“F”

Water Availability Analysis

Nickel & Nickel Winery, Use Permit Major Modification
Application No. P17-00400-MOD
Planning Commission Hearing, September 16, 2020

WATER AVAILABILITY ANALYSIS

NICKEL & NICKEL WINERY

8164 St. Helena Hwy, Oakville, CA

APN: 031-010-003

SUMMIT

CIVIL STRUCTURAL ELECTRICAL WATER|WASTEWATER

Project No. 2016131

August 2019

TABLE OF CONTENTS

LIST OF ENCLOSURES

PROJECT SUMMARY

Nickel & Nickel is applying for a Use Permit Modification for the existing winery facility to increase employees, visitation and annual wine production capacity from the currently permitted 125,000 gallons per year to 225,000 gallons per year, with changes to marketing events to capture reoccurring temporary special events that have occurred for at least the last ten years. Summit has prepared the following Water Availability Analysis, which provides a comparison between the proposed water use and the available water capacity on the property.

Total annual water demand at Nickel & Nickel associated with the proposed increase in employees and visitation, including production, domestic, vineyard and landscape irrigation, is estimated to be 25.8 ac-ft per year, which represents an increase of 9.1 ac-ft per year from the current water usage. The site is located within the Napa Valley floor, so the water availability criterion is 1.0 acre-ft/acre-year for the project site. A lot line adjustment for the winery and adjacent vineyard parcels (provided by RSA+) shows that the total parcel acreage is approximately 34.64 acres.

The overall annual water demand is anticipated to be 25.8 ac-ft per year, resulting in an overall water use of 0.74 ac-ft/ac-year, which is less than the allotted 1.0 acre-ft/acre/year.

The winery parcel average domestic water demand (excluding landscape irrigation) can be met with the existing domestic well (located on the winery parcel, APN: 031-010-003) operating for 12 hours per day at 8.2 gpm. The well completion report is provided in Enclosure C, which includes a 4-hour air lift test completed when the well was drilled in February 2002, and showing a 36 GPM well yield.

SITE DESCRIPTION

The winery facility is located on an existing 32.19 acre parcel, which will be expanded to a proposed 34.64 acres by the lot line adjustment, east of Highway 29 and north of Oakville Grade. The site is set in an agricultural area with vineyards to the north, east, and west and residential properties to the south. The site topography slopes gradually downward to the east to the Napa River. Surface drainage flows overland to the east. Prior to the development of the winery, the property was used as agricultural land. No distillation occurs at the facility. An overall site plan for the facility is provided in Enclosure A.

The existing winery parcel consists of seven winery buildings, onsite vineyards, landscaping, a sanitary sewage leach field, and a winery process wastewater and irrigation storage pond. Water sources for the project consist of one domestic water supply well, one irrigation supply well and one backup/irrigation well. Irrigation water supply is provided by one agricultural well on the parcel, surface water rights to divert 6.1 ac-ft/year from the Napa River, and treated PW effluent. The backup well is capable of providing both domestic and irrigation water supply.

WATER DEMAND

EXISTING WATER DEMAND

Current water use at the facility and adjacent vineyard parcels, also owned by Far Niente Wine Estates, is based on the following needs:

- Process needs for production capacity of 125,000 gallons of wine per year
- Full Time Employees = 21 per day
- Part Time Employees = 6 per day
- Vinescape Employees = 5 per day, on separate septic system and parcel
- Tasting Visitors = 75 peak per day, 50 average per day (350 per week), with food pairings/meal for approximately 20% of guests
- Weekly Marketing Event = 25 peak per event, 3 events per week
- Special Event = 100 peak per event, up to 4 events per year
- Annual Special Event = 250 peak per event, up to 1 event per year
- Irrigation of 19.24 acres of vineyard
- Irrigation of landscape (estimated based on facility irrigation records and landscape architect WELO calculations)

PROPOSED WATER DEMAND

Anticipated water use at the facility and adjacent vineyard parcels will be based on the following needs:

- Process needs for production capacity of 225,000 gallons of wine per year
- Full Time Employees = 67 per day
- Part Time Employees = 6 per day, during the harvest month of September
- Vinescape Employees = included as part of 67 total listed above
- Tasting Visitors = 260 peak per day, 165 average per day (1,440 per week), with food pairings/meal for approximately 20% of guests
- Weekly Marketing Event = 25 peak per event, 3 events per week
- Special Event = 100 peak per event, up to 4 events per year
- Annual Special Events = 1 event at up to 250 peak per event, 1 event at up to 450 peak per event, 2 events at up to 900 peak per event, 1 event at up to 1,000 peak per event,
- Irrigation of 19.64 acres of vineyard
- Irrigation of landscape (estimated based on landscape architect WELO calculations)

WINERY PROCESS WATER DEMAND

Water demand for wine production is expected to correlate to the process wastewater (PW) generated at the facility. Based on typical flow data from wineries of similar size and characteristics, the approximate process water demand for the current wine production is calculated as follows:

Existing Annual production = 125,000 gal wine/year

PW generation rate	=	6 gal PW/gal wine[a]
Annual PW Flow	=	125,000 gal wine x 6 gal PW/gal wine
	=	750,000 gal PW/year
Average PW Flow	=	(750,000 gal PW/year) / (365 days)
	=	2,055 gal PW/day
Peak PW Flow	=	(750,000 gal PW/year x 32[b] %)/(30 day)
	=	8,000 gal PW/day
Annual Production Water Demand	=	(750,000 gal water/yr) / (325,851 gal/ac-ft)
	=	2.30 ac-ft water/year

[a] Generation rate based on industry standards and water data for similar wineries
[b] The harvest month of September accounts for approximately 32 percent of the annual water demand based on this facility's operational records.

