion Reports (WCR's) for wells near the project parcel were obtained through the California Department of Water Resources' Well Completion Report Map Application and through the County of Napa Planning, Building, and Environmental Services Department's Electronic Document Retrieval system. The subset of these WCR's which could be accurately georeferenced based on parcel and location sketch information is discussed below and shown in Figure 2; these WCR's are compiled in Appendix A.

The project well (Well 1) was constructed in September 2006 in the eastern portion of the project parcel (Appendix A). The total depth of Well 1 is 396 feet; the well head elevation is about 180 ft amsl. Surficial geology in the vicinity of the project well is the Andesite of Staggs Leap unit of the Sonoma Volcanics (Map Unit Psvasl). The geologic log for this well reported volcanics for its entirety. This well is screened from 116 to 376 feet below ground surface (bgs) and the static water level at the time of construction in September was reported at 66 ft (~114 ft amsl). A two-hour air lift pump test conducted in September 2006 showed an estimated yield of 100 gallons per minute (gpm) but did not report a drawdown. The depth to water 50 ft above the depth of the shallowest well perforations indicates a pressure head indicative of a confined aquifer. This is generally consistent with the expectations regarding the regional fractured rock (Sonoma Volcanics) aquifer discussed above.

A 24-hr pump test of the project well (Well 1) in August 2013 by McLean & Williams found static water level at a depth of 73.6 ft, similar to that at time of construction but during a dry year. During the last 14 hours of the 24-hr pump test, the water elevation was stable with a drawdown of 19.6 ft (93.2 bgs) at a steady pumping rate of 20 gallons per minute. The water level recovered 93% of the drawdown within 24 hours. This pump test (Appendix C) provided robust data regarding well capacity, drawdown, and water level recovery at the operational pumping rate of the well.

In a recent lot line adjustment, 1.93 acres of vineyard and an additional well (Well 20) were incorporated into the project parcel. A WCR could not be found for this well but a pump test conducted in June 2023 showed a static water level 130 feet bgs. A two-hour pump test on this well revealed a flow rate of 7.3 gpm with 50 feet of drawdown (Appendix C). The well is currently pumped at a rate of 20 gpm though pumping rate may be reduced in the future as recommended in the pump test.

Well Completion Reports provided information for thirteen other nearby wells that could be accurately georeferenced, eight of which are constructed partially or wholly within the Sonoma Volcanics (Wells 2-5, 8-10, 15, see Figure 2 and Table 1). Wells 2-5 are located in surficial units of the Andesite of Staggs Leap and their geologic logs report that these wells are constructed and screened in volcanics for their entirety. Other wells are constructed on the floor of Napa Valley and reported encountering volcanic materials between 100 and 300 feet bgs. Every well documented in this analysis except Well 12 is screened partially or entirely within volcanics. Well yields in the vicinity of the project parcel range from 20 to 150 gpm. These yields are not unusual in the Sonoma Volcanics but may be artificially increased by short pump test durations.

Table 1: Well completion details for wells in the vicinity of the project parcel.

Well ID	1	2	3	4	5	6	7	8	9	10
Year Completed	2006	2016	2022	2014	1982	-	-	1974	2004	2004
Depth (ft)	396	358	500	665	500	-	-	300	404	352
Static Water Level (ft)	66	55	98	340	375	-	-	18	40	40
Estimated Yield (gpm)	100	60	100	50	50	-	-	20	30	45
Top of Screen (ft)	116	138	80	385	380	-	-	-	104	102
Bottom of Screen (ft)	376	338	480	665	500	-	-	-	404	352
Geologic Map Unit	Tsa	Qhf	Tsa	Tsa	Tsa	Tsa	Tsa	Qhf	Qhf	Qhf
DWR WCR No.	e036934	e0322921	E19-00194	e0210024	119514	E20-00306	E20-00306	2959	796962	918500
Well ID	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Year Completed	-	2000	2014	195	1992	2008	2013	-	-	-
Depth (ft)	-	198	480	180	400	400	622	-	-	-
Static Water Level (ft)	-	32	85	-	30	75	25	-	6	130
Estimated Yield (gpm)	-	2.5	45	35-40	100	30	150	-	-	7.3
Top of Screen (ft)	-	78	220	60	40	104	102	-	-	-
Bottom of Screen (ft)	-	198	480	180	400	400	622	-	-	-
Geologic Map Unit	Qhf	Qhf	Qhf	Qhf	Qhf	Qhf	Qhf	Qhf	Qhf	Qhf
DWR WCR No.	E14-00268	710535	e0231592	15706	384942	1073612	e0176210	E12-00002	19545	-

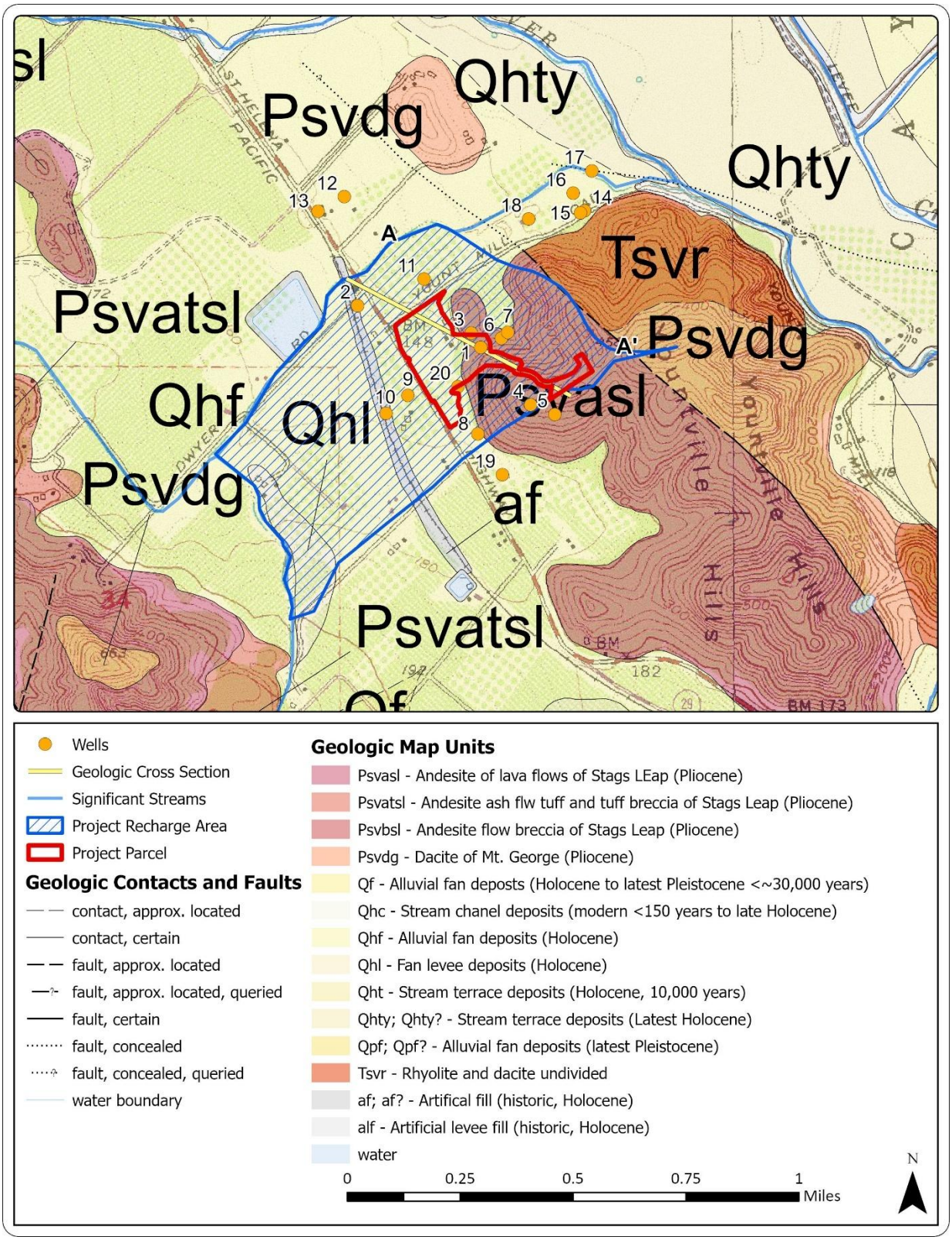

Figure 2: Surficial geology and locations of wells in the vicinity of the project parcel. Surficial geology based on data from the Geologic Map of the Napa and Bodega Quadrangle 30' x 60' (Wagner and Gutierrez, 2017).

Geologic Cross Section

A geologic cross-section oriented northwest to southeast is shown in Figure 3 (see Figure 2 for location). Elevations along the cross-section range from approximately 145 feet above sea level at the streambed of Lincoln Creek to 404 feet above sea level at the peak of the Yountville Hills. Driller's logs from WCRs for wells located near the cross section indicate that wells are screened partially or entirely within the Sonoma Volcanics; this aquifer material extends a minimum of 750 feet bgs to at least 300 ft below sea level.

Static water levels from Well Completion Reports for wells constructed or partially screened in surficial alluvial deposits are typically higher and closer to ground surface than in wells constructed and screened entirely within the Andesite of Staggs Leap. The static water level reported at Well 1 at the time of construction (September 2006) was 66 feet bgs or approximately 114 ft amsl. This is about 30 feet below the streambed elevation on the cross section and about 10 feet below the streambed elevation at the point closest to the project well.

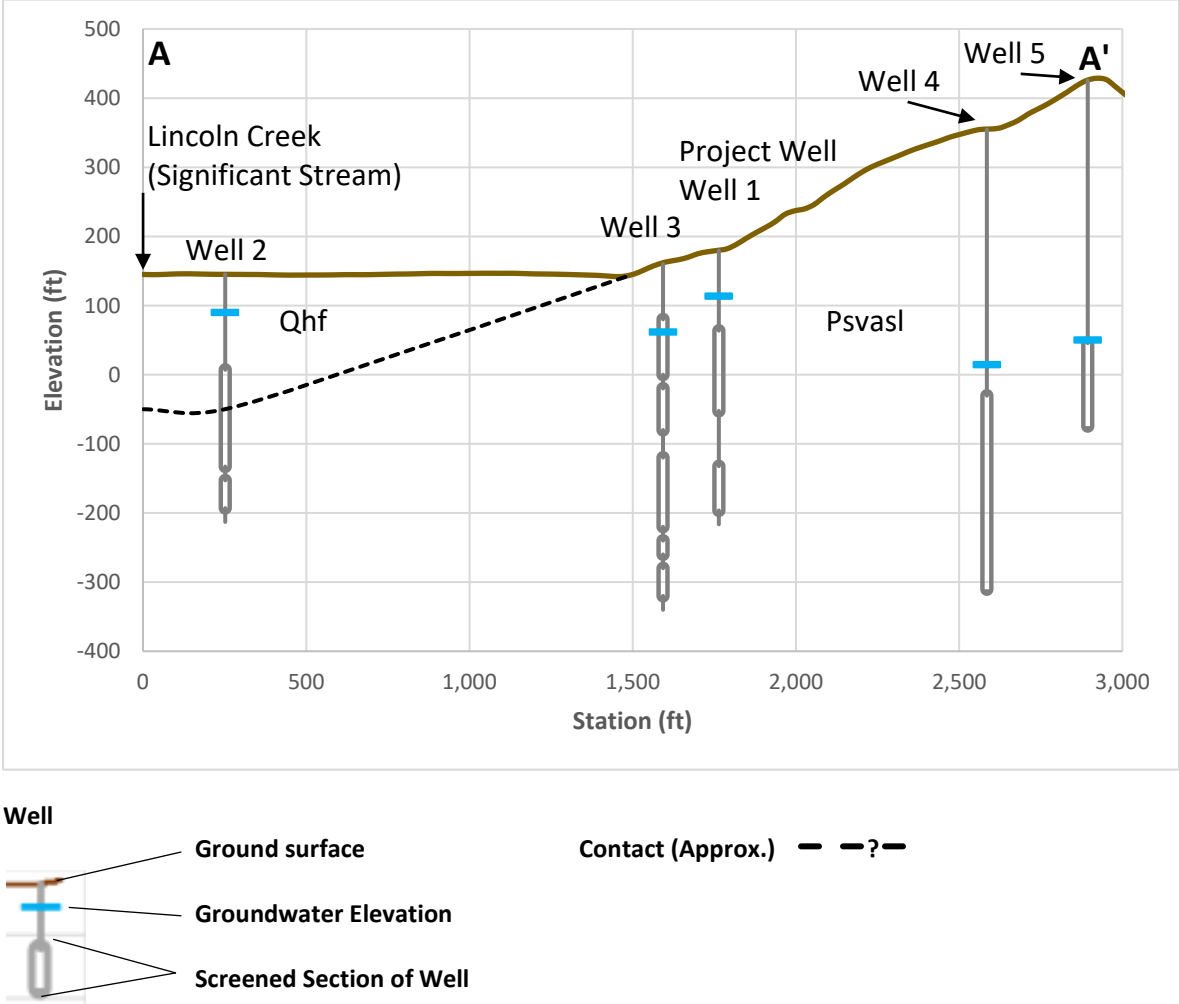

Figure 3: Hydrogeologic cross section A -A' (see Fig. 2 for location & geologic map units). Note that Lincoln Creek is about 1,380 feet from the project well (#1) at its nearest point which is not in the cross-section alignment.

Project Aquifer

The existing well on the project parcel (Well 1) is on the lower slope of the Yountville Hills and above the floor of Napa Valley that comprises the Napa Valley Groundwater Sub-basin (Figure 1). This well is constructed entirely in the Andesite of Staggs Leap and has no contact with the surficial alluvial deposits in which Lincoln Creek lies.

Due to the depth of the surrounding wells, the depth of well perforations (screened intervals) in nearby wells, the mapped extent of the Andesite of Staggs Leap (Map unit Psvasl), and apparent shallow depth of alluvium near the project parcel, we believe that Well 1 utilizes groundwater in the fractured bedrock aquifer comprised of the Sonoma Volcanics. This appears to be the same for nearly all other wells near the project parcel where alluvium is present at the surface as discussed in detail below.

Little vertical connection exists between the aquifer accessed by the project well and the alluvial aquifer that supports flow in Lincoln Creek and the Napa River. These waterways lie in surficial alluvial deposits which extend approximately 50 feet bgs in the vicinity of the project parcel (map unit Qhf). Subsurface geology and depths of alluvium can be inferred from geologic logs in WCRs from wells completed in the project recharge area (Table 2). The majority of wells in the vicinity of the project, including the project well (Well 1), are screened exclusively in the Sonoma Volcanics bedrock aquifer (Map Units Tsr and Tsa, Figure 7). These wells do not draw any water from the alluvial aquifer and are vertically separated from Lincoln Creek such that they will not impact streamflow in the waterway. Two wells in the project recharge area (Fig. 4a) are screened in both the alluvial aquifer and the underlying bedrock, though these wells are constructed in deposits identified as Artificial Levee Fill (Map Unit af, Figure 7) and as such, fine-grained sediment identified as alluvium could also be placed material and is not necessarily indicative that the wells are screened in an alluvial aquifer. It is clear from these geologic logs that the project well and most other wells in the recharge area are accessing the fractured bedrock aquifer that is vertically separated from the alluvial aquifer, making any potential streamflow interference highly unlikely.

Table 2: Subsurface geologic conditions summarized from WCRs for wells in the recharge area

Well No.	Top Screen	Bottom Screen	Alluvium Depth	Aquifer Accessed
1	116	376	0	Bedrock
2	138	338	195	Both
3	80	480	0	Bedrock
4	385	665	0	Bedrock
5	380	500	25	Bedrock
6	-	-	-	?
7	-	-	-	?
8	-	-	0	Bedrock
9	104	404	90	Bedrock
10	102	352	200	Both
11	-	-	?	?

The Sonoma Volcanics aquifer likely receives recharge via direct percolation of rainfall, percolation from overlying alluvial units, and from streambed infiltration from streams located along the eastern margin of the Napa Valley as well as via mountain block recharge (LSCE, 2017). Given the relatively great depths of wells and the low porosity of the underlying fractured rocks, and high static water levels relative to top of their perforated casing, the project aquifer is likely confined or semi-confined. Additional discussion of this aquifer is found later in this report in the "Groundwater Surface Water Risk Assessment" section.

In the recent line adjustment, the project parcel acquired another well (Well 20) which lies outside of the 1500-ft buffer zone of from Lincoln Creek. The construction details of this well are unknown. Water use in this well is not expected to increase as a result of this project. In the existing condition, this well is used to irrigate approximately 1.9 acres of vineyard acquired in the lot line adjustment. No record of a domestic well could be found on this newly acquired 1.9 acre parcel.

Water Demand and Groundwater Pumping Regime

Within the project recharge area, water demand was estimated for both the existing and proposed conditions. Uses on the project parcel were determined using site details provided by the project applicant and verified using satellite imagery. Uses on other neighboring parcels within the project recharge area were determined using satellite imagery and information from the Napa County Wineries Public Database. Irrigation rates for vineyards on the project parcel were estimated using data provided by the project applicant. All other water use rates were estimated using data from the County of Napa's Water Availability Analysis Guidance Document dated May 12, 2015.

Approach for Tier 1 Analysis

Groundwater use data for the project for the updated Tier 1 WAA is updated to reflect the recent lot line adjustment and updated understanding of water uses on the property. OEI's Tier 1 analysis evaluates this groundwater use data in relation to local area existing use in the project recharge area and compares groundwater use to local area groundwater recharge per techniques used for upland watersheds outside the Napa Valley Groundwater Basin which accounts for direct precipitation recharge but neglects potential interaction with the Napa River alluvium. The project aquifer is fractured bedrock that is hydrogeologically distinct from the Napa Valley Groundwater Basin.

Existing Use

Water demand for pre-project (existing conditions) was determined both from overall pumping from Well 1 combined with use rates for specific uses. Average annual groundwater use from Well 1 was 9.57 ac-ft based on the five year average of annual pumping from Well 1 for the period 2018 to 2022 (Appendix B). Rates of use and total annual use are summarized in Table 3.

A recently acquired vineyard block of 1.93 acres included in the lot line adjustment was previously irrigated from a second well (Well 20) located adjacent to the acquired vineyard block; this water use is itemized separately in Table 3. Existing water use on the project parcel is estimated to be 11.02 ac-ft per year calculated as the sum of the average annual pumping from Well 1 and irrigation of the recently acquired vineyard block. Vineyard irrigation rates are based on reported viticultural practices for the property. Landscaping water use is estimated based on a WELO analysis commissioned for the prior Tier 1 work (Appendix B). Guest and employee use in Table 3 is representative of existing uses and practices as reported by the applicant. Miscellaneous Use in Table 3 accounts for the difference between the sum of water use from Well 1 and Well 20 and estimated uses listed in Table 3. Actual water uses believed to be represented in Miscellaneous Use are for construction work on the property, losses associated with a ruptured pipe (since repaired), and extra irrigation of landscaping during drought and heat events.

Table 3: Existing water use as on the project parcel

	# of Units	Use per Unit	Annual Water Use (AF/yr)
Agricultural Use			**7.98**
Vineyard	8.71 Acres	0.75 AF/acre/yr	6.53
Vineyard (Separate Well)	1.93 Acres	0.75 AF/acre/yr	1.45
Winery Use			**2.11**
Process Water	0 Gallons	2.15 AF/100,000 gal.	0.00
Landscaping	2.11 AF	-	2.11
Guest & Employee Use			**0.40**
Tasting Room Visitations	20020 Guests	3 gal./Guest	0.18
Events w/ On-Site Catering	1146 Guests	15 gal./Guest	0.05
Full-Time Employees	13 Employees	15 gal./shift @ 250 shifts/yr	0.15
Part-Time Employees	2 Employees	15 gal./shift @ 125 shifts/yr	0.01
Miscellaneous Use	-	-	**0.53**
Total			**11.02**

Neighboring parcels within the project recharge area contain 11 primary residences, 2 secondary residences, four pools, and 5,900 square feet of additional lawn (Figure 4). Also within the recharge area are 117 acres of vineyard and three wineries with a combined production capacity of 110,000 gallons, a combined visitation of 42,640 tasting guests and 30 event guests, and a combined 19 full-time employees (Table 4). In total, water demand in the project recharge area is estimated to be 81.94 Acre-ft/yr of which 11.02 acre-ft comes from the project parcel and the remaining 70.92 acre-ft/year come from neighboring parcels (Table 5).

Table 4: Estimated existing water use on neighboring parcels within the project recharge area.

	# of Units	Use per Unit	Annual Water Use (AF/yr)
Residential Use			**9.94**
Residences, Primary	11 Residences	0.75 AF/Residence	8.25
Residences, Secondary	2 Residences	0.35 AF/Residence	0.70
Pools	4 Pools	0.10 AF/Pool	0.40
Lawn, Additional	5893 sq. ft.	0.10 AF/1,000 sq. ft.	0.59
Agricultural Use			**57.45**
Vineyard	114.9 Acres	0.50 AF/acre/yr	57.45
Winery Use			**2.92**
Process Water	110000 Gallons	2.15 AF/100,000 gal.	2.37
Domestic & Landscaping	110000 Gallons	0.50 AF/100,000 gal.	0.55
Guest & Employee Use			**0.61**
Tasting Room Visitations	42640 Guests	3 gal./Guest	0.39
Events w/ On-Site Catering	30 Guests	15 gal./Guest	0.00
Full-Time Employees	19 Employees	15 gal./shift @ 250 shifts/yr	0.22
Total			**70.92**

Proposed Use

Water use in the proposed condition for the project is summarized in Table 5. Wine production on the project parcel will increase to 75,000 gallons per year. There are relatively small increases in water use associated with winery landscaping and Guest & Employee Use. These increase in water demand from are offset by a decrease in vineyard irrigation rate from 0.75 to 0.5 ac-ft/ac/yr such that there will be a net decrease of 1.29 acre-ft per year to 9.73 acre-ft/yr. The overall change in water use in the project recharge area is summarized in Table 6 where both neighboring uses and project use under project conditions are compared.

Table 5: Proposed water use on the project parcel.

	# of Units	Use per Unit	Annual Water Use (AF/yr)
Agricultural Use			**5.20**
Vineyard	10.39 Acres	0.50 AF/acre/yr	5.20
Winery Use			**3.82**
Process Water	75000 Gallons	2.15 AF/100,000 gal.	1.61
Landscaping	2.20 AF	-	2.20
Guest & Employee Use			**0.71**
Tasting Room Visitations	45240 Guests	3 gal./Guest	0.42
Events w/ On-Site Catering	1866 Guests	15 gal./Guest	0.09
Full-Time Employees	17 Employees	15 gal./shift @ 250 shifts/yr	0.20
Part-Time Employees	2 Employees	15 gal./shift @ 125 shifts/yr	0.01
Total			**9.73**

Table 6: Estimated groundwater use within the project recharge area in the existing and proposed conditions.

	Existing Condition (acre-ft/yr)	Proposed Condition (acre-ft/yr)
Project Parcel	**11.02**	**9.73**
Irrigation Use	7.98	5.20
Winery Use	2.11	3.82
Employee/Guest Use	0.40	0.71
Neighboring Parcels	**70.92**	**70.92**
Residential Use	9.94	9.94
Irrigation Use	57.45	57.45
Winery Use	2.92	2.92
Employee/Guest Use	0.61	0.61
Total	**81.94**	**80.65**

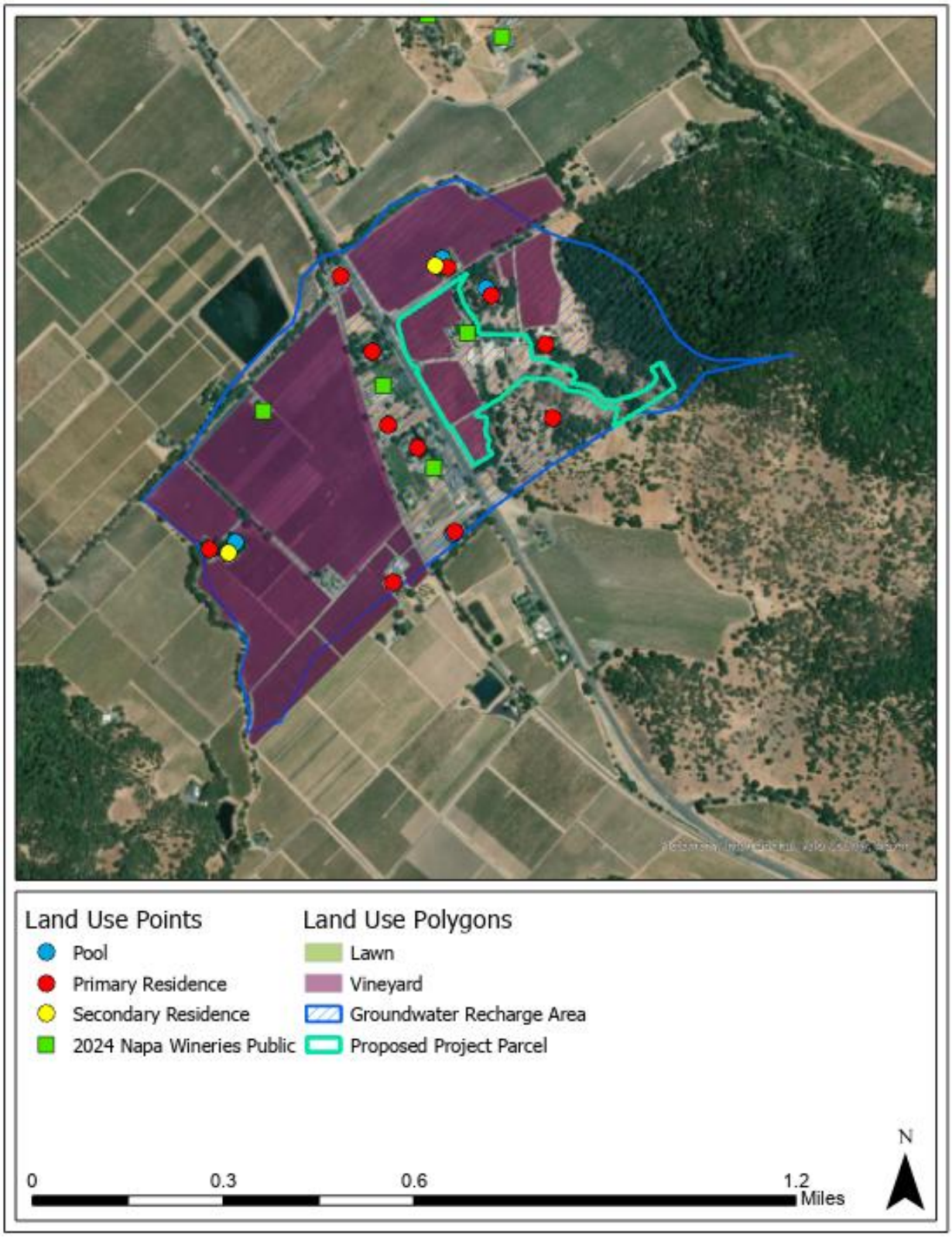

Figure 4: Existing water uses on parcels within the project recharge area.

Groundwater Recharge Analysis

Groundwater recharge within the project recharge area was estimated using a Soil Water Balance (SWB) of Napa County developed by OEI. This model implements the U.S. Geologic Survey's SWB modeling software and produces a spatially distributed estimate of annual recharge. This model operates on a daily timestep and uses daily values for precipitation and evapotranspiration along with soil hydrologic parameters and vegetation cover. The model calculates runoff based on the Natural Resources Conservation Service (NRCS) curve number approach and Actual Evapotranspiration (AET) and recharge based on a modified Thornthwaite-Mather soil-water-balance approach (Westenbroek et al., 2010). Details of this model are included in Appendix D.

Groundwater recharge for this project area was previously simulated for Water Year 2010 which was selected because annual precipitation in that year was nearest to the 30-year average for the period 1981-2010. OEI's SWB modeling also estimated recharge for Water Year 2014 to represent drought year conditions. In late November 2022, County of Napa instituted a new policy prescribing that for purposes of estimating groundwater recharge, the mean annual precipitation to be used is that mean for Water Years 2012-2021 derived from the newest PRISM data. County of Napa has provided gridded GIS data of the mean precipitation for this period for use by WAA practitioners.

OEI's use of the SWB model is believed to provide more accurate estimates of potential groundwater recharge because it is a physically based distributed model that incorporates information characterizing the water balance in the soil column. Calculation of evapotranspiration using local climate data along with soil moisture storage and precipitation is believed to provide a more accurate representation of local conditions; evapotranspiration is the largest component of the water balance. Unfortunately, the SWB model structure does not allow for a groundwater recharge calculation based on a mathematical average because the model is driven by daily climate data. Consequently, OEI has adapted the SWB model estimates for the prior "average year" (WY 2010) and the "drought year" (WY 2014) to provide an estimate for the average annual rainfall for the period 2012-2021 developed by County of Napa.

OEI has utilized SWB models for WY 2010 and WY 2014 for dozens of project sites in the County of Napa. We have observed that potential recharge for WY 2010 is consistently much greater than for WY 2014 across a wide variety of terrain, vegetation, soils and climate. This is most easily characterized by the percentage of annual precipitation available for recharge that we calculate for each project site. Our approach for adapting the SWB model outputs to estimate groundwater recharge for the specified annual average precipitation is to assume that the percentage of annual rainfall available for groundwater recharge is a linear function of annual rainfall and interpolating between the recharge percentage for WY 2010 and WY 2014. The linear interpolation procedure is unique for each project site; the application for this project site is graphically displayed in Figure 5. The water balance data from the SWB model years is tabulated in Table 7.

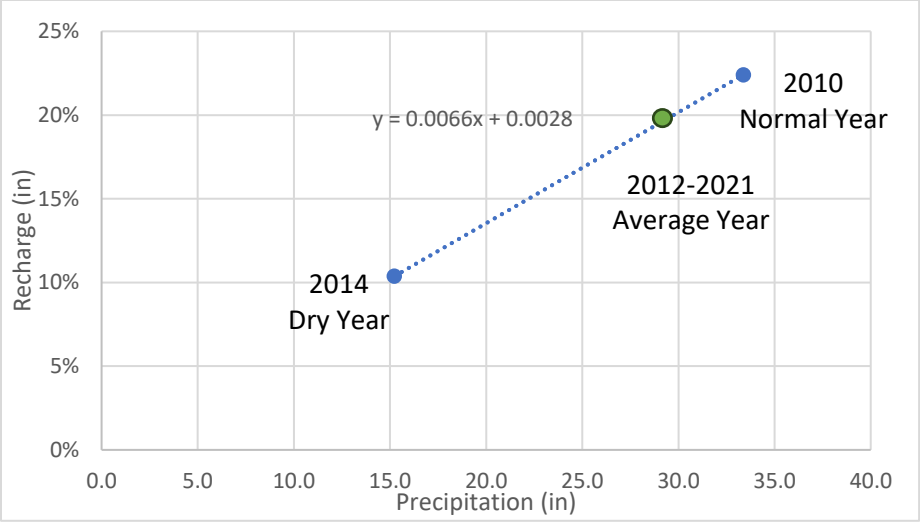

Figure 5: Linear relationship between precipitation and recharge in 2010 (Average Water Year) and 2014 (Dry Water Year) conditions. Estimated based on SWB outputs.

Soil-water balance model results for the average water year 2010 showed 33.4 inches per year of precipitation and 7.5 inches of recharge. Model results for dry water year 2014 showed a spatially averaged 15.2 inches of precipitation, 1.6 inches or 10% of which became recharge (Table 7). In 2022, County of Napa issued new policy to utilize 10-year average precipitation data assembled between 2012 and 2021 by the PRISM climate group. If we assume a linear relationship between precipitation and the percentage of precipitation recharged, we can forecast the 10-year average groundwater recharge. The 10-year average precipitation in the project recharge area is estimated to be 28.5 inches, assuming a linear relationship, 19% or 5.44 inches of this precipitation is available as groundwater recharge in the project recharge area (Figure 5).

Groundwater recharge estimates can also be expressed as a total volume by multiplying the estimated recharge rate by a representative area. For the 226-acre project recharge area, these calculations yield an estimated average annual recharge of 102.6 acre-ft/yr. For the approximately 21.7-acre project parcel, these calculations yield an estimated average annual recharge of 9.8 acre-ft/yr (Table 8).

Table 7: Summary of water balance results estimated by the SWB model.

	2010 Normal Year		2014 Dry Year		2021 Average Year	
	inches	% of precip	inches	% of precip	inches	% of precip
Precipitation	33.4	-	15.2	-	28.5	-
AET	19.5	58%	14.8	97%	-	-
Runoff	7.2	22%	2.7	18%	-	-
Δ Soil Moisture	-0.8	-2%	-3.9	-26%	-	0%
Recharge	7.5	22%	1.6	10%	5.44	19%

Water balance estimates are available for several nearby watersheds that are predominately underlain by the Sonoma Volcanics including Conn, Redwood, Milliken, and Tulucay Creeks. Average annual recharge for these watersheds is estimated to range from 5% in Tulucay Creek to 21% in Conn Creek (LSCE, 2013). Regional estimates are also available for the Napa River watershed, the Santa Rosa Plain, Sonoma Valley, and the Green Valley Creek watershed. These regional analyses estimated mean annual recharge to be between 7% and 28% of mean annual precipitation (Farrar et. al., 2006; Flint and Flint 2014, Kobor and O'Connor, 2016; Wolfenden and Hevesi, 2014).

Results

The total proposed groundwater use for the project recharge area is estimated to be 80.65 acre-ft/yr. This use is equivalent to 79% of the estimated 102.6 acre-feet of recharge based on the 2012-2021 average precipitation. A similar comparison can be drawn for the 21.7-acre project parcel where the proposed 9.73 ac-ft/year demand is equivalent to 99% of the estimated 9.8 acre-ft of average annual recharge during (Table 8). Given that this project would result in a net decrease in demand, water use associated with the proposed project is highly unlikely to result in reductions in groundwater levels or depletion of groundwater resources over time relative to existing conditions.

Table 8: Comparison of proposed water use to average annual groundwater recharge for the project recharge area and for the project parcel.

	Area (acres)	Total Proposed Demand (ac-ft/yr)	2012-2021 10-Year Average		
			Recharge (ac-ft/yr)	Recharge Surplus (ac-ft/yr)	Demand as % of Recharge
Project Recharge Area	226.2	80.7	102.6	21.9	79%
Project Parcel	21.7	9.73	9.84	0.1	99%

Well Interference Analysis

Because there is a decrease in water use relative to existing conditions, Tier 2 analysis is not required.

Groundwater - Surface Water Interaction Risk Assessment-Tier 3

Napa County Tier 3 WAA guidance for assessment of groundwater-surface water interactions was modified by the emergency policy adopted in June 2022 along with other objectives. PBES guidance now identifies streams of concern for groundwater-surface water interaction, including Lincoln Creek, a Napa River tributary flowing across alluvial deposits north of the project parcel. Figure 6 displays the location of the Well 1 and Well 20 relative to Lincoln Creek. Well 1 is

approximately 1,385 feet from Lincoln Creek at its nearest point. Well 20 lies greater than 1,500 ft from Lincoln Creek and is not subject to the Tier 3 analysis.

Hydrogeologic Conditions Supporting Streamflow

Lincoln Creek lies in surficial units of Quaternary-aged alluvial deposits (Figure 2 and Figure 7). Well 1 is constructed and perforated entirely within the Andesite of Staggs Leap as shown in Figure 3. The Andesite of Staggs Leap underlies the alluvium intersected by the creek and as such it is possible that the underlying Sonoma Volcanics deliver some groundwater inflows to the alluvial aquifer. The degree of connectivity between the alluvial aquifer and the underlying and adjacent confined aquifer of the Sonoma Volcanics is limited by its low porosity and low transmissivity relative to the unconfined alluvial aquifer.

Chapter 6 of the Napa Valley Subbasin Groundwater Sustainability Plan (GSP) describes groundwater and surface water conditions in the Napa Valley. Lincoln Creek was identified as one of many Napa River tributaries with intermittent flow in a 2015 mapping effort by the Napa County Resource Conservation District (LCSE, 2022). In contrast to a perennial stream which is assumed to have continuous hydraulic connection to groundwater throughout the year, intermittent streams are believed to only have the potential for hydraulic connection to groundwater for limited periods throughout the year.

The Napa Valley Integrated Hydrologic Model (NVIHM) prepared for the GSP simulated the period 1988 to 2014 and investigates hydrologic connectivity between the Napa River and its tributaries with the underlying and adjacent aquifer (Chapter 6; LCSE, 2022). As presented in Figures 6-123b-e (GSP Chapter 6), the Lincoln Creek is hydraulicly connected to groundwater for 2 to 13 weeks annually in the reach near the project well. No connection is expected in the period between June and October, and connection frequency is modeled to be 2-25% during March. This indicates that Lincoln Creek experiences groundwater connectivity only during the winter period of the year when streamflow is highest and project water demand is lowest.

The degree of connectivity between a well screened within the Sonoma Volcanics and groundwater hydraulicly connected to Lincoln Creek will depend on several factors: aquifer characteristics including the groundwater flow gradient, the depth of the screened interval compared to the channel elevation in the river, the spatial relationship between the well and channel, and the pumping regime of the well. The specific factors considered in the County guidance for assessing potential interaction between surface water and groundwater are discussed below.

