Clearpath Canyon LLC
Ordinance 3106 Hydrology Report and Drought Management Plan

Lead Agency:

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1. INTRODUCTION

1.1. PURPOSE

The purpose of this report is to present the assessment and requirements of Ordinance 3106. On July 27, 2021, the Lake County Board of Supervisors passed an Ordinance 3106, an Urgency Ordinance requiring land use applicants to provide enhanced water analysis during a declared drought emergency. Ordinance 3106 requires all projects that require a California Environmental Quality Act (CEQA) analysis of water use include the following items in a Hydrology Report prepared by a licensed professional experienced in water resources:

- Approximate amount of water available for the project's identified water source,
- Approximate recharge rate for the project's identified water source,
- Cumulative impact of water use to surrounding areas due to the project, and
- A Drought Management Plan (DMP) depicting how the applicant proposes to reduce water use during a declared drought emergency.

1.2. PROJECT LOCATION AND SITE DESCRIPTION

The project is located 2050 and 2122 Ogulin Canyon Road, Clearlake, Lake County, California (APNs 010-053-01 and 010-053-02). The project site is located northeast of the City of Clearlake, about 1-mile east of State Highway 53. The project site is part of a former hops farm, operated as Hops-Meister Farms, cultivating approximately 13.6-acres of hops beginning in about 2009.

The site is accessed off of Ogulin Canyon Road. The subject property is designated as 'Rural Lands' zoning, with a General Plan land use designated the same. The topography of the of the area is mountainous with several small plateaus, ridges, ravines, and valleys, including Blackeye Canyon, which is located along the northern edge of the parcels. The elevation ranges from approximately 1,425 feet to 1,775 feet above mean sea level (Graening and Associates, 2023). The site drains in various directions, but flows eventually into Burns Valley Creek, flowing southwest, and eventually into Clear Lake.

1.3. PROPOSED PROJECT

The project proposes 15-acres of outdoor cannabis cultivation either full-sun or using light deprivation within temporary hoophouses. The proposed cultivation will be distributed across five (5) sites (Appendix A), labeled A through E, summarized in Table 1. The proposal includes the development of facilities appurtenant to cultivation, including facilities for drying and curing of harvested cannabis, ancillary nursery, storage sheds, the appropriate irrigation infrastructure, and ancillary processing. Ancillary drying is proposed to occur in an existing 2,800 sq. ft. drying structure. The project may include ancillary nursery space in the drying building when drying is not occurring. Ancillary nursery space may also occur in temporary agriculturally exempt hoop structures.

Table 1. Summary of cannabis cultivation areas.

		Cultivation Area		Canopy Area		Temporary Ag-Exempt Hoop Structures	
Site	**Name**	**acres**	**sq. ft.**	**acres**	**sq. ft.**	**Number**	**sq. ft.**
A	Northwestern Hops Field	4.42	192,663	4.07	177,436	99	178,200
B	Southwest Clearing	6.42	279,444	5.25	228,692	128	230,400
C	Northeast Hops Field	1.95	85,137	1.16	50,501	29	52,200
D	Central Hops Field	4.23	184,454	2.98	129,798	73	131,400
E	Chaparral Clearing	2.61	113,485	1.54	66,973	38	68,400
	Total	**19.63**	**855,183**	**15.00**	**653,400**	**367**	**660,600**

2. WATER SOURCE AND SUPPLY

There are five (5) existing, permitted groundwater wells that would be used for cultivation. The estimated yield reported on the Well Completion Report (WCR) for each well is summarized in the Table 2. Wells are shown on the Site Plans in Appendix A and are strategically placed adjacent to each proposed cultivation area. The WCR's for each well are provided in Appendix B. The wells range in depth from 114 ft to 460 ft and have a combined yield of 720 gpm (1,161 acre-feet/year or AFY).

Three, 4-hour well production tests were conducted by Pollack & Sons Pump January 31st through February 2nd, 2022 (Appendix C). The results are summarized in

Table 3. The well production test results confirm the high productivity of the wells as reported on the WCRs. The tests were conducted at a rate of 38 gpm due to limitations of the pump used during the test, however, the pump operator noted that the wells would yield more with a larger pump.