The approximate annual water use associated with the existing production capacity is 750,000 gallons of water per year, or 2.30 ac-ft per year. The proposed use permit modifications include an increase to wine production capacity up to 225,000 gallons, and the associated water demand is calculated as follows:

Proposed Annual production	=	225,000 gal wine/year
PW generation rate	=	6 gal PW/gal wine[a]
Annual PW Flow	=	225,000 gal wine x 6 gal PW/gal wine
	=	1,350,000 gal PW/year
Average PW Flow	=	(1,350,000 gal PW/year) / (365 days)
	=	3,700 gal PW/day
Peak PW Flow	=	(1,350,000 gal PW/year x 32[b] %)/(30 day)
	=	14,400 gal PW/day
Annual Production Water Demand	=	(1,350,000 gal water/yr) / (325,851 gal/ac-ft)
	=	4.14 ac-ft water/year

[a] Generation rate based on industry standards and water data for similar wineries
[b] The harvest month of September accounts for approximately 32 percent of the annual water demand based on this facility's operational records.

The anticipated annual water use associated with the proposed production capacity is 1,350,000 gallons of water per year, or 4.14 ac-ft per year. Winery process water demand will continue to be provided by the existing domestic well. Refer to Enclosure B for wastewater generation and water demand estimates.

DOMESTIC WATER DEMAND

Domestic water use at the facility is determined based on the total number of employees, visitors and event guests. Domestic water is currently supplied by the domestic well on the winery parcel. Sanitary Sewage generation is expected to be equivalent to the water demand for domestic uses. Using Napa County Environmental Management's Table 4 from "Regulations for Design, Construction, and Installation of Alternative Sewage Treatment Systems", annual domestic water usage is estimated as follows:

Table 1. Existing Domestic Water Use at Nickel & Nickel

Use Type	Maximum Quantity (persons/day)	Water Demand (gal/person)	Daily Demand (gal/day)	Number of Days (days/year)	Annual Water Use (gal/year)
Full Time Employee	21	15	315	365	114,975
Part Time Employee [a]	6	15	90	30	2,700
Full Time Employee (Vinescape)[b]	5	15	75	365	27,375
Tasting Visitors (80% of total) [c]	40	3	120	365	43,800
Tasting Visitors w/ Meal (20% of total) [c]	10	15	150	365	54,750
Marketing Event	25	15	375	156	58,500
Special Event	100	15	1,500	4	6,000
Annual Special Event	250	15	3,750	1	3,750
				Total Water Use	**311,850**
				Total Water Use (ac-ft/yr)	**1.0**

[a] Part time employees are assumed during harvest, for approximately 30 days per year
[b] Currently 5 employees are located at Vinescape, and the demand is provided by the well located on the Vinescape parcel.
[c] Annual water demand is based on average tasting visitation (maximum per week visitation in entitlement request)

Table 2. Proposed Domestic Water Use at Nickel & Nickel

Use Type	Maximum Quantity (persons/day)	Water Demand (gal/person)	Daily Demand (gal/day)	Number of Days (days/year)	Annual Water Use (gal/year)
Full Time Employee	67	15	1,005	365	366,825
Part Time Employee [a]	6	15	0	30	2,700
Tasting Visitors (80% of total) [b]	165	3	495	365	180,675
Tasting Visitors w/ Meal (20% of total) [b]	41	15	630	365	224,475
Marketing Event	25	15	375	156	58,500
Special Event	100	15	1,500	4	6,000
Annual Special Event [c]	250	15	3,750	1	3,750
Annual Special Event [c]	450	15	6,750	1	6,750
Annual Special Event [c]	900	15	13,500	2	27,000
Annual Special Event [c]	1,000	15	15,000	1	15,000
				Total Water Use	**891,675**
				Total Water Use (ac-ft/yr)	**2.7**

[a] Part time employees are assumed during harvest, for approximately 30 days per year
[b] Annual water demand is based on daily average tasting visitation (maximum per week visitation in entitlement request)
[c] Special events will utilize portable toilet facilities that require connection to the winery water system

The estimated existing annual domestic water use is 311,850 gallons per year, or 1.0 ac-ft per year. The expected annual domestic water use for the proposed marketing and visitation plan is 891,675 gallons per year, or 2.7 ac-ft per year. Water use for visitation is estimated based on the daily average number of guests and corresponds to the maximum weekly visitation contained in the entitlement request. Refer to Enclosure B for wastewater generation and water demand estimates.

IRRIGATION WATER DEMAND

- Vineyard Irrigation

  Water from the agricultural well, surface water diversion, and treated PW effluent is currently used to irrigate 19.24 acres of vineyards on the adjusted winery parcel. The total acreage of vineyard will increase by 0.40 acres (to 19.64 acres total) as space is reclaimed on the site for vineyard use, according to the landscaping site plan. Napa County Water Availability Analysis Phase 1 standard rates for vineyard irrigation are 0.2 to 0.5 ac-ft/acre/year. Vineyard irrigation demand was estimated using a rate of 0.5 ac-ft per acre of vineyard. The existing vineyard irrigation is estimated to be:

  19.24 acres x 0.5 ac-ft/acre/year = 9.62 ac-ft/yr = 3,135,000 gal/yr

  Vineyard irrigation demand is estimated to be 9.6 ac-ft per year of water demand. This represents a conservative estimate compared to actual water use records for vineyard irrigation at Nickel & Nickel, which indicated an annual water use of approximately 3,845,000 gallons (11.8 ac-ft) per year, on a

total of 31.77 acres of vineyard managed by the Nickel & Nickel staff. The total 31.77-acre vineyard area includes offsite vineyards which are not included in this project. These records indicate approximately 0.37 ac-ft/ac/yr, which is less than Napa County's recommended 0.5 ac-ft/ac/yr, therefore the above estimate is conservative for the onsite vineyards.