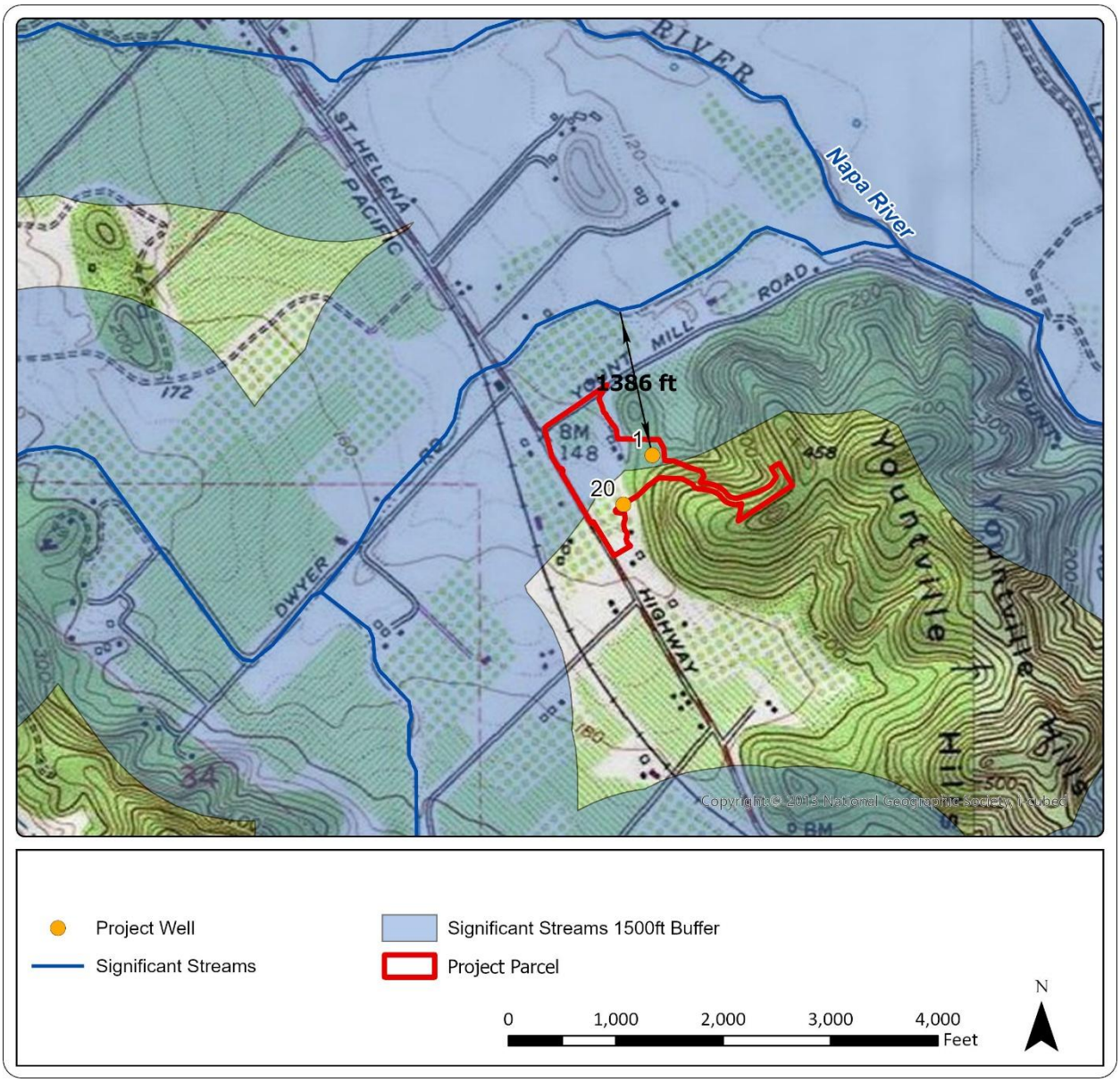

Figure 6: Significant streams in Napa County with 1,500ft buffer and distances to Well 1 – Project Well

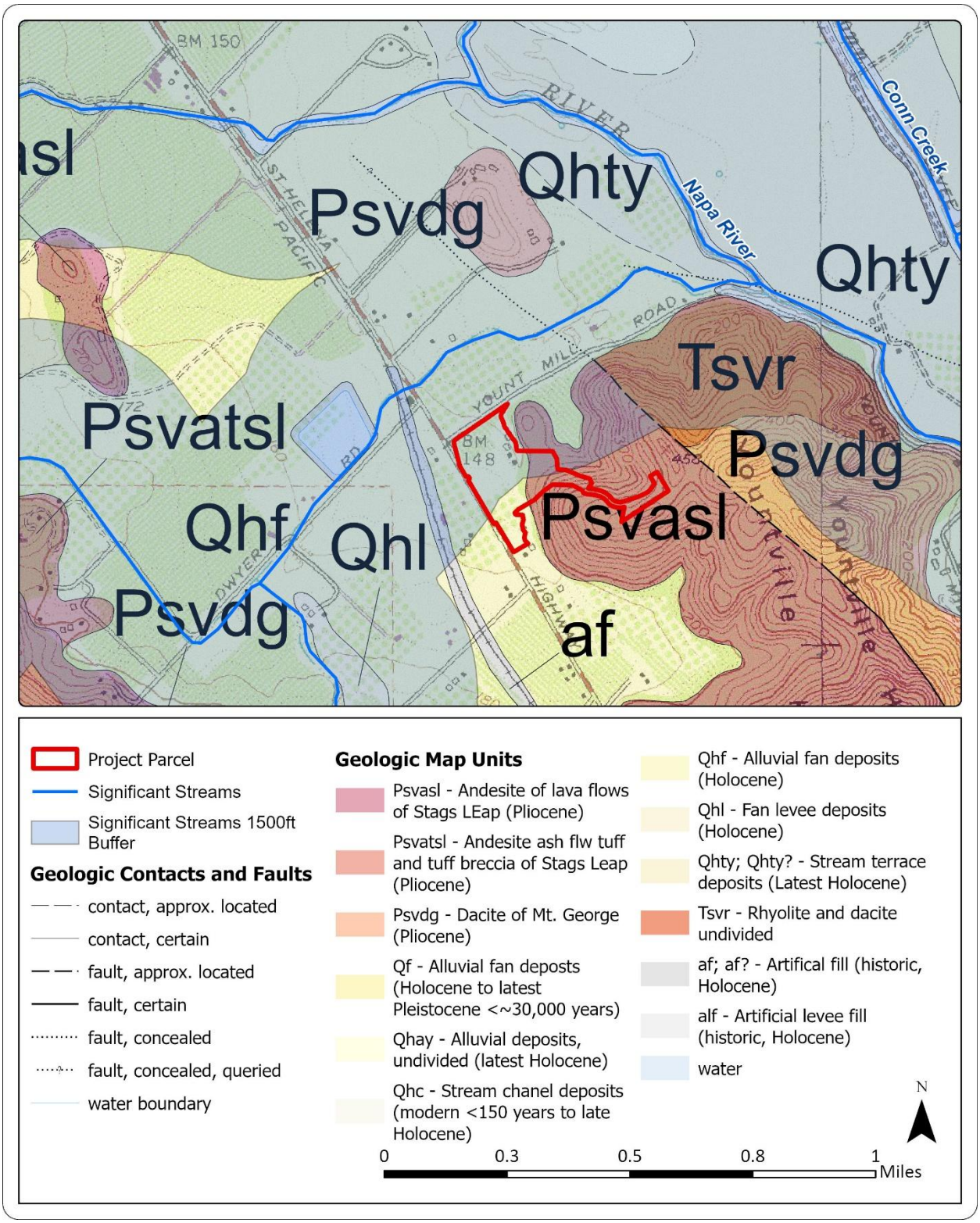

Figure 7: Surficial geology and significant streams with 1,500 ft buffer in immediate vicinity of the project parcel. Surficial geology based on data from the Geologic Map of the Napa and Bodega Quadrangle 30' x 60' (Wagner and Gutierrez, 2017).

Tier 3 WAA Criteria and Potential Connectivity Between Project Aquifer and Surface Water

As shown in Figure 6, the project well (Well 1) is within 1,500 feet of the nearest stream of concern for potential streamflow depletion identified by the County of Napa. Well 1 is approximately 1,385 feet south of the nearest point on Lincoln Creek.0 The Tier 3 WAA guidance provides well set-back standards and construction assumptions that "if applicable would be expected to preclude any significant adverse effects on surface waters". Specifically, the "Tier 3 Groundwater Surface Water Interaction Criteria" section (pp. 10-13 of the Napa County guidance document dated May 12, 2015) states:

> *The groundwater/surface water criteria are presumptively met if the distance standards and project well construction assumptions are met (see Tables 3, 4, and 5). (p. 10)*

These standards consider the planned pumping rate of the project well along with the well depth, screened interval, and seal depth along with aquifer hydraulic conductivity values and present acceptable distances based on specific combinations of parameters, Tables 3, 4, and 5 in the Napa WAA guidance document present these distance standards and assumptions for wells constructed in unconsolidated (alluvial) and unconfined aquifers. These assumptions are primarily intended for wells in the Napa Valley Groundwater Basin (NVGB). The Project Well is constructed in Sonoma Volcanics and lies outside of the boundaries of the NVGB.

The Tier 3 WAA guidance for wells drilled in bedrock in the "hillside zone" (All Other Areas excluding the MST aquifer in southeast Napa) is as follows:

> *All Other Areas, will be subject to other distance standards based on site-specific aquifer conditions. Distance standards for project wells completed in consolidated formations will generally be no more restrictive than those shown in* ***Tables 3, 4, and 5*** *for hydraulic conductivity values of 0.5 ft/day*. (p. 11)

In other words, standards described in Tables 3, 4 and 5 for wells in bedrock aquifers are to be considered as wells with hydraulic conductivity values of 0.5 ft/day. Tier 1 WAA assembled by Guadalupe S. Chavarria, PE assumes a peak pumping demand just over 20 gpm, placing the project well in the "Low capacity" pumping category as summarized in Table 4 below (numbered per County Guidance Document, 2015) reproduced from the County guidance document. Hydraulic conductivity in andesite, basalt, and rhyolite units of the Sonoma Volcanics (including map unit Psvasl where the project well is constructed) is typically on the order of 0.0001 ft/day (Faye, 1973), lower than that assumed per Table 4 and therefore likely to have even less effect on streamflow than implied by Table 4.

The well head elevation of the project well (Well 1) is about 180 ft amsl. The screened interval of Well 1 begins 116 ft bgs (about 64 ft amsl), which is approximately 60 ft below the bed of Lincoln Creek (about 125 ft amsl at its nearest point). Well 1 also has a concrete well seal extending to 57 ft bgs (about 123 ft amsl). The static water elevation in the well is about 70

ft bgs (~110 ft amsl), which is about 15 ft below the bed of Lincoln Creek at its nearest point. The elevation relationships portrayed in Figure 3 are similar. The pumping rate of the well is 20 gpm, and peak daily demand for groundwater would require pumping for 9 hours per day.

Table 4. 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
50			✓	50	150
30			✓	50	100
0.5		✓		50	100

Per Table 4 above, "Low Capacity" wells that are constructed in materials with a hydraulic conductivity of 0.5 ft/day and meet all construction standards, including a minimum seal depth of 50 ft and a minimum depth to uppermost perforations of 100 ft are not considered to have adverse effects on streamflow when located 1,000 ft or more from surface waters of concern. As detailed above, the project well (Well 1) meets all criteria in Table 4.

As noted above, several additional hydrogeologic factors indicate that impacts of groundwater pumping for the proposed project upon flows in Lincoln Creek are not likely to be substantial:

- Lincoln Creek is an intermittent stream that has a short seasonal period in winter and/or spring when a hydraulic connection with groundwater exists; this period of connectivity does not coincide with periods of high groundwater demand.
- Groundwater elevation in the project well (Well 1) measured in September 2006 (66 ft bgs or ~114 ft amsl) and in August 2013 (73 ft bgs or ~107 ft amsl) lies below the streambed elevation of Lincoln Creek (~125 ft amsl) at its nearest proximity to the project well (~1,300 ft).
- Drawdown of groundwater elevation in the project well (Well 1) during a 24-hr pump test at 20 gpm in August 2013 was only 20 ft with 93% recovery within 24 hours indicates that the pressure head in the Sonoma Volcanics confined aquifer is relatively high and the operational pumping does not excessively lower the groundwater elevation. This indicates that potential groundwater movement that may occur from the Sonoma Volcanics to the alluvium underlying Lincoln Creek is unlikely to be significantly affected.

- The relatively low hydraulic conductivity of the Sonoma Volcanics (~0.0001 ft/day) from which the project well pumps groundwater relative to the hydraulic conductivity of the alluvial aquifer underlying Lincoln Creek (>10 ft/day) suggests that the rate of potential groundwater flow from the Sonoma Volcanics to the adjacent/overlying alluvial aquifer is low.

Based on these data and our interpretation of the hydrogeology of the project area, we believe that the proposed project will not have a significant impact on seasonal flows in Lincoln Creek.

References

Graymer et al., 2007. Geologic Map and Map Database of Eastern Sonoma and Western Napa Counties, California. U.S. Geologic Survey Scientific Investigations Map 2956.

Luhdorff and Scalmanini Consulting Engineers (LSCE), 2022. Napa Balley Subbasin Groundwater Sustainability Plan Section 6. Groundwater and Surface Water Conditions. Prepared for Napa County Groundwater Sustainability Agency.

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Luhdorff and Scalmanini Consulting Engineers (LSCE), 2017. Northeast Napa Area: Special Groundwater Study. Prepared for Napa County.

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Wagner, D.L., and Gutierrez, C.I., Geologic Map of the Napa 30 x 60 Minute Quadrangle, California. California Geological Survey.

Weaver, C.E., 1949, Geology of the Coast Ranges Immediately north of the San Francisco Bay Region, California. Geological Society of America.

APPENDIX A

WELL COMPLETION REPORTS

Well 1

31-120-27

2/8/07

ORIGINAL
File with DWR

Page 1 of 1

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. e039634

DWR USE ONLY — DO NOT FILL IN
STATE WELL NO./ STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

Owner's Well No. 1-'06

Date Work Began 9/12/2006, Ended 9/15/2006

Local Permit Agency Napa County Environmental Mgmt

Permit No. E06-01313 Permit Date 8/31/2006

GEOLOGIC LOG

ORIENTATION (✓) ✓ VERTICAL — HORIZONTAL — ANGLE — (SPECIFY)

DRILLING METHOD ROTARY FLUID AIR

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain, size, color, etc.*
0	15	GRAY/TAN VOLCANICS
15	30	BLACK VOLCANICS
30	40	GRAY/BROWN VOLCANICS
40	100	BLACK VOLCANICS
100	120	BLACK/GRAY VOLCANICS
120	220	BLACK/RED VOLCANICS
220	240	BLACK VOLCANICS
240	400	BLACK/GREEN VOLCANICS
		CONTINUED CASING LAYOUT
316	376	SCREEN PVC 6" .032 SLOT
376	396	BLANK PVC 6"

RECEIVED
NOV 07 2006
DEPT. OF ENVIRONMENTAL MANAGEMENT

TOTAL DEPTH OF BORING 400 (Feet)

TOTAL DEPTH OF COMPLETED WELL 396 (Feet)

WELL OWNER

Name [redacted]

Mailing Address [redacted]

St. Helena CA 94574

CITY STATE ZIP

WELL LOCATION

Address 7466 Highway 29

City Yountville CA

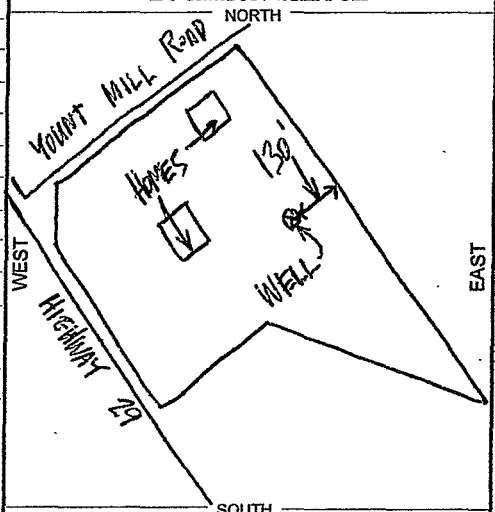
County Napa

APN Book 031 Page 120 Parcel 010

Township ____ Range ____ Section ____

Latitude ____ DEG. MIN. SEC. ____ DEG. MIN. SEC.

LOCATION SKETCH



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)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 135 (Ft.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL 66 (Ft.) & DATE MEASURED 9/15/2006

ESTIMATED YIELD * 100 (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.

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	60	12								
60	400	9								
0	116		✓				PVC F480	6	SDR-21	
116	236			✓			PVC F480	6	SDR-21	.032
236	316		✓				PVC F480	6	SDR-21	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	57	✓			CONCRETE
57	396			✓	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 Napa CA 94559
ADDRESS CITY STATE ZIP

Signed ____ 09/15/06 439-746
WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED C-57 LICENSE NUMBER

DWR 188 REV. 11-97

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

E16-00619 WL

ORIGINAL
File with DWR

Well 2

Page 1 of 1

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. e0322921

DWR USE ONLY — DO NOT FILL IN
STATE WELL NO / STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

Owner's Well No. 1-2016
Date Work Began 10/20/2016 Ended 11/1/2016
Local Permit Agency Napa County Environmental Mgmt
Permit No. E16-00619 Permit Date 9/8/2016

GEOLOGIC LOG

ORIENTATION (✓) ✓ VERTICAL — HORIZONTAL — ANGLE — (SPECIFY)
DRILLING METHOD ROTARY FLUID BENTONITE

DEPTH FROM SURFACE Ft. to Ft.	DESCRIPTION *Describe material, grain, size, color, etc.*
0 – 4	BROWN CLAY
4 – 25	SAND & GRAVEL
25 – 40	LARGE GRAVEL
40 – 45	BROWN CLAY
45 – 52	SAND & GRAVEL
52 – 56	BROWN CLAY
56 – 80	SAND & GRAVEL
80 – 88	BROWN CLAY
88 – 142	BROWN CLAY WITH GRAVEL STRINGERS
142 – 160	SAND & GRAVEL
160 – 195	50% SAND & GRAVEL / 50% BROWN CLAY
195 – 230	GRAY, BROWN VOLCANICS
230 – 235	RED VOLCANICS
235 – 350	BLACK, BROWN VOLCANICS
350 – 360	BLACK, BROWN VOLCANICS WITH GRAY ASH

RECEIVED
1 8 2017
Napa County Planning, Building & Environmental Services

TOTAL DEPTH OF BORING 360 (Feet)
TOTAL DEPTH OF COMPLETED WELL 358 (Feet)

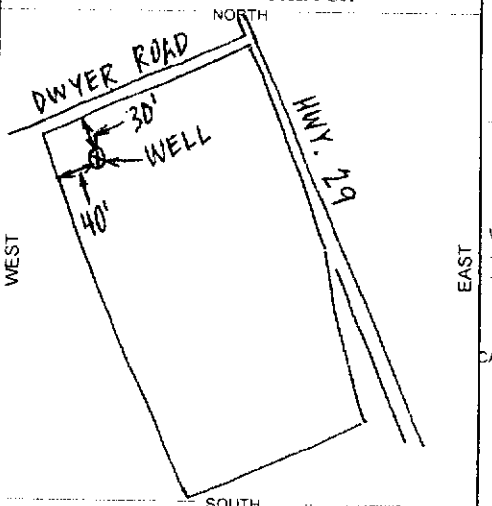
WELL OWNER

Name [redacted]
Mailing Address [redacted]
[redacted] CA [redacted]
CITY STATE ZIP

WELL LOCATION

Address Dwyer Road
City Oakville CA
County Napa
APN Book 027 Page 540 Parcel 004
Township Range Section
Latitude DEG. MIN. SEC. DEG. MIN. SEC.

LOCATION SKETCH



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)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER N/A (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 55 (Ft.) & DATE MEASURED 11/2/2016
ESTIMATED YIELD 60 (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.

CASING (S)

DEPTH FROM SURFACE Ft. to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0 – 360	12								
0 – 138			✓			PVC F480	6	SDR-21	
138 – 278				✓		PVC F480	6	SDR-21	.032
278 – 298			✓			PVC F480	6	SDR-21	
298 – 338				✓		PVC F480	6	SDR-21	.032
338 – 358			✓			PVC F480	6	SDR-21	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft. to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0 – 58	✓			10 SK SAND
58 – 358			✓	#6 SAND

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 [signature] WELL DRILLER/AUTHORIZED REPRESENTATIVE
11/07/16 DATE SIGNED
439-746 C-57 LICENSE NUMBER

DWR 188 REV 11-97

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

Well 3

State of California

Well Completion Report

Form DWR 188 Submitted 11/10/2022

WCR2022-013292

Owner's Well Number

Date Work Began 05/09/2022 Date Work Ended 05/19/2022

Local Permit Agency Napa County Planning Building and Environmental Services

Secondary Permit Agency Permit Number E19-00194 Permit Date

Well Owner (must remain confidential pursuant to Water Code 13752)

[redacted]

Planned Use and Activity

Activity New Well

Planned Use Water Supply Domestic

Well Location

Address 1181 YOUNTMILL RD

City NAPA Zip 94558 County Napa

Latitude 38 Deg. 25 Min. 20.5932 Sec. N

Longitude -122 Deg. 23 Min. 12.2171 Sec. W

Dec. Lat. 38.422387 Dec. Long. -122.386727

Vertical Datum Horizontal Datum WGS84

Location Accuracy Location Determination Method

APN 031-120-032-000

Township 07 N

Range 05 W

Section 26

Baseline Meridian Mount Diablo

Ground Surface Elevation

Elevation Accuracy

Elevation Determination Method

Borehole Information

Orientation Vertical Specify

Drilling Method Direct Rotary Drilling Fluid Bentonite

Total Depth of Boring 500 Feet

Total Depth of Completed Well 500 Feet

Water Level and Yield of Completed Well

Depth to first water 80 (Feet below surface)

Depth to Static Water Level 98 (Feet) Date Measured

Estimated Yield* 100 (GPM) Test Type Air Lift

Test Length 4 (Hours) Total Drawdown 172 (feet)

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

Geologic Log - Free Form

Depth from Surface Feet to Feet		Description
0	60	TOPSOIL,GRAY,RED,WHITE ROCK
60	100	MIXED LARGE ROCK, SAND INBEDED
100	140	MIXED BIG ROCK, RED,ORANGE,GRAY ROCK
140	180	LT GRAY,DK GRAY ROCK
180	240	DK GRAY,RED,YELLOW, LT GRAY ROCK
240	320	HARD GRAY, GREEN ROCK
320	340	GRAY,GREEN,RED ROCK, ASH INBEDED
340	420	GRAY ASH,RED,GRAY,BLACK SAND INBEDED
420	460	GRAY ROCK,RED ROCK,SOME ASH
460	480	HARD GRAY ROCK BLACK SAND
480	500	GRAY ASH,GRAY ROCK

Well 3

Casings

Casing #	Depth from Surface Feet to Feet		Casing Type	Material	Casings Specificatons	Wall Thickness (inches)	Outside Diameter (inches)	Screen Type	Slot Size if any (inches)	Description
1	0	80	Blank	PVC	OD: 6.625 in. | SDR: 21 | Thickness: 0.316 in.	0.316	6.625			
1	80	160	Screen	PVC	OD: 6.625 in. | SDR: 21 | Thickness: 0.316 in.	0.316	6.625	Milled Slots	0	
1	160	180	Blank	PVC	OD: 6.625 in. | SDR: 21 | Thickness: 0.316 in.	0.316	6.625			
1	180	240	Screen	PVC	OD: 6.625 in. | SDR: 21 | Thickness: 0.316 in.	0.316	6.625	Milled Slots	0	
1	240	280	Blank	PVC	OD: 6.625 in. | SDR: 21 | Thickness: 0.316 in.	0.316	6.625			
1	280	380	Screen	PVC	OD: 6.625 in. | SDR: 21 | Thickness: 0.316 in.	0.316	6.625	Milled Slots	0	
1	380	400	Blank	PVC	OD: 6.625 in. | SDR: 21 | Thickness: 0.316 in.	0.316	6.625			
1	400	420	Screen	PVC	OD: 6.625 in. | SDR: 21 | Thickness: 0.316 in.	0.316	6.625	Milled Slots	0	
1	420	440	Blank	PVC	OD: 6.625 in. | SDR: 21 | Thickness: 0.316 in.	0.316	6.625			
1	440	480	Screen	PVC	OD: 6.625 in. | SDR: 21 | Thickness: 0.316 in.	0.316	6.625	Milled Slots	0	
1	480	500	Blank	PVC	OD: 6.625 in. | SDR: 21 | Thickness: 0.316 in.	0.316	6.625			

Annular Material

Depth from Surface Feet to Feet		Fill	Fill Type Details	Filter Pack Size	Description
0	61	Cement	Other Cement		6 SACK
61	500	Filter Pack	Other Gravel Pack		PEA GRAVEL

Other Observations:

Well 3 Borehole Specifications

Depth from Surface Feet to Feet		Borehole Diameter (inches)
0	61	14
61	500	11

Certification Statement

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

Name: MC LEAN & WILLIAMS INC
Person, Firm or Corporation

878 EL CENTRO AVENUE | NAPA | CA | 94558
Address | City | State | Zip

Signed: *electronic signature received* | 11/10/2022 | 396352
C-57 Licensed Water Well Contractor | Date Signed | C-57 License Number

Attachments

CCF05192022_0002.pdf - Location Map

DWR Use Only

CSG #	State Well Number	Site Code	Local Well Number

					N							W

Latitude Deg/Min/Sec | Longitude Deg/Min/Sec

TRS:

APN:

*The free Adobe Reader may be used to view and complete this form. However, software must be purchased to complete, save, and reuse a saved form.

File Original with DWR

Well 4

State of California

Well Completion Report

Refer to Instruction Pamphlet

No. e0210024

Page _____ of _____

Owner's Well Number _____

Date Work Began 04/11/2014 Date Work Ended 4/22/2014

Local Permit Agency Napa County

Permit Number E14-00244 Permit Date 4/3/14

DWR Use Only – Do Not Fill In

State Well Number/Site Number

Latitude N Longitude W

APN/TRS/Other

Geologic Log

Orientation ◉ Vertical ○ Horizontal ○ Angle Specify _____

Drilling Method Direct Rotary Drilling Fluid Air

Depth from Surface Feet	to Feet	Description Describe material, grain size, color, etc
0	60	Yellow Clay & hard Gray Rock
60	460	Dark Gray Volcanic Rock
460	500	Dark Gray Green Volcanic Rock
500	510	Red & Gray Volcanic Rock
510	520	Gray Green Volcanic Rock
520	590	Gray, Red, & Green Volcanic Rock
590	640	Gray, Green Volcanic Rock
640	680	Red, Gray, & Green Volcanic Rock
680	705	Hard Gray Green Rock
		Perforation Lay out
		P = Perforation
		B = Blank
		0 to 385 Blank
		P 405 ft
		B
		B
		P
		P
		B 505 ft
		P
		B
		P
		P 605 ft
		B
		P
		P 665 ft

Total Depth of Boring 705 Feet

Total Depth of Completed Well 665 Feet

Well Owner

Name CS2 Wines LLC

Mailing Address P.O. Box 47

City Oakville State CA Zip 94562

Well Location

Address 7400 Highway 29

City Yountville County Napa

Latitude ___ ___ ___ N Longitude ___ ___ ___ W
(Deg. Min. Sec.) (Deg. Min. Sec.)

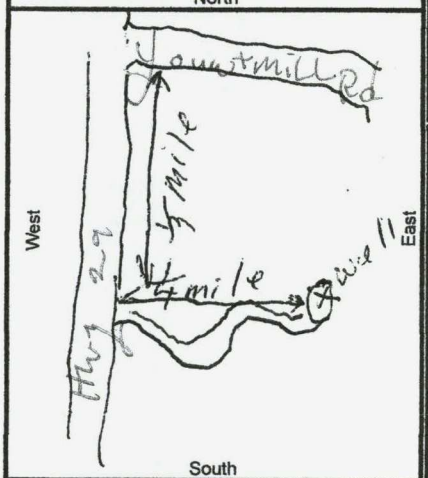
Datum _____ Dec. Lat. _____ Dec. Long. _____

APN Book 031 Page 130 Parcel 029-000

Township _____ Range _____ Section _____

Location Sketch

(Sketch must be drawn by hand after form is printed.)



Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. **Please be accurate and complete.**

Activity

◉ New Well
○ Modification/Repair
○ Deepen
○ Other _____
○ Destroy
Describe procedures and materials under "GEOLOGIC LOG"

Planned Uses

◉ Water Supply
☐ Domestic ☐ Public
☑ Irrigation ☐ Industrial
○ Cathodic Protection
○ Dewatering
○ Heat Exchange
○ Injection
○ Monitoring
○ Remediation
○ Sparging
○ Test Well
○ Vapor Extraction
○ Other _____

Water Level and Yield of Completed Well

Depth to first water 420 (Feet below surface)

Depth to Static Water Level 340 (Feet) Date Measured 04/19/2014

Estimated Yield * 50 (GPM) Test Type Air Lift

Test Length 4.0 (Hours) Total Drawdown 300 (Feet)

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

Casings

Depth from Surface Feet	to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)
0	70	12	Blank	PVC Sch. 40	R21	6		
70	385	10	Blank	PVC Sch. 40	R21	6		
385	665	10	Screen	PVC Sch. 40	R21	6	Milled Slots	0.032

Annular Material

Depth from Surface Feet	to Feet	Fill	Description
0	70	Cement	
70	200	Filter Pack	pea gravel
200	665	Filter Pack	#6 well pack

Attachments

☐ Geologic Log
☐ Well Construction Diagram
☐ Geophysical Log(s)
☐ Soil/Water Chemical Analyses
☐ 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 Pulliam Well Exploration Inc
(Person, Firm or Corporation)

4371 Cantelow Rd (Address) Vacaville (City) CA (State) 95688 (Zip)

Signed _____ (C-57 Licensed Water Well Contractor) 04/20/2014 (Date Signed) 808-508 (C-57 License Number)

DWR 188 REV. 1/2006

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

Well 5

QUA[redacted]ATE
Use to comply with local requirements

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WATER WELL DRILLERS REPORT

Do not fill in
No. 119514

Notice of Intent No.
Local Permit No. or Date
State Well No.
Other Well No.

(1) OWNER: Name Newton A Cupp
Address 1075 California St
City San Francisco, Ca Zip 94108

(2) LOCATION OF WELL (See instructions):
County Napa Owner's Well Number 31-130-13
Well address if different from above off Hwy 29
Township Yountville Range Section
Distance from cities, roads, railroads, fences, etc.

RECEIVED
SEP 10 1982
DIVISION OF ENVIRONMENTAL HEALTH

WELL LOCATION SKETCH

(3) TYPE OF WORK:
New Well [X] Deepening [ ]
Reconstruction [ ]
Reconditioning [ ]
Horizontal Well [ ]
Destruction [ ] (Describe destruction materials and procedures in Item 12)

(4) PROPOSED USE:
Domestic [X]
Irrigation [ ]
Industrial [ ]
Test Well [ ]
Stock [ ]
Municipal [ ]
Other [ ]

(5) EQUIPMENT:
Rotary [ ] Reverse [ ]
Cable [ ] Air [X]
Other [ ] Bucket [ ]

(6) GRAVEL PACK:
Yes [ ] No [X] Size
Diameter of bore 8 3/4
Packed from to ft.

(7) CASING INSTALLED:
Steel [ ] Plastic [X] Concrete [ ]

From ft.	To ft.	Dia. in.	Gage or Wall
0	380	6	160

(8) PERFORATIONS: power saw
Type of perforation or size of screen

From ft.	To ft.	Slot size
380	500	1/8x3

(9) WELL SEAL:
Was surface sanitary seal provided? Yes [X] No [ ] If yes, to depth 25 ft.
Were strata sealed against pollution? Yes [ ] No [X] Interval ft.
Method of sealing neat cement

(10) WATER LEVELS:
Depth of first water, if known 375 ft.
Standing level after well completion ft.

(11) WELL TESTS:
Was well test made? Yes [X] No [ ] If yes, by whom? driller
Type of test Pump [ ] Bailer [ ] Air lift [X]
Depth to water at start of test ft. At end of test ft
Discharge 50 gal/min after hours Water temperature
Chemical analysis made? Yes [ ] No [X] If yes, by whom?
Was electric log made? Yes [ ] No [X] If yes, attach copy to this report

(12) WELL LOG: Total depth 500 ft. Depth of completed well 500 ft.

from ft.	to ft.	Formation (Describe by color, character, size or material)
0	25	boulders & gray rock
25	50	black & brown rock fract- med. hard
50	150	black gray & brown rock fra
150	225	red, green, black med hard frqctr
225	300	brown red rock stringers of red fract. med hard
300	350	brown gray green rock - med hard fractures
350	375	green black brown & yellow rock-med hard fractures
375	400	black gray & brown rock- med hard fract
400	500	black,red, green & gray- med hard fractures

Work started 8/2/ 19 82 Completed 8/10 19 82

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
SIGNED Harold Gregson (Well Driller)
NAME Doshier & Gregson Drilling, Inc (Person, firm, or corporation) (Typed or printed)
Address 5365 Napa Vallejo Hwy
City Vallejo, Ca Zip 94589-9679
License No. 294001 Date of this report 8/11/82

DWR 188 (REV. 7-76) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

Well 6 & 7 - Location Only

SD. PMT

E20-00306

OFFICE SET

Planning, Building & Environmental Services

1195 Third Street, 2nd Floor
Napa CA 94559
www.countyofnapa.org
Main: (707) 253-4417

David Morrison
Director

A Tradition of Stewardship
A Commitment to Service

SEWAGE PERMIT

This Permit is NOT VALID until Building Permit # BR19-02297ALT is Issued

Application Type:	Environmental / EM Permits / Sewage System / Repair	**Applied Date:**	7/6/2020
Permit Number:	E20-00306	**Issued Date:**	7/21/2020
Parcel Number:	031-120-037-000	**Expiration Date:**	7/21/2022
Site Address:	1201 Yount Mill Rd, Napa		
Owner:	DDNG INC	**Phone:**	() -
Address:	1055 ATLAS PEAK RD, NAPA CA 94558		
Applicant:	DDNG INC	**Phone:**	() -
Business Name:			

Project Type: Environmental / EM Permits / Sewage System / Repair

E20-00306

	Bedrooms			Commerical UP#:	
	Existing	**Proposed**	**GPD**		**GPD**
Residence	3	3	450	**Sanitary Waste**	
Second Dwelling				**Process Waste**	
Guest House					
Total Residential:			450	**Total Commercial:**	

Water Supply: Yes

Distance from closest water source to any part of sewage system: 100'

Specifications:

Designer:	Guadalupe Chavarria	**Drainline:**	182	**Sump Type:**	
Engineered Plan Date:		**Trench Depth (in):**	18	**A/V Alarm:**	
Conventional Plan Date:	07/21/2020	**Rock Under Pipe (in):**	12	**Remote Alarm:**	
Septic Tank:	IAPMO	**Chamber Manu:**		**Elec Self Cert:**	
Sewer Line:	ex	**Model Number:**			
Length (ft):		**DOC Backfill (in):**			
		DOC Fill (in):	12		

TO PERMITEE:

Any work performed or operations conducted under the auspices of this permit constitutes acceptance of all conditions, inspections and comments contained in the this permit, and the incorporation of all requirements as set forth in the permit application.

Staff Signature: Kim Withrow Date: 7-21-2020

CONDITIONS/INSPECTIONS/COMMENTS

Application Type:	Environmental / EM Permits / Sewage System / Repair	**Applied Date:**	7/6/2020
Permit Number:	E20-00306	**Issued Date:**	7/21/2020
Parcel Number:	031-120-037-000	**Expiration Date:**	7/21/2022
Owner:	DDNG INC	**Phone:**	() -
Applicant:	DDNG INC	**Phone:**	() -

Conditions:

Code	Condition
SD-03	An as-built/record drawing must be submitted prior to final.

1-12-21 - Watertight Test Certificate Sent to OK Base (5 scanned)

Inspections: **Inspected By:** **Date:**

Inspection Type

Leach Lines PA ASV 11/9/20 need bottom of trench elevations 11/12/20 MSB OK

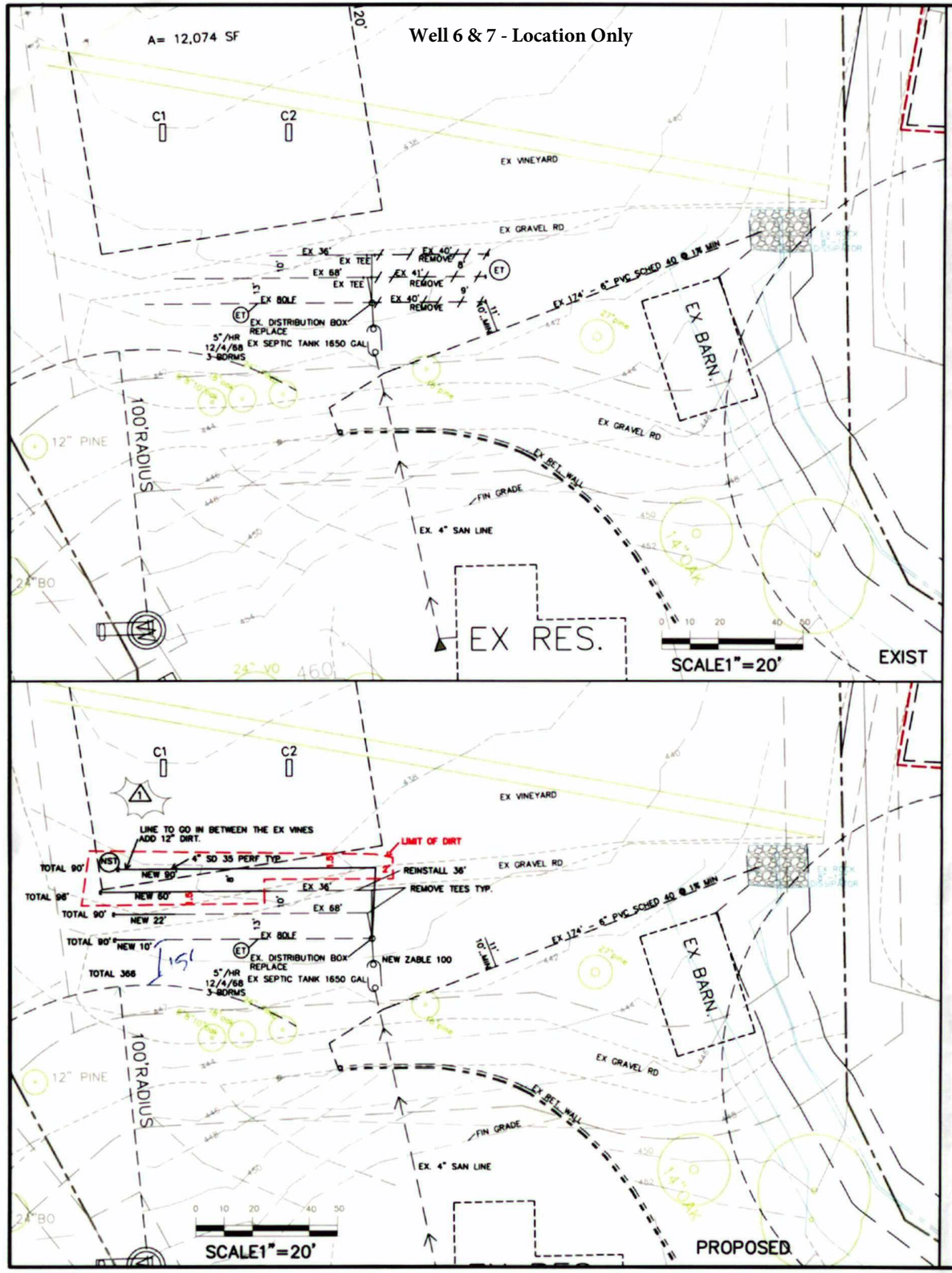
Septic Tank Installation PA ASV 11/9/20 waiting on H_2O tight test - inside filter ok

D-Box PA ASV 11/9/20 need speed levelers + test balance of flow 11/12/20 MSB. (PA) Needs concrete under D-box OK

Comments:

Date	Comment
7/21/2020	Call 253-4135 at least 24 hours in advance during normal business hours to schedule inspection requests. Inspections are taken on a first-come-first-served basis so if you need a specific date and time be sure to call well in advance
	Environmental Management's inspection must be obtained prior to covering any portion of the system.
	Any deviation from these permit specifications without prior approval from the Department of Environmental Management will be cause for stopping work until the changes are fully justified and approved.
	If a claim is to be submitted for a refund, per County Code, a 25% processing fee will be retained. Such claims must be made within one year of the date on the receipt.
	This permit authorizes a septic system repair for the installation of leach lines to replace the existing leach lines connected to a legal structure that are no longer functioning effectively. The new leach lines, although expected to function satisfactorily, do not meet current Napa County Code requirements. The owner shall be advised that building permits may not be approved until the wastewater system is replaced with a code compliant wastewater system.