Table 2. Summary of project well information (WCRs in Appendix B).

Site	**Name (Well Latitude/Longitude)**	**Well #**	**Year Drilled**	**Depth (ft)**	**Yield (gpm)**	**Yield (AFY)**
A	Northwestern Hops Field (38.982011, -122.599900)	1	2011	240	60	96.8
B	Southwest Clearing (38.978344, -122.599803)	5	2020	340	300	483.9
C	Northeast Hops Field (38.982033, -122.594181)	2	2004	114	60	96.8
D	Central Hops Field (38.979569, -122.595764)	4	2013	358	200	322.6
E	Chaparral Clearing (38.980981, -122.586219)	3	2006	460	100	161.3
				Total	720	1,161

Table 3. Summary well production test results (Results in Appendix C).

Site	Location	Static Water Level (ft bgs)		2022 Pump Test Rate[1] (gpm)	Water Level at end of 2hr Test (ft bgs)	Water Level at end of 4hr Test (ft bgs)	Water Level after 24hrs Recovery (ft bgs)
		Well Log	2022 Pump Test				
A	Northwestern Hops Field	150+	150	38	180	200	150
B	Southwest Clearing	173	175	38	210	260	175
C	Northeast Hops Field	68	70	38	80	85	70

[1]The pump operator noted the yield was limited by the size of pump used to conduct the test and that the wells could yield more with a larger pump.

3. WATER DEMAND AND STORAGE

3.1. HISTORICAL WATER DEMAND

The property has a history of intensive agricultural use. The property was formerly operated as a hops farm (Hops Meister Farms), and the crops were started in approximately 2009 over about 13.6 acres. There are also remnants of almond orchards, which existed earlier than 1993. Hops plants have a large leaf area and require a significant amount of water, approximately 1.5-inches of water equivalent per week (Bamka and Dager, 2002). This equates to 40,700 gallons per acre per week or 79,100 gallons per day (gpd) (note: one gallon equates to 231 cubic inches) or 36.4 acre-feet (AF) per year (AFY) assuming a 150-day cultivation season.

In addition to the historical irrigation demand, there is an existing residence on site. According to the Environmental Protection Agency (EPA, https://www.epa.gov/watersense/how-we-use-water), the average American family uses 300 gallons of water per day, which equates to an annual demand of 109,500 gallons or 0.33 AF. Thus, the total annual historical demand was approximately 36.7 AF.

3.2. PROJECT WATER DEMAND

The CalCannabis Environmental Impact Report (CDFA, 2017) uses 6.0 gallons per day per plant as an estimated water demand for cannabis cultivation. This is 1.0 gallon (gpd) per plant more than reported by Bauer et. el. (2015), who reported up to 5.0 (gpd) per plant (18.9 liters/day/plant). Using the more conservative estimate of 6.0 gpd (CDFA, 2017), the demand is 3,000 gpd (2.1 gallons per minute [gpm]) per acre of canopy.

The estimate of 6.0 gpd is a largely conservative estimate for a large outdoor plant, measured in the driest period of the season. Another estimate that is used for outdoor cultivation is 1.2 to 14.7 gallons per canopy square foot per year (Ascent, 2017) which equates to 290-3,560 gpd per acre. Using the upper end of this range, and assuming 65% of the time the cultivation is in the vegetative state and 35% it is in the flowering state and the water use during the flowering period is about 1.7 times the water used during the vegetative state, the total estimated irrigation water demand, for 15 acres of cannabis canopy is as follows:

- Average Daily – 53,470 gpd
- Maximum Daily (Flowering Period) – 73,425 gpd
- Yearly (assuming up to 180-day outdoor season):
    - 29.5 acre-feet per year (AFY)

The monthly irrigation demand and the irrigation demand by cultivation site are summarized in Table 4 and Table 5.

In addition to the irrigation demand, there is an existing annual demand of the onsite residence is approximately 109,500 gallons or 0.33 AF. Employees will utilize portable toilets and thus should require little to no water demand. Thus, the total annual demand is approximately 29.8 AF.