The proposed vineyard irrigation is estimated to be:

19.64 acres x 0.5 ac-ft/acre/year = 9.82 ac-ft/yr = 3,200,000 gal/yr

The total proposed vineyard irrigation demand is therefore estimated to be 9.8 ac-ft per year.

- Landscape Irrigation

Water from the agricultural wells and irrigation pond is used to irrigate landscaping on the winery parcel. The total acreage of landscape will increase from approximately 58,500 square feet of landscaping and 17,600 square feet of existing horse corral to 155,535 square feet total. The existing landscape irrigation demand was calculated by the project landscape architect, based on the Estimated Total Water Use (ETWU) according to Water Efficient Landscape Ordinance (WELO) guidelines. The ETWU for the 58,500 square feet of existing landscaping and 17,600 square feet of existing horse corral resulted in an estimated 1,233,370 gallons (7.5 acre-ft) per year, whereas irrigation records from the facility totaled 600,000 gallons per year.

The anticipated water demand for landscape irrigation of the proposed 25,935 additional square feet of new landscaping and 53,500 square feet of landscape area irrigated with recycled water is 1,716,109 gallons (0.8 acre-ft) per year. This sums to a total landscape irrigation demand of approximately 2,949,479 gallons (9.1 acre-ft) per year, based on the most conservative estimate of the existing water demand when compared to irrigation records.

The proposed domestic wastewater treatment system will produce Title 22 disinfected tertiary wastewater that can be reused for landscape irrigation, to reduce the irrigation water demand. To be conservative, winery landscape irrigation demand is estimated to be 9.1 acre-ft per year of water demand based on the landscaping plan for the site, with no reduction for reused water.

TOTAL WATER DEMAND

The total water demand at the facility associated with the production, employee and visitation increase is expected to be 25.6 ac-ft per year, which is equivalent to approximately 8.3 million gallons per year.

Table 3. Total Projected Annual Water Demand

Water Use	Gallons per day	Gallons per year	Acre-Feet per year
Wine Production	3,700	1,350,000	4.1

Domestic Use	2,310	892,000	2.7
Vineyard Irrigation	13,100[a]	3,200,000	9.8
Landscape Irrigation	12,040[a]	2,950,000	9.1
Total	31,150	8,392,000	25.7

[a] Estimated assuming that during the months of November through February no irrigation is required.

Based on the proposed increase in production, employees, visitation, and landscape irrigation, there is an overall increase in projected water demand of about 8.9 ac-ft/year (see Table 4).

Table 4. Water Demand Comparison

Water Use	Existing (ac-ft)	Proposed (ac-ft)	Difference (ac-ft)
Wine Production	2.3	4.1	1.8
Domestic Use	1.0	2.7	1.7
Vineyard Irrigation	9.6	9.8	0.2
Landscape Irrigation	3.8	9.1	5.3
Total	16.7	25.8	9.1

Refer to Enclosure B for wastewater generation and water demand estimates.

TIER I ANALYSIS: WATER USE CRITERIA

The Tier I analysis criteria is required for all parcels located within the "Napa Valley Floor" per the WAA guidelines. Nickel & Nickel is located within the Napa Valley floor, therefore a Tier I analysis estimating annual recharge during average and dry years is not required.

WATER AVAILABILITY

The total estimated water demand of 25.8 ac-ft/year represents 74% of the water allotment for the project. There are 3 wells currently serving the winery and vineyards, as indicated on the attached Site Plan (Enclosure A). The existing domestic well on the winery parcel was drilled in 2002, with a 51 foot sanitary seal, and an estimated yield of 36 gpm sustained for 4 hours. Well information is in Enclosure C.

The domestic well will be required to supply sufficient water to meet the domestic and process demands. The average water demand should include 2,220 gal/day of domestic water and 3,700 gal/day of process water, for a total of 5,920 gal/day; therefore the domestic well will be required to supply on average 8.2 gpm over 12 hours. The existing domestic well should have sufficient capacity to supply the potable water demand.

TIER II ANALYSIS: WELL INTERFERENCE

A Tier II analysis is not required for parcels located within the "Napa Valley Floor" per the WAA guidelines, unless substantial evidence indicates a potentially significant impact. However, this analysis is included for reference and is intended to estimate any interference between wells and springs that could affect their supply capacity due to water usage. The objective of the Tier II analysis is to determine if any well (existing or in the future) within 500 ft of the project's wells could be affected by the drawdown of the project's wells. The analysis was performed for all wells onsite that are within 500 feet of the property line, to cover any possibility of an existing neighboring well or future well within a 500 ft range from the existing property wells.

- Method

  Using the Theis equation as indicated in the WAA Napa County guidelines, the groundwater drawdown from all property wells to the edge of the parcel was determined. The assumed closest distance that any neighboring well could be located is the edge of the parcel. Due to the limited data on the aquifer, values that would yield a conservative drawdown estimate were selected from Napa County Water Availability Analysis guidelines.

  Assumptions:

  - Aquifer Thickness of 75 ft.
  - Hydraulic Conductivity moderate range of 10 to 30 ft/day for project site (Water Availability Analysis Figure F-3)
  - Specific Storage range of 1.5x 10^{-5} to 3.1x 10^{-4} (1/ft) (Water Availability Analysis table F3)

  The Theis equation can be seen below along with an example calculation.

$$\text{Theis Equation: Drawdown} = \frac{\text{Flow}}{(4\pi \times \text{Transmissivity})} \times W(u)$$

$$W(u) = \int_u^{\infty} \frac{1}{\omega} e^{-\omega} d\omega$$

$$u = \frac{(\text{Distance}^2 \times \text{Specific Storage})}{(4 \times \text{Transmissivity} \times \text{Time})}$$

$$\text{Transmissivity} = \text{Hydraulic Conductivity} \times \text{Aquifer Thickness}$$