Well 6 & 7 - Location Only



NOTES

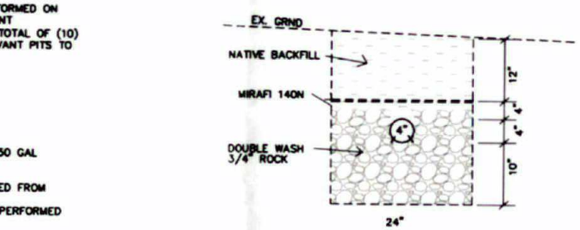
1. THE ORIGINAL SYSTEM WAS INSTALLED ACCORDING TO IN 5/22/1969 UNDER PERMIT NO. 3332.
2. THE ORIGINAL DESIGN DESIGN INSTALLED 3 BDLF. THE INFILTRATION RATE WAS WAS STATED AS 5" PER HOUR.
3. SITE EVALUATION JULY 30, 2014 A SITE EVALUATION WAS PERFORMED ON JULY 30, 2014 WITH NAPA COUNTY ENVIRONMENTAL MANAGEMENT ENVIRONMENTAL HEALTH SPECIALIST MS. MAUREEN SHIELDS. A TOTAL OF (10) BACKHOE TEST PITS WERE EXCAVATED AND LOGGED. THE RELEVANT PITS TO THIS SITE ARE:

C1–C3 CONVENTIONAL STD SYSTEM CLAY
LOAM TABLE 2, STRONG 0.33 GAL/SF/DAY
ATS TABLE 5 CLAY LOAM, STRONG 0.5 GAL/SF/DAY
AREA AVAILABLE = 12,074 SF

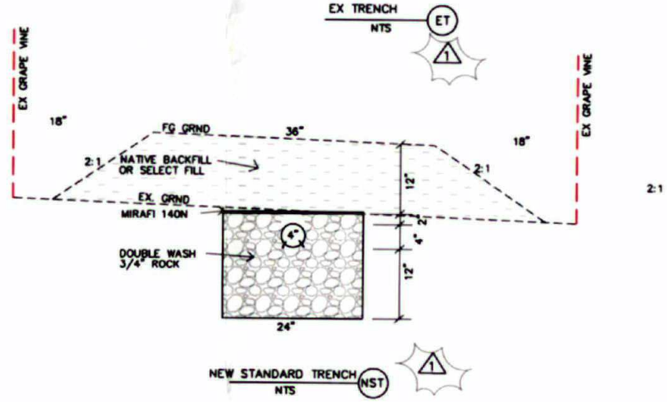
4. EXIST TANK WAS REVIEWED AND WAS DETERMINED TO BE A 1,650 GAL ACCORDING TO VOLUME PUMPED OUT.
5. THE TANK TO BE INSTALLED NEW TEES.
6. THE SEPTIC AREA WILL BE PLANTED WITH GRASS AND PROTECTED FROM TRAFFIC.
4. THE EXISTING SEPTIC LINES ARE PER THE FIELD INVESTIGATION PERFORMED BY SAKAI ENGINEERING.

TABLE 8 STD SYSTEM LINE SPACING

SLOPE	0–5% 5' OC.
SLOPE	6–10% 8' OC.
SLOPE	11–20% 12' OC.
SLOPE	21–30% 16' OC.



EX TRENCH NTS (ET) 1



NEW STANDARD TRENCH NTS (NST) 1

SITE PLAN
1201 YOUNTMILL RD, YOUNTVILLE CA
APN 031–120–037

Guadalupe S. Chavarria, PE QSD/QSP
Civil Engineer CA Lic. 37970
QSD-QSP
P.O. BOX 1782, Windsor CA 95492
CEL 707-799-5432 gschavarria1@yahoo.com

Kevin Witthaus 7-21-2020
BY DATE

ASBUILT AND PROPOSED

REVISIONS NO.	DESCRIPTION	DATE:	5/8/2020
7/16/20 1	REVISED LAYOUT SEPTIC	DRAWN BY:	GSC
		CHECKED BY:	GSC
		ASBUILT - NO CHANGES	

SHEET 2 OF 2

Well 6 & 7 - Location Only

SANITARY PLAN FOR REMODEL OF EXISTING RESIDENCE

1201 YOUNTMILL RD YOUNTVILLE, CA
APN 031-120-037

LEGEND

EXISTING		PROPOSED	
SD	EX STORM DRAIN	SD	STORM DRAIN
SAN	EX SANITARY	SAN	SANITARY
W	EX WATER LINE	W	WATER LINE
	EX FIRE HYDRANT		FIRE HYDRANT
	EX WATER VALVE		WATER VALVE
	EX SAN OR SD MH		SAN OR SD MH
	EX SANITARY CLEANOUT		SANITARY CLEANOUT
	EX BALL VALVE		BALL VALVE
	EX POWER POLE		POWER POLE
	BUILDING OUTLINE		SWALE FLOW DIRECTION
275	CONTOUR LINE MAJOR		
270	CONTOUR LINE MINOR		
	DAYLIGHT LINE		
	BUILDING SETBACK LINE		
	PROPERTY LINE		
UT	UTILITY TRENCH		
	EXIST TREE		
	TREE PROTECTION FENCE		
W	WATER WELL		

AB	AGGREGATE BASE
AC	ASPHALT CONCRETE
ADS	ADVANCED DRAINAGE SYSTEMS
BOW	BOTTOM OF WALL
CP	CENTRAL PRECAST
CL	CENTER LINE
CO	CLEAN OUT
DWY	DRIVEWAY
EASE	EASEMENT
EG	EXIST GROUND
EP	EDGE OF PAVEMENT
EX	EXIST
FC	FACE OF CURB
FD	FRENCH DRAIN
FF	FINISHED FLOOR
FG	FINISHED GRADE
FH	FIRE HYDRANT
FL	FLOW LINE
FM	FORCE MAIN
FNC	FENCE
FUT	FUTURE
GRT	GRATE
GVL	GRAVEL
HP	HIGH POINT
INV.	INVERT
IFO	IN FAVOR OF
JT	JOINT TRENCH
O.C.	ON CENTER
PAV.	PAVEMENT
PED	PEDESTRIAN
PVT	POINT OF VERTICAL INTERSECTION
PVI	PRIVATE
P.U.E.	PUBLIC UTILITY EASMENT
PP	POWER POLE
RC	RELATIVE COMPACTION
SB	SETBACK LINE
SAN	SANITARY SEWER
SS	SIDE SLOPE
SW	SIDE WALK
SDE	STORM DRAIN EASEMENT
TC	TOP OF CURB
TYP.	TYPICAL
TG	TOP OF GRATE
TW	TOP OF WALL
WS	WATER SERVICE
45.5	EXIST SPOT ELEV
	PRE PREC PIT

VICINITY MAP

SHEET LIST

1. TITLE
2. SITE PLAN

STRUCTURAL ENGINEER

RETAINING WALLS 819-00230
SEE PLANS BY ALEXANDER WILLIAMS PE

OWNER:

DONG, LLC
450 TECHNOLOGY WAY
NAPA, CA

ENGINEER:

GUADALUPE S. CHAVARRIA, PE
P.O. BOX 1782 WINDSOR CA 95492
CEL 707-799-5432
FAX 707-838-9161

WATER SUPPLY

1. EXIST WATER SOURCE IS THE EXISTING WELL JUST WEST OF THE HOUSE

SEPTIC INFO

1. STANDARD SYSTEM L= 311 LF AS DETERMINED BY FIELD SURVEY (SAKAI)
2. INSTALLED 5/18/69
3. PERC RATE: 5" PER HOUR (3-5) BEDROOMS PER NAPA CO. REGULATIONS
4. FORMER APN

BOUNDARY TOPO INFORMATION PROVIDED BY: STATE OF CALIFORNIA

H W B
H W B-P L S, I N C.
PROFESSIONAL LAND SURVEYORS
www.howardbrunner.com
117 WEST NORTH STREET (707) 433-9760
HEALDSBURG, CALIFORNIA 95448 FAX (707) 433-9761

Guadalupe S. Chavarria, PE QSD/QSP
Civil Engineer CA Lic 37970
QSD-QSP
CEL 707-799-5432
P.O. Box 1782
Windsor CA 95492
fax 707-838-9161
gschavarria1@yahoo.com

REF 18-00230

REVISIONS			
DATE:	NO.	DESCRIPTION	
6/4/20	1	REVISED LAYOUT SEPTIC	

DATE:	5/8/2020
DRAWN BY:	GSC
CHECKED BY:	GSC

ALTH DEPT. USE ONLY
E: 12.00
TE: 4-11-74
RECEIPT NO: C959
BY:

Well 8

RECEIVED
MAY 2 1974
DIVISION OF ENVIRONMENTAL HEALTH

A.P. # 31-13029
29

NAPA COUNTY HEALTH DEPARTMENT
DIVISION OF ENVIRONMENTAL HEALTH

APPLICATION & PERMIT TO CONSTRUCT
A WATER WELL
(ORDINANCE #)

NAME _____ (Owner) ADDRESS _____ (Job Location) DATE 4-11-74

NAME Washington Ferguson (Well Driller) ADDRESS Napa Valley, Hwy.

TYPE OF WORK

NEW WELL	✓	RECONDITIONING	___	DEEPENING	___
TEST HOLES	___	DESTROYING	___	OTHER	___
TYPE I PERMIT	✓	TYPE II PERMIT	___	FEE	___

PROPOSED USE

DOMESTIC ✓ IRRIGATION ___ INDUSTRIAL ___ MUNICIPAL ___
TEST WELL ___ OTHER ___

Sewage Disposal On Site (Existing or Proposed) Public___ Individual___ Private___
Distance from well to any part of nearest sewage disposal system ___ feet.
(Sketch of site to accompany application. None

TYPE OF EQUIPMENT TO BE USED

Rotary ✓ Cable ___ Hand Dug ___ Other ___

CONSTRUCTION PROPOSED

Diameter of casing 6" Material ___ Annular Space: Size 2"
Sealed with: Concrete___ Grout ___ Neat Cement ✓ Puddled Clay ___ Other___
Conductor Casing: Yes___ No ✓ Material ___
Chlorination By: Owner ✓ Pump Co___ Driller ___

J. Ruby Ferguson (SIGNATURE OF APPLICANT) 4/12/74 (DATE)

NOTICE TO DRILLER: COMPLETE THIS PORTION AND PROVIDE OWNER WITH THIS COPY.

CASING

CONSTRUCTION
Total Depth 300' Ft. Completed
Surface Seal to 23' Ft.
Any Stratas sealed: Yes___ No X
If yes, depth of Stratas
From___ Ft. to ___ Feet
From___ Ft. to ___ Feet
Perforations None
From___ Ft. to ___ Feet
From___ Ft. to ___ Feet
From___ Ft. to ___ Feet

WATER LEVELS
First water at 167' Feet
Static level at 18' Feet

WELL TESTS
How performed Bailing.
Yield 20 GPM with 172' Feet
Drawdown___ Ft. after 6 Hrs.

WELL LOG

(Formation; describe by color, size of material, structure)

Ft.	to Ft/	
0	3	Top Soil
3	18	Pumice & Boulders
18	117	Green & Yellow Pum.
117	135	Black Pumice
135	167	Fractured Dark Br. Rock
167	178	Fractured Black Rock
178	191	Fractured Black Rock w/Soft Gray Rock Str
191	217	Dark Gray Volcanic, w/Soft Brown Strgrs.
217	224	Dark Brown Frtd Volcanic Rock
224	231	Hard Dk Gr. Frtd Rk.

(cont'd, reverse side)

Signed: J. Washington
License # 258826

Well 8

Formation Continuation:

231	243	Hard Dark Brown & Gray Fractured Rock
243	251	Hard Dark Gray Rock w/White Stringers
251	262	Dark Gray Granular w/Yellow Stringers
262	271	Brown Gray & Fractued Yellow Sandrock
271	302	Hard Black Rock

Well 9

QUADRUPLICATE
For Local Requirements

Page ___ of ___
Owner's Well No. ___
Date Work Began 9-6-04, Ended 9-11-04
Local Permit Agency Napa County
Permit No. 24905 Permit Date 08-14-03

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 796962

DWR USE ONLY — DO NOT FILL IN
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD Rotary FLUID Mud

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	12	Brown Clay
12	14	Gravel, some Clay
14	90	Brown Clay with Gravel
90	240	Black, Gray & Red Ash
240	255	White Clay
255	315	Black, Gray & Red Ash
315	335	Red Ash, Red Clay
335	404	Green & Black Ash with Gray Clay

RECEIVED
OCT - 4 2004
DEPT. OF ENVIRONMENTAL MANAGEMENT

TOTAL DEPTH OF BORING 404 (Feet)
TOTAL DEPTH OF COMPLETED WELL 404 (Feet)

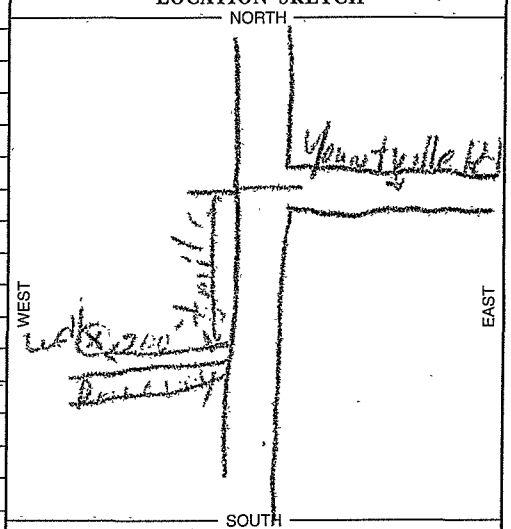
WELL OWNER

Name [redacted]
Mailing Address [redacted]
CITY STATE ZIP

WELL LOCATION

Address 7429 Saint Helena Hwy
City Napa
County Napa
APN Book 27 Page 540 Parcel 10
Township ___ Range ___ Section ___
Latitude ___ DEG. ___ MIN. ___ SEC. NORTH Longitude ___ DEG ___ MIN. ___ SEC. WEST

LOCATION SKETCH



*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)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 44 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 40 (Ft.) & DATE MEASURED 9-11-04
ESTIMATED YIELD * 30 (GPM) & TEST TYPE Air Lift
TEST LENGTH 3 (Hrs.) TOTAL DRAWDOWN 260 (Ft.)
** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	33	10	✓				Plastic	5	200	
23	104	8 3/4	✓				"	"	"	
104	404	5 3/4		✓			"	"	"	Factory 020

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	33	✓			
33	404			#2	Lonestar

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ 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 Pelligrini Well Exploration
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS 1710 Hwy 12E CITY Napa STATE CA ZIP 94558
Signed Tom Pellegrini WELL DRILLER/AUTHORIZED REPRESENTATIVE
DATE SIGNED 9-25-04 C-57 LICENSE NUMBER 708705

DWR 188 REV 11-97

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

027-340-007

QUADRUPLICATE
For Local Requirements

Well 10

Page ___ of ___

Owner's Well No. ___

Date Work Began 9-10-2004 Ended 9-22-2004

Local Permit Agency Napa County

Permit No. EH-0396 Permit Date 9-10-2004

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 0918500

DWR USE ONLY — DO NOT FILL IN
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)

DRILLING METHOD ROTARY FLUID WATER

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	9	Brown clay
9	11	Gravel
11	90	Brown clay
90	100	Gravel
100	200	Brown clay with Gravel
200	352	Basalt Rock Black

RECEIVED
OCT - 4 2004
DEPT. OF ENVIRONMENTAL MANAGEMENT

TOTAL DEPTH OF BORING 352 (Feet)
TOTAL DEPTH OF COMPLETED WELL 352 (Feet)

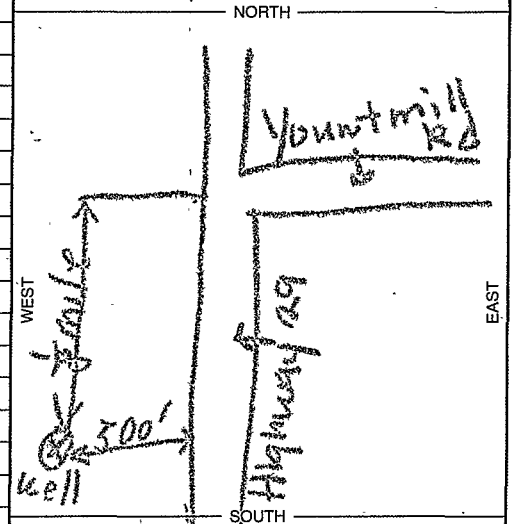
WELL OWNER

Name [redacted]
Mailing Address [redacted]
[redacted] ZIP

WELL LOCATION

Address Silverado Trail
City Yountville, CA
County Napa
APN Book 027 Page 340 Parcel 007
Township ___ Range ___ Section ___
Lat ___ DEG. ___ MIN. ___ SEC. N
Long ___ DEG. ___ MIN. ___ SEC. W

LOCATION SKETCH



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 (✓)

X NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

USES (✓)

WATER SUPPLY
___ Domestic ___ Public
X Irrigation ___ Industrial
___ MONITORING
___ TEST WELL
___ CATHODIC PROTECTION
___ HEAT EXCHANGE
___ DIRECT PUSH
___ INJECTION
___ VAPOR EXTRACTION
___ SPARGING
___ REMEDIATION
___ OTHER (SPECIFY)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 211 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 140 (Ft.) & DATE MEASURED 9-23-04
ESTIMATED YIELD * 15 (GPM) & TEST TYPE 10 hr. I.E.T.
TEST LENGTH 2 (Hrs.) TOTAL DRAWDOWN 200 (Ft.)
** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	24	10	X				Plastic	5	200	
24	102	8 3/4	X				"	"	"	
100	352	8 3/4		X			"	"	"	Factor V-7

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	24	X			
24	302			Pea Gravel	

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ 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 William Well Evaluations
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

510 Hwy 12 E ADDRESS | Napa CITY | CA STATE | 94558 ZIP

Signed [signature] C-57 LICENSED WATER WELL CONTRACTOR | 9-24-04 DATE SIGNED | 880-278 C-57 LICENSE NUMBER

DWR 188 REV. 05-03

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

Well 11

Planning, Building & Environmental Services

1195 Third Street, Suite 210
Napa CA 94559
www.countyofnapa.org
(707) 253-4417

David Morrison
Director

A Tradition of Stewardship
A Commitment to Service

OFFICE COPY

Well Permit

Application Type:	Environmental / EM Permits / Water Wells / Class I	**Applied Date:**	4/10/2014
Permit Number:	E14-00268	**Issued Date:**	4/10/2014
Parcel Number:	031-100-019-000	**Expiration Date:**	4/9/2016
Site Address:	1140 YOUNT MILL RD, Napa		
Owner:	POZZAN A MICHAEL & MARY ANN	**Phone:**	() -
Address:	1140 YOUNT MILL RD, NAPA CA 94558		
Applicant:	McLean & Williams	**Phone:**	() -
Business Name:			
Project Type:	Environmental / EM Permits / Water Wells / Class I		
Proposed Use:			
Use:	Private	**Name of Public Water System:**	
Well To Service This Parcel Only?:	Yes		
Water Supply:			
All Setbacks Required By Code?:	Greater Than 100	**Hazmat Site Within 1500 feet?:**	No
Ground Water Permit Required?:	No	**Hazmat Site Number and Name:**	
Emergency Exemption Granted?:	No	**Well Located in Flood Zone?:**	No
Reason For Emergency Exemption:			
Specifications:			
Casing Diameter:	~~6 In.~~ 6"	**Method of Seal Placement:**	pumping
Boring Diameter:	12 In. 10"	**Minimum Seal Depth:**	20 Ft.
Annular Seal:	~~3 In.~~ 2"	**Material:**	conrete & bentonite

TO PERMITEE:

Any work performed or operations conducted under the auspices of this permit constitutes acceptance of all conditions, inspections and comments contained in the this permit, and the incorporation of all requirements as set forth in the permit application.

Staff Signature: _____ Date: 4/10/2014

CONDITIONS/INSPECTIONS/COMMENTS

Application Type:	Environmental / EM Permits / Water Wells / Class I	**Applied Date:**	4/10/2014
Permit Number:	E14-00268	**Issued Date:**	4/10/2014
Parcel Number:	031-100-019-000	**Expiration Date:**	4/9/2016
Owner:	POZZAN A MICHAEL & MARY ANN	**Phone:**	() -
Applicant:	McLean & Williams	**Phone:**	() -

Conditions:

Code	Condition
EM-11	The applicant shall comply with the Department of Public Works "Conditions of Approval-National Polution Discharge Elimination System Requirements", a copy of which was provided at the time of permit issuance. Failure to comply with the NPDES requirements will result in a stop-work order.
EM-2	A copy of the State of California Well Completion Report must be submitted within 60 days of well completion.

Inspections:	Inspected By:	Date:
Inspection Type		
Construction Inspection	Annular seal = 2", well located in option # 3 seal 60'	UB 5/29/2014
Environmental Management Final		

Comments:

Date	Comment
4/10/2014	Call 253-4135 at least 24 hours in advance during normal business hours to schedule inspection requests. Inspections are taken on a first-come-first-served basis so if you need a specific date and time be sure to call well in advance Any deviation from these permit specifications without prior approval from the Department of Environmental Management will be cause for stopping work until the changes are fully justified and approved. Well permits are issued only to licensed well drillers. A copy of the well driller's license (C-57) must be on file with DEM. If a claim is to be submitted for a refund, per County Code, a 25% processing fee will be retained. Such claims must be made within one year of the date on the receipt. If this well will at any point serve a public water system, the siting, construction, capacity testing and additional requirements must comply with Title 22 California Code of Regulations (CCR), Chapter 16, California Waterworks Standards. This office may deny an application for a water supply permit if the well does not meet the above noted requirements. Please be aware that the old well does not meet current standards for septic system setbacks. Well shall be 100' or more from dispersal field, unless seal is 50' and old well is 60' from dispersal field with an unknown seal depth. This may pose health risks if used for domestic purposes.

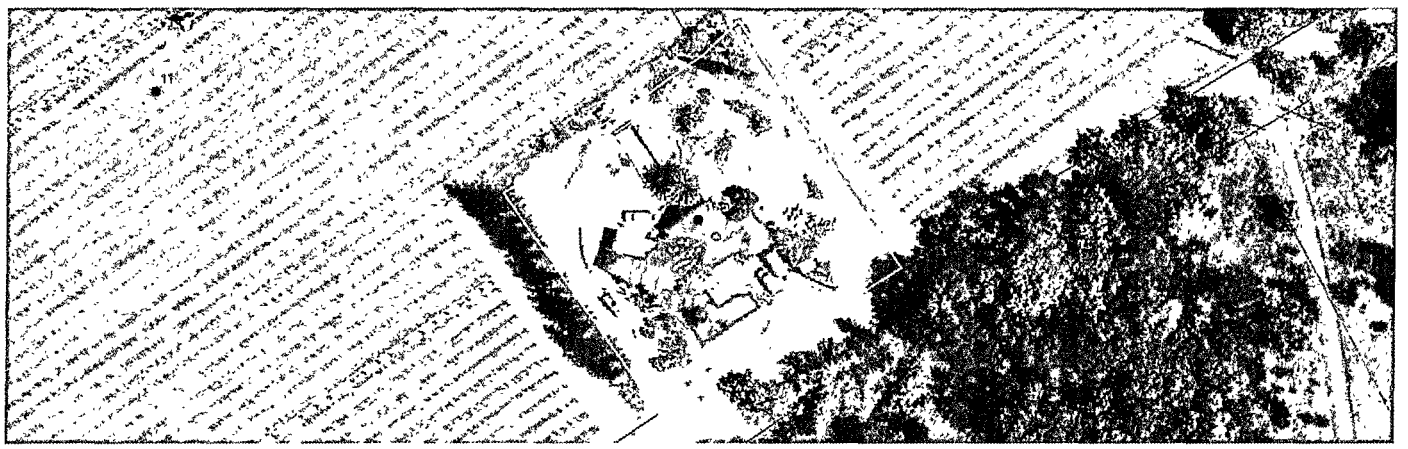
Well 11

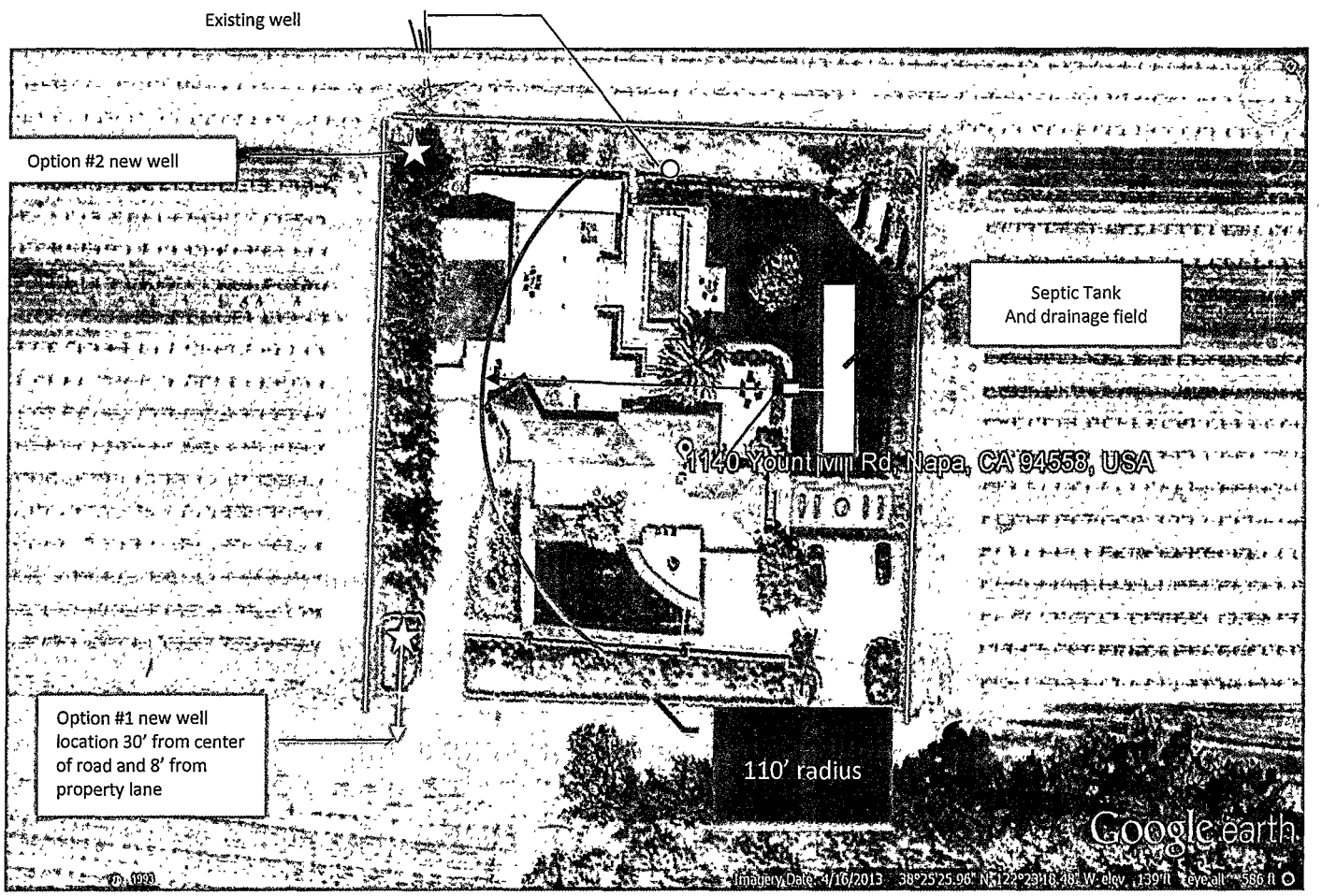
McLEAN & WILLIAMS
SINCE 1949

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

PLANS APPROVED
Division of Environmental Health
COUNTY OF NAPA
By: _____ Date: 4/11/2014

1140 Yount Mill Road AP # 031-100-019 well locations





Well 11

Planning, Building & Environmental Services

1195 Third Street, Suite 210
Napa, CA 94559
www.countyofnapa.org

Hillary Gitelman
Director

A Tradition of Stewardship
A Commitment to Service

WELL CONSTRUCTION APPLICATION

PROPERTY OWNER INFORMATION

Name: Mike Pozzan

Address: 1140 Yountmill Rd

APN: 031-100-019

Phone #: 925-351-5215

WELL DRILLER INFORMATION

Company Name: McLean & Williams Inc

Contact person: Gonzalo Salinas

Address: 878 El Centro Ave, Napa CA

Phone #: 707-255-6450

TYPE OF PERMIT (circle one): (Class 1A) Class 1B Class II Deepening
Reconstruction Other:_____

PROPOSED USE (circle one): Private Public

Well to serve this parcel only: Y (N) Well Located in MST Groundwater Basin: Y (N)
If no, list other APN(s):_____ Well Located in Floodplain: Y (N)

SETBACKS TO WELL:

NO Flood
NO GW
NO Hazmat

Sewer Line:	—	feet
Septic Tank:	150'	feet
Disposal Field:	150'	feet

WELL SPECIFICATIONS:

Casing Diameter: 6" inches
Boring Diameter: 12" inches
Annular Seal: 3" inches
Minimum Seal Depth: 20' feet

Sealing Material: Concrete & Bentonit
Sealing Method: Pumping

A MAP OF THE WELL LOCATION SHALL BE ATTACHED TO THIS APPLICATION. THE MAP SHALL INCLUDE THE DISTANCE FROM THE WELL TO PROPERTY LINES, SEWAGE DISPOSAL SYSTEMS, STRUCTURES, ETC AND SHALL INCLUDE ALL OTHER PERTINENT INFORMATION SPECIFIC TO THIS WELL.

Well 11

Planning, Building & Environmental Services

1195 Third Street, Suite 210
Napa CA 94559
www.countyofnapa.org
(707) 253-4417

David Morrison
Director

A Tradition of Stewardship
A Commitment to Service

APPLICATION
THIS IS NOT A PERMIT

Application Type:	Environmental / EM Permits / Water Wells / Class I		
Permit Number:	E14-00268	**Parcel Number:**	031-100-019-000
Situs Address:	1140 YOUNT MILL RD, Napa	**Applied Date:**	4/10/2014
Owner:	POZZAN A MICHAEL & MARY ANN	**Phone:**	(999) 999-9999
Applicant:	McLean & Williams	**Phone:**	(999) 999-9999

Worker's Compensation Coverage:

(X) A Certificate of current Worker's Compensation Insurance Coverage is on file with this office (or filed with this application)
( ) I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner so as to become subject to the Worker's Compensation laws of California.

By executing this application, the undersigned agrees to comply with all conditions, inspections and comments of the issued permit and all federal, state and county code requirements applicable to this permit. Furthermore, I understand that the Department of Environmental Management in no way guarantees trouble-free operation of the system, and that future repair may be necessary.

Owner or Authorized Agent Signature: _____ Date: 4-10-14

QUADRUPLICATE Well 12
For Local Requirements

Page 1 of 1

Owner's Well No. _____

Date Work Began 10-23-00, Ended 10-27-00

Local Permit Agency Napa County Environmental Mgmt.

Permit No. 96-11643 Permit Date 9-19-00

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. 710535

DWR USE ONLY — DO NOT FILL IN
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)

DRILLING METHOD rotary FLUID _____

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	15	brown clay
15	30	sand & gravel
30	90	brown clay
90	100	sand & clay
100	115	brown clay
115	120	sand & gravel
120	135	brown clay
135	200	sand & gravel

RECEIVED
NOV 7 2000
DEPT. OF
ENVIRONMENTAL MANAGEMENT

TOTAL DEPTH OF BORING 200 (Feet)
TOTAL DEPTH OF COMPLETED WELL 198 (Feet)

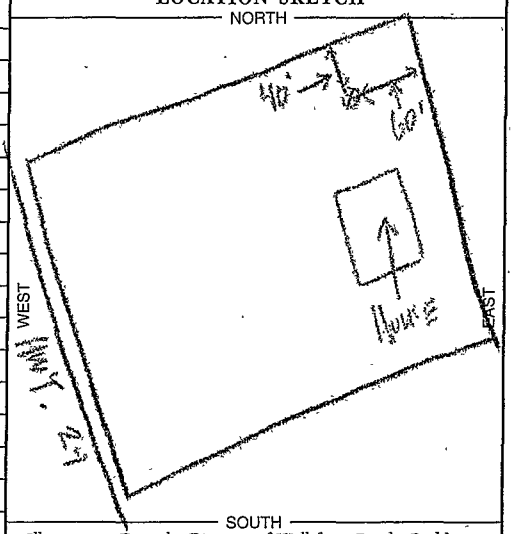
WELL OWNER

Name [redacted]
Mailing Address
CITY STATE ZIP

WELL LOCATION

Address same
City
County Napa
APN Book 31 Page 100 Parcel 26
Township Range Section
Latitude DEG. MIN. SEC. NORTH Longitude DEG. MIN. SEC. WEST

LOCATION SKETCH



*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 (✓)

X NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

PLANNED USES (✓)

WATER SUPPLY
X Domestic ___ Public
___ Irrigation ___ Industrial
MONITORING ___
TEST WELL ___
CATHODIC PROTECTION ___
HEAT EXCHANGE ___
DIRECT PUSH ___
INJECTION ___
VAPOR EXTRACTION ___
SPARGING ___
REMEDIATION ___
OTHER (SPECIFY) ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 15 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 32 (Ft.) & DATE MEASURED 10-27-00
ESTIMATED YIELD * 2½ (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.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	200	12								
0	78		X				PVC F480	6	SDR-21	
78	198			X			PVC F480	6	SDR-21	.032

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	17	X			concrete
17	23		X		chips
23	198			X	#6 sand

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ 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
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS 2110 Penny Lane CITY Napa STATE CA ZIP 94559

Signed _____ 10-28-00 439-746
WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED C-57 LICENSE NUMBER

DWR 188 REV. 11-97

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

Well 13

*The free Adobe Reader may be used to view and complete this form. However, software must be purchased to complete, save, and reuse a saved form.

File Original with DWR

State of California

Well Completion Report

Refer to Instruction Pamphlet

No. e0231592

Page 1 of 1

Owner's Well Number 1

Date Work Began 09/05/2014 Date Work Ended 9/8/2014

Local Permit Agency Planning, Building & Environmental

Permit Number E14-00602 Permit Date 7/25/14

DWR Use Only – Do Not Fill In

State Well Number/Site Number

N W

Latitude Longitude

APN/TRS/Other

Geologic Log

Orientation ⦿ Vertical ○ Horizontal ○ Angle Specify

Drilling Method Direct Rotary Drilling Fluid Bentonite mud

Depth from Surface Feet	to Feet	Description Describe material, grain size, color, etc
0	90	Brown clay
90	110	layer of rock in clay
110	160	Clay
160	190	Rock, clay and sand mix
190	210	clean gravel 1/16" round
210	290	Brown rock and sand
290	330	Multi color gravel and sand 30 gpm total
330	480	Red and brown clean gravel 45- 50 gpm total

Total Depth of Boring 480 Feet

Total Depth of Completed Well 480 Feet

Well Owner

Name Carter Callahan

Mailing Address Po Box 3478

City Yountville State CA Zip 94599

Well Location

Address 7564 Hyw 29

City Napa County Napa

Latitude Deg. Min. Sec. N Longitude Deg. Min. Sec. W

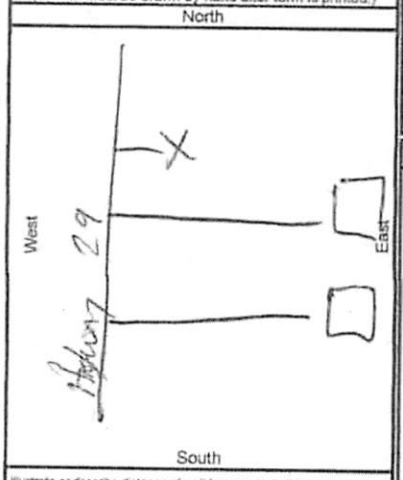
Datum Decimal Lat. Decimal Long.

APN Book 031 Page 100 Parcel 026

Township Range Section

Location Sketch

(Sketch must be drawn by hand after form is printed.)



Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. Please be accurate and complete.