  Example for the domestic well drawdown effect on possible wells on adjacent properties:

$$u = \frac{(120\ \text{ft})^2 \times (1.50\ \text{X}\ 10^{-5})}{4 \times 10 \frac{\text{ft}}{\text{day}} \times 75\ \text{ft} \times 1\text{day}} = 7.20 \times 10^{-5}$$

  With this value of u, W(u) =8.96

$$\text{Drawdown} = \frac{36\,\frac{\text{gal}}{\text{min}} \times\ 0.1337\,\frac{\text{cuft}}{\text{gal}} \times 1{,}440\,\frac{\text{min}}{\text{day}}}{4\pi\ \times 10\,\frac{\text{ft}}{\text{day}} \times 75\ \text{ft}} \times 8.90 = 6.59\ \text{ft}$$

The table below shows a summary of the worst case scenario of drawdown results for the onsite well closest to neighboring non-project parcels. More detailed tables can be found in Enclosure D, Tier II Well Drawdown Calculation Tables.

Table 4. Well Drawdown Calculations

	Well Flow Rate (gpm)	Distance to Property Line (ft)	Estimated Drawdown (ft)
Domestic Well	36	120	6.59

Results

Using very conservative estimates for aquifer thickness, specific storage, and hydraulic conductivity, based on values from the Water Availability Analysis guidelines adopted by Napa County, none of the wells should produce a drawdown greater than 10 feet on any existing or future wells that could be adjacent to the property. The Water Availability Analysis guidelines establish a 10 foot drawdown as the default criteria to determine significant adverse effects. Since the wells estimated drawdown is less than 10 feet, no significant drawdown impact is expected for wells in adjacent parcels.

TIER III ANALYSIS: GROUNDWATER AND SURFACE WATER INTERACTION

Based on the screening criteria from the Water Availability Analysis guidelines from May 2015, a Tier III analysis is not required for either the Napa Valley Floor, MST or all other areas, unless substantial evidence determines the need for such analysis. Due to the lack of substantial evidence, no analysis is needed for Tier III.

CONCLUSION

Total annual water demand at Nickel & Nickel, associated with the proposed production capacity of 225,000 gallons of wine per year and proposed increase to employees, tasting and visitation, is estimated to be 25.8 ac-ft per year, representing an increase of 9.1 ac-ft per year from the current water uses. Based on the Tier I analysis, the groundwater allotment for the parcels is a total of 34.64 ac-ft/year. This water availability analysis establishes that the estimated water demand for the facility represents 74% of the total water availability for the parcel per year. In addition, the facility utilizes treated process wastewater effluent to offset vineyard irrigation, and proposes to utilize Title 22 disinfected tertiary domestic effluent for landscape irrigation, which has the potential to reduce the parcel's water demand.

ENCLOSURE A

OVERALL SITE PLAN

ABBREVIATIONS:

AC	ASPHALT CONCRETE	LL	LOWER LEVEL
APPROX	APPROXIMATE	NCRSS	NAPA COUNTY ROAD & STREET STANDARDS
BLDG	BUILDING		
℄	CENTERLINE	PD	PLANTER DRAIN
DI	DRAIN INLET	PIP	PROTECT IN PLACE
DS	DOWNSPOUT	PW	PROCESS WASTE
DG	DECOMPOSED GRANITE	SD	STORM DRAIN
(E)	EXISTING	SS	SANITARY SEWAGE
FF	FINISH FLOOR	TD	TRENCH DRAIN
FH	FIRE HYDRANT	TYP	TYPICAL
GB	GRADE BREAK	UL	UPPER LEVEL
LIDF	LOW IMPACT DEVELOPMENT FACILITY		

OWNER:
FAR NIENTE WINE ESTATES, LLC
8164 ST. HELENA HIGHWAY
OAKVILLE, CA 94558

APPLICANT:
GREG ALLEN
8164 ST. HELENA HIGHWAY
OAKVILLE, CA 94558

0 80 160
GRAPHIC SCALE IN FEET

APN 031-010-002

VISITOR PARKING [27 SPACES]
(E) GLEASON BARN
ACCESSIBLE PARKING, TYP
CANOPY OVER (E) BOTTLING AREA
(E) TRASH ENCLOSURE
(E) PROPANE TANK
(E) FH, TYP OF 4
(E) DOMESTIC WELL
100' WELL SETBACK
(E) WHITE BARN
(E) BUILDING
SEE SHEET UP2
(E) WATER & FIRE PROTECTION STORAGE TANKS
(E) SS SEPTIC & PUMP TANKS
(E) PW PUMP SUMP
GENERATOR PAD
(E) MECHANICAL BARN
(E) NORTH FERMENTATION BUILDING
(E) SOLAR PANEL ARRAY
(E) PW TREATMENT POND
APN 031-010-009
2030±
246'±
497'±
653±
APN 027-280-050
600' SETBACK
STATE HIGHWAY 29
324'
SEE SHEET UP4
FEMA 100 YEAR FLOODPLAIN BOUNDARY
APN 031-010-003
215±
220±
FEMA FLOODWAY BOUNDARY
COMBINED DOMESTIC & PROCESS WASTEWATER PACKAGE TREATMENT PLANT
EMPLOYEE PARKING [44 SPACES]
1557'±
SOLAR PANEL ARRAY CANOPY
VINEYARD ACCESS ROAD
TRASH ENCLOSURE
PRODUCTION EXPANSION
FH, TYP OF 2
DRIVEWAY
SEE SHEET UP3
SEASONAL PARKING/ EVENT SETUP
CANOPY OVER (E) CRUSH PAD
2144±
140±
145±
(E) RESIDENCE
(E) OFFICE BUILDING
(E) SS LEACHFIELD
(E) SOUTH FERMENTATION BUILDING
APPROXIMATE PROPERTY LINE, TYP
APPROXIMATE LOCATION (N) DOMESTIC/ IRRIGATION WELL
APN 031-020-001
APN 031-020-003
100' WELL SETBACK
APPROXIMATE LOCATION OF (E) WELL

SUMMIT
Summit Engineering, Inc
463 Aviation Blvd, Suite 200 • Santa Rosa, CA 95403
707-527-0775 • www.summit-sr.com

NICKEL & NICKEL WINERY
8164 ST. HELENA HIGHWAY
OAKVILLE, CA 94558
APN 031-010-003

USE PERMIT APPLICATION

OVERALL SITE PLAN

2017-11-09	PERMIT SUBMITTAL
2018-08-31	PERMIT RESUBMITTAL
2018-10-09	PERMIT RESUBMITTAL
2018-12-18	PERMIT RESUBMITTAL

DATE:	2017-11-09
JOB NO:	2016131
SCALE:	AS SHOWN
DRAWN:	JA
CHECKED:	MS
SHEET	UP1

ENCLOSURE B

WASTEWATER GENERATION AND WATER DEMAND

SUMMIT ENGINEERING, INC. Consulting Civil Engineers	NICKEL & NICKEL WASTEWATER FEASIBILITY STUDY Existing Water Demand	PROJECT NO. 2016131 BY: SW CHK: GG

DOMESTIC WATER DEMAND

Average Day w/o Event - Non-harvest						
Employee (full-time)	21	x	15 gpcd	=	315	gal/day
Employee (part-time)	6	x	15 gpcd	=	90	gal/day
Employee (Vinescape)	0	x	15 gpcd	=	0	gal/day
Tasting Visitors (80% of total)	40	x	3 gpcd	=	120	gal/day
Onsite meals with 20% of Tastings[1]	10	x	10 gpcd	=	100	gal/day
Total				=	625	gal/day
				=	***630***	***gal/day***

Peak Tasting Day Harvest W/Event						
Employee (full-time)	21	x	15 gpcd	=	315	gal/day
Employee (part-time)	6	x	15 gpcd	=	90	gal/day
Employee (Vinescape)	0	x	15 gpcd	=	0	gal/day
Tasting Visitors	60	x	3 gpcd	=	180	gal/day
Tasting Visitors food pairing[1]	15	x	0.75 gpcd	=	11	gal/day
Special Event[2]	25	x	15 gpcd	=	375	gal/day
Total				=	971	gal/day
				=	***980***	***gal/day***

1) Meals prepared and served onsite for 20% of current visitors

2) Portable restrooms provided for all events with more than 25 people, only 1 event per day. The larger events will have some per person water use, but the peak condition is represented by a smaller event with onsite meal prep and toilets.

PROCESS WATER DEMAND

Average Day Flow	=	2,055	gal/day
Average, Day Peak Harvest Month Flow	=	8,000	gal/day

TOTAL WATER DEMAND

	Average		Peak	
	gal/day	gal/min[3]	gal/day	gal/min[3]
Domestic Water	630	1.3	980	2.04
Process Water	2,055	4.3	8,000	16.67
Total (Domestic and Process)	2,685	5.6	8,980	18.71

Peaking Factor	=	1.5	
MDD (based on peak demand)	**=**	**13,470**	**gal/day**

3) Based on 8 hours of pumping per day

SUMMIT ENGINEERING, INC. Consulting Civil Engineers	NICKEL & NICKEL WASTEWATER FEASIBILITY STUDY Proposed Water Demand	PROJECT NO. 2016131 BY: SW CHK: GG

PEAK DOMESTIC WATER DEMAND

Average Day w/o Event - Non-harvest							
Employee (full-time)	67	x	15	gpcd	=	1,005	gal/day
Employee (part-time)	6	x	15	gpcd	=	90	gal/day
Employee (Vinescape)	0	x	15	gpcd	=	0	gal/day
Tasting Visitors (80% of total)	165	x	3	gpcd	=	495	gal/day
Onsite meals with 20% of Tastings[1]	42	x	15	gpcd	=	630	gal/day
Total					=	2,220	gal/day
					=	***2,220***	***gal/day***
Peak Tasting Day Harvest W/Event							
Employee (full-time)	40	x	15	gpcd	=	600	gal/day
Employee (part-time)	0	x	15	gpcd	=	0	gal/day
Employee (Vinescape)	0	x	15	gpcd	=	0	gal/day
Tasting Visitors (80% of total)	0	x	3	gpcd	=	0	gal/day
Onsite meals with 20% of Tastings[1]	0	x	15	gpcd	=	0	gal/day
Special Event[2]	1000	x	15	gpcd	=	15000	gal/day
Total					=	15,600	gal/day
					=	***15,600***	***gal/day***
Peak Tasting Day Harvest W/Event							
Employee (full-time)	67	x	15	gpcd	=	1,005	gal/day
Employee (part-time)	6	x	15	gpcd	=	90	gal/day
Employee (Vinescape)	0	x	15	gpcd	=	0	gal/day
Tasting Visitors (80% of total)	208	x	3	gpcd	=	624	gal/day
Onsite meals with 20% of Tastings[1]	52	x	15	gpcd	=	780	gal/day
Special Event[2]	100	x	15	gpcd	=	1500	gal/day
Total					=	3,999	gal/day
					=	***4,000***	***gal/day***
DESIGN FLOW					=	***15,600***	

1) Meals prepared and served onsite for 20% of current visitors
2) Portable restrooms provided for all events with more than 100 people, only 1 event per day. The larger events will have some per person water use, but the peak condition is represented by a smaller event with onsite meal prep and toilets.