Activity

⦿ New Well
○ Modification/Repair
○ Deepen
○ Other
○ Destroy
Describe procedures and materials under "GEOLOGIC LOG"

Planned Uses

⦿ Water Supply
☑ Domestic ☐ Public
☐ Irrigation ☐ Industrial
○ Cathodic Protection
○ Dewatering
○ Heat Exchange
○ Injection
○ Monitoring
○ Remediation
○ Sparging
○ Test Well
○ Vapor Extraction
○ Other

Water Level and Yield of Completed Well

Depth to first water 85 (Feet below surface)

Depth to Static Water Level 85 (Feet) Date Measured 09/10/2014

Estimated Yield * 45 (GPM) Test Type Air Lift

Test Length 2.0 (Hours) Total Drawdown 0 (Feet)

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

Casings

Depth from Surface Feet	to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size If Any (Inches)
0	50	12	Blank	PVC Sch. 80		5		
50	220	8 3/4	Blank	PVC Sch. 80		5		
220	380	8 3/4	Screen	PVC Sch. 80		5	Milled Slots	0.032
380	480	8 3/4	Screen	PVC Sch. 80		5	Milled Slots	0.032

Annular Material

Depth from Surface Feet	to Feet	Fill	Description
0	20	Bentonite	seal
20	480	Filter Pack	

Attachments

☐ Geologic Log
☐ Well Construction Diagram
☐ Geophysical Log(s)
☐ Soil/Water Chemical Analyses
☐ 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 D. Bess Pump & Well
Person, Firm or Corporation

1115 Mt. George Ave Napa CA 94558
Address City State Zip

Signed [signature] 7/29/16
C-57 Licensed Water Well Contractor Date Signed

C-57 License Number 487027

DWR 188 REV. 1/2006

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

Well 14

31-100-029

#4182

QUADRUPLICATE
Use to comply with local requirements

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WATER WELL DRILLERS REPORT

Do not fill in

No. **384942**

Notice of Intent No. ______

Local Permit No. or Date 31531

State Well No. ______

Other Well No. ______

(1) OWNER: Name Spencer Howes
Address 1380 [illegible] rd.
City [illegible] ZIP

(2) LOCATION OF WELL (See instructions):
County 28 Owner's Well Number
Well address if different from above
Township 31 Range 100 Section 029
Distance from cities, roads, railroads, fences, etc. [illegible]

WELL LOCATION SKETCH

(3) TYPE OF WORK:
New Well ☒ Deepening ☐
Reconstruction ☐
Reconditioning ☐
Horizontal Well ☐
Destruction ☐ (Describe destruction materials and procedures in Item 12)

(4) PROPOSED USE:
Domestic ☒
Irrigation ☒
Industrial ☐
Test Well ☐
Municipal ☐
Other ☒
(Describe)

(5) EQUIPMENT:
Rotary ☒ Reverse ☐
Cable ☐ Air ☐
Other ☐ Bucket ☐

(6) GRAVEL PACK:
Yes ☒ No ☐ Size [illegible]
Diameter of bore 10
Packed from 34 to 400 ft.

(7) CASING INSTALLED:
Steel ☐ Plastic ☒ Concrete ☐

(8) PERFORATIONS:
Type of perforation or size of screen

From ft.	To ft.	Dia. in.	Gage or Wall	From ft.	To ft.	Slot size
0	400	6	200	40	400	[illegible]

(9) WELL SEAL:
Was surface sanitary seal provided? Yes ☐ No ☐ If yes, to depth ______ ft.
Were strata sealed against pollution? Yes ☒ No ☐ Interval 18 - 20 ft.
Method of sealing cement

(10) WATER LEVELS:
Depth of first water, if known 18 ft.
Standing level after well completion 30 ft.

(11) WELL TESTS:
Was well test made? Yes ☒ No ☐ If yes, by whom? [illegible]
Type of test Pump ☐ Bailer ☐ Air lift ☒
Depth to water at start of test 40 ft. At end of test 140 ft.
Discharge 100 gal/min after 3 hours Water temperature
Chemical analysis made? Yes ☐ No ☒ If yes, by whom?
Was electric log made Yes ☐ No ☒ If yes, attach copy to this report

(12) WELL LOG: Total depth 400 ft. Completed depth 400 ft.

from ft. to ft. Formation (Describe by color, character, size or material)

0 - 18' clay
18 - 20' clay & gravel
20 - 120' clay, streaks of gravel & boulders
120 - 400 gray ash, streaks of [illegible] gray ash

CONFIDENTIAL
NOT FOR PUBLIC USE
WATER CODE SEC. 13752

RECEIVED
JUN 21 1993
DEPT. OF ENVIRONMENTAL MANAGEMENT

Work started 7-13 19 93 Completed 7-23 19 93

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

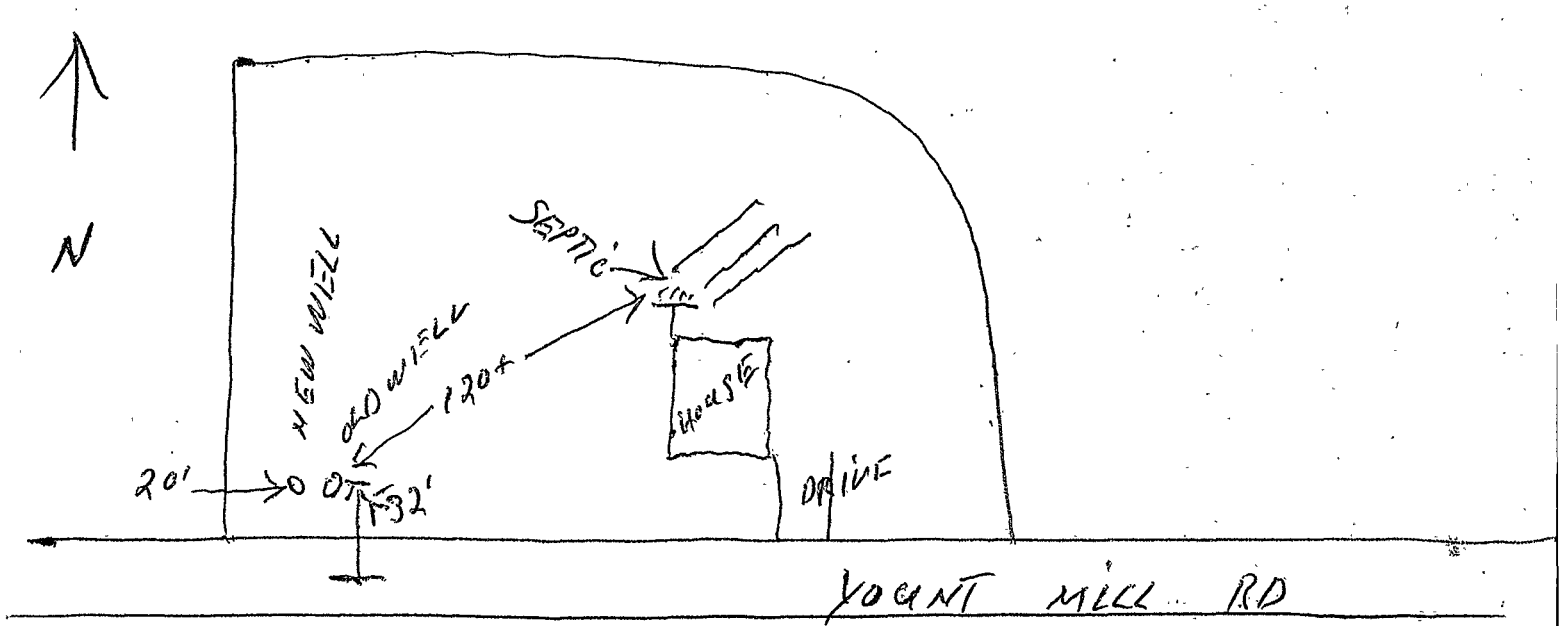
Signed [signature] (Well Driller)
NAME Pullian Well Drilling (Person, firm, or corporation) (Typed or printed)
Address [illegible]
City [illegible] ZIP [illegible]
License No. [illegible] Date of this report 7-23-93

DWR 188 (REV. 12-86) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM 86 96355

Well 14

SPENCER HOOPES
1380 YOUNT MILL RD
YOUNTVILLE

PARCEL = 31-100-23



ORIGINAL
File with DWR

Well 15

Page ___ of ___

Owner's Well No. ___

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 1073612

Date Work Began 10/10/2008, Ended 10/16/2008

Local Permit Agency Napa County

Permit No. E08-00578 Permit Date 10/02/2008

DWR USE ONLY — DO NOT FILL IN
07N05W26
STATE WELL NO./STATION NO.
LATITUDE 38 25 37 LONGITUDE 122 22 55
APN/TRS/OTHER 031 + 100 - 035

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIF

DRILLING METHOD Rotary FLUID Mud

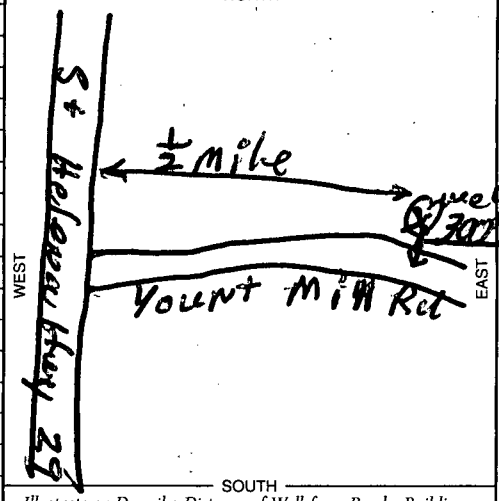
DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	25	Brown Clay & Gravel
25	38	Gravel
38	65	Brown Clay & Gravel
65	80	Yellow Clay
80	100	Yellow Ash
100	120	Gray Clay
120	140	Gray Gravel, some Clay
140	180	Gray Clay
180	220	Gray Rock & Gray Clay
220	320	Gray Rock & some Gray Clay
320	390	Gray & Green Fractured Rock
390	404	Gray Clay & some Rock

TOTAL DEPTH OF BORING 404 (Feet)
TOTAL DEPTH OF COMPLETED WELL 400 (Feet)

WELL OWNER

Address 1350 Yount Mill Road
City Napa
County Napa
APN Book 031 Page 100 Parcel 032-000
Township ___ Range ___ Section ___
Lat ___ N DEG. MIN. SEC. Long ___ W DEG. MIN. SEC.

LOCATION SKETCH



*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")*

USES (✓)

WATER SUPPLY
✓ Domestic ___ Public
___ Irrigation ___ Industrial
___ MONITORING
___ TEST WELL
___ CATHODIC PROTECTION
___ HEAT EXCHANGE
___ DIRECT PUSH
___ INJECTION
___ VAPOR EXTRACTION
___ SPARGING
___ REMEDIATION
___ OTHER (SPECIFY)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER UK (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 75 (Ft.) & DATE MEASURED 10-16-08
ESTIMATED YIELD 30 (GPM) & TEST TYPE air lift
TEST LENGTH 5 (Hrs.) TOTAL DRAWDOWN UK (Ft.) GPM at day of Test
** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	55	11	✓				Plastic	5	Sch 80	
55	104	8¾	✓				"	"	"	
104	400	8¾		✓			"	"	"	.032

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	55	✓			
55	400			Pea Gravel	

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ 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 Pulliam Well Exploration, Inc.
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS 5110 Highway 128 CITY Napa STATE CA ZIP 94558

Signed Tom Pulliam
C-57 LICENSED WATER WELL CONTRACTOR

DATE SIGNED 11-11-08

C-57 LICENSE NUMBER 808-508

DWR 188 REV. 05-03

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

OSP 03 78836

File Original with DWR

Well 16

Page _____ of _____

Owner's Well Number _____

Well Completion Report

State of California

Refer to Instruction Pamphlet

No. e0176210

Date Work Began 04/23/2013 Date Work Ended 5/3/2013

Local Permit Agency Napa County

Permit Number E12-00447 Permit Date 8/1/12

DWR Use Only – Do Not Fill In

State Well Number/Site Number

Latitude N Longitude W

APN/TRS/Other

Geologic Log

Orientation ◉ Vertical ○ Horizontal ○ Angle Specify _____

Drilling Method Direct Rotary Drilling Fluid Polymer mud

Depth from Surface Feet	to Feet	Description Describe material, grain size, color, etc
0	20	Brown Clay
20	40	Brown Clay & Gravel
40	60	Brown Clay
60	120	Blue Rock
120	280	Blue Rock with Blue Clay
280	390	Fractured Blue Rock
390	540	Gray Clay
540	580	Green Clay
580	595	Fractured Green Rock
595	625	Green Clay
		Perforation Layout 302 ft
		P = Perforation P
		B = Blank B
		0 to 102 Blank P
		P B
		B P 402 ft
		P B
		B P
		P 202 ft B
		B P
		P B 502 ft
		B P
		P B
		B 302 ft P
		B
		P
		P 622 ft

Total Depth of Boring 625 Feet

Total Depth of Completed Well 622 Feet

Well Owner

Name Barbara Hoopes

Mailing Address 1350 Yount Mill Road

City Napa State CA Zip 94558

Well Location

Address 1350 Yount Mill Rd

City Napa County Napa

Latitude ___ Deg. ___ Min. ___ Sec. N Longitude ___ Deg. ___ Min. ___ Sec. W

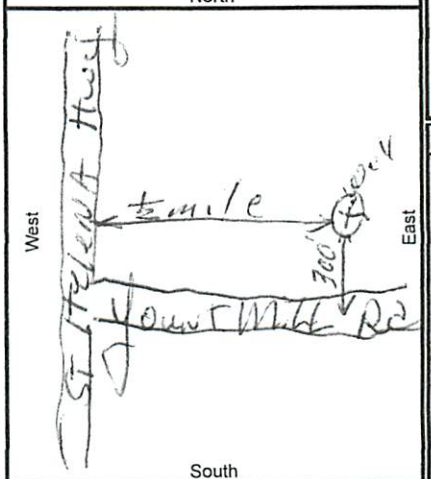
Datum _____ Decimal Lat. _____ Decimal Long. _____

APN Book 031 Page 100 Parcel 035-000

Township _____ Range _____ Section _____

Location Sketch

(Sketch must be drawn by hand after form is printed.)



Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. **Please be accurate and complete.**

Activity

◉ New Well
○ Modification/Repair
○ Deepen
○ Other _____
○ Destroy
Describe procedures and materials under "GEOLOGIC LOG"

Planned Uses

◉ Water Supply
☐ Domestic ☐ Public
☑ Irrigation ☐ Industrial
○ Cathodic Protection
○ Dewatering
○ Heat Exchange
○ Injection
○ Monitoring
○ Remediation
○ Sparging
○ Test Well
○ Vapor Extraction
○ Other _____

Water Level and Yield of Completed Well

Depth to first water 100 (Feet below surface)

Depth to Static Water Level 25 (Feet) Date Measured 05/03/2013

Estimated Yield * 150 (GPM) Test Type Air Lift

Test Length 2.0 (Hours) Total Drawdown 275 (Feet)

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

Casings

Depth from Surface Feet	to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)
0	55	12	Blank	PVC Sch. 40	R21	6		
55	102	10	Blank	PVC Sch. 40	R21	6		
102	622	10	Screen	PVC Sch. 40	R21	6	Milled Slots	0.032

Annular Material

Depth from Surface Feet	to Feet	Fill	Description
0	52	Cement	cement/Vol Clay
52	622	Filter Pack	#6 Well Pack

Attachments

☐ Geologic Log
☐ Well Construction Diagram
☐ Geophysical Log(s)
☐ Soil/Water Chemical Analyses
☐ 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 Pulliam Well Exploration, Inc
Person, Firm or Corporation

4371 Cantelow Road Vacaville CA 95688
Address City State Zip

Signed _____ 5/8/2013 808-508
C-57 Licensed Water Well Contractor Date Signed C-57 License Number

DWR 188 REV. 1/2006

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

Well 17

Napa County Department of Environmental Management

SITE EVALUATION REPORT

Please attach an 8.5" x 11" plot map showing the locations of all test pits triangulated from permanent landmarks or known property corners. The map must be drawn to scale and include a North arrow, surrounding geographic and topographic features, direction and % slope, distance to drainages, water bodies, potential areas for flooding, unstable landforms, existing or proposed roads, structures, utilities, domestic water supplies, wells, ponds, existing wastewater treatment systems and facilities.

Permit #: E12-00002	
APN: 031-100-034	
(County Use Only) Reviewed by: RS	Date: 1/24/12

PLEASE PRINT OR TYPE ALL INFORMATION

Property Owner Spencer Hoopes White House Vineyard, LLC	☒ New Construction ☐ Addition ☐ Remodel ☐ Relocation ☐ Other:
Property Owner Mailing Address	☒ Residential - # of Bedrooms: 4 Design Flow : 480 gpd
City State Zip	☐ Commercial – Type: Winery Sanitary Waste: gpd Process Waste: gpd
Site Address/Location Yount Mill Road, Yountville (no street address)	☐ Other: Sanitary Waste: gpd Process Waste: gpd

Evaluation Conducted By:

Company Name **Delta Consulting & Engineering**	Evaluator's Name Kristi Wagner, PE	Signature (Civil Engineer, R.E.H.S., Geologist, Soil Scientist)
Mailing Address: **1104 Adams Street, Suite 203**		Telephone Number **707-963-8456**
City State Zip **St. Helena** **CA** **94574**		Date Evaluation Conducted 01/4/12

Primary Area	Expansion Area
Acceptable Soil Depth: 72 in. Test pit #'s: 4 & 5	Acceptable Soil Depth: 66 in. Test pit #'s: 2, 3, 6
Soil Application Rate (gal. /sq. ft. /day): 0.33	Soil Application Rate (gal. /sq. ft. /day): 0.33
System Type(s) Recommended: standard	System Type(s) Recommended: standard
Slope: <5 %. Distance to nearest water source: >100 ft.	Slope: <5 %. Distance to nearest water source: >100 ft.
Hydrometer test performed? No ☐ Yes ☒ (attach results)	Hydrometer test performed? No ☐ Yes ☒ (attach results)
Bulk Density test performed? No ☒ Yes ☐ (attach results)	Bulk Density test performed? No ☒ Yes ☐ (attach results)
Percolation test performed? No ☒ Yes ☐ (attach results)	Percolation test performed? No ☒ Yes ☐ (attach results)
Groundwater Monitoring Performed? No ☒ Yes ☐ (attach results)	Groundwater Monitoring Performed? No ☒ Yes ☐ (attach results)

Site constraints/Recommendations:

A standard system is recommended for this site. The test pits were dug in between existing vine rows. The new leach lines shall be installed in the center of the space in between each vine row. There is an existing blue-line stream located near the north property line. In addition, there are existing wells on this parcel and the neighboring parcel. The new leach field shall be located to meet the 100' creek setback and the 100' well setback. Other than the existing vineyards, this parcel is currently undeveloped.

SCANNED

RECEIVED

JAN 18 2012

DEPT. OF ENVIRONMENTAL MANAGEMENT

Test Pit # 1

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-38		10	SCL	M/SB	SH	FRB	NS	F/C	F-M/C	-
38-62	G	5	SCL	M/SB	H	FRB	NS	F/F	-	-
hydrometer test performed on soil samples from both horizons of this pit										

Test Pit # 2

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-39	same as pit #1									
39-67	same as pit #1									

Test Pit # 3

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-16		10	SCL	M/SB	S	FRB	NS	F/C	F-M/C	-
16-53	G	40	SL	M/SB	S	FRB	NS	F/C	F-M/C	-
53-66	C	5	SCL	M/SB	H	FRB	NS	F/F	-	-
hydrometer test performed on soil samples from horizon 2 (16" - 53") of this pit										

Attach additional sheets as needed

Test Pit # 4

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-73		20	SL	M/SB	SH	FRM	NS	F/C	F-M/C	-
hydrometer test performed on soil sample from this pit, sample taken from the bottom half of the pit depth.										

Test Pit # 5

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-72	same as pit #4									

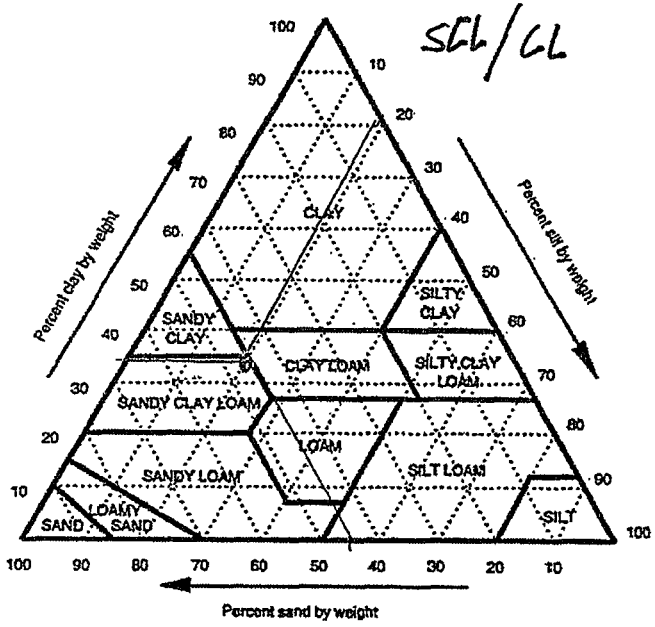
Test Pit # 6

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-48	same as pit #1									
48-72	same as pit #1									

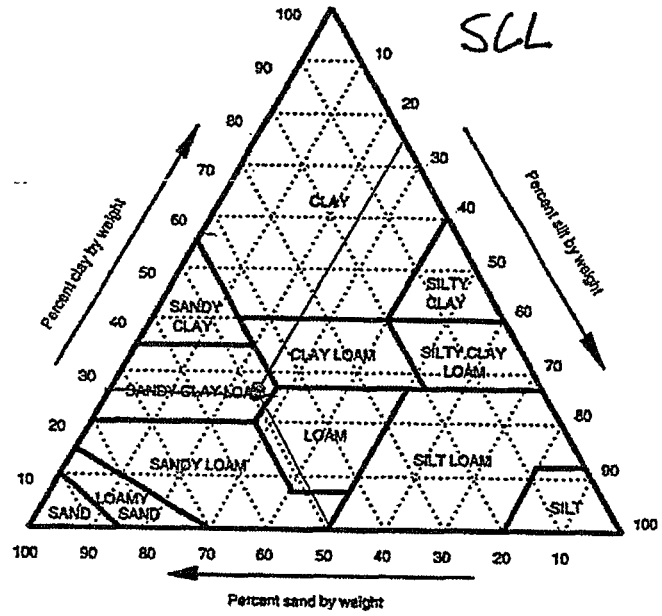
Attach additional sheets as needed

Well 17

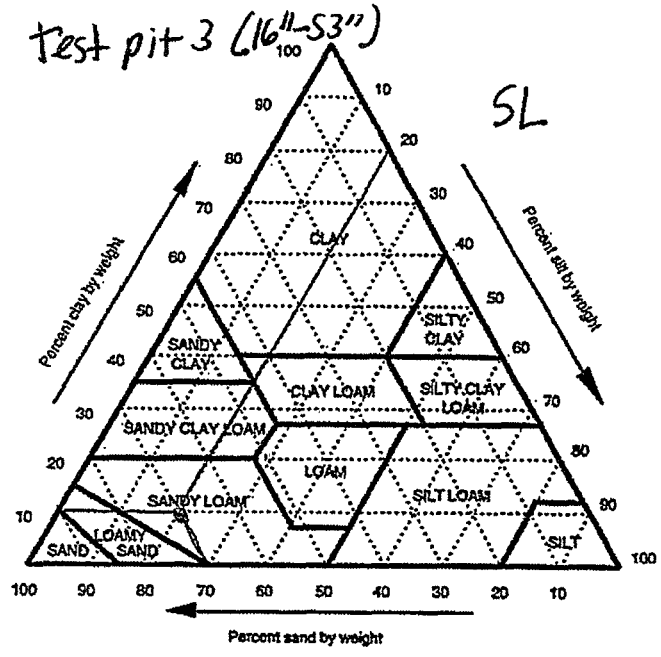
Test pit 1, Hor 1 (0–38")



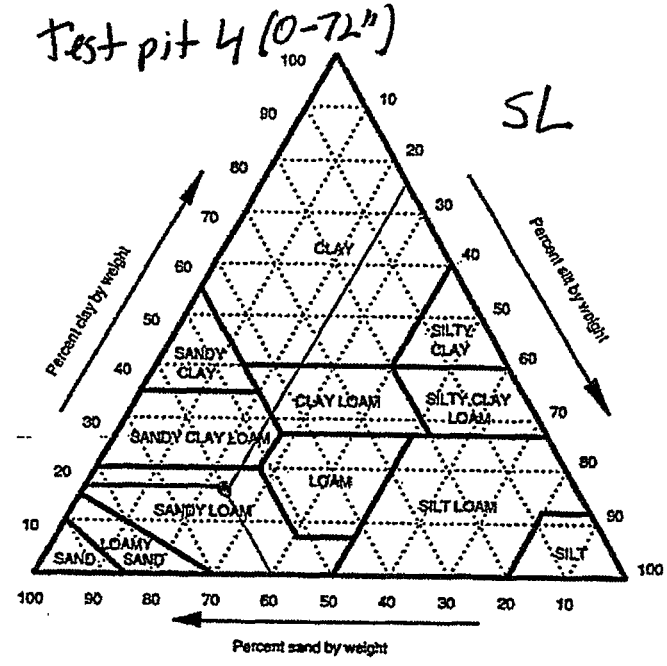
Test pit 1, Hor 2 (38"–62")

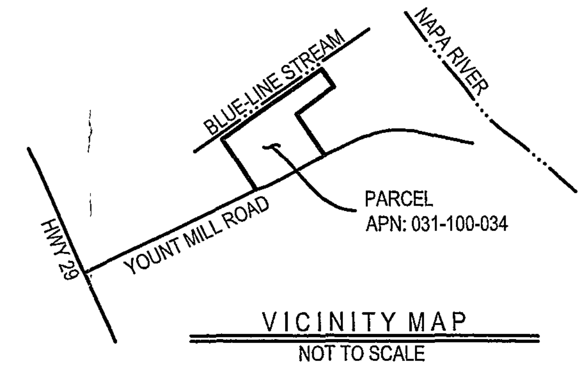


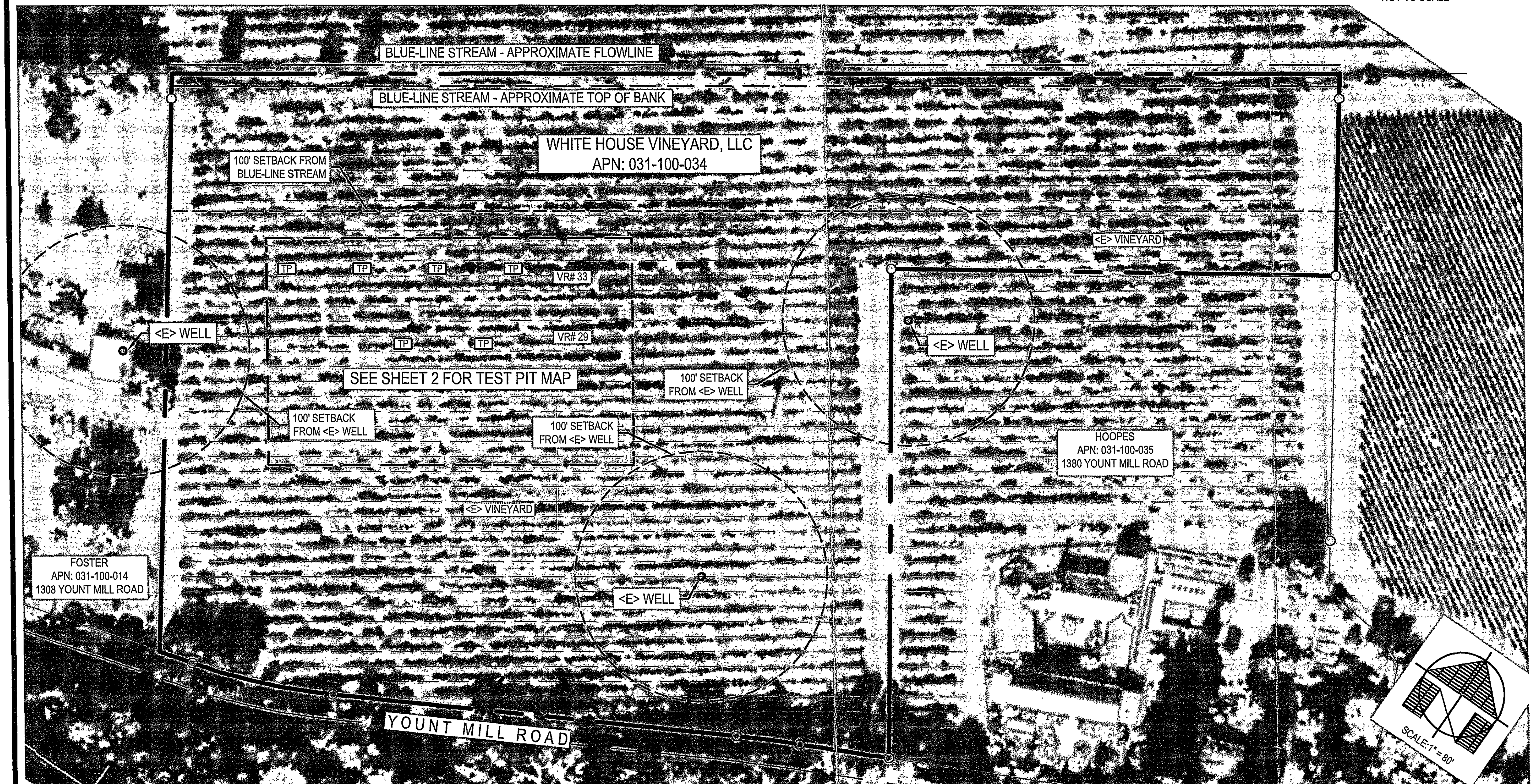
Test pit 3 (16"–53")



Test pit 4 (0–72")







OVERALL SITE PLAN

SCALE: 1" = 80'

SITE EVALUATION REPORT
OVERALL SITE PLAN

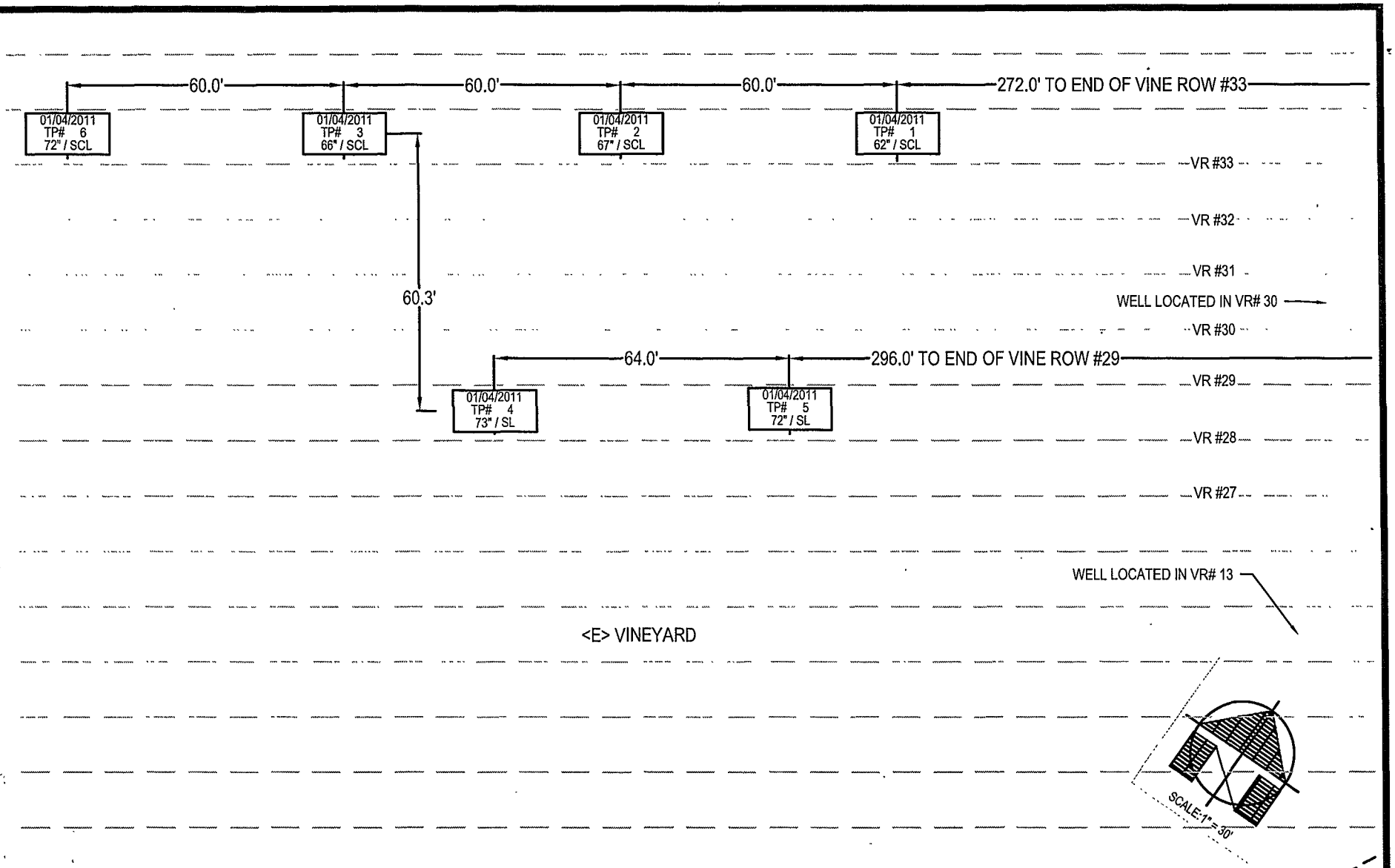
YOUNTVILLE CALIFORNIA

DELTA CONSULTING & ENGINEERING OF ST. HELENA
1104 ADAMS STREET, SUITE 203 - ST. HELENA, CALIFORNIA 94574
707-963-8456 • 707-963-8528 FAX

DATE: 01/04/12
SCALE: AS NOTED
JOB #: K-148
APN: 031-100-034

1 OF 2

Well 17



TEST PIT MAP

SCALE: 1" = 30'

SITE EVALUATION REPORT

TEST PIT MAP

DELTA CONSULTING & ENGINEERING
OF ST. HELENA
1104 ADAMS STREET, SUITE 203 - ST. HELENA, CALIFORNIA 94574
707-963-8456 + 707-963-8528 FAX

DATE: 01/04/12	JOB # K-148
SCALE: AS NOTED	APN: 031-100-034

Well 18

DATE 4/23/87
FEE $10.00
RECEIPT NO. 19515
BY W. Castells

NAPA COUNTY
DEPARTMENT OF ENVIRONMENTAL HEALTH
APPLICATION & PERMIT TO CONSTRUCT A SEWAGE SYSTEM

A.P.# 31-130-05
RECORD # 570

OWNER: DeLissa & Hale
SITE ADDRESS: 7340 St. Helena Hwy
MAILING ADDRESS: Box 2007 Yountville Ca.

CONTRACTOR: Montelli Const.
ADDRESS:

TYPE OF WORK: NEW CONSTRUCTION ( ) REPAIR (X) ADDITION ( ) ALTERATIONS ( )
SPECIAL DESIGN ( ) PRIVATE SEWAGE DISPOSAL SYSTEM (Ponds) ( )

PROPOSED USE: Residential(1) Units 2 /BDRMS ____ Commercial/Industrial(-) ____ G.P.D.
Other( ) Explain ____

WATER SUPPLY: Public ( ) Individual (X) (Well X, Spring ____, Creek ____ or Lake ____)
Distance from well to any part of nearest sewage disposal system 100' feet.
Additional nearby wells 100'+. Plot plan of proposed sewage system received ____.

County Road setback 90 feet from center line. Bldg. Dept. Form Received ( )

SPECIFICATIONS: Septic Tank: Type Concrete or Approved Plastic Size 1200 (gallons)
Drainline: Total Length 200' Trench Depth 24" Rock Under Leach Line 12"
Sewer Line: Type ABS sched 40 Approximate Length 130' Depth 12" Min
Sump Pump: Tank Size ____ Alarm Type ____
See Special Design Plans Approved: (date) ____ Designer ____
See Private Sewage Disposal System Plans Approved: (date) ____ Designer ____
Other Min width of Trench 18"
- 6" of Fill Required to maintain 12" min Cover

Issuing Sanitarian: Bob Hamsi

WORKER'S COMPENSATION COVERAGE: (Check one of the following)
(X) A certificate of current Worker's Comp. Insurance is on file with this office.
( ) A certificate of current Worker's Comp. Insurance is being filed with this application.
( ) I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner without complying with the Worker's Compensation laws California.

TERMS OF PERMIT

Applicant agrees that:
1) Sanitarian will be notified a minimum of 24 hours prior to requiring inspection(s).
2) Sanitarian and engineer's inspection, when indicated, will be obtained prior to covering the system.
3) The permit and a copy of the approved sewage disposal system design shall be available at the parcel site at all times.
4) Any deviation from approved plan and specifications without prior approval of this office will be cause for stopping work until the changes are fully justified and approved.
5) Prior to authorizing occupancy of any building with an engineered designed system a signed statement by the design engineer certifying that the system was installed in compliance with the approved plan must be submitted to the Department of Environmental Health.
6) This permit is subject to revocation if found to be in nonconformance with Napa County Code of Ordinances, Title V, Article 3 (The Sewage Ordinance).

IT IS UNDERSTOOD THAT THE ISSUANCE OF A PERMIT IN NO WAY INDICATES THAT A GUARANTEE OF PERFECT AND INDEFINITE OPERATION OF THIS SYSTEM IS MADE BY THE NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL HEALTH AND THAT THE OWNER IS REQUIRED TO MAKE ANY REPAIRS NECESSARY TO CONFINE SEWAGE AS REQUIRED BY THE COUNTY SEWAGE ORDINANCE. I HEARBY ACKNOWLEDGE THAT I HAVE READ THIS APPLICATION AND STATE THAT THE ABOVE IS CORRECT AND AGREE TO COMPLY WITH ALL COUNTY ORDINANCES AND STATE LAWS REGULATING CONSTRUCTION OF SEWAGE DISPOSAL SYSTEMS. THIS PERMIT SHALL EXPIRE BY LIMITATION IF WORK AUTHORIZED IS NOT COMMENCED WITHIN 2 YEARS.

Owner or Authorized Agent Richard Hale

EHD-10:11/12/86

Well 18

INSPECTION RECORD

Sewer Line ABS 4" Sch 40 12-18" 4/28/87 JG
Material Depth Date Inspector

Septic Tank Poly - Norwesco 1200 gallon 4/28/87 JG
Type Size Date Inspector

Leach Lines DIC 4/28/87 JG
Date Inspector

Soil Compares with Percolation Record N/A - Soil is Typical for the area - Heavy Black Clay

Average Surface Slope(s) 0-19%

Trench Width 18" Depth 24-28" Total Length 200' No. Lines 4

Rock Under Leachline 12" Distance Between Trenches 6'

Top of Leachline to Finish Grade 6" Native + 6" fill Distance Wells from System 100'

Accessory Facilities (Diversion Drains, Sump Pumps, etc.)