PROCESS WATER DEMAND

Average Day Flow	=	3,700	gal/day
Average, Day Peak Harvest Month Flow	=	14,400	gal/day

TOTAL WATER DEMAND

	Average		Peak[4]	
	gal/day	gal/min[3]	gal/day	gal/min[3]
Domestic Water	2,220	3.1	4,000	5.6
Process Water	3,700	5.1	14,400	20.0
Total (Domestic and Process)	5,920	8.2	18,400	25.6
Peaking Factor	=	1.5		
MDD (based on peak demand)	**=**	**27,600**	**gal/day**	

3) Based on 12 hours of pumping per day
4) Peak domestic water demand of 15,600 GPD will occur on a day without any winery production activity

SUMMIT ENGINEERING, INC. Consulting Civil Engineers	NICKEL & NICKEL WATER AVAILABILITY ANALYSIS Summary Water & Wastewater Flows	PROJECT NO. 2016131 BY: SW CHK: GG

EXISTING DOMESTIC WATER USE

Use Type	Maximum Quantity (persons/day)	Water Demand (gal/person)	Daily Demand (gal/day)	Number of Days (days/year)	Annual Water Use (gal/year)
Full Time Employee	21	15	315	365	114,975
Part Time Employee	6	15	90	30	2,700
Full Time Employee (Vinescape)	5	15	75	365	27,375
Tasting Visitors (80% of total)	40	3	120	365	43,800
Onsite meals with 20% of Tastings[a]	10	15	150	365	54,750
Marketing Event	25	15	375	156	58,500
Special Event	100	15	1,500	4	6,000
Annual Special Event	250	15	3,750	1	3,750
				Total Water Use	**311,850**
				Average Annual Water use (gpd)	**860**
				Total Water Use (ac-ft/yr)	**1.0**

PROPOSED DOMESTIC WATER USE

Use Type	Maximum Quantity (persons/day)	Water Demand (gal/person)	Daily Demand (gal/day)	Number of Days (days/year)	Annual Water Use (gal/year)
Full Time Employee	67	15	1,005	365	366,825
Part Time Employee	6	15	90	30	2,700
Full Time Employee (Vinescape)	0	15	0	365	-
Tasting Visitors (80% of total)	165	3	495	365	180,675
Onsite meals with 20% of Tastings[a]	41	15	615	365	224,475
Marketing Event	25	15	375	156	58,500
Special Event	100	15	1,500	4	6,000
Annual Special Event	250	15	3,750	1	3,750
Annual Special Event	450	15	6,750	1	6,750
Annual Special Event	900	15	13,500	2	27,000
Annual Special Event	1000	15	15,000	1	15,000
				Total Water Use	**891,675**
				Average Annual Water use (gpd)	**2,450**
				Total Water Use (ac-ft/yr)	**2.7**

TOTAL EXISTING WAA

Water Use	Gallons per day	Gallons per year	Acre-Feet per year
Wine Production	2,055	750,000	2.3
Domestic Use	860	311,850	1.0
Vineyard Irrigation[1]	13,000	3,135,000	9.6
Landscape Irrigation[1]	5,100	1,233,370	3.8
Total	21,015	5,430,220	17.0

TOTAL PROPOSED WAA

Water Use	Gallons per day	Gallons per year	Acre-Feet per year
Wine Production	3,699	1,350,000	4.1
Domestic Use	2,450	891,675	2.7
Vineyard Irrigation[1]	13,100	3,200,000	9.8
Landscape Irrigation[2]	12,040	2,949,479	9.1
Total	31,289	8,391,154	25.8

WATER DEMAND COMPARISON

Water Use	Existing (ac-ft)	Proposed (ac-ft)	Difference (ac-ft)
Wine Production	2.3	4.1	1.8
Domestic Use	1.0	2.7	1.8
Vineyard Irrigation	9.6	9.8	0.2
Landscape Irrigation	3.8	9.1	5.3
Total	16.7	25.8	9.1

Available Acreage:
34.64 ac

1) Based on vineyard records

2) Based on LA ETWU estimate, irrigation from February to November

ENCLOSURE C

WELL LOGS AND PERMIT

DATE 1-28-02
FEE $175.00
RECEIPT NO. 20912
BY DLP
ck #8988

NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

APPLICATION AND PERMIT TO CONSTRUCT A WATER WELL

APN 31-010-03
JOB # 96-12010
ISSUE DATE 1/29/02
EXPIR. DATE 1/29/04

OWNER Nickel & Nickel Vineyard LLC. **CONTRACTOR** Huckfeldt Well Drlg.
ADDRESS 8164 St. Helena Hwy Oakville **ADDRESS** 2110 Penny Lane Napa
OWNER'S PHONE 944-0693 **PHONE** 255-7923

TYPE OF WORK	( ) CLASS IA (X) CLASS IB ( ) CLASS II ( ) HORIZONTAL WELL ( ) WELL RECONSTRUCTION ( ) WELL DEEPENING ( ) DESTRUCTION:( ) HIGH HAZARD ( ) LOW HAZARD ( ) LARGE DIAMETER
PROPOSED USE	**WELL TO SERVE THIS PARCEL ONLY (X) YES ( ) NO. IF NO, LIST OTHER PARCELS (APN's) TO BE SERVED BY THIS WELL**_____ ( ) PRIVATE DOMESTIC ( ) INDUSTRIAL (X) AGRICULTURAL ( ) GEOTHERMAL (D.O.G.APPROVAL) (X) PUBLIC DOMESTIC: NAME OF PUBLIC WATER SYSTEM_____
SPECIFI-CATIONS	CASING DIAMETER 6 in. BORING DIAMETER 12 in. SEAL RADIUS 3 in. MINIMUM ANNULAR SEAL DEPTH 50 ft. (or to first impervious layer) SEALING MATERIAL concrete METHOD (TREMIE, ETC.)_____ **SETBACKS:** ALL SEPTIC TANKS_____ ALL DISPOSAL FIELDS_____ HAZ-MAT SITE OK PROPERTY LINE_____ ROADS_____ SEWER LINE_____

WORKER'S COMPENSATION COVERAGE: (Check one of the following)

(X) A certificate of current Worker's Comp. Insurance coverage is on file with this office (or 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 so as to become subject to the Worker's Compensation laws of California

TERMS OF PERMIT:

1. Call at least 24 hours in advance during normal business hours, to schedule inspection requests (no voice messages). You must confirm with the district inspector between 8:00 and 9:00AM the day of the inspection, or the request may be denied.
2. Prior to receiving final clearance on the well, a copy of the State of California Well Completion Report (DWR 188) must be returned to this department.
3. This permit shall expire two (2) years from the date of issuance.
4. Permits are issued only to licensed well drillers. Copy of Well Driller's license (C-57) must be on file with this Dept.
5. If a claim is to be submitted for a refund, this request must be processed within one year of the date on the receipt.