Additional Field Notes

Plot Plan Accuracy Checked

Date of Final Inspector

Date Bldg. Dept. Final Inspector

EHD-10:10/86

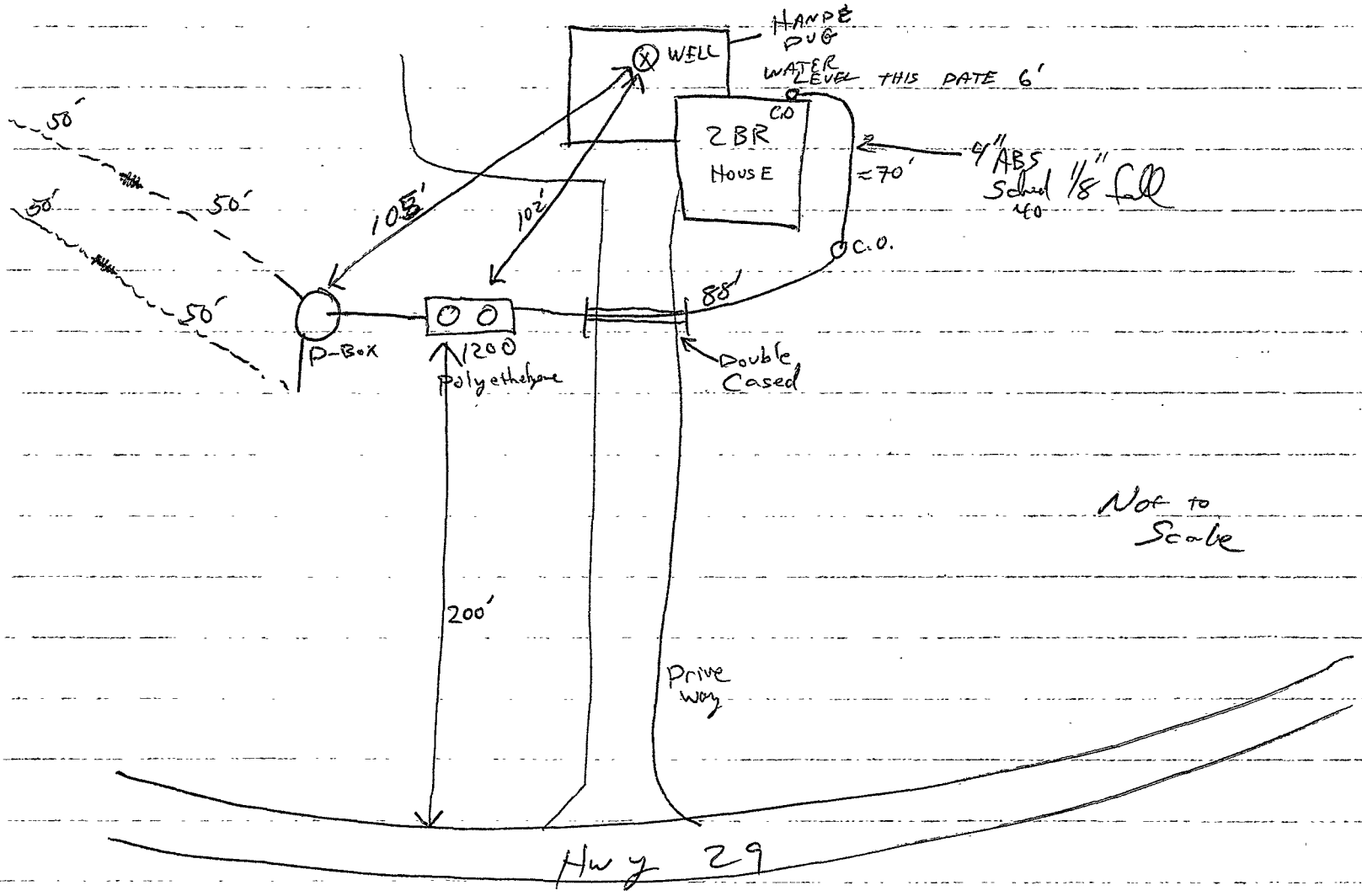
Well 18

Pelissa & Hale

7370 St. Helena Hwy — AS-BUILT — 4/28/87

Yountville

31-130-05 — Repair



APPENDIX B

WELL USE AND LANDSCAPE IRRIGATION DATA SELECTED FROM 2023 WAA

Del Dotto Winery
7466 St. Helena Hwy
St. Helena, CA 94574

Section B. Water Efficient Landscape Worksheet
Eto = 44.1

Valve #	Hydrozone / Planting Description	WUCOLS	Plant Factor (PF)	Irrigation Method	Irrigation Efficiency (IE)	ETAF (PF/IE)	Landscape Area (sq.ft)	ETAF x Area	Estimated Total Water Use (ETWU)
Existing Plantings at Entry and Tasting Room									
1	Wisteria Arbor in Courtyard and mixed bed in circular planter	Moderate	0.6	Drip	0.81	0.74	271	201	5,489
2	Unused								
3	Olives West Auto Court	Very Low	0.1	Drip	0.81	0.12	2,960	365	9,992
4	Unused								
5	Olives East Auto Court	Very Low	0.1	Drip	0.81	0.12	1,666	206	5,624
6	Unused								
7	Lavender in Auto Court	Low	0.3	Drip	0.81	0.37	4,626	1,713	46,846
8	Unused								
9	Jasmine in front of chicken coop	Moderate	0.6	Drip	0.81	0.74	234	173	4,739
10	Olives in Courtyard	Very Low	0.1	Drip	0.81	0.12	1,800	222	6,076
11	Mixed beds under Olives in Courtyard	Moderate	0.4	Drip	0.81	0.49	2,032	1,003	27,437
12	Fruit trees behind chicken coop	Moderate	0.6	Drip	0.81	0.74	960	711	19,443
13	Mixed beds in Courtyard	Moderate	0.4	Drip	0.81	0.49	332	164	4,483
14	Mixed beds in Courtyard	Moderate	0.4	Drip	0.81	0.49	332	164	4,483
15	Mixed beds in Courtyard	Moderate	0.4	Drip	0.81	0.49	470	232	6,346
16	Mixed beds in Courtyard	Moderate	0.4	Drip	0.81	0.49	470	232	6,346
17	Entry Gate North Side: Lavender area 1	Low	0.3	Spray	0.75	0.40	1,037	415	11,341
18	Entry Gate North Side: Boxwood hedge	Moderate	0.6	Drip	0.81	0.74	224	166	4,537
19	Entry Gate North Side: Lavender area 2	Low	0.3	Spray	0.75	0.40	771	308	8,432
20	Entry Gate North Side: Rosemary	Low	0.3	Drip	0.81	0.37	660	244	6,684
21	Unused								
22	First 5 Olives along North side of driveway	Very Low	0.1	Drip	0.81	0.12	4,288	529	14,474
23	Entry Gate South Side: Boxwood hedge	Moderate	0.6	Drip	0.81	0.74	157	116	3,180
24	First 8 Olives along South side of driveway	Very Low	0.1	Drip	0.81	0.12	6,376	787	21,523
25	Entry Gate South Side: Rosemary	Low	0.3	Drip	0.81	0.37	480	178	4,861
26	Entry Gate South Side: Unused								
27	Entry Gate South Side: Lavender	Low	0.3	Spray	0.75	0.40	1,442	577	15,771
28	Lawn areas around fountain in courtyard	High	0.8	Spray	0.75	1.07	800	853	23,332
29	Hanging baskets and Jasmine East of fountain	Moderate	0.6	Drip	0.81	0.74	214	159	4,334
30	Hanging baskets and Jasmine West of fountain	Moderate	0.6	Drip	0.81	0.74	116	86	2,349
31	Boxwood hedge around fountain lawn areas	Moderate	0.6	Drip	0.81	0.74	200	148	4,051
32	Wisteria West of fountain	Moderate	0.6	Drip	0.81	0.74	100	74	2,025
33	Lawn at Tasting Room Entry - East	High	0.8	Spray	0.75	1.07	453	483	13,212
34	Boxwood hedge around East lawn	Moderate	0.6	Drip	0.81	0.74	215	159	4,354
35	Lawn at Tasting Room Entry - West	High	0.8	Spray	0.75	1.07	583	622	17,003
36	Boxwood hedge around West lawn	Moderate	0.6	Drip	0.81	0.74	242	179	4,901
B-1	Jasmine East of Tasting Room	Moderate	0.6	Drip	0.81	0.74	91	67	1,843
	Water Features at Tasting Room	High	0.8		1	0.80	82	66	1,794
Existing Plantings at New Pool Fountain									
B-2	Mixed plantings along South fence	Moderate	0.4	Drip	0.81	0.49	291	144	3,929
F1	Native trees and shrubs in riparian area 1	Low	0.2	Drip	0.81	0.25	4,745	1,172	32,034
F2	Native trees and shrubs in riparian area 2	Low	0.2	Drip	0.81	0.25	3,631	897	24,513
F3	Native trees and shrubs in riparian area 3	Low	0.2	Drip	0.81	0.25	1,406	347	9,492
F4	Native trees and shrubs in riparian area 4	Low	0.2	Drip	0.81	0.25	1,562	386	10,545
F5	Front hedge South side of bridge	Moderate	0.6	Drip	0.81	0.74	737	546	14,927
F6	Front hedge North side of bridge	Moderate	0.6	Drip	0.81	0.74	907	672	18,370
F7	Jasmine hedge all along fountain edge	Moderate	0.6	Drip	0.81	0.74	1,243	921	25,175
	New Pool Fountain	High	0.8		1	0.80	6,281	5,025	137,388
Existing Plantings at Cave Building									
B-3	Mixed bed above crush pad	Moderate	0.4	Drip	0.81	0.49	753	372	10,167
T1	Mixed bed North side of trash enclosure	Moderate	0.4	Drip	0.81	0.49	205	101	2,768
T2	Mixed bed South side of trash enclosure	Moderate	0.4	Drip	0.81	0.49	106	52	1,431
T3	Mixed Bed along access road	Moderate	0.4	Drip	0.81	0.49	5,694	2,812	76,882
T4	Trees on South side of trash enclosure	Moderate	0.6	Drip	0.81	0.74	75	56	1,519
Proposed Plantings at Future Barrel Building									
1	Vegetables in raised planters on upper level	Moderate	0.6	Drip	0.81	0.74	1,120	830	22,684
2	Trees in Pots on upper level	Moderate	0.6	Drip	0.81	0.74	177	131	3,585
3	Trees in Pots on lower level	Moderate	0.6	Drip	0.81	0.74	79	59	1,600
	Water Feature	High	0.8		1	0.80	182	146	3,981
						Totals	63,878	26,271	718,293
Special Landscape Areas									
	N/A								
								ETWU Total =	**718,293**
	ETAF Calculations						**Maximum Applied Water Allowance (MAWA) =**		**785,949**
	Regular Landscape Areas								
	Total ETAF x Area	26271							
	Total Area	63878				MAWA calculation:			44.1*0.62*(0.45*63,878)
	Average ETAF	**0.41**							
	All Landscape Areas								
	Total ETAF x Area	26271							
	Total Area	63878							
	Average ETAF	**0.41**							

Piazza Del Dotto Winery
7466 St. Helena Hwy
St. Helena, CA 94574

Streamline
irrigation design and compliance
streamlinesdc.com
(707) 529-2633

Date 08/04/2022
Drawn By LM
Checked By
Project No.

Date Issue

WELO Worksheet

SCALE : AS NOTED

IR 1.4

Sheet

of

Del Dotto Winery
7466 St. Helena Hwy
St. Helena, CA 94574

Attachment 2

Section B. Water Efficient Landscape Worksheet
Eto = 44.1

Valve #	Hydrozone / Planting Description	WUCOLS	Plant Factor (PF)	Irrigation Method	Irrigation Efficiency (IE)	ETAF (PF/IE)	Landscape Area (sq.ft)	ETAF x Area	Estimated Total Water Use (ETWU)
Existing Plantings at Entry and Tasting Room									
1	Wisteria Arbor in Courtyard and mixed bed in circular planter	Moderate	0.6	Drip	0.81	0.74	271	201	5,489
2	Unused								
3	Olives West Auto Court	Very Low	0.1	Drip	0.81	0.12	2,960	365	9,992
4	Unused								
5	Olives East Auto Court	Very Low	0.1	Drip	0.81	0.12	1,666	206	5,624
6	Unused								
7	Lavender in Auto Court	Low	0.3	Drip	0.81	0.37	4,626	1,713	46,846
8	Unused								
9	Jasmine in front of chicken coop	Moderate	0.6	Drip	0.81	0.74	234	173	4,739
10	Olives in Courtyard	Very Low	0.1	Drip	0.81	0.12	1,800	222	6,076
11	Mixed beds under Olives in Courtyard	Moderate	0.4	Drip	0.81	0.49	2,032	1,003	27,437
12	Fruit trees behind chicken coop	Moderate	0.6	Drip	0.81	0.74	960	711	19,443
13	Mixed beds in Courtyard	Moderate	0.4	Drip	0.81	0.49	332	164	4,483
14	Mixed beds in Courtyard	Moderate	0.4	Drip	0.81	0.49	332	164	4,483
15	Mixed beds in Courtyard	Moderate	0.4	Drip	0.81	0.49	470	232	6,346
16	Mixed beds in Courtyard	Moderate	0.4	Drip	0.81	0.49	470	232	6,346
17	Entry Gate North Side: Lavender area 1	Low	0.3	Spray	0.75	0.40	1,037	415	11,341
18	Entry Gate North Side: Boxwood hedge	Moderate	0.6	Drip	0.81	0.74	224	166	4,537
19	Entry Gate North Side: Lavender area 2	Low	0.3	Spray	0.75	0.40	771	308	8,432
20	Entry Gate North Side: Rosemary	Low	0.3	Drip	0.81	0.37	660	244	6,684
21	Unused								
22	First 5 Olives along North side of driveway	Very Low	0.1	Drip	0.81	0.12	4,288	529	14,474
23	Entry Gate South Side: Boxwood hedge	Moderate	0.6	Drip	0.81	0.74	157	116	3,180
24	First 8 Olives along South side of driveway	Very Low	0.1	Drip	0.81	0.12	6,376	787	21,523
25	Entry Gate South Side: Rosemary	Low	0.3	Drip	0.81	0.37	480	178	4,861
26	Entry Gate South Side: Unused								
27	Entry Gate South Side: Lavender	Low	0.3	Spray	0.75	0.40	1,442	577	15,771
28	Lawn areas around fountain in courtyard	High	0.8	Spray	0.75	1.07	800	853	23,332
29	Hanging baskets and Jasmine East of fountain	Moderate	0.6	Drip	0.81	0.74	214	159	4,334
30	Hanging baskets and Jasmine West of fountain	Moderate	0.6	Drip	0.81	0.74	116	86	2,349
31	Boxwood hedge around fountain lawn areas	Moderate	0.6	Drip	0.81	0.74	200	148	4,051
32	Wisteria West of fountain	Moderate	0.6	Drip	0.81	0.74	100	74	2,025
33	Lawn at Tasting Room Entry - East	High	0.8	Spray	0.75	1.07	453	483	13,212
34	Boxwood hedge around East lawn	Moderate	0.6	Drip	0.81	0.74	215	159	4,354
35	Lawn at Tasting Room Entry - West	High	0.8	Spray	0.75	1.07	583	622	17,003
36	Boxwood hedge around West lawn	Moderate	0.6	Drip	0.81	0.74	242	179	4,901
B-1	Jasmine East of Tasting Room	Moderate	0.6	Drip	0.81	0.74	91	67	1,843
	Water Features at Tasting Room	High	0.8		1	0.80	82	66	1,794

Existing Plantings at New Pool Fountain									
B-2	Mixed plantings along South fence	Moderate	0.4	Drip	0.81	0.49	291	144	3,929
F1	Native trees and shrubs in riparian area 1	Low	0.2	Drip	0.81	0.25	4,745	1,172	32,034
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F4	Native trees and shrubs in riparian area 4	Low	0.2	Drip	0.81	0.25	1,562	386	10,545
F5	Front hedge South side of bridge	Moderate	0.6	Drip	0.81	0.74	737	546	14,927
F6	Front hedge North side of bridge	Moderate	0.6	Drip	0.81	0.74	907	672	18,370
F7	Jasmine hedge all along fountain edge	Moderate	0.6	Drip	0.81	0.74	1,243	921	25,175
	New Pool Fountain	High	0.8		1	0.80	6,281	5,025	137,388
Existing Plantings at Cave Building									
B-3	Mixed bed above crush pad	Moderate	0.4	Drip	0.81	0.49	753	372	10,167
T1	Mixed bed North side of trash enclosure	Moderate	0.4	Drip	0.81	0.49	205	101	2,768
T2	Mixed bed South side of trash enclosure	Moderate	0.4	Drip	0.81	0.49	106	52	1,431
T3	Mixed Bed along access road	Moderate	0.4	Drip	0.81	0.49	5,694	2,812	76,882
T4	Trees on South side of trash enclosure	Moderate	0.6	Drip	0.81	0.74	75	56	1,519
Proposed Plantings at Future Barrel Building									
1	Vegetables in raised planters on upper level	Moderate	0.6	Drip	0.81	0.74	1,120	830	22,684
2	Trees in Pots on upper level	Moderate	0.6	Drip	0.81	0.74	177	131	3,585
3	Trees in Pots on lower level	Moderate	0.6	Drip	0.81	0.74	79	59	1,600
	Water Feature	High	0.8		1	0.80	182	146	3,981
						Totals	63,878	26,271	718,293
Special Landscape Areas									
	N/A								
								ETWU Total =	**718,293**
	ETAF Calculations				**Maximum Applied Water Allowance (MAWA) =**				**785,949**
	Regular Landscape Areas								
	Total ETAF x Area	26271							
	Total Area	63878				MAWA calculation:			44.1*0.62*(0.45*63,878)
	Average ETAF	**0.41**							
	All Landscape Areas								
	Total ETAF x Area	26271							
	Total Area	63878							
	Average ETAF	**0.41**							

Attachment 7

CA2800048 PIAZZA WINERY

To view last year's report, click here (../TakeSurvey/PreviousSummary?surveysTakenId=454234).

6. Water Supply and Delivery

A. WATER PRODUCED, PURCHASED, AND SOLD

Units of Measure for tables in Section 6A:
- --Pick one--
- Gallons
- Million Gallons
- Acre-feet (AF)
- 100 cubic feet

2022

Volumes are based on:
- --Pick one--
- METERED VOLUMES
- ESTIMATED VOLUMES

6.A1 - Water Produced, Purchased, and Sold

If **only total annual production is available**, report your monthly estimated volumes by dividing the total by 12 for monthly reporting. If you have no annual production, please use the checkboxes to prefill zero values and advance to subsection 6.A2 for water purchasing details.

A	B	C	D	E	F	G	H	I
	Potable Water					Non-potable Water		
Month	Water Produced from Groundwater (Wells)	Water Produced from Surface Water	Finished Water Purchased or Received from another PWS	Total Amount of Potable Water*	Water Sold to Another PWS	Total Amount of Non-potable Water	Water Sold to Another PWS	Recycled
Check here if no production for every month	☐	☑	☑		☑	☑	☑	☑
January	27204	0	0	27204	0	0	0	0
February	113570	0	0	113570	0	0	0	0
March	58562	0	0	58562	0	0	0	0
April	178393	0	0	178393	0	0	0	0
May	90060	0	0	90060	0	0	0	0
June	260333	0	0	260333	0	0	0	0
July	692867	0	0	692867	0	0	0	0

6.A1 - Water Produced, Purchased, and Sold (../Content/2021EARHelp.htm#)

If **only total annual production is available**, report your monthly estimated volumes by dividing the total by 12 for monthly reporting. If you have no annual production, please use the checkboxes to prefill zero values and advance to subsection 6.A2 for water purchasing details.

A	B	C	D	E	F	G	H	I
Month	Potable Water					Non-potable Water		
	Water Produced from Groundwater (Wells)	Water Produced from Surface Water	Finished Water Purchased or Received from another PWS	Total Amount of Potable Water*	Water Sold to Another PWS	Total Amount of Non-potable Water	Water Sold to Another PWS	Recycled
Check here if no production for every month	☐	☑	☑		☑	☑	☑	☑
January	77354	0	0	77354	0	0	0	0
February	28407	0	0	28407	0	0	0	0
March	27847	0	0	27847	0	0	0	0
April	110798	0	0	110798	0	0	0	0
May	174235	0	0	174235	0	0	0	0
June	299332	0	0	299332	0	0	0	0
July	169587	0	0	169587	0	0	0	0
August	105860	0	0	105860	0	0	0	0
September	781700	0	0	781700	0	0	0	0
October	509300	0	0	509300	0	0	0	0
November	158138	0	0	158138	0	0	0	0
December	51604	0	0	51604	0	0	0	0
Annual Total*	2494162	0	0	2494162	0	0	0	0
Percent Treated	YY							

PWS = Public Water System

*Calculated field

The **Maximum Day** is the day during 2021 with the highest total water usage. Provide the date for Maximum volume supplied to the Distribution System, and report individual volumes recorded that day for each supply type. (../Content/2021EARHelp.htm#6.1)

Maximum Daily Demand (Date)	09/07/2022
Maximum Day - Groundwater (Volume)	21713
Maximum Day - Surface Water (Volume)	0
Maximum Day - Purchased or Received (Volume)	0
Maximum Day - Total Potable Water (Calculated)	21713
Maximum Day - Sold (Volume)	0

6.A2 - Water Purchased or Sold or Transferred (../Content/2021EARHelp.htm#6.2)

Volumes are based on:
- --Pick one--
- METERED VOLUMES
- ESTIMATED VOLUMES

6.A1 - Water Produced, Purchased, and Sold

If **only total annual production is available**, report your monthly estimated volumes by dividing the total by 12 for monthly reporting. If you have no annual production, please use the checkboxes to prefill zero values and advance to subsection 6.A2 for water purchasing details.

A	B	C	D	E	F	G	H
Month	Potable Water					Non-potable (exclude recycled)	Recycled
	Water Produced from Groundwater (Wells)	Water Produced from Surface Water	Finished Water Purchased or Received from another PWS	Total Amount of Potable Water*	Water Sold to Another PWS		
Check here if no production for every month							
January	59556	0	0	59556	0	0	0
February	137694	0	0	137694	0	0	0
March	23652	0	0	23652	0	0	0
April	107075	0	0	107075	0	0	0
May	194312	0	0	194312	0	0	0
June	371211	0	0	371211	0	0	0
July	460900	0	0	460900	0	0	0
August	623050	0	0	623050	0	0	0
September	487100	0	0	487100	0	0	0
October	642814	0	0	642814	0	0	0
November	170307	0	0	170307	0	0	0
December	134421	0	0	134421	0	0	0
Annual Total*	3412092	0	0	3412092	0	0	0
Percent Treated	YY						

PWS = Public Water System

*Calculated field

The **Maximum Day** is the day during 2020 with the highest total water usage. Provide the date for Maximum volume supplied to the Distribution System, and report individual volumes recorded that day for each supply type.

Maximum Daily Demand (Date)	YY
Maximum Day - Groundwater (Volume)	YY
Maximum Day - Surface Water (Volume)	YY
Maximum Day - Purchased or Received (Volume)	YY

☐ Mark this box if your water system does not have monthly production data.

If you do not have monthly production data to report, please report your Annual Total production in the row for January and leave all the other months blank.

Units of Measure for this table except for the Maximum Day: --Pick one-- / ● Gallons / ○ Million Gallons / ○ Acre-feet (AF) / ○ 100 cubic feet

2019

Volumes are based on: --Pick one-- / ● METERED VOLUMES / ○ ESTIMATED VOLUMES

A	B	C	D	E	F	G	H	I
	Potable Water							
	Date/ Month	**Water Produced from Groundwater (Wells)**	**Water Produced from Surface Water[2]**	**Finished Water Purchased or Received from another PWS[5]**	**Total Amount of Potable Water[3*]**	**Water Sold to Another PWS[5]**	**Non-potable (exclude recycled)**	**Recycled**
Check here if no production for every month		☐	☐	☐		☐	☐	☐
Maximum Day[1]	YY	YY	YY	YY	0	YY		
January		81029	0	0	81029	0	0	0
February		122536	0	0	122536	0	0	0
March		53263	0	0	53263	0	0	0
April		135225	0	0	135225	0	0	0
May		152636	0	0	152636	0	0	0
June		128497	0	0	128497	0	0	0
July		73556	0	0	73556	0	0	0

August	63545	0	0	63545	0	0	0
September	143400	0	0	143400	0	0	0
October	468100	0	0	468100	0	0	0
November	461719	0	0	461719	0	0	0
December	121581	0	0	121581	0	0	0
Annual Total*	2005087	0	0	2005087	0	0	0
Percent Treated[4]	YY						

2019

PWS = Public Water System

*Calculated field.

Non-potable = water supplies, except recycled water, that do not enter the drinking water distribution system and are for non-potable uses only such as irrigation

Recycled = domestic wastewater which as a result of treatment is suitable for uses other than potable use such as irrigation or toilet flushing

[1]Only report Maximum Day if it is actually measured or determined from production records. It should not be the average day demand during the maximum month of production.

[2]Do not include raw water purchased; report only volume of water that was treated.

[3](F) Total Amount of Potable Water = Sum of Columns (C), (D) and (E), automatically calculated. Total water production includes water that is sold to another water system. To update, click below

[4]This is the percentage of the total annual volume for Groundwater produced that was provided treatment to meet drinking water standards other than precautionary disinfection and flouridation.

[5]If water was *Purchased* from or *Sold* to another PWS, complete the table below:

Specify whether water
was *Purchased* or *Sold*~Name of PWS

Specify whether water was *Purchased* or *Sold*	Name of PWS
NA	NA

If recycled water was *supplied* to *your customers*, complete the table below: Specify the level of treatment
(e.g., tertiary, disinfected secondary)~Name of Recycled Water supplier

Specify the level of treatment (e.g., tertiary, disinfected secondary)	Name of Recycled Water supplier
NA	NA

- --Pick one--
- Gallons
- Million Gallons
- Acre-feet (AF)
- 100 cubic feet

2018

Volumes are based on:

- --Pick one--
- METERED VOLUMES
- ESTIMATED VOLUMES

A	B	C	D	E	F	G	H	I	
	Potable Water						**Non-potable (exclude recycled)**	**Recycled**	
	Date/ Month	**YY**	YY	YY	YY	0			YY
January		65800	0	0	65800	0	0	0	
February		70000	0	0	70000	0	0	0	
March		64700	0	0	64700	0	0	0	
April		33138	0	0	33138	0	0	0	
May		186112	0	0	186112	0	0	0	
June		279425	0	0	279425	0	0	0	
July		626550	0	0	626550	0	0	0	
August		1153385	0	0	1153385	0	0	0	
September		788870	0	0	788870	0	0	0	
October		771598	0	0	771598	0	0	0	
November		297863	0	0	297863	0	0	0	
December		74614	0	0	74614	0	0	0	

2018

Annual Total*	4412055	0	0	4412055	0	0	0
Percent Treated[4]	YY						

PWS = Public Water System

*Calculated field.

Non-potable = water supplies, except recycled water, that do not enter the drinking water distribution system and are for non-potable uses only such as irrigation

Recycled = domestic wastewater which as a result of treatment is suitable for uses other than potable use such as irrigation or toilet flushing

[1]Only report Maximum Day if it is actually measured or determined from production records. It should not be the average day demand during the maximum month of production.

[2]Do not include raw water purchased; report only volume of water that was treated.

[3](F) Total Amount of Potable Water = Sum of Columns (C), (D) and (E), automatically calculated. Total water production includes water that is sold to another water system. To update, click below

[4]This is the percentage of the total annual volume for Groundwater produced that was provided treatment to meet drinking water standards other than precautionary disinfection and flouridation.

[5]If water was *Purchased* from or *Sold* to another PWS, complete the table below:

Specify whether water
was *Purchased* or *Sold*~Name of PWS

Specify whether water was *Purchased* or *Sold*	Name of PWS

If recycled water was *supplied* to *your customers*, complete the table below: Specify the level of treatment (e.g., tertiary, disinfected secondary)~Name of Recycled Water supplier

Specify the level of treatment (e.g., tertiary, disinfected secondary)	Name of Recycled Water supplier

COMMENTS (Note: Comments will be made publicly available): (2018SWSHelp.htm#Comments) YY

Intro | Contacts | Population | Connections | Sources | Water Supplied | Water Rates and Deliveries | Water Quality | Treatment
Backflow | Certification | Improvements | Complaints | Distribution | Conservation | Climate Change | LSLR | Finalize

Well 1 Water Use		
	Gallons/year	AF/year
2018	4,412,055	13.540
2019	2,005,087	6.153
2020	3,412,092	10.471
2021	2,494,162	7.654
2022	3,264,687	10.019
5-year avg.	3,117,617	9.568

APPENDIX C

PROJECT WELL PUMP TESTS

MCLEAN & WILLIAMS, AUGUST 2013

PERRY'S PUMPS JUNE 2023

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

WELL INSPECTION REPORT FOR:

Attn: Yountville Vineyards **Date of test:** August 9 - 11th, 2013
Upon your request, we have checked the well and/or pressure system at
7466 Hwy.29, Yountville
Our findings are as follows:

WELL INFORMATION

Casing Size: 6" pvc
Static Water Level: 73.6' from top of well casing at time of test
Well Depth: 363' **draw down during test:** 93.2' from top of well casing
Total water draw down in feet from static water level at end of flow test 19.6'
How tested: Open discharge using test pumping equipment
Well yield after test: 20.09 gallons per minute after 23 1/2 hours @ 93' pumping level
Well Comments: Well located on hill above cave

WELL EQUIPMENT INFORMATION

Pump Make: J-Class **HP** 10 **Pump Setting:** 336'
Type: Submersible **Voltage:** 230 **Pipe Size:** 2" galvanized
Pump Model: 10S375-10XX **Phase:** 3 **Wire Size:** submersible pump cable #6-3/wg
Pressure tank: Amtrol Well Flow 360 (Installed 06-19-2007)
Comments: Pressure system is not connected to anything at the time of the inspection. Well pump equipped with Yaskawa VFD for constant pressure. New pump, motor, pipe and wire installed 06-19-2007.

WELL TEST INFORMATION

8/8/2013	17:16:03	0:00:00	0	-73.618	
8/8/2013	18:16:03	1:00:00	60	-73.618	
8/8/2013	19:16:03	2:00:00	120	-73.667	
8/8/2013	20:16:03	3:00:00	180	-73.650	
8/8/2013	21:16:03	4:00:00	240	-73.634	
8/8/2013	22:16:03	5:00:00	300	-73.634	
8/8/2013	23:16:03	6:00:00	360	-73.667	
8/9/2013	0:16:03	7:00:00	420	-73.650	
8/9/2013	1:16:03	8:00:00	480	-73.650	
8/9/2013	2:16:03	9:00:00	540	-73.634	
8/9/2013	3:16:03	10:00:00	600	-73.634	
8/9/2013	4:16:03	11:00:00	660	-73.650	
8/9/2013	5:16:03	12:00:00	720	-73.667	
8/9/2013	6:16:03	13:00:00	780	-73.650	
8/9/2013	7:16:03	14:00:00	840	-73.634	
8/9/2013	8:16:03	15:00:00	900	-73.663	
8/9/2013	8:51:03	15:35:00	935	-75.024	Begin flow test at 8:50 a.m. @ 20 gpm
8/9/2013	8:56:03	15:40:00	940	-82.203	
8/9/2013	9:01:03	15:45:00	945	-84.901	Flow rate 20gpm with rusty water color
8/9/2013	9:31:03	16:15:00	975	-88.090	Flow rate 20 gpm with cloudy water color
8/9/2013	10:01:03	16:45:00	1005	-88.646	Flow rate 20 gpm with clear water color
8/9/2013	10:31:03	17:15:00	1035	-89.039	Flow rate 20 gpm
8/9/2013	11:31:03	18:15:00	1095	-89.857	Flow rate 20 gpm
8/9/2013	12:31:03	19:15:00	1155	-90.167	Flow rate 20 gpm
8/9/2013	13:31:03	20:15:00	1215	-90.658	Flow rate 20 gpm
8/9/2013	14:31:03	21:15:00	1275	-90.968	Flow rate 20 gpm
8/9/2013	15:31:03	22:15:00	1335	-91.296	Flow rate 20 gpm
8/9/2013	16:31:03	23:15:00	1395	-91.721	Flow rate 20 gpm
8/9/2013	17:31:03	1.00:15:00	1455	-91.966	Flow rate 20gpm
8/9/2013	18:31:03	1.01:15:00	1515	-92.489	Flow rate 20 gpm
8/9/2013	19:31:03	1.02:15:00	1575	-92.686	Flow rate 20 gpm
8/9/2013	20:31:03	1.03:15:00	1635	-92.833	Flow rate 20 gpm
8/9/2013	21:11:03	1.03:55:00	1675	-93.078	93' pumping level
8/9/2013	21:31:03	1.04:15:00	1695	-93.045	Flow rate 20 gpm
8/9/2013	22:31:03	1.05:15:00	1755	-93.225	Flow rate 20 gpm
8/9/2013	23:31:03	1.06:15:00	1815	-93.569	Flow rate 20 gpm
8/10/2013	0:31:03	1.07:15:00	1875	-93.029	Flow rate 20 gpm
8/10/2013	1:31:03	1.08:15:00	1935	-92.767	Flow rate 20 gpm
8/10/2013	2:31:03	1.09:15:00	1995	-92.980	Flow rate 20 gpm

8/10/2013	3:31:03	1.10:15:00	2055	-92.898	Flow rate 20 gpm
8/10/2013	4:31:03	1.11:15:00	2115	-92.980	Flow rate 20 gpm
8/10/2013	5:31:03	1.12:15:00	2175	-93.193	Flow rate 20 gpm
8/10/2013	6:31:03	1.13:15:00	2235	-93.242	Flow rate 20 gpm
8/10/2013	7:31:03	1.14:15:00	2295	-93.238	Flow rate 20 gpm
8/10/2013	8:11:03	1.14:55:00	2335	-93.242	Pumping level still 93' after 11 hours
8/10/2013	8:21:03	1.15:05:00	2345	-86.144	8:20 am stop test and begin recovery
8/10/2013	8:26:03	1.15:10:00	2350	-82.056	
8/10/2013	8:31:03	1.15:15:00	2355	-81.140	
8/10/2013	8:36:03	1.15:20:00	2360	-80.650	
8/10/2013	8:41:03	1.15:25:00	2365	-80.224	
8/10/2013	8:46:03	1.15:30:00	2370	-79.963	
8/10/2013	8:51:03	1.15:35:00	2375	-79.750	
8/10/2013	8:56:03	1.15:40:00	2380	-79.521	
8/10/2013	9:01:03	1.15:45:00	2385	-79.341	
8/10/2013	9:06:03	1.15:50:00	2390	-79.194	
8/10/2013	9:11:03	1.15:55:00	2395	-79.096	
8/10/2013	9:16:03	1.16:00:00	2400	-79.014	
8/10/2013	9:21:03	1.16:05:00	2405	-78.818	
8/10/2013	9:26:03	1.16:10:00	2410	-78.704	
8/10/2013	9:31:03	1.16:15:00	2415	-78.638	
8/10/2013	9:36:03	1.16:20:00	2420	-78.491	
8/10/2013	9:41:03	1.16:25:00	2425	-78.426	
8/10/2013	9:46:03	1.16:30:00	2430	-78.344	
8/10/2013	9:51:03	1.16:35:00	2435	-78.278	
8/10/2013	9:56:03	1.16:40:00	2440	-78.164	
8/10/2013	10:01:03	1.16:45:00	2445	-78.131	
8/10/2013	10:06:03	1.16:50:00	2450	-78.05	
8/10/2013	10:11:03	1.16:55:00	2455	-78.033	
8/10/2013	10:16:03	1.17:00:00	2460	-77.902	
8/10/2013	10:21:03	1.17:05:00	2465	-77.870	
8/10/2013	11:21:03	1.18:05:00	2525	-77.346	
8/10/2013	12:21:03	1.19:05:00	2585	-76.921	
8/10/2013	13:21:03	1.20:05:00	2645	-76.610	
8/10/2013	14:21:03	1.21:05:00	2705	-76.316	
8/10/2013	15:21:03	1.22:05:00	2765	-76.136	
8/10/2013	16:21:03	1.23:05:00	2825	-76.022	
8/10/2013	17:21:03	2.00:05:00	2885	-75.842	
8/10/2013	18:21:03	2.01:05:00	2945	-75.776	
8/10/2013	19:21:03	2.02:05:00	3005	-75.711	
8/10/2013	20:21:03	2.03:05:00	3065	-75.597	
8/10/2013	21:21:03	2.04:05:00	3125	-75.515	

8/10/2013	22:21:03	2.05:05:00	3185	-75.400	
8/10/2013	23:21:03	2.06:05:00	3245	-75.302	
8/11/2013	0:21:03	2.07:05:00	3305	-75.269	
8/11/2013	1:21:03	2.08:05:00	3365	-75.220	
8/11/2013	2:21:03	2.09:05:00	3425	-75.122	
8/11/2013	3:21:03	2.10:05:00	3485	-75.041	
8/11/2013	4:21:03	2.11:05:00	3545	-75.008	
8/11/2013	5:21:03	2.12:05:00	3605	-74.975	
8/11/2013	6:21:03	2.13:05:00	3665	-74.975	
8/11/2013	7:21:03	2.14:05:00	3725	-74.910	
8/11/2013	7:51:03	2.14:35:00	3755	-74.893	7:50 am end of recovery

20.09 gallons per minute is the final pump flow after 23 hours and 30 minutes of continuous pumping with a totalized yield of 28,237 gallons and a stable pumping level of 93'. After 23 hours and 30 minutes the well recovered to within 1foot 4 inches of the starting static level. All measurements were taken to the top of wellhead using an electronic water level indicator 1-1/10th of an inch measurement and a Dynotek Data manager with submersible pressure transducer.

RECOMMENDATIONS

None at this time.

WATER SAMPLES

Water samples were drawn and delivered to the lab but will not be made available until 08-23-2013. The bacteria sample came back positive for coliform as expected on an unused well but will be chlorinated and re sampled as soon as possible.

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

PERRY'S PUMPS

2220 Jasper Lane
Santa Rosa, Ca 95404

Customer Information

Report #: 062923.1	Date Of Test: 06/29/23
Customer Name: Mike Burgess	Contact:
Agent Name:	Contact:
Property Address: 7460 Saint Helena Hwy.	Sent To:

Well Data

Location Of Well: next to vineyard in front of the 10000 Gallon Tank
Type Of Well: *Drilled* PVC
Depth Of Completed Well: *Probe stopped at* unknown
Diameter of Well Casing: 5"
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
Depth Of Pump Suction: unknown

Water Production Results

Water Level at Start (Static Level): 130'	Flow Rate at Start: 27 GPM
Final Pumping Level: 180'	Final Flow Rate: 7.3 GPM
Water Level Drawdown: 50'	Total Length of Test: *2 Hours*

Constant Pumping Level Information

Stabilized Pumping Level: 180'	Stabilized Flow Rate (Yield): 438 Gallons
Duration Of Constant Pumping Level: *1 Hour*	Total Yield: 978 Gallons

Water System Inspection

Well Pump:	Technical Info: 20 GPM Pump End
Electrical:	Technical Info: 230 Volt
Pressure Tank:	Technical Info: 85 Gallon WellxTrol
Storage Tank:	Technical Info: 10000 Gallon Poly
Booster Pump:	Technical Info: 2 HP HSC20 Goulds

Water Quality Testing

The Following Samples Are Being Analyzed. Please Refer to Follow-up Report For Results		
none taken	Dated:	Turnaround:
	Dated:	Turnaround:
	Dated:	Turnaround:
	Dated:	Turnaround:

See Next Page for Further Information...

Date: 12/29/23

Address: 7460 Saint Helena Hwy.

Comments:

So the Well Pump is oversized for that well, at some point replace the 3 HP 20 GPM with a 1 HP 10 GPM that will be a better fit for the well.

The Pressure Tank on the Booster System is leaning too much to one side and needs to be leveled out, and the Booster Pump manifold and suction need to be replumbed at some point.

The well fill line needs to be straightened on the 10000 Gallon holding tank, and the main power wire are wound up under the main panel.

Recommendations:

Recommend leveling the Pressure Tank so it sits straight.

Recommend replumbing the Pressure System manifold.

Recommend fixing the main power wire under the sub panel.

Thank you for allowing us to do your well inspection!

Approved By:

John Perry

Perry's Pumps

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 influences 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.

APPENDIX D

SOIL WATER BALANCE ANALYSIS NAPA COUNTY

Napa County Groundwater Recharge Analysis

Introduction

Developing accurate estimates of the spatial and temporal distribution of groundwater recharge is a key component of sustainable groundwater management. Efforts to quantify recharge are inherently difficult owing to the wide variability of factors controlling hydrologic processes, the wide range of available tools/methods for estimating recharge, and the difficulty in assessing the accuracy of estimates because direct measurement of recharge rates is, for the most part, infeasible (Healy 2010, Seiler and Gat 2007).

Numerical modeling is a common approach for developing recharge estimates. Soil-water-balance modeling is one category of numerical models particularly well-suited for estimating recharge across large areas with modest data requirements. This study describes an application of the U.S. Geological Survey's (USGS) Soil Water Balance Model (SWB) (Westenbroek et al. 2010) to develop spatial and temporal distributions of groundwater recharge across Napa County. This model operates on a daily timestep and calculates surface runoff based on the Natural Resources Conservation Service (NRCS) curve number method and potential evapotranspiration based on the Hargreaves-Samani methods (Hargreaves and Samani 1985). Actual evapotranspiration (AET) and recharge are calculated using a modified Thornthwaite-Mather soil-water-balance approach (Westenbroek et al. 2010).

It is important to note that the SWB model focuses on surface and soil-zone processes and does not simulate the groundwater system or track groundwater storage over time. The model also does not simulate surface water/groundwater interaction or baseflow; thus, the runoff estimates represent only the surface runoff component of streamflow resulting from rainstorms and the recharge estimates represent only the infiltration recharge component (also referred to as diffuse recharge) of total recharge (stream-channel recharge is not simulated).

This modeling work and summary report has been prepared by O'Connor Environmental, Inc., for it's private use in relation to Water Availability Analyses (WAA) prepared on behalf of private clients for projects using groundwater in "hillside" areas of Napa County as required by Napa Planning, Building & Environmental Services. The modeling to-date is complete in its current form but remains subject to revision; it is considered a working draft with information suitable for use to support WAA projects. Parties interested in obtaining more information regarding the modeling or who may wish to offer comments should contact O'Connor Environmental, Inc.

Model Development

The model was developed using a 30-meter (98.4 ft) resolution rectangular grid. Water budget calculations were made on a daily time step. Key spatial inputs included a flow direction map developed from the USGS 1 arc-second resolution Digital Elevation Model (DEM), a land cover map derived from the U.S. Forest Service (USFS) CALVEG dataset that was supplemented by a database of agricultural areas maintained by the County of Napa (Figure 1), a distribution of Hydrologic Soil Groups (A through D classification from lowest to highest runoff potential; Figure 2), and a distribution of Available Water Capacity (AWC) developed from the NRCS Soil Survey Geographic Database (SSURGO) (Figure 3).

A series of model parameters were assigned for each land cover type/soil group combination including an infiltration rate, a curve number, dormant and growing season interception storage values, and a rooting depth (Table 1).

Infiltration rates for hydrologic soil groups A through D were applied based on Cronshey et al. (1986) (Table 2) along with default soil-moisture-retention relationships based on Thornthwaite and Mather (1957) (Figure 4). Curve numbers were assigned based on standard NRCS methods. Interception storage values and rooting depths were assigned based on literature values and from previous modeling experience including a SWB model covering Sonoma County and calibrated using runoff volumes from several stream gages (OEI 2017).

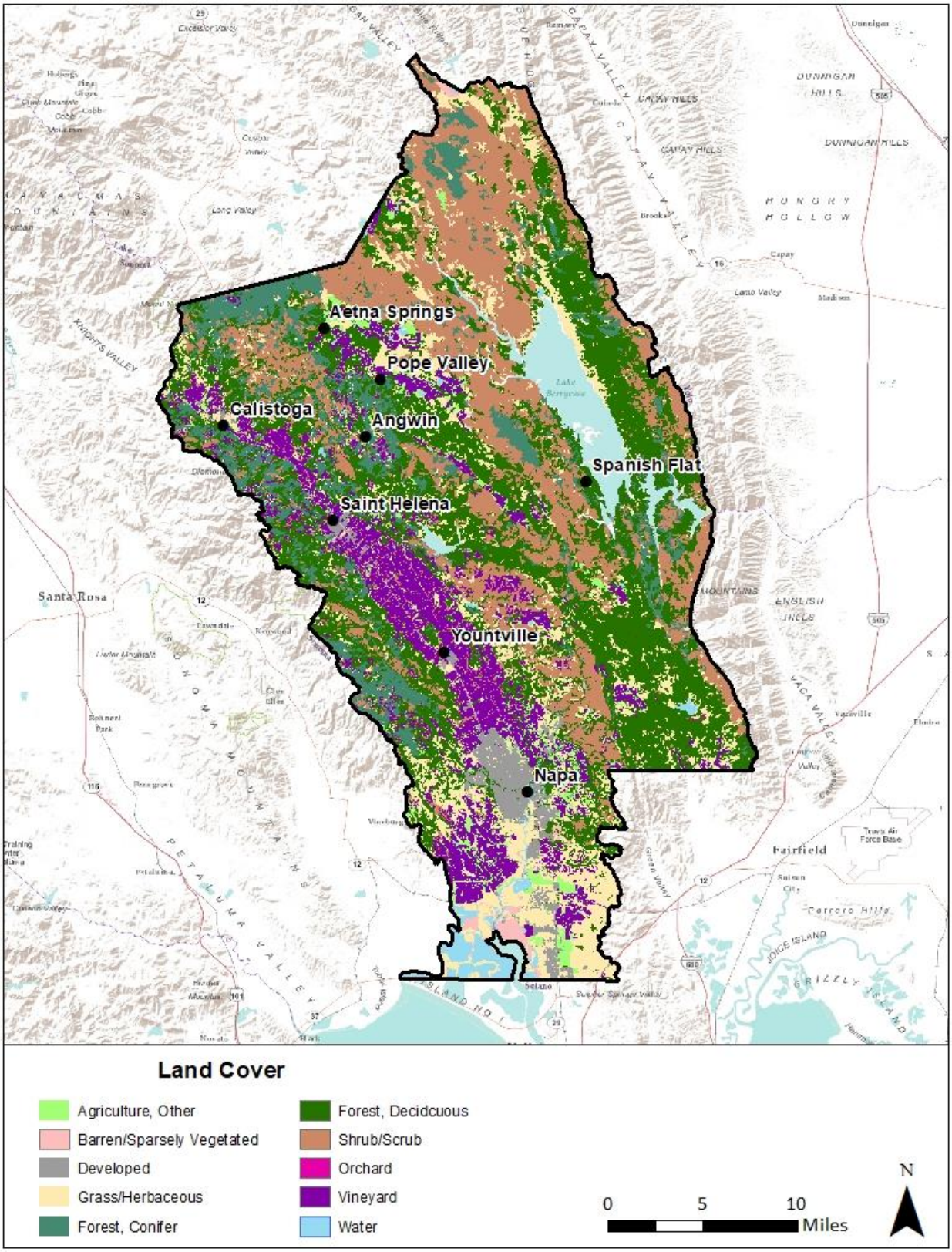

Figure 1: Land cover distribution used in the Napa County SWB model.

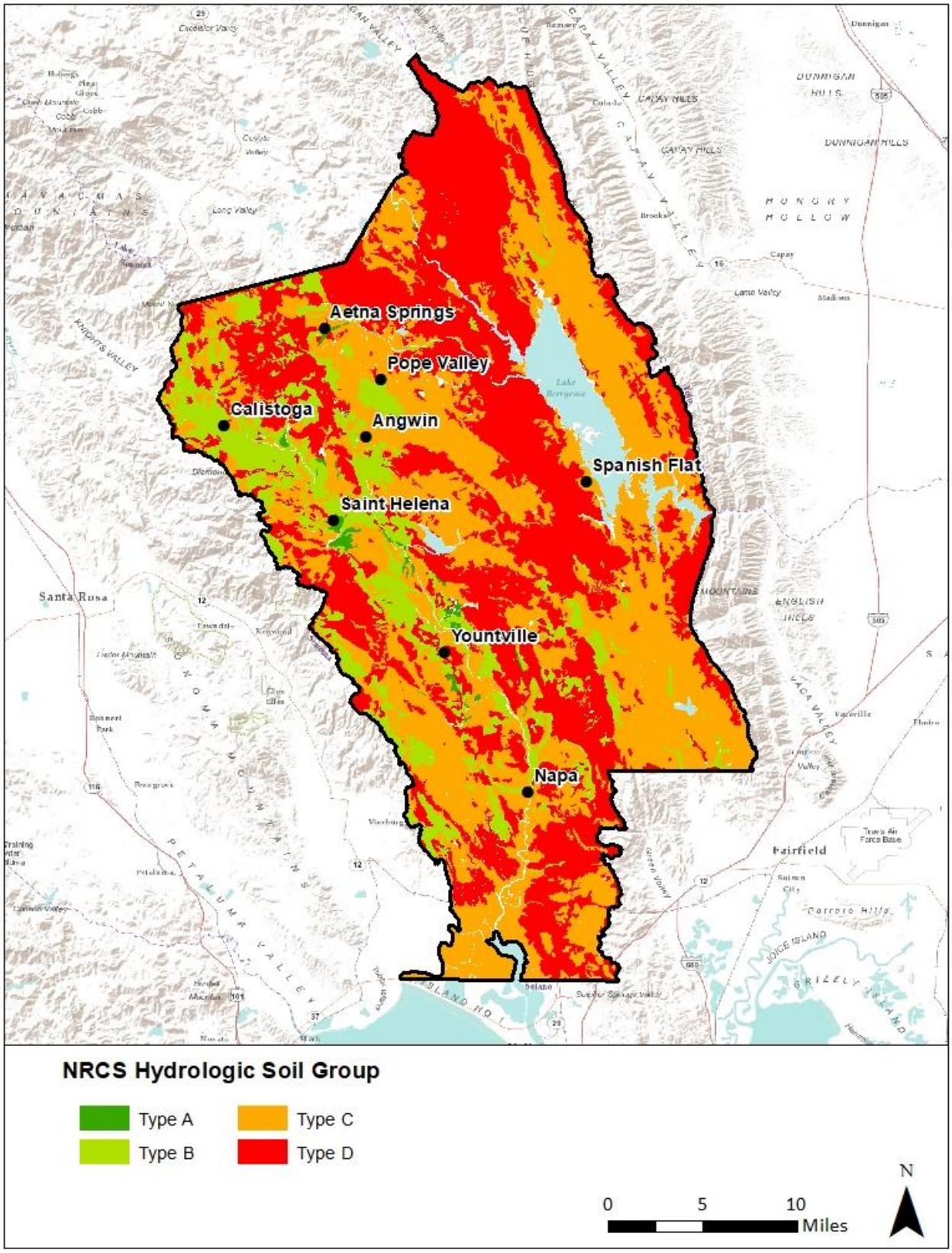

Figure 2: Hydrologic soil group distribution used in the Napa County SWB model.

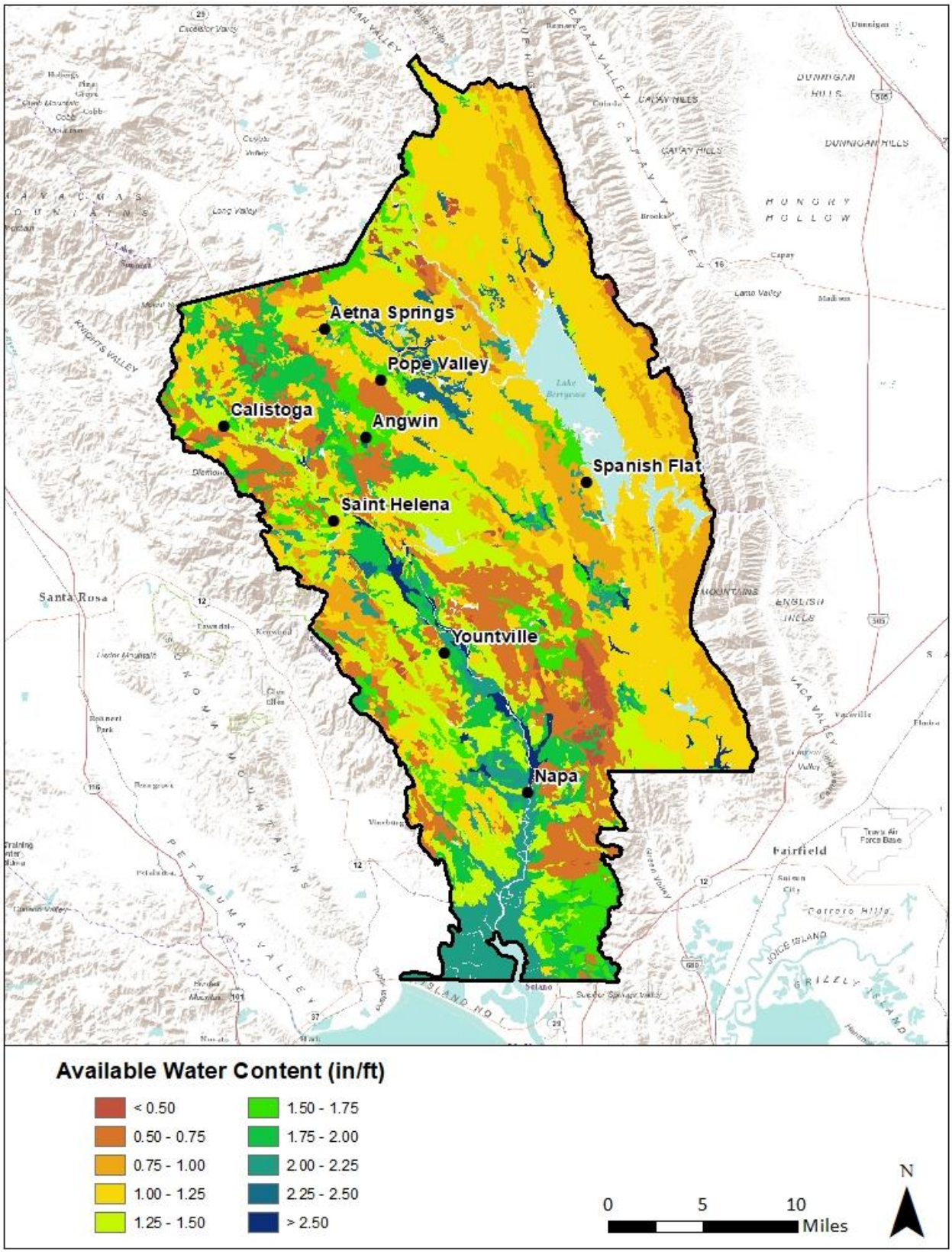

Figure 3: Available water capacity distribution used in the Napa County SWB model.

Table 1: Soil and land cover properties used in the Napa County SWB model.

Land Cover	Interception Storage Values ()		Curve Number by NRCS Soil Type ()				Rooting Depth by NRCS Soil Type (ft)			
	Growing Season	Dormant Season	Type A	Type B	Type C	Type D	Type A	Type B	Type C	Type D
Agriculture, Other	0.080	0.040	38	61	75	81	2.0	1.9	1.8	1.7
Barren	0.000	0.000	77	86	91	94	0.0	0.0	0.0	0.0
Developed	0.005	0.002	61	75	83	87	2.3	2.1	2.0	1.8
Grassland/Herbaceous	0.005	0.004	30	58	71	78	1.3	1.1	1.0	1.0
Forest, Coniferous	0.050	0.050	30	55	70	77	5.9	5.1	4.9	4.7
Forest, Deciduous	0.050	0.020	30	55	70	77	5.9	5.1	4.9	4.7
Shrub/Scrub	0.080	0.015	30	48	65	73	3.2	2.8	2.7	2.6
Orchard	0.050	0.015	38	61	75	81	3.2	2.8	2.7	2.6
Vineyard	0.080	0.015	38	61	75	81	2.2	2.1	2.0	1.9
Water	0.000	0.000	100	100	100	100	0.0	0.0	0.0	0.0

Table 2: Infiltration rates for NRCS hydrologic soil groups (Cronshey et al. 1986).

Soil Group	Infiltration Rate (in/hr)
A	> 0.3
B	0.15 - 0.3
C	0.05 - 0.15
D	<0.05

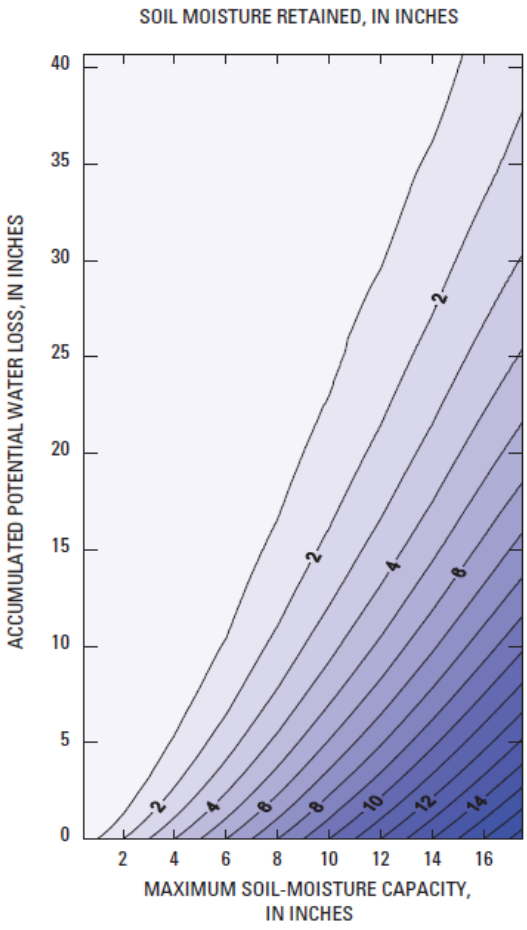

Figure 4: Soil-moisture-retention table (Thornthwaite and Mather 1957).

The SWB model utilizes daily precipitation and mean daily temperature data derived from climate stations. To account for the spatial variability of these parameters, daily precipitation and mean daily temperature were input as gridded (spatially-distributed) time-series. The gridded precipitation time-series was created using data from 15 weather stations in Napa County, and the gridded mean temperature time-series was created using data from 8 stations (Table 3). These stations were selected based on completeness of the records and to provide station data representative of the range of climates experienced in the county. Data was obtained from the California Data Exchange Center (CDEC), the National Climatic Data Center (NCDC), and from Napa One Rain.

To create the gridded time-series, the model domain was divided into discrete areas represented by individual weather stations (Figures 5 and 6). This delineation was based on climate variations described by existing gridded mean annual (1981-2010) precipitation and temperature data (PRISM 2010) and local knowledge of climatic variations across the county.

For the precipitation time-series, each area representing a weather station was subdivided into four to twenty-three zones based on 1-inch average annual precipitation contours. Within each zone the raw station data was multiplied by a unique scaling factor. This scaling factor was calculated as the ratio of average annual precipitation within a zone to average annual precipitation at the representative rain gage. In certain locations, typically near the boundary of areas represented by gages located on the valley bottom and at higher elevations, this scaling was unable to smoothly resolve differences in annual and event precipitation totals. To more accurately estimate precipitation near these boundaries, precipitation records from the two gages in question were averaged using weights calculated proportionally to the difference between PRISM mean annual precipitation at a rain gage and within a selected zone. The resulting gridded time-series is comprised of 220 individual time-series based on the scaled station data from 15 stations.

The assignment of temperature stations was based on the understanding that the spatial variability of temperatures across Napa County is relatively homogenous, with elevation being the primary variable. Temperature records were classified either as Mountain, Valley Bottom, or East County and applied within areas the PRISM datasets described as being similar. To smooth the transition from Mountain zones to Valley Bottom and East County zones, Hillside zones were created where the temperature records of the two nearest gages were averaged.

Missing and suspect data was encountered in the raw precipitation and temperature data from the weather stations used by the model. Values that were significantly outside the typical range, and where similar observations were not found at nearby stations, were removed from the datasets. These and missing values were filled using scaled data from other nearby stations. Precipitation data used for gap filling was scaled using the ratio of the 1981 to 2010 mean annual precipitation (PRISM 2010) between the two stations. Temperature data was scaled using the ratio of the 1981 to 2010 mean monthly minimum and maximum temperatures (PRISM 2010) between the two stations.

The current analysis focuses on Water Year 2010 (October 1, 2009 – September 30, 2010) and Water Year 2014 (October 1, 2013 – September 30, 2014). These years were selected because they represent periods with data available from most weather stations in the county and where most stations reported annual precipitation totals close to the long-term average (WY 2010) and significantly below the long term average (WY 2014). Based on a comparison between station data and PRISM average precipitation depths during Water Year 2010, rainfall averaged 101% of long-term average conditions and ranged from 78% at Lake Hennessey to 111% at the Napa County Airport. In Water Year 2014, rainfall averaged 55% of long-term average conditions and ranged from 41% at Lake Hennessey to 73% at the Napa State Hospital (Table 3).

Table 3: Weather stations used in the Napa County SWB model. See Figures 7- 9 for associated timeseries.

Station	Data Used	1981 - 2010 Mean Annual Precip (in)	WY 2010		WY 2014	
			Precip (in)	% Avg	Precip (in)	% Avg
Angwin[1]	Precip & Temp	42.54	44.64	105%	25.04	59%
Atlas Peak[1]	Precip & Temp	41.76	39.04	93%	20.08	48%
Berryessa[1]	Precip & Temp	28.97	28.16	97%	13.97	48%
Calistoga[2]	Precip	39.41	41.75	106%	18.18	46%
Knoxville Creek[1]	Temp Only	-	-	-	-	-
Lake Hennessey[3]	Precip Only	34.09	26.52	78%	13.92	41%
Mt. George[3]	Precip Only	31.15	29.64	95%	18.24	59%
Mt. Veeder[3]	Precip Only	44.81	46.44	104%	28.6	64%
Napa County Airport[2]	Precip & Temp	21.14	23.56	111%	9.87	47%
Napa River at Yountville Cross Rd[3]	Precip Only	31.86	32.72	103%	14.93	47%
Napa State Hospital[2]	Precip & Temp	26.81	28.85	108%	19.66	73%
Petrified Forest[3]	Precip Only	42.39	46.6	110%	22.84	54%
Redwood Creek At Mt. Veeder Road[3]	Precip Only	34.71	37.36	108%	23.48	68%
Saint Helena[2]	Precip & Temp	37.43	39.11	104%	19.11	51%
Saint Helena 4WSW[1]	Precip & Temp	45.44	47.88	105%	28.88	64%
Sugarloaf Peak[3]	Precip Only	32.20	26.16	81%	17.12	53%

1 – Data accessed from California Data Exchange Center (CDEC)
2 – Data accessed from National Climate Data Center (NCDC)
3 – Data access from Napa One Rain

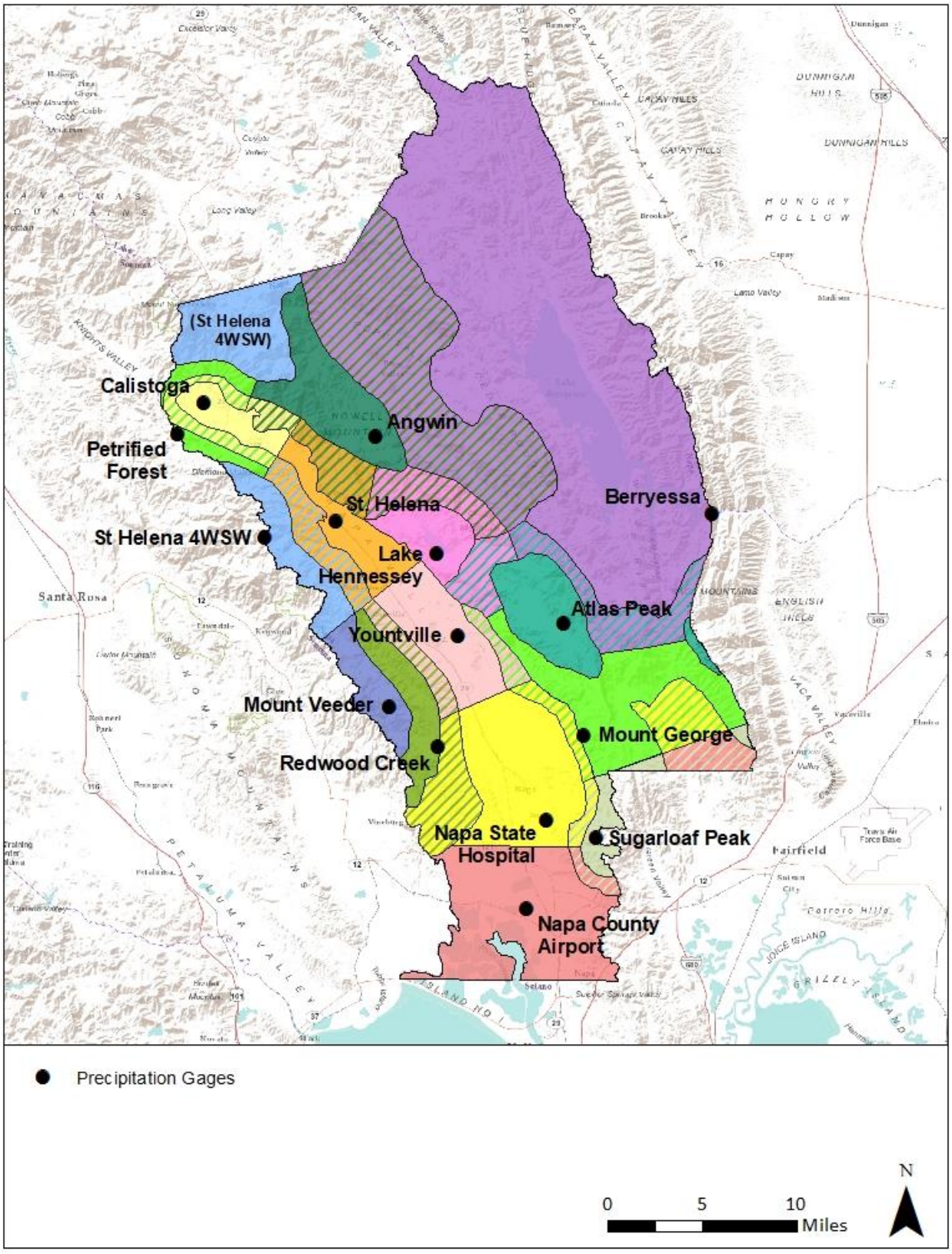

Figure 5: Precipitation zones used in the Napa County SWB model. Hatching indicates areas where two precipitation records were averaged across a zone.

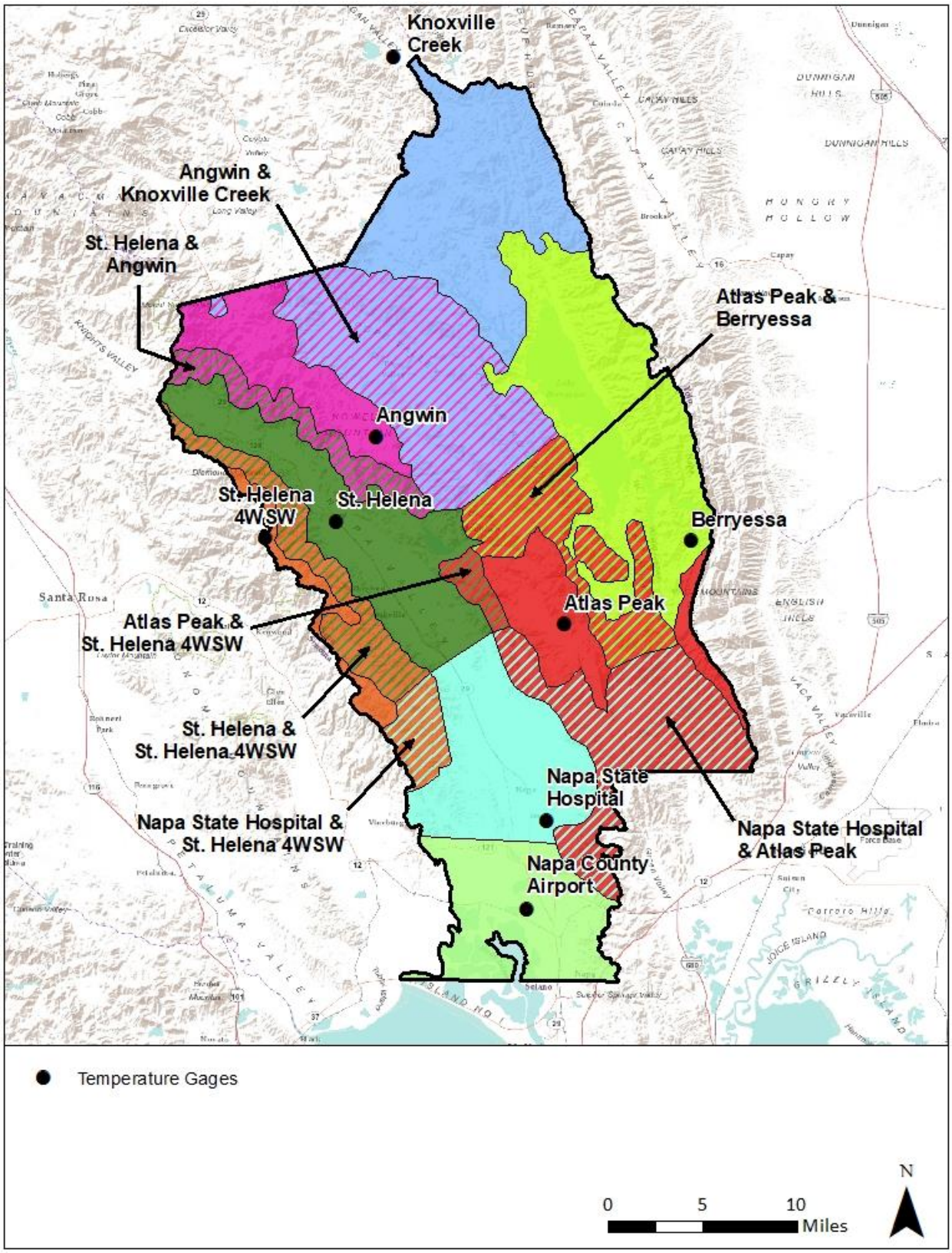

Figure 6: Temperature zones used in the Napa County SWB model. Hatching indicates areas where two temperature records were averaged across a zone.

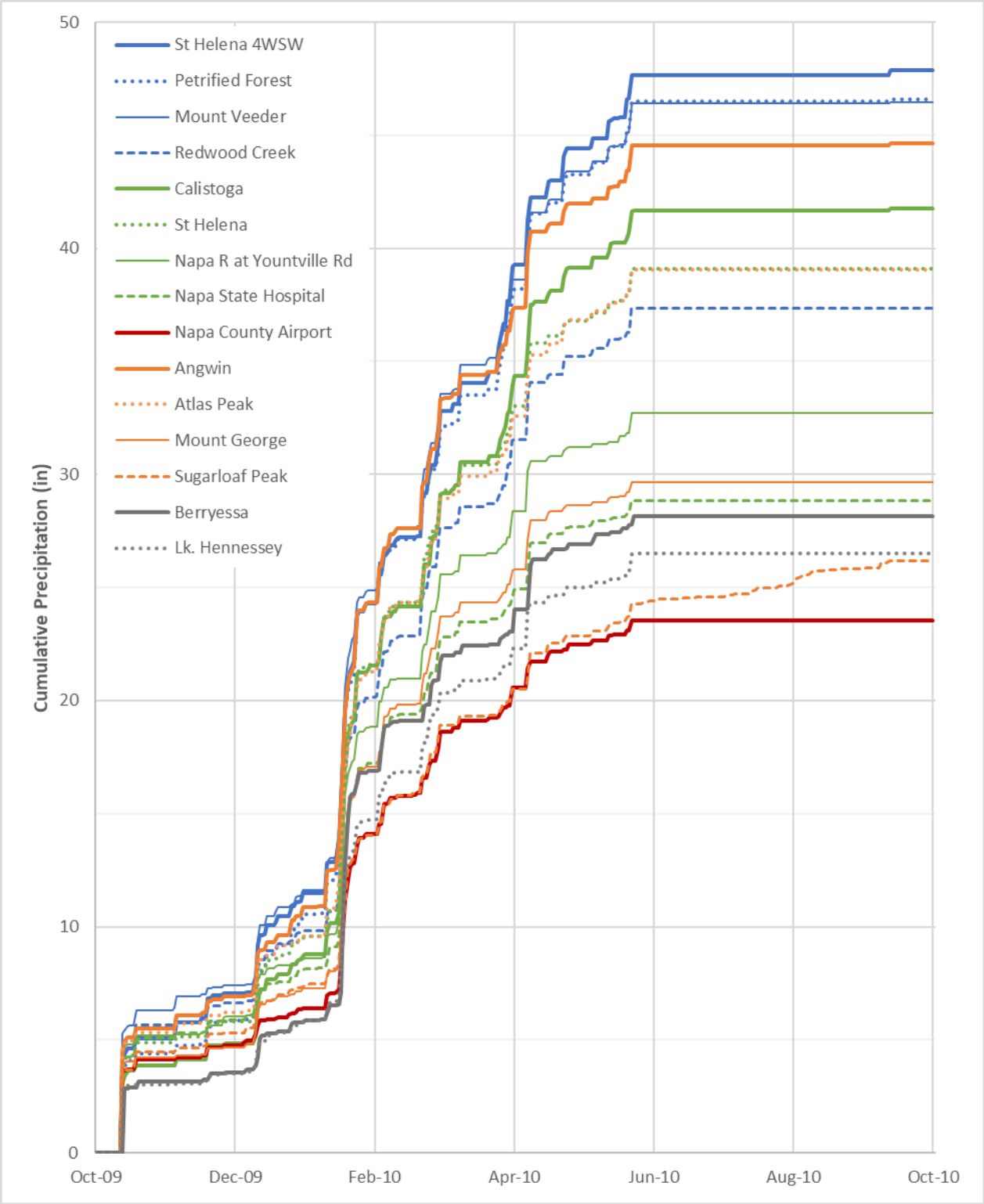

Figure 7a: Daily precipitation data used in the Napa County SWB model for WY 2010.

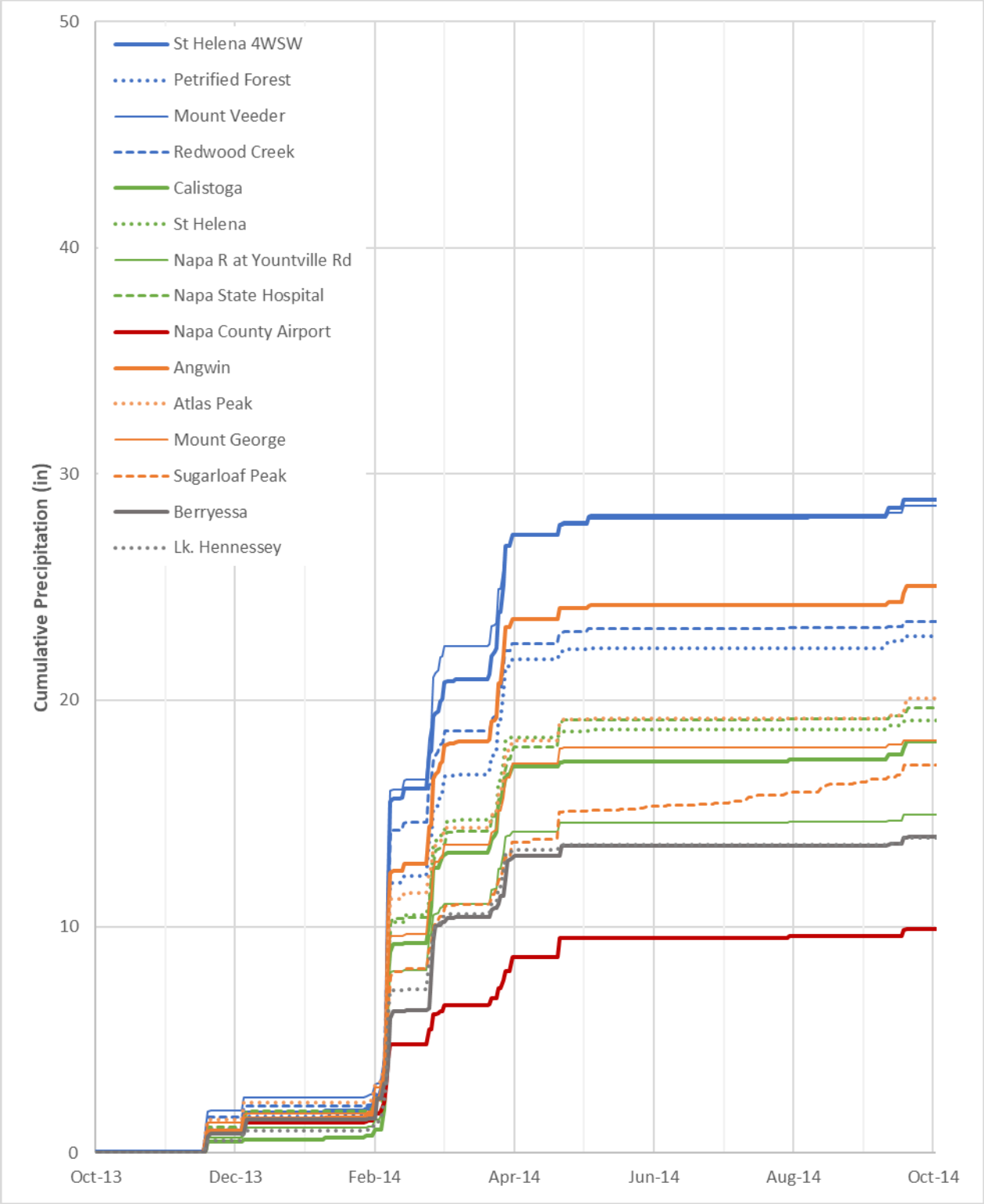

Figure 7b: Daily precipitation data used in the Napa County SWB model for WY 2014.