CONDITIONS/REMARKS: FLOOD ZONE OK / GWO OK
NEED LETTER STATING ALL OTHER AREAS OF PARCEL ARE NOT ACCEPTABLE DUE TO WATER QUALITY.

I, the undersigned, hereby assume fully all risks associated with providing incorrect information as to the location of the septic systems. I acknowledge that the County of Napa will issue a well permit in reliance upon information contained in this Application and, on behalf of myself, heirs, administrators and/or assigns, I hereby fully release the County, its elected officials, officers, and employees from any and all claims and liability whether actual or potential, known or unknown, that may arise in connection with the information provided in the Application.

Don Huckfeldt	Jan. 28, 2002
Signature of Licensed Well Driller	**Date**

	Date	By	Remarks
City Clearance			
Public Works Clearance			
Pre-Inspection			
Class II approval			
Permit issued	DC	1/29/02	
Construction inspection	SS	2/1/02	6" casing, 12" bore, Sealed to 53'
Well log received			

GWO review: ( ) **Permit ok to issue**_____ ( ) **Applicant to apply for GW permit**_____
Effective date of Groundwater Permit_____

ORIGINAL
File with DWR

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. 769471

Page 1 of 1
Owner's Well No. _____
Date Work Began 1-29-02, Ended 2-5-02
Local Permit Agency Napa County Environmental Mgmt.
Permit No. 96-12010 Permit Date 1-28-02

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

GEOLOGIC LOG

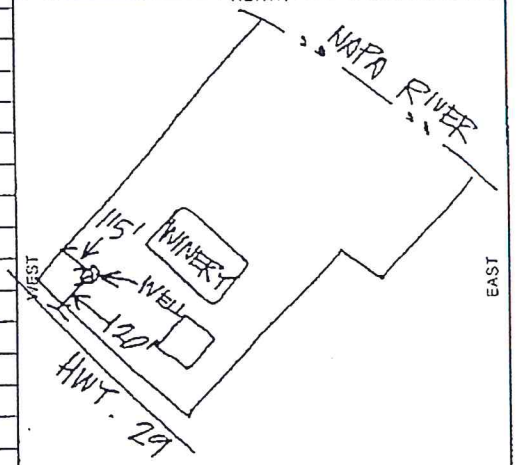
ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD rotary FLUID bentonite

DEPTH FROM SURFACE Ft. to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0 to 23	sandy brown clay
23 to 38	small sand & gravel
38 to 45	brown clay
45 to 50	small sand & gravel
50 to 54	brown clay
54 to 64	small sand & gravel
64 to 74	gray blue soft ash
74 to 77	large gravel
77 to 79	brown red tan clay
79 to 92	large sand & gravel
92 to 115	gray brown ash/tuff

TOTAL DEPTH OF BORING 115 (Feet)
TOTAL DEPTH OF COMPLETED WELL 110 (Feet)

WELL OWNER
Name Nickel & Nickel Vineyard LLC
Mailing Address P.O. Box 7
Oakville, CA 94562
CITY STATE ZIP

WELL LOCATION
Address 8164 St. Helena HWY
City Oakville
County Napa
APN Book 31 Page 010 Parcel 03
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 Material Under "GEOLOGIC LOG")

PLANNED USES (✓)
WATER SUPPLY
X 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 N/A (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 19 (Ft.) & DATE MEASURED 2-5-02
ESTIMATED YIELD * 36 (GPM) & TEST TYPE air lift
TEST LENGTH 4 (Hrs.) TOTAL DRAWDOWN N/A (Ft.)
* *May not be representative of a well's long-term yield.*

DEPTH FROM SURFACE Ft. to Ft.	BORE-HOLE DIA. (Inches)	CASING (S) TYPE (✓) BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0 to 110	12								
0 to 60		X				PVC F480	6	SDR-21	
60 to 95			X			PVC F480	6	SDR-21	.032
95 to 110		X				PVC F480	6	SDR-21	

DEPTH FROM SURFACE Ft. to Ft.	ANNULAR MATERIAL TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0 to 51	X			concrete
51 to 110			XX	#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)

2110 Penny Lane Napa CA 94559
ADDRESS CITY STATE ZIP

Signed _____ 2-14-02 439-746
WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED C-57 LICENSE NUMBER

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

JOB SET

WELL PERMIT

Planning, Building & Environmental Services - Environmental Health Division

Record Number: E17-00350
Parcel Number: 031-020-001-000

Submittal Date: 7/7/2017
Issued Date: 7/7/2017
Expiration Date: 6/27/2019

Application Type: Environmental / Online / Water Wells / Class I
Site Address: 8146 St Helena Hwy, Napa
Contact: Don Huckfeldt **Owner:** FN LAND LLC

WELL CONSTRUCTION

Proposed use:	Private		
To serve this parcel only?	No	If No, list other APN(s):	031-010-003
Is this a replacement well?	No	Replacement reason:	

Additional Comments:

Setbacks

Setbacks Met?	Yes				
Sewer Line:	100.00 ft	Septic Tank:	100.00 ft	Disposal Field:	100.00 ft

Additional Comments:

Well Specifications

Casing Diameter:	6.00 in	Boring Diameter:	12.00 in	Annular Seal:	3.00 in
Sealing Method:	Tremie Pipe/Pump	Min. Seal Depth:	50 ft or first impervious layer, whichever is greater		
Sealing Material:	Concrete	Other Material:			

Additional Comments:

TO PERMITEE:

By executing this application, the applicant 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.