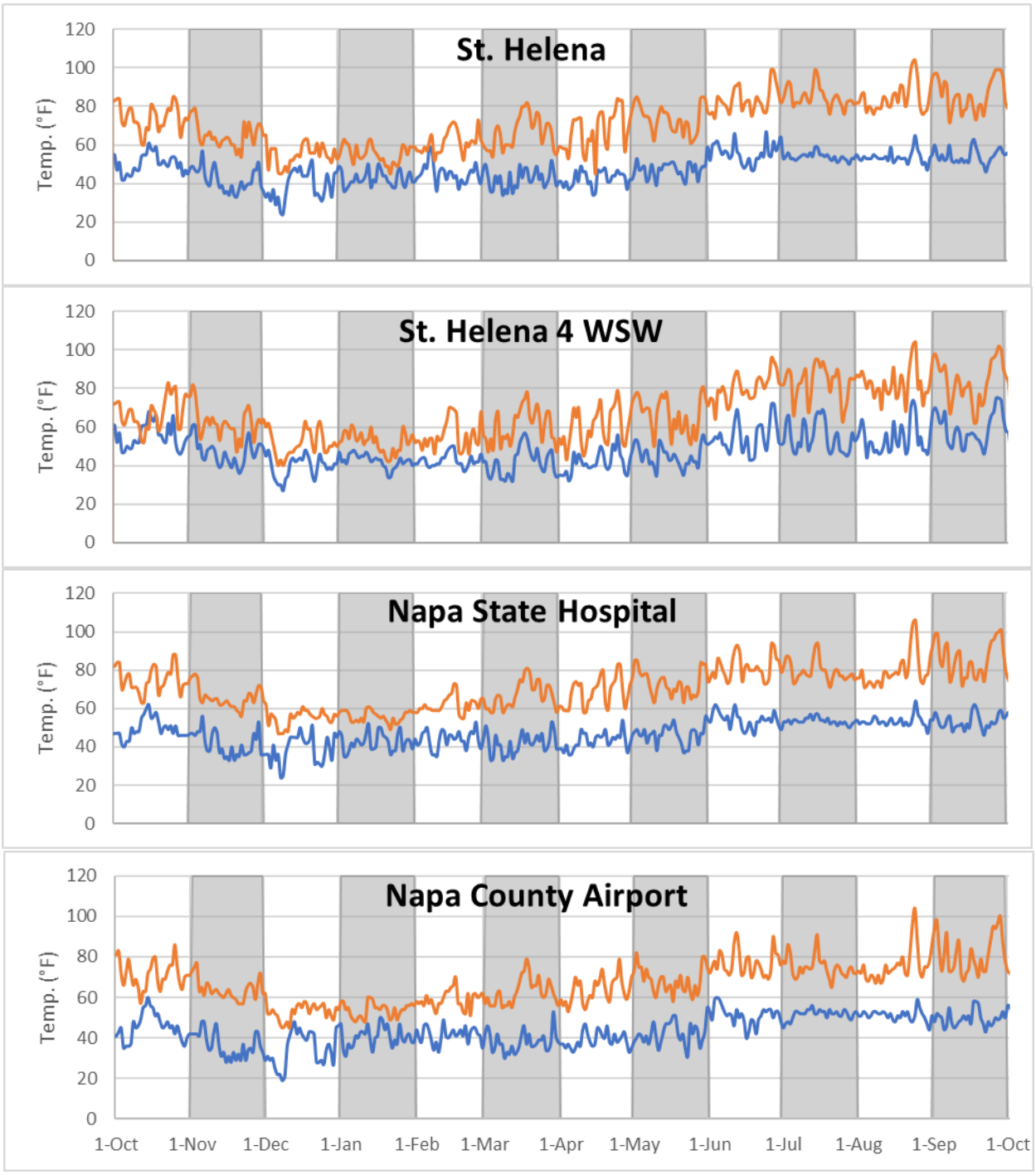

Figure 8: Daily minimum and maximum temperature data used in the Sonoma County SWB model for WY 2010.

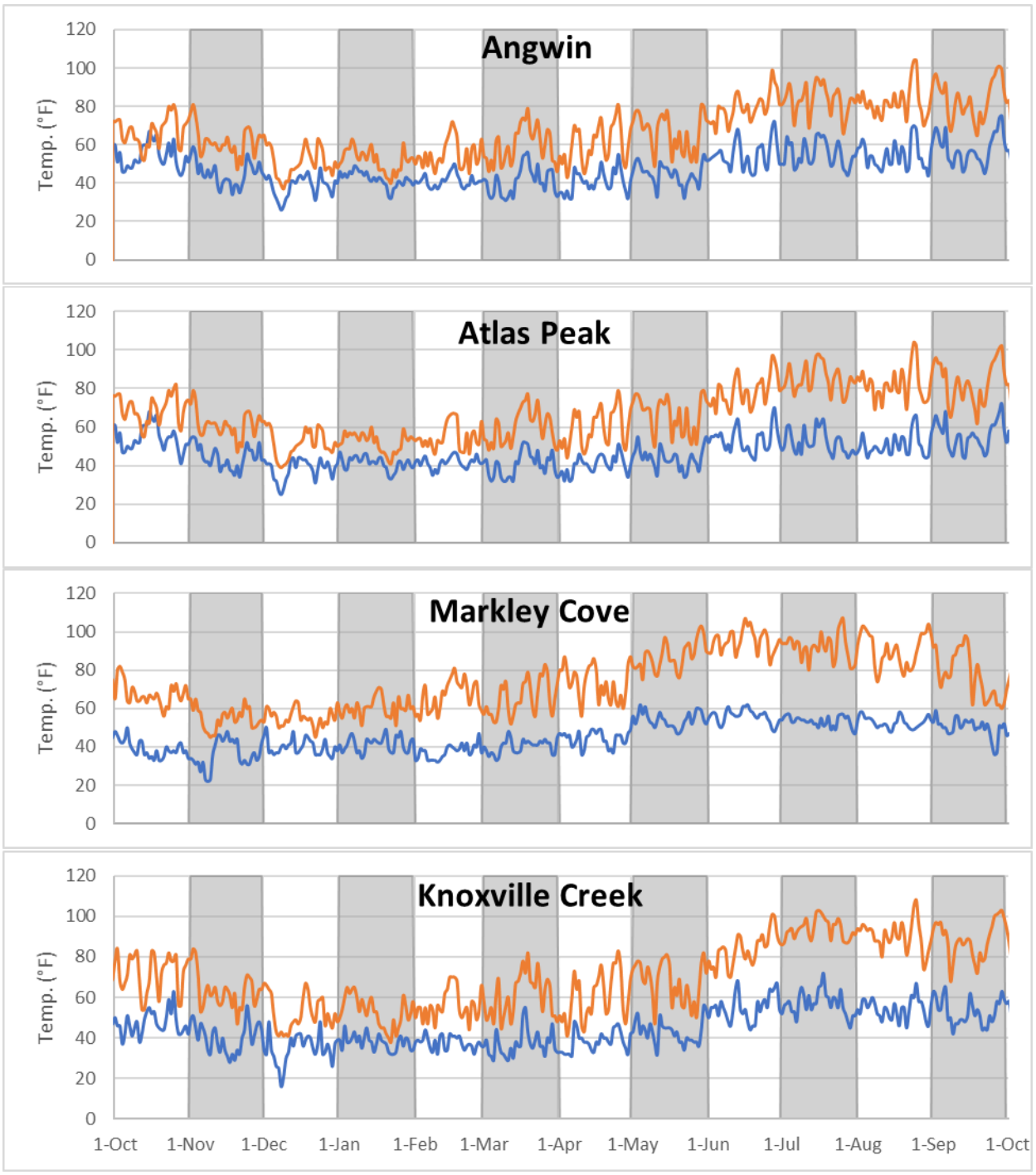

Figure 8 – cont.

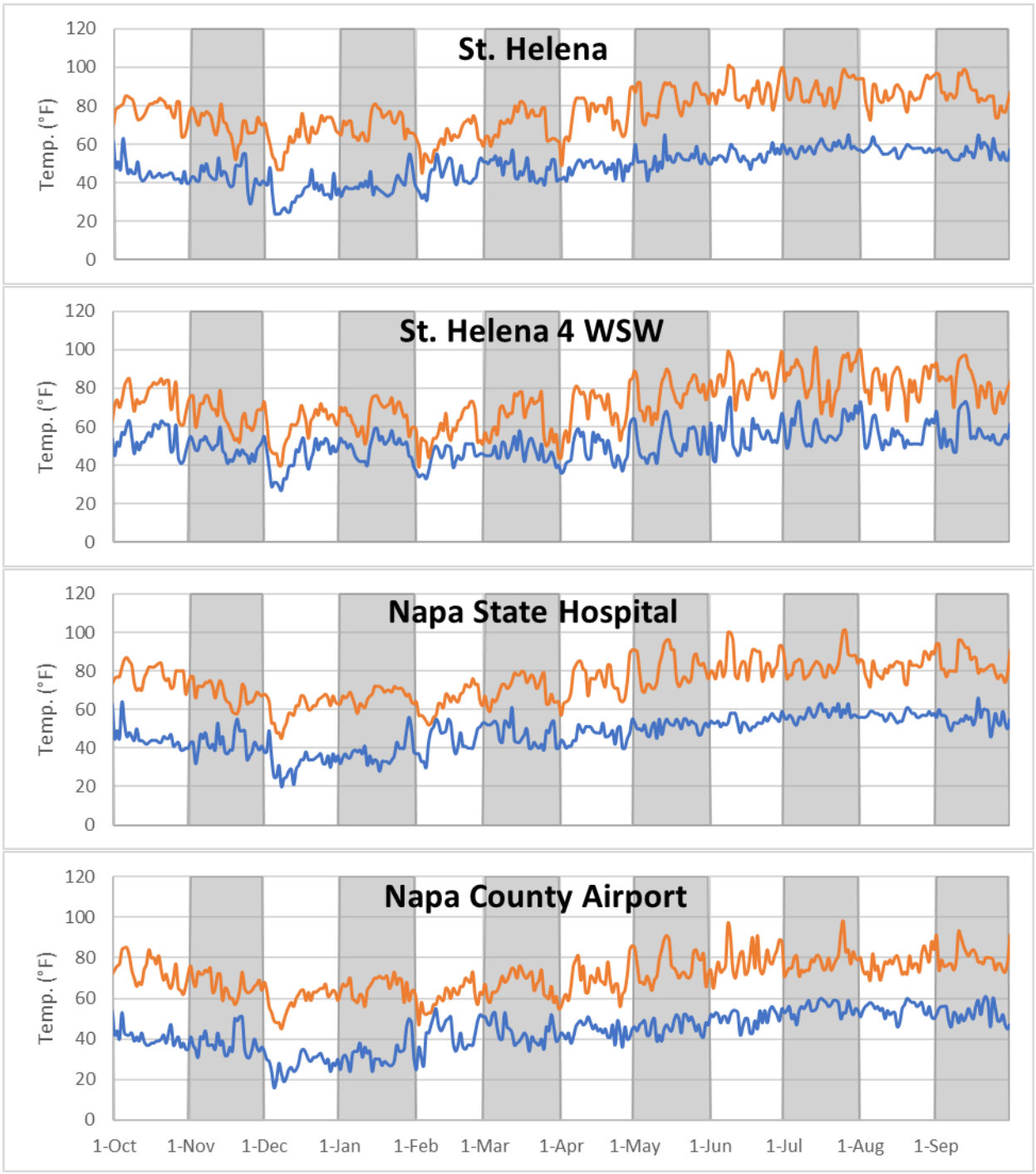

Figure 9: Daily minimum and maximum temperature data used in the Sonoma County SWB model for WY 2010.

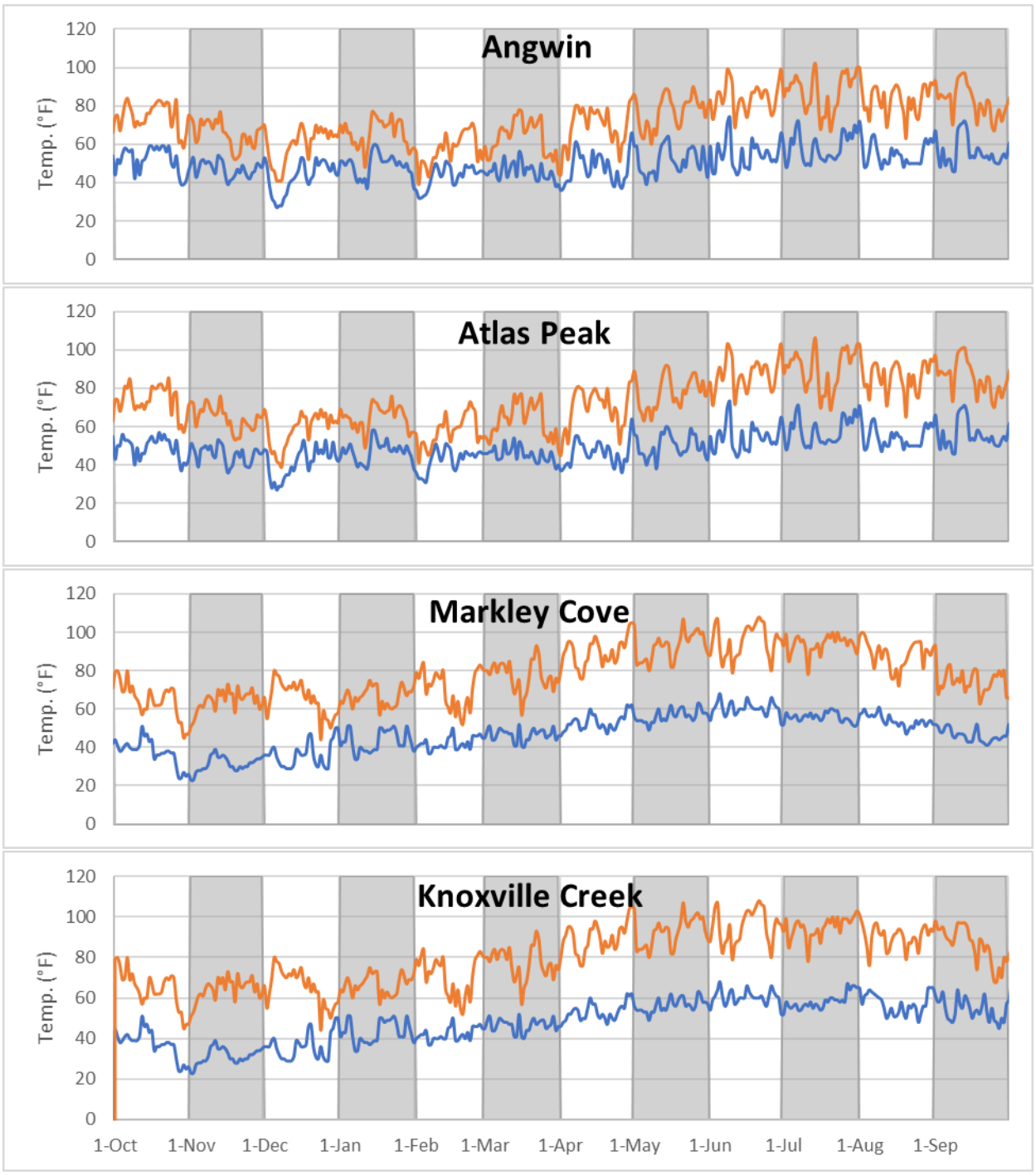

Figure 9 – cont.

Model Calibration

Available data are insufficient to calibrate the Water Year 2010 and 2014 SWB simulations; however, the land cover and soil properties used in the model were obtained from a previously prepared and calibrated SWB model of Sonoma County (OEI 2017). The Sonoma County model was calibrated against total monthly runoff volumes derived using baseflow separation of streamflow data for five watersheds within Sonoma County. Gages were selected because they represented relatively small watersheds (1.2 – 14.3 mi^2) without significant urbanization, diversions, groundwater abstraction, reservoir impoundments, or large alluvial bodies where significant exchanges between surface water and groundwater may be expected. These attributes are desirable because the hydrographs can more readily be separated into surface runoff and baseflow components and the surface runoff pattern is more directly comparable to the SWB simulated surface runoff which does not account for water use, reservoir operations, or surface water/groundwater exchange.

SWB utilizes a simplified routing scheme whereby surface runoff is routed to downslope cells or out of the model domain on the same day in which it originates as rainfall, thus it is not capable of accurately estimating streamflow over short time periods. The use of the total monthly surface runoff volumes provided a means of calibrating the Sonoma County SWB model to measured surface runoff data within the limitations of the model's approach to simulating surface runoff.

The SWB model of Sonoma County reproduced seasonal variations in surface runoff in all five calibration watersheds. Monthly Mean Errors (ME) ranged from -0.2 to 0.4 inches with a mean value of 0.1 inches. Annual surface runoff totals ranged from an under-prediction of approximately 10% at Franchini Creek to an over-prediction of approximately 19% at Buckeye Creek, with a mean over-prediction of approximately 6% across the five watersheds. These results indicate that the SWB model was able to reproduce monthly surface runoff volumes with a reasonable degree of accuracy and that the model tends to over-predict surface runoff somewhat, suggesting that the model may generate a low-range estimate of recharge.

Although the climate in Napa County is slightly drier than in Sonoma County, the vegetation, soils, and geology are similar and parameters calibrated using data from Sonoma County should be applicable to Napa County. Calibration of the Napa County SWB model was not performed due to a lack of publicly-available contemporary discharge records in suitable watersheds. Contemporary discharge records exist for USGS gaging stations located along the Napa River near St. Helena and Napa, but the watersheds above these gages are large and contain significant groundwater abstraction, reservoir impoundments, and alluvial bodies. USGS gages on smaller watersheds in Napa County have been inactive since 1983 or earlier. Discharge records exist through Napa One Rain for several streams gaged by the Napa County Resource Conservation District (RCD) but the RCD has cautioned against use of these discharge records for calibration purposes due to incomplete rating curve development.

Estimates of groundwater recharge are also available from an earlier model prepared by Luhdorff and Scalmanini Engineers and MBK Engineers (LSCE 2013). This report provided estimates of average annual recharge as a percentage of average annual precipitation for nine watersheds in Napa County. Averaged across the same nine watersheds, the SWB model predicts significantly higher rates of recharge than the model prepared by LSCE, which predicts slightly lower AET but significantly more runoff (Table 4). Differences in methodology between these two models complicate direct comparisons. The LSCE model calculated infiltration into the soil as the difference between monthly precipitation and discharge volumes within each watershed. Discharge volumes were calculated from USGS stream gages and included both direct runoff and baseflow from groundwater. Inclusion of baseflow with direct runoff in these calculations may inappropriately reduce the estimated volume of water infiltrated into the soil and available for recharge.

Table 4: Comparison of results from SWB model and Luhdorff and Scalmanini model.

USGS Gage	HUC	Mean Precip, 2010 (in)	Mean AET, 2010 (% Precip)		Mean Runoff, 2010 (% Precip)		Mean Recharge, 2010 (% Precip)	
			SWB	LSCE	SWB	LSCE	SWB	LSCE
Conn Ck nr Oakville	11456500	34.8	59%	53%	21%	25%	21%	21%
Dry Ck nr Napa	11457000	41.5	56%	50%	18%	43%	25%	6%
Milliken Ck nr Napa	11458100	32.3	52%	41%	20%	51%	28%	8%
Napa Ck at Napa	11458300	36.6	61%	43%	16%	46%	23%	11%
Napa R nr Napa	11458000	39.5	56%	48%	20%	35%	24%	17%
Napa R nr St Helena	11456000	47.9	46%	45%	23%	42%	30%	14%
Redwood Ck nr Napa	11458200	39.6	53%	49%	26%	40%	22%	10%
Tulucay Ck nr Napa	11458300	27.0	64%	49%	16%	47%	20%	5%

Model Results

The principal elements of the annual water budget simulated with the Napa County SWB model for Water Years 2010 and 2014 are presented in map form in Figures 10 - 19 and in tabular form for 27 major watershed areas in Napa County (Tables 5 - 8). The watersheds are based on USGS HUC-12 watersheds and are named for the stream which comprises the largest proportion of the area; in many cases the areas consist of multiple tributary streams (Figure 20).

In Water Year 2010 (representing "average" hydrologic conditions) precipitation varied from 21.8 inches in the Ledgewood Creek watershed to 53.3 inches in the Saint Helena Creek watershed (Figure 10, Table 5). Actual evapotranspiration (AET) ranged from 13.4 inches in the Jackson Creek watershed to 25.2 inches in the Saint Helena Creek watershed (Figure 11). Surface runoff ranged from 3.4 inches in the Ledgewood Creek watershed to 13.5 inches in the Saint Helena Creek watershed (Figure 12). Recharge ranged from 3.3 inches in the Ledgewood Creek watershed to 14.4 inches in the Saint Helena watershed. (Figure 13). Small decreases in soil moisture storage (up to 1.8 inches) occurred in most watersheds, with changes in most

watersheds being less than an inch (Figure 14). Note that the San Pablo Bay estuaries have been excluded from these comparisons.

Expressed as a percentage of the annual precipitation, AET ranged from 77% in the Ledgewood Creek watershed to 45% in the Jackson Creek watershed (Table 6). Surface runoff ranged from 15% of precipitation in the Ledgewood Creek watershed to 42% in the Jackson Creek watershed. Recharge ranged from 10% of the precipitation in the Jackson Creek watershed to 27% in the Saint Helena watershed.

In Water Year 2014 (representing "dry" hydrologic conditions during the second year of an extreme three-year drought) precipitation varied from 10.1 inches in the American Canyon Creek watershed to 32.2 inches in the Saint Helena Creek watershed (Figure 15, Table 7). Actual evapotranspiration (AET) ranged from 10.3 inches in the Jackson Creek watershed to 17.8 inches in the Saint Helena Creek watershed (Figure 16). Surface runoff ranged from 0.7 inches in the American Canyon Creek watershed to 13.2 inches in the Saint Helena Creek watershed (Figure 17). Recharge ranged from 0.6 inches in the Wragg Canyon watershed to 4.1 inches in the Saint Helena watershed. (Figure 18). Large decreases in soil moisture storage of between 2.3 and 4.3 inches were also simulated (Figure 19).

Expressed as a percentage of the annual precipitation, AET ranged from 55% in the Saint Helena Creek watershed to 121% in the Jackson Creek watershed (Table 8). These very large AET rates caused significant decreases in soil moisture. Decreases in soil moisture ranged from 9% of precipitation in the Saint Helena watershed to 36% in the American Canyon Creek watershed. Surface runoff ranged from 7% of precipitation in the American Canyon Creek watershed to 41% in the Saint Helena Watershed. Recharge ranged from 18% in the Milliken Creek Watershed to 5% in the Jackson Creek and Wragg Canyon watersheds.

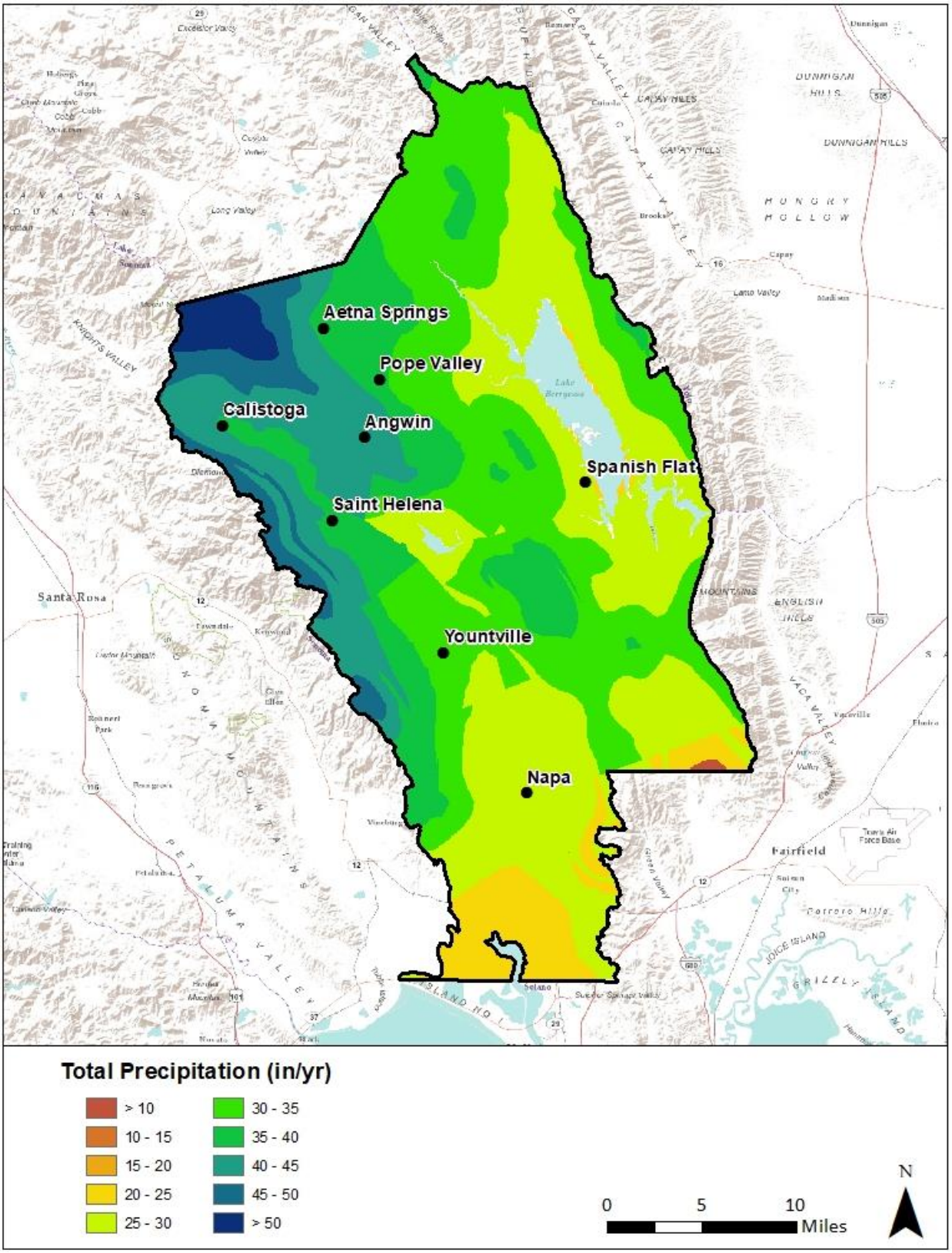

Figure 10: Water Year 2010 precipitation simulated with the Napa County SWB model.

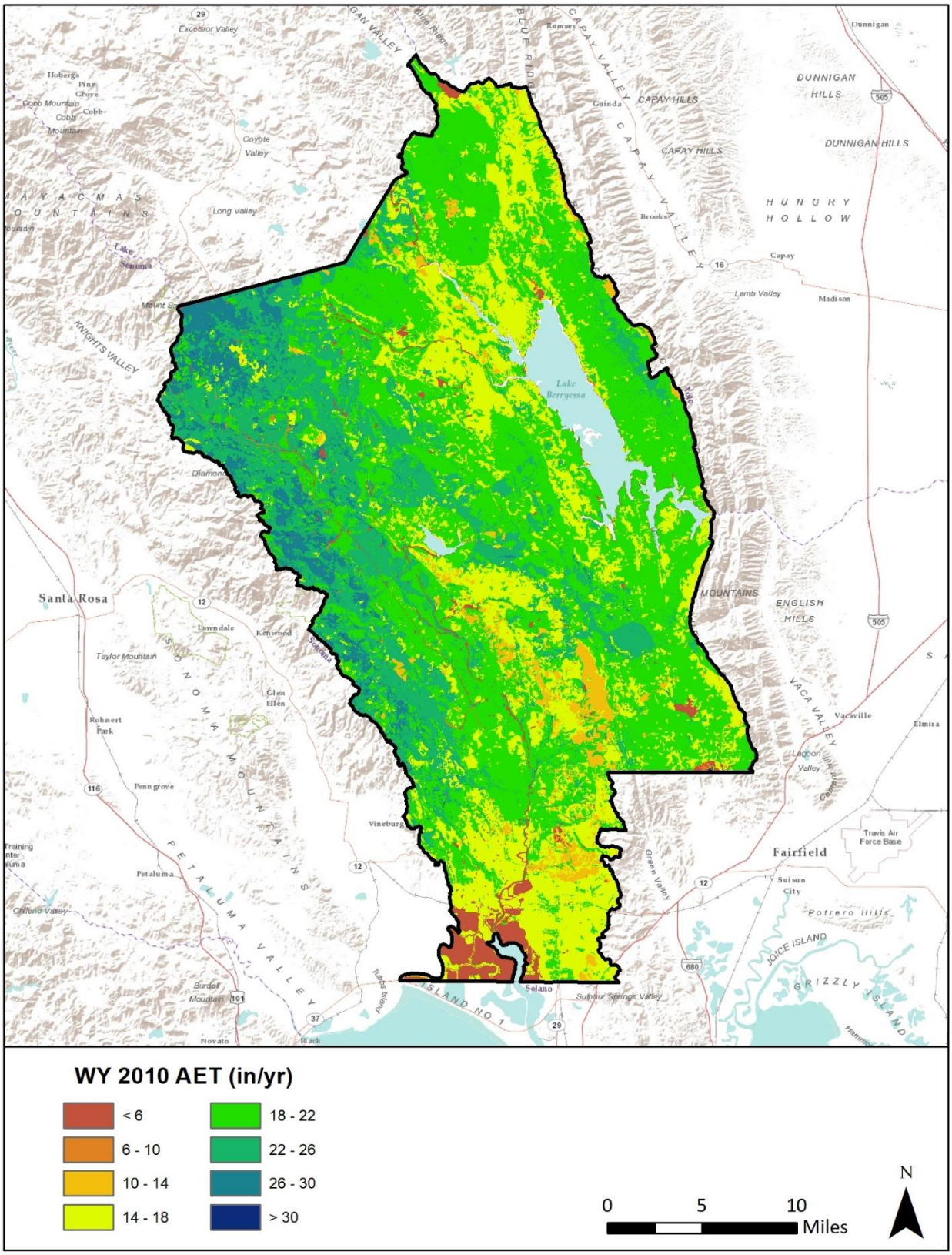

Figure 11: Water Year 2010 AET simulated with the Napa County SWB model.

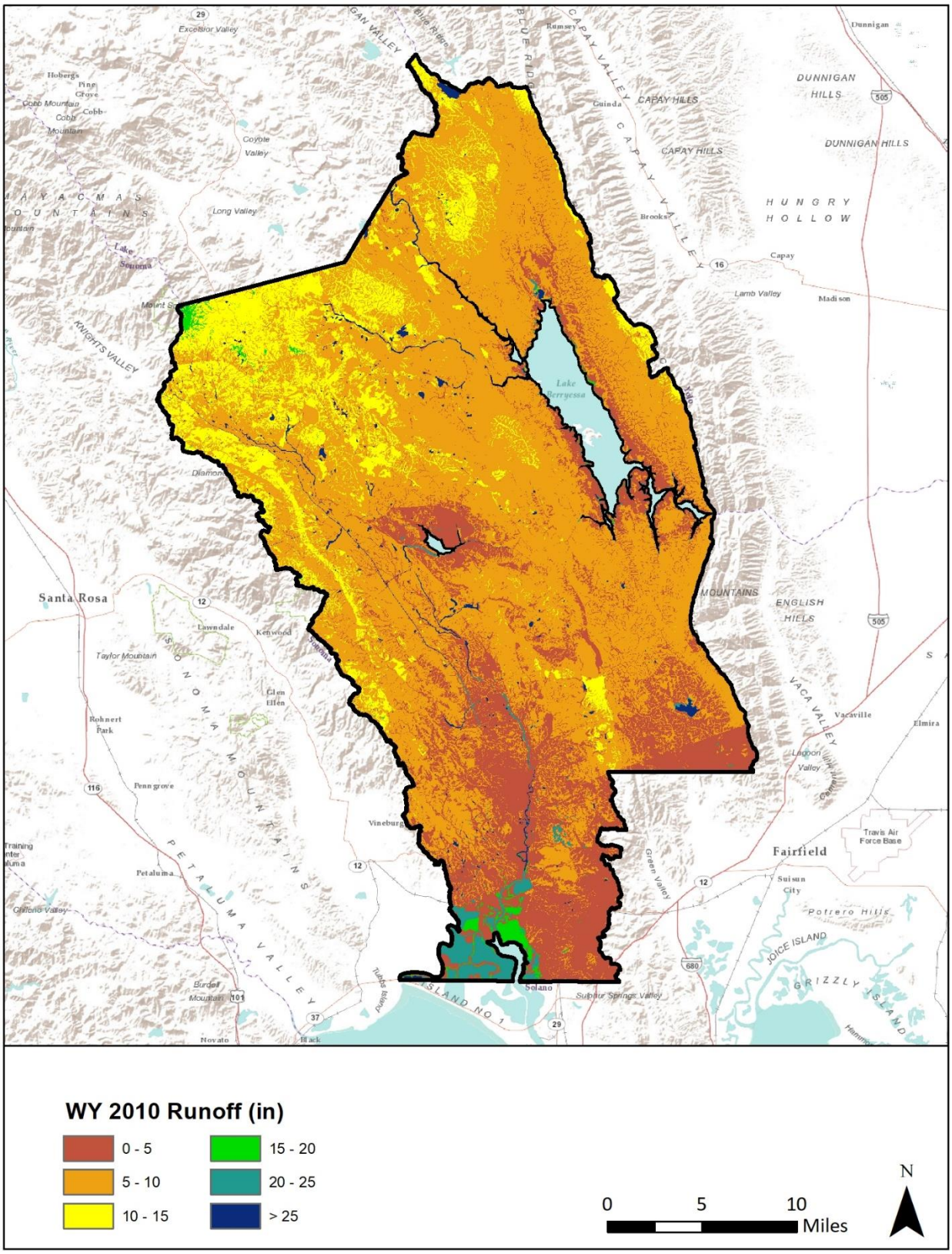

Figure 12: Water Year 2010 runoff simulated with the Napa County SWB model.

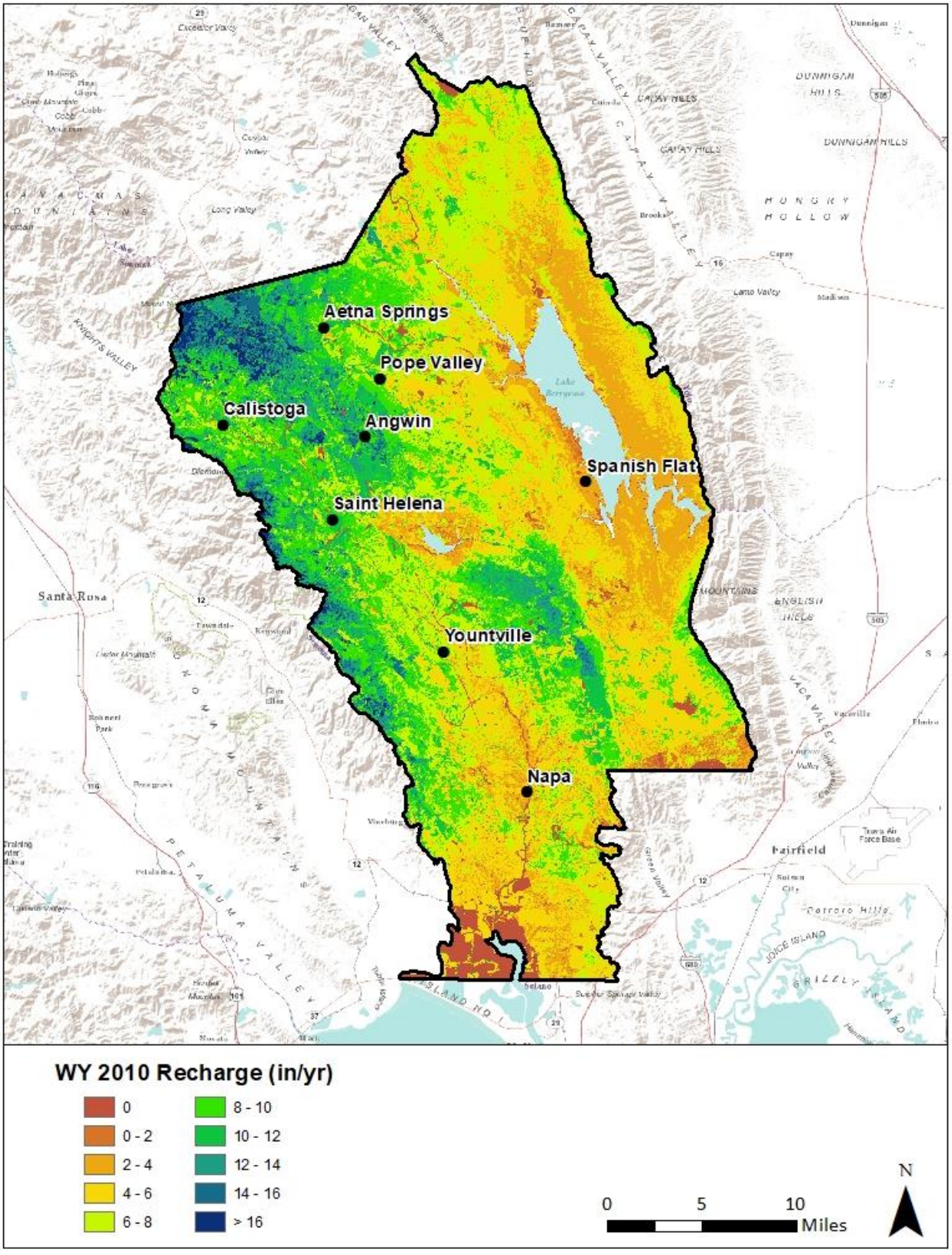

Figure 13: Water Year 2010 recharge simulated with the Napa County SWB model.