Issued By:

Staff Signature: Date: July 7, 2017

ORIGINAL
File with DWR

Page 1 of 1

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. e0346603

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

Owner's Well No. 3
Date Work Began 7/10/2017, Ended 7/25/2017
Local Permit Agency Napa County Environmental Mgmt
Permit No. E17-00350 Permit Date 7/7/2017

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	3	TOP SOIL
3	30	BROWN CLAY WITH EMBEDDED GRAVEL
30	48	BLUE CLAY
48	65	TAN CLAY WITH EMBEDDED GRAVEL
65	70	BROWN SANDY CLAY
70	76	SAND & GRAVEL
76	97	75% SAND & GRAVEL / 25% TAN CLAY
97	115	BLUE CLAY
115	130	GRAY CLAY
130	135	SAND & GRAVEL
135	163	75% SAND & GRAVEL / 25% BLUE CLAY
163	180	BROWN, BLUE CLAY
180	190	60% SAND & GRAVEL / 40% GRAY CLAY
190	206	BLUE SANDY CLAY
206	233	SAND & GRAVEL
233	255	BLUE, GRAY SANDY CLAY
255	260	GRAVEL
260	297	50% SAND & GRAVEL / 50% GRAY CLAY
297	310	DARK GREEN CLAY
310	320	SAND & GRAVEL
320	350	50% SAND & GRAVEL / 50% DARK GREEN CLAY
		CONTINUED CASING LAYOUT
250	320	SCREEN PVC 6" .032 SLOT
320	340	BLANK PVC 6"

TOTAL DEPTH OF BORING 350 (Feet)
TOTAL DEPTH OF COMPLETED WELL 340 (Feet)

WELL OWNER

Name FN Land, LLC
Mailing Address P.O. Box 7
Oakville CA 94562
CITY STATE ZIP

WELL LOCATION

Address 8146 St. Helena Hwy
City Oakville CA
County Napa
APN Book 031 Page 020 Parcel 001
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 1
DEPTH OF STATIC WATER LEVEL 72 (Ft.) & DATE MEASURED 7/25/2017
ESTIMATED YIELD * 60 (GPM) & TEST TYPE AIR LIFT
TEST LENGTH 3 (Hrs.) TOTAL DRAWDOWN N/A (Ft.)
May not be representative of a well's long-term yield.

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	CASING (S) TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	350	12								
0	80		✓				PVC F480	6	SDR-21	
80	100			✓			PVC F480	6	SDR-21	.032
100	120		✓				PVC F480	6	SDR-21	
120	230			✓			PVC F480	6	SDR-21	.032
230	250		✓				PVC F480	6	SDR-21	

DEPTH FROM SURFACE Ft.	to Ft.	ANNULAR MATERIAL TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	53	✓			10 SK SAND
53	70		✓		TABLETS
70	340			✓	#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 Napa CA 94559
ADDRESS CITY STATE ZIP
Signed ____ 08/01/17 439-746
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

ENCLOSURE D

TIER II ANALYSIS: WELL DRAWDOWN CALCULATION TABLES

SUMMIT ENGINEERING, INC.	NICKEL & NICKEL Water Availability Tier II: Well Drawdown Analysis	PROJECT NO. 2016131 BY: SW CHK: GG

Site Specific Parameters

Well Flow:
36 gpm

Radius of Influence:
120 ft

Aquifer Thickness
75 ft

Pumping Time:
1 day

Low End Specific Storage:
1.50E-05 1/ft

High End Specific Storage:
3.10E-04 1/ft

Low Hydraulic Conductivity:
10 ft/day

High Hydraulic Conductivity:
30 ft/day

Theis Drawdown

Scenario	Specific Storage (1/ft):	Hydraulic Conductivity (ft/day)	Theis u value (unitless):	u_a, rounded down (unitless):	u_b, rounded up (unitless):	$W(u_a)$	$W(u_b)$	W(u), interpolated	Theis s value	Drawdown(ft)
High S, Low h	3.10E-04	10	1.49E-03	1.00E-03	2.00E-03	6.332	5.639	5.99	0.0229	4.41
Low S, Low h	**1.50E-05**	**10**	**7.20E-05**	**7.00E-05**	**8.00E-05**	**8.99**	**8.856**	**8.96**	**0.0342**	**6.59**
High S, High h	3.10E-04	30	4.96E-04	4.00E-04	5.00E-04	7.247	7.024	7.03	0.0090	1.72
Low S, High h	1.50E-05	30	2.40E-05	2.00E-05	3.00E-05	10.24	9.837	10.08	0.0128	2.47

Notes:
1) Adjust parameters highlightd in yellow for site specific aquifer/well conditions
2) Retrieve hydraulic conductivity from Napa WAA map; Specific Storage from well drilling lithology/soil type
3) 4 Extreme conditions (varying specific storage and hydraulic conductivity) are considered
4) Low specific storage and low hydraulic conductivity typically will result in max drawdown (highlighted in green)
5) Drawdown < 10 ft to eliminate significant impacts
6) Min and max Specific storage and conductivity values can be adjusted to be site specific

Contact:
Gina Giacone
gina@summit-sr.com
(707) 636-9162

SUMMIT ENGINEERING, INC.
463 Aviation Blvd., Suite 200
Santa Rosa, CA 95403
707 527-0775
sfo@summit-sr.com