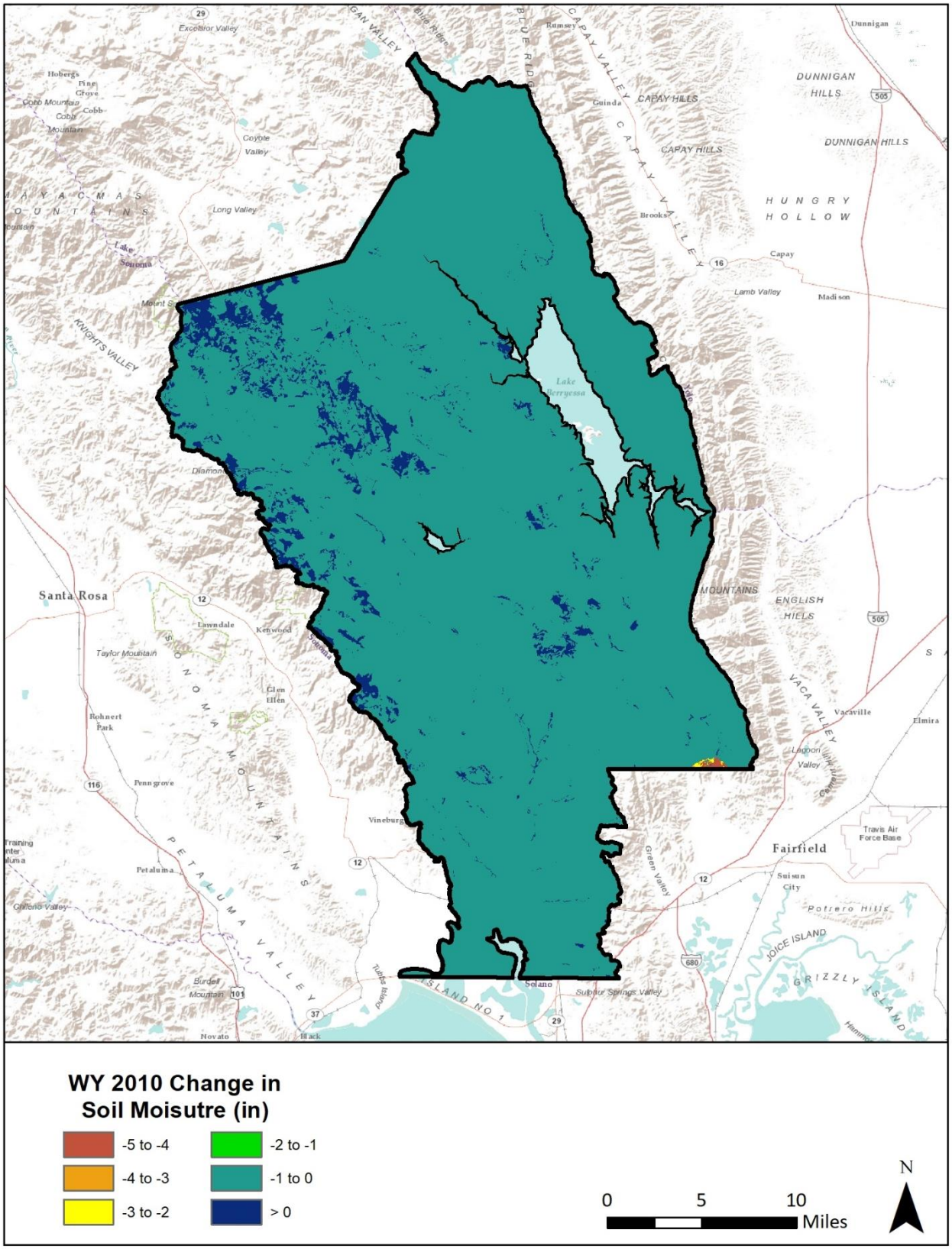

Figure 14: Water Year 2010 change in soil moisture content simulated with the Napa County SWB model.

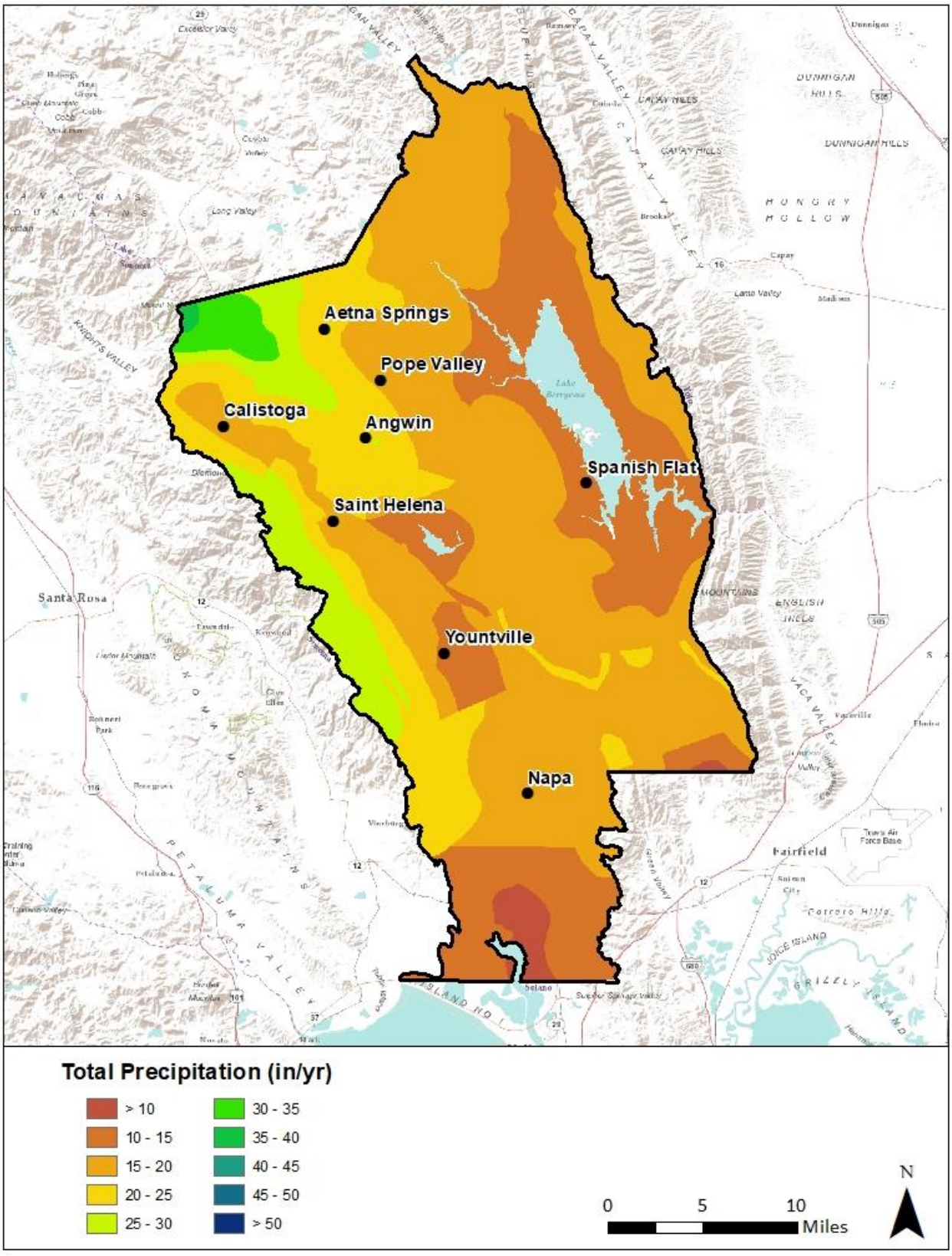

Figure 15: Water Year 2014 precipitation simulated with the Napa County SWB model.

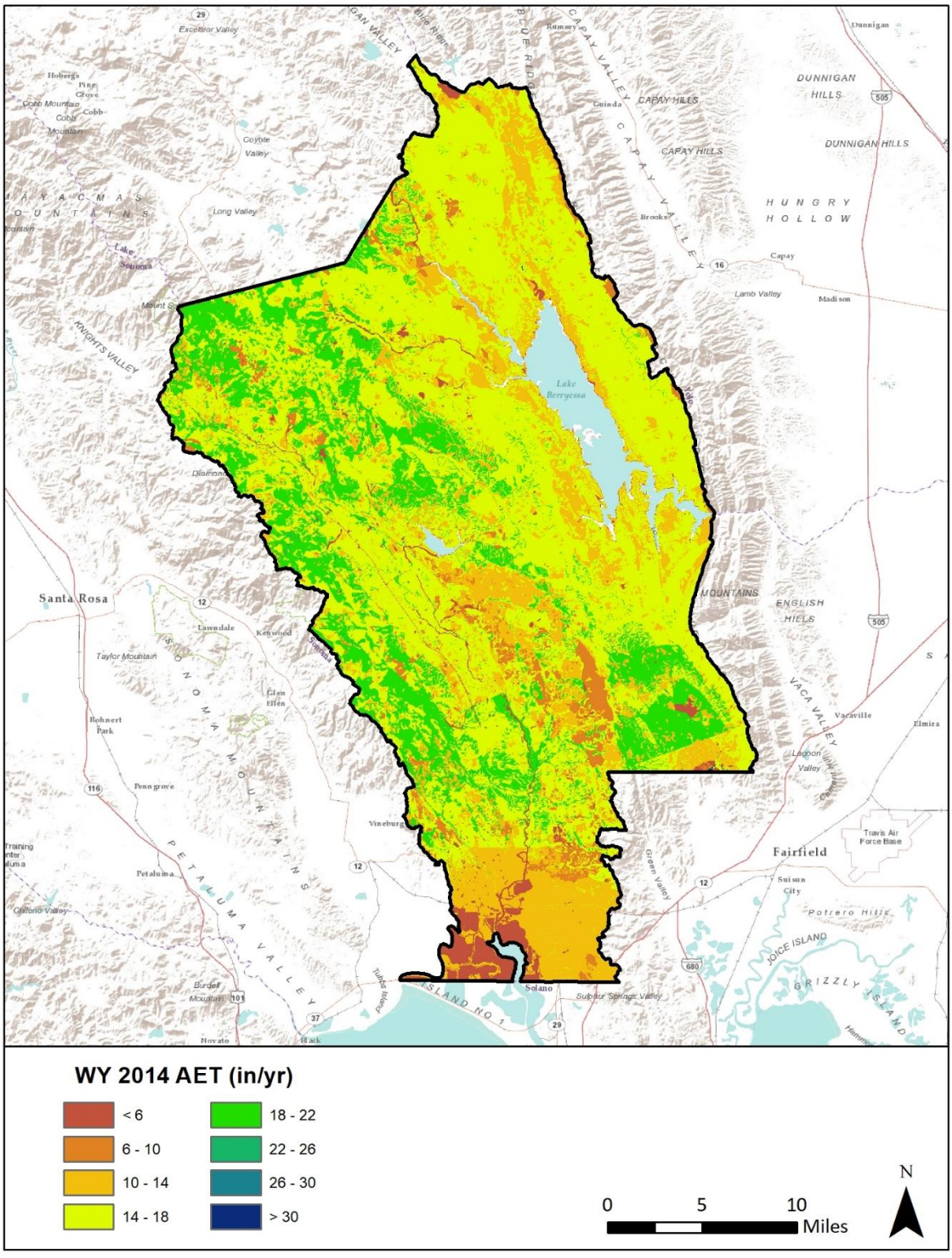

Figure 16: Water Year 2014 AET simulated with the Napa County SWB model.

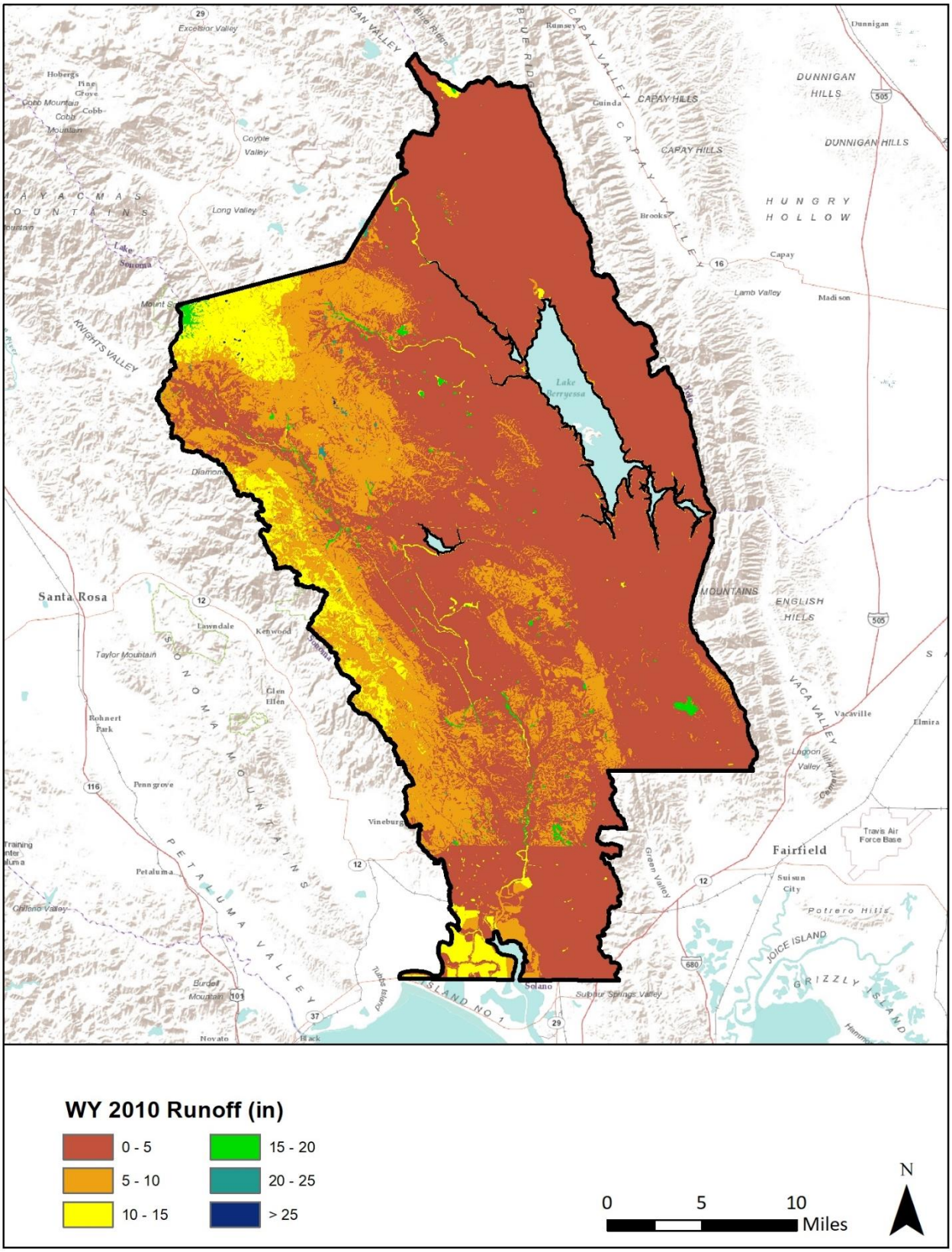

Figure 17: Water Year 2014 recharge simulated with the Napa County SWB model.

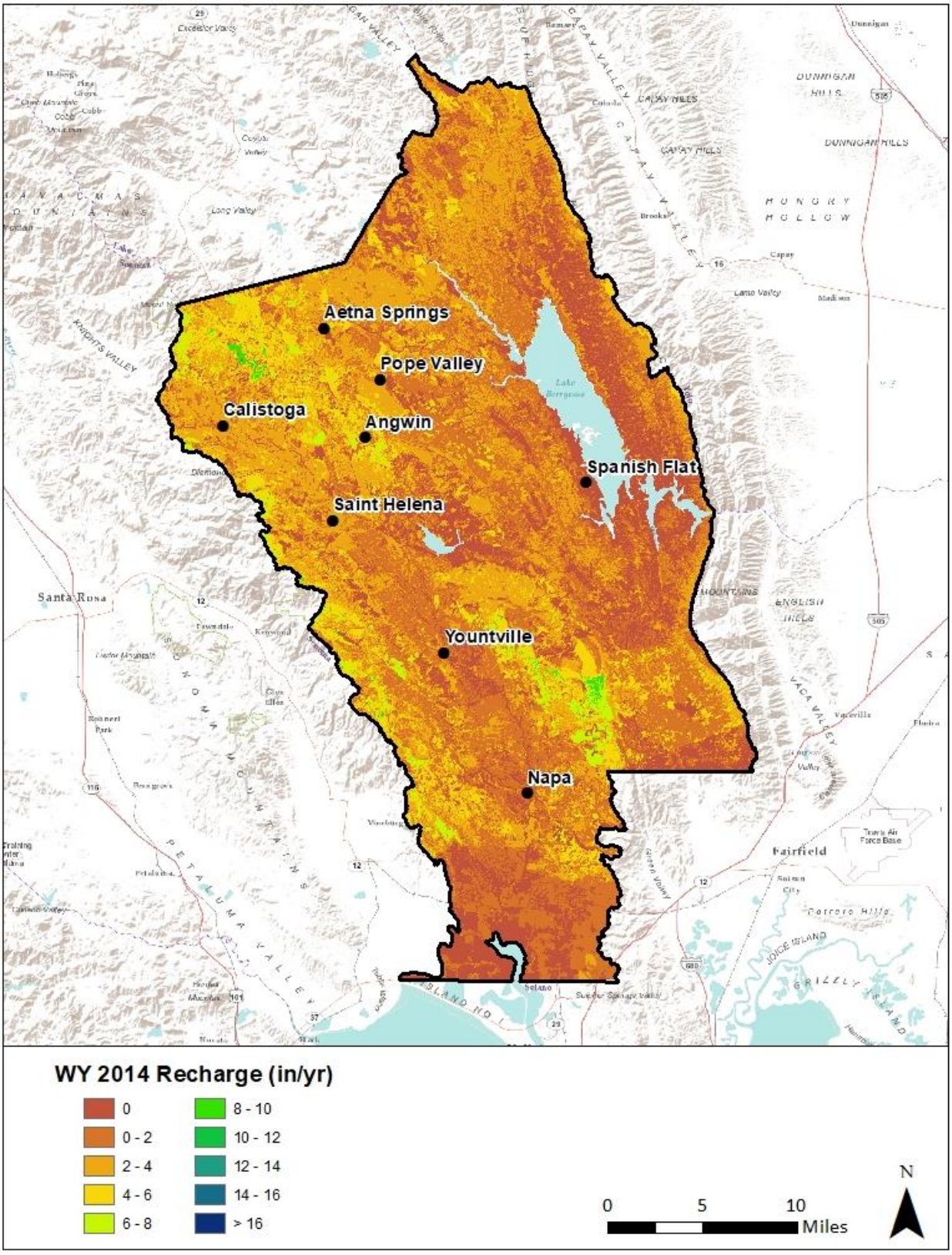

Figure 18: Water Year 2014 recharge simulated with the Napa County SWB model.

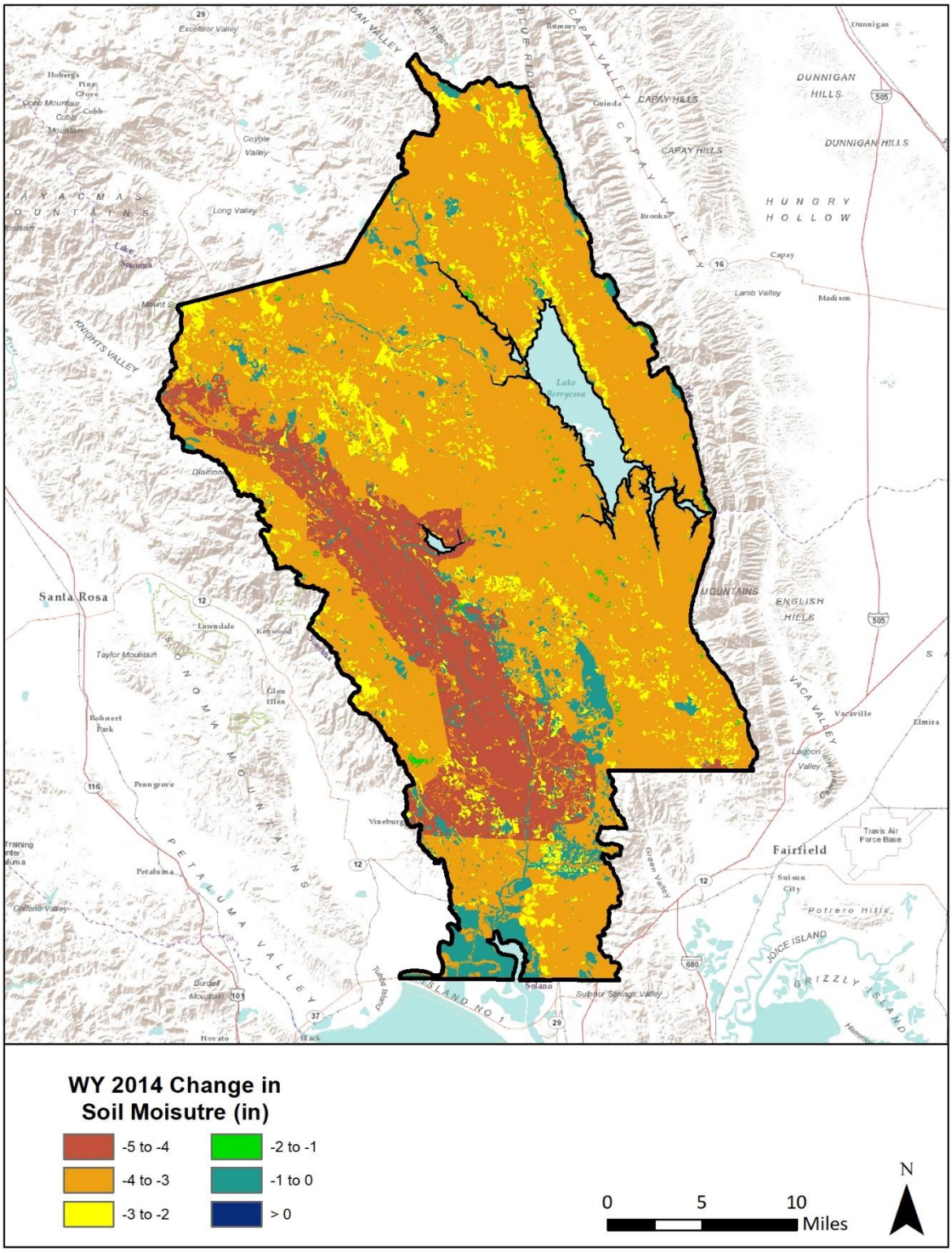

Figure 19: Water Year 2014 change in soil moisture content simulated with the Napa County SWB model.

Table 5: Simulated precipitation and recharge values averaged across HUC-12 watersheds in Napa County for Water Year 2010 expressed as depths. See Figure 20 for watershed locations.

Name	Drainage Area (mi^2)	Precipitation (in)	AET (in)	Surface Runoff (in)	Recharge (in)	Soil Moisture Change (in)
American Canyon Creek	10.8	24.1	16.3	3.7	4.7	-0.6
Bucksnort Creek	1.9	47.9	24.5	12.1	11.1	0.1
Butts Creek-Putah Creek	49.9	33.0	17.4	9.7	6.2	-0.7
Capell Creek	43.0	31.1	19.1	7.4	5.0	-0.6
Carneros Creek	29.7	28.0	18.6	5.2	5.5	-0.6
Chiles Creek	32.0	34.6	21.1	7.1	6.8	-0.5
Dry Creek	28.8	37.0	22.2	7.2	8.4	-0.5
Hunting Creek	12.0	33.7	19.0	9.7	5.7	-0.8
Jackson Creek-Putah Creek	54.5	29.9	13.4	12.6	3.0	-0.5
Lake Curry-Suisun Creek	16.4	30.7	18.9	6.5	5.9	-0.6
Lake Hennessey-Conn Creek	20.0	35.1	19.6	8.5	7.3	-0.4
Ledgewood Creek	6.4	21.8	16.9	3.4	3.3	-1.8
Lower Eticuera Creek	44.0	30.0	17.7	8.1	4.7	-0.7
Lower Napa River	45.0	31.7	19.9	5.6	6.7	-0.6
Lower Pope Creek	31.8	33.9	18.0	9.7	6.5	-0.6
Maxwell Creek	35.1	34.7	19.6	8.7	6.9	-0.6
Middle Napa River	60.3	39.9	22.8	8.5	9.2	-0.5
Milliken Creek	29.7	30.9	16.9	6.6	7.9	-0.6
Rector Creek-Conn Creek	22.3	32.8	18.0	7.1	8.2	-0.7
Saint Helena Creek	7.7	53.3	25.2	13.5	14.4	0.1
San Pablo Bay Estuaries	19.5	23.9	8.1	13.8	2.3	-0.3
Tulucay Creek	34.2	26.1	16.7	4.6	5.4	-0.7
Upper Eticuera Creek	25.6	31.2	17.2	8.6	6.1	-0.8
Upper Napa River	44.6	44.7	23.6	10.6	10.8	-0.4
Upper Pope Creek	21.7	44.5	22.7	10.5	11.5	-0.3
Wooden Valley & Suisun Creeks	23.3	29.0	19.0	5.1	5.5	-0.6
Wragg Canyon-Putah Creek	34.2	28.3	16.3	8.6	3.3	-0.6

Table 6: Simulated precipitation and recharge values averaged across HUC-12 watersheds in Napa County for Water Year 2010 expressed as a percentage of precipitation. See Figure 20 for watershed locations.

Name	Drainage Area (mi^2)	Precipitation (in)	AET (%)	Surface Runoff (%)	Recharge (%)	Soil Moisture Change (%)
American Canyon Creek	10.8	24.1	67%	15%	19%	-3%
Bucksnort Creek	1.9	47.9	51%	25%	23%	0%
Butts Creek-Putah Creek	49.9	33.0	53%	29%	19%	-2%
Capell Creek	43.0	31.2	61%	24%	16%	-2%
Carneros Creek	29.7	29.7	66%	19%	20%	-2%
Chiles Creek	32.0	34.6	61%	21%	20%	-1%
Dry Creek	28.8	37.8	60%	20%	23%	-1%
Hunting Creek	12.0	33.7	56%	29%	17%	-2%
Jackson Creek-Putah Creek	54.5	29.7	45%	42%	10%	-2%
Lake Curry-Suisun Creek	16.4	30.7	61%	21%	19%	-2%
Lake Hennessey-Conn Creek	20.0	36.0	56%	24%	21%	-1%
Ledgewood Creek	6.4	21.8	77%	15%	15%	-8%
Lower Eticuera Creek	44.0	30.0	59%	27%	16%	-2%
Lower Napa River	45.0	31.7	63%	18%	21%	-2%
Lower Pope Creek	31.8	33.9	53%	29%	19%	-2%
Maxwell Creek	35.1	34.7	56%	25%	20%	-2%
Middle Napa River	60.3	40.4	57%	21%	23%	-1%
Milliken Creek	29.7	30.9	55%	21%	26%	-2%
Rector Creek-Conn Creek	22.3	32.8	55%	22%	25%	-2%
Saint Helena Creek	7.7	53.3	47%	25%	27%	0%
San Pablo Bay Estuaries	19.5	23.9	34%	58%	10%	-1%
Tulucay Creek	34.2	26.1	64%	18%	21%	-3%
Upper Eticuera Creek	25.6	31.2	55%	28%	19%	-3%
Upper Napa River	44.6	44.7	53%	24%	24%	-1%
Upper Pope Creek	21.7	44.5	51%	23%	26%	-1%
Wooden Valley & Suisun Creeks	23.3	29.0	65%	18%	19%	-2%
Wragg Canyon-Putah Creek	34.2	28.3	58%	31%	12%	-2%

Table 7: Simulated precipitation and recharge values averaged across HUC-12 watersheds in Napa County for Water Year 2014 expressed as depths. See Figure 20 for watershed locations.

Name	Drainage Area (mi^2)	Precipitation (in)	AET (in)	Surface Runoff (in)	Recharge (in)	Soil Moisture Change (in)
American Canyon Creek	10.8	10.1	12.3	0.7	0.7	-3.6
Bucksnort Creek	1.9	28.8	17.6	11.5	2.6	-3.0
Butts Creek-Putah Creek	49.9	16.9	14.2	3.9	1.9	-3.2
Capell Creek	43.0	15.8	14.8	3.1	1.1	-3.1
Carneros Creek	29.7	15.0	14.7	4.6	2.0	-3.7
Chiles Creek	32.0	18.3	16.5	3.7	1.5	-3.3
Dry Creek	28.8	21.5	16.5	6.8	2.5	-3.7
Hunting Creek	12.0	16.7	15.4	3.1	1.6	-3.4
Jackson Creek-Putah Creek	54.5	14.9	10.3	6.1	0.7	-2.3
Lake Curry-Suisun Creek	16.4	18.4	16.1	3.7	1.9	-3.4
Lake Hennessey-Conn Creek	20.0	19.1	14.8	5.7	2.2	-3.2
Ledgewood Creek	6.4	12.2	13.9	1.7	0.8	-4.3
Lower Eticuera Creek	44.0	14.9	14.0	2.6	1.3	-3.1
Lower Napa River	45.0	19.4	15.9	5.0	2.2	-3.6
Lower Pope Creek	31.8	17.8	14.5	4.5	2.0	-3.2
Maxwell Creek	35.1	18.3	15.9	3.8	2.0	-3.3
Middle Napa River	60.3	21.3	16.5	6.6	2.5	-3.7
Milliken Creek	29.7	18.7	13.7	4.5	3.4	-2.9
Rector Creek-Conn Creek	22.3	16.5	13.6	4.0	2.3	-3.4
Saint Helena Creek	7.7	32.2	17.8	13.2	4.1	-3.0
San Pablo Bay Estuaries	19.5	10.4	6.0	5.6	0.5	-1.6
Tulucay Creek	34.2	14.6	13.5	2.6	1.7	-3.3
Upper Eticuera Creek	25.6	15.5	14.1	2.5	2.1	-3.2
Upper Napa River	44.6	22.9	16.2	6.9	3.3	-3.5
Upper Pope Creek	21.7	25.6	16.8	8.5	3.5	-3.2
Wooden Valley & Suisun Creeks	23.3	17.9	16.4	3.1	2.0	-3.5
Wragg Canyon-Putah Creek	34.2	14.1	12.6	3.6	0.6	-2.8

Table 8: Simulated precipitation and recharge values averaged across HUC-12 watersheds in Napa County for Water Year 2014 expressed as a percentage of precipitation. See Figure 20 for watershed locations.

Name	Drainage Area (mi^2)	Precipitation (in)	AET (%)	Surface Runoff (%)	Recharge (%)	Soil Moisture Change (%)
American Canyon Creek	10.8	10.1	121%	7%	7%	-36%
Bucksnort Creek	1.9	28.8	61%	40%	9%	-10%
Butts Creek-Putah Creek	49.9	16.8	84%	23%	11%	-19%
Capell Creek	43.0	15.8	94%	20%	7%	-20%
Carneros Creek	29.7	17.6	98%	30%	13%	-25%
Chiles Creek	32.0	18.4	90%	20%	8%	-18%
Dry Creek	28.8	22.1	77%	32%	12%	-17%
Hunting Creek	12.0	16.7	92%	18%	10%	-20%
Jackson Creek-Putah Creek	54.5	14.7	69%	41%	5%	-16%
Lake Curry-Suisun Creek	16.4	18.4	88%	20%	10%	-19%
Lake Hennessey-Conn Creek	20.0	19.6	78%	30%	12%	-17%
Ledgewood Creek	6.4	12.2	114%	14%	7%	-35%
Lower Eticuera Creek	44.0	14.9	94%	18%	9%	-21%
Lower Napa River	45.0	19.4	82%	26%	11%	-19%
Lower Pope Creek	31.8	17.8	81%	25%	11%	-18%
Maxwell Creek	35.1	18.3	87%	21%	11%	-18%
Middle Napa River	60.3	21.8	77%	31%	12%	-18%
Milliken Creek	29.7	18.7	74%	24%	18%	-16%
Rector Creek-Conn Creek	22.3	16.5	83%	24%	14%	-21%
Saint Helena Creek	7.7	32.2	55%	41%	13%	-9%
San Pablo Bay Estuaries	19.5	10.4	58%	53%	4%	-16%
Tulucay Creek	34.2	14.6	93%	18%	12%	-23%
Upper Eticuera Creek	25.6	15.5	91%	16%	14%	-21%
Upper Napa River	44.6	22.9	71%	30%	14%	-15%
Upper Pope Creek	21.7	25.6	66%	33%	14%	-12%
Wooden Valley & Suisun Creeks	23.3	17.9	91%	17%	11%	-20%
Wragg Canyon-Putah Creek	34.2	14.1	90%	26%	5%	-20%

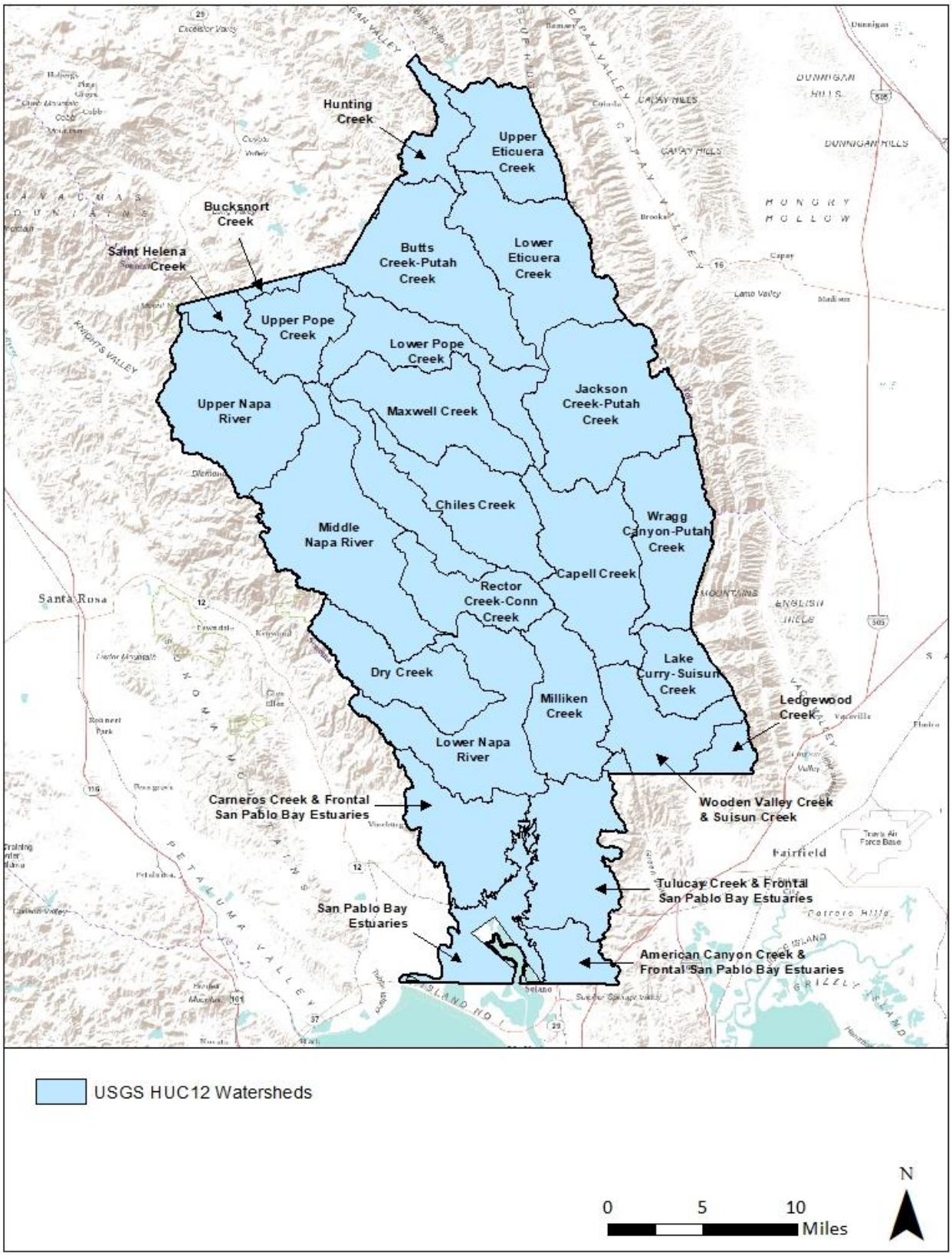

Figure 20: Major watersheds areas used to summarize water budget information in Tables 5 - 8.

Discussion and Conclusion

Numerous previous modeling studies have estimated water budget components in several larger watershed areas in Sonoma and Napa Counties including the Santa Rosa Plain, the Green Valley and Dutch Bill Creek watersheds, and the Sonoma Valley (Farrar et. al., 2006; Kobor and O'Connor, 2016; Woolfenden and Hevesi, 2014). Comparisons to these water budgets are useful for evaluating the SWB results, but one would not expect precise agreement owing to significant variations in climate, land cover, soil types, underlying hydrogeologic conditions, and different spatial scales of modeling studies. These regional analyses estimate that average annual recharge varies from 7% to 19% of the annual precipitation. The equivalent county-wide value from this study is slightly higher at 20%.

Water budgets for the Napa River and selected sub-basins were also estimated in a previous study by Luhdorff and Scalmanini Engineers and MBK Engineers (LSCE 2013). The LSCE study estimated that, as a percentage of annual precipitation, AET comprised slightly less, runoff significantly more, and recharge substantially less of the typical annual water budget. LSCE (2013) calculated infiltration of precipitation based on the difference between total monthly streamflow at selected gaging stations and total monthly precipitation for the gages' drainage area. Streamflow volumes include both direct runoff (overland flow and interflow) and baseflow from groundwater. Inclusion of baseflow with direct runoff in these calculations may inappropriately reduce the estimated volume of water infiltrated into the soil and available for recharge; the LSCE approach therefore tends to underestimate groundwater recharge. Additionally, many of the gauging stations used for the analysis are located in reaches that may be significantly influenced by upstream reservoir releases, surface water diversions, groundwater abstraction, and/or surface water groundwater exchanges, further complicating the interpretation of the LSCE (2013) runoff rates and the interrelated calculations of AET and recharge rates. In contrast, the SWB model presented here is based on calibrated parameter values developed for a similar model in Sonoma County which was calibrated to gauges specifically selected to minimize the effects of reservoir releases, water use, or significant surface water/groundwater interaction, and after separating and removing the baseflow component of streamflow.

The recharge estimates presented here arguably represent the best available county-wide estimates produced at a fine spatial resolution using a consistent and objective data-driven approach. This analysis focused on two Water Years, 2010 and 2014, which represent average and drought conditions respectively. Input parameters were determined based on literature values and values calibrated through prior modeling experience in Sonoma County.

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