Table 4. Estimated projected monthly irrigation water use based on vegetative (65% or 117 days) and flowering (35% or 63 days) periods.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Irrigation (1,000 gal)	0	0	0	641	1,324	1,282	1,324	1,969	2,203	881	0	0	9,624

The estimated irrigation water demand reported above is an average daily rate over the course of the growing season; however, seasonal water demand likely varies in response to temporal and environmental variables (e.g., temperature, relative humidity, wind, plant age and size, etc.).

Table 5. Summary of cannabis cultivation areas and water demand by cultivation site.

		Canopy Area		Annual Demand	
Site	**Name**	**acres**	**sq. ft.**	**1,000 Gallons**	**AF**
A	Northwestern Hops Field	4.07	177,436	2,611	8.0
B	Southwest Clearing	5.25	228,692	3,368	10.3
C	Northeast Hops Field	1.16	50,501	744	2.3
D	Central Hops Field	2.98	129,798	1,912	5.9
E	Chaparral Clearing	1.54	66,973	988	3.0
	Total	**15.00**	**653,400**	**9,624**	**29.5**

3.3. IRRIGATION METHOD AND WATER STORAGE

The project proposes to use the existing groundwater wells to fill forty-six (46) 5,000-gallon water tanks adjacent to the proposed cultivation areas (Table 6, Appendix A), amounting to a total of 230,000-gallons of storage, representing 3 to 5 days of water storage for the cannabis operation. Water from the storage tanks will be piped to drip irrigation systems in individual greenhouses. Drip lines will be sized to irrigate the cultivation areas at a slow rate to maximize absorption and prevent runoff. Drip irrigation systems, when implemented properly, conserve water compared to other irrigation techniques.

Table 6. Summary of water storage at each cultivation site.

Site	Name	# of 5,000 Gallon Tanks	Water Storage (gallons)
A	Northwestern Hops Field	12	60,000
B	Southwest Clearing	16	80,000
C	Northeast Hops Field	4	20,000
D	Central Hops Field	9	45,000
E	Chaparral Clearing	5	25,000
	Total	46	230,000

4. GEOLOGY AND HYDROGEOLOGY

The geology of the property is mapped predominantly as '*QTc*' – Cache Formation (Pleistocene and Pliocene) – siltstone, sandstone, conglomeratic sandstone and tuff with elements of 'tb' – terrace deposits of Burns Valley (Pleistocene) – sand and gravel predominantly composed of chert and greenstone clasts reworked from the Cache Formation and rare cobbles of early basaltic rocks, underlain by the Cache Formation. There are a few mapped faults dissecting the property in the region of the Cross Spring fault zone. (Figure 1 and Figure 2)

According to the geologic logs from the project's WCRs, the water bearing unit of the wells is comprised primarily of green stone (Table 7), which is consistent with the Cache Formation water bearing unit. Based on this, groundwater in the project wells is likely within a confined aquifer consistent with the locally mapped sedimentary sandstone and shale units. The wells are located near/adjacent to mapped historic geologic structural faults, although they are not mapped as active faults as per the California Geological Survey Fault Activity Map of California (https://maps.conservation.ca.gov/cgs/fam/).

Table 7. Summary of water bearing units of the project's wells.

Well #	Site	Surface Elevation (ft)	Depth (ft)	Screened Interval (ft bgs)	Elevation (ft)	Screened Material
1	A	1,458	240	240 – 200	1,218 – 1,258	Green Clay w/ Green Stone
5	B	1,564	340	340 – 240	1,224 – 1,324	Franciscan Cemented Gravels/Green Stone/Green Shale
2	C	1,482	114	114 – 74	1,368 – 1,408	Green Stone/Black Rock
4	D	1,588	358	342 – 272	1,236 – 1,316	Green Clay/Green Stone
3	E	1,773	460	460 – 340	1,313 – 1,433	Green Stone

4.1. GROUNDWATER BASIN INFORMATION

The project's water sources are located at the boundary of two groundwater basins, the Burns Valley (Basin #5-17) Groundwater Basin (BVGB) and the Clear Lake Cache Formation (Basin #5-66) Groundwater Basin (CLCFGB) (Figure 1). The Burns Valley Creek Watershed spans the BVGB and the western portion of the CLCFGB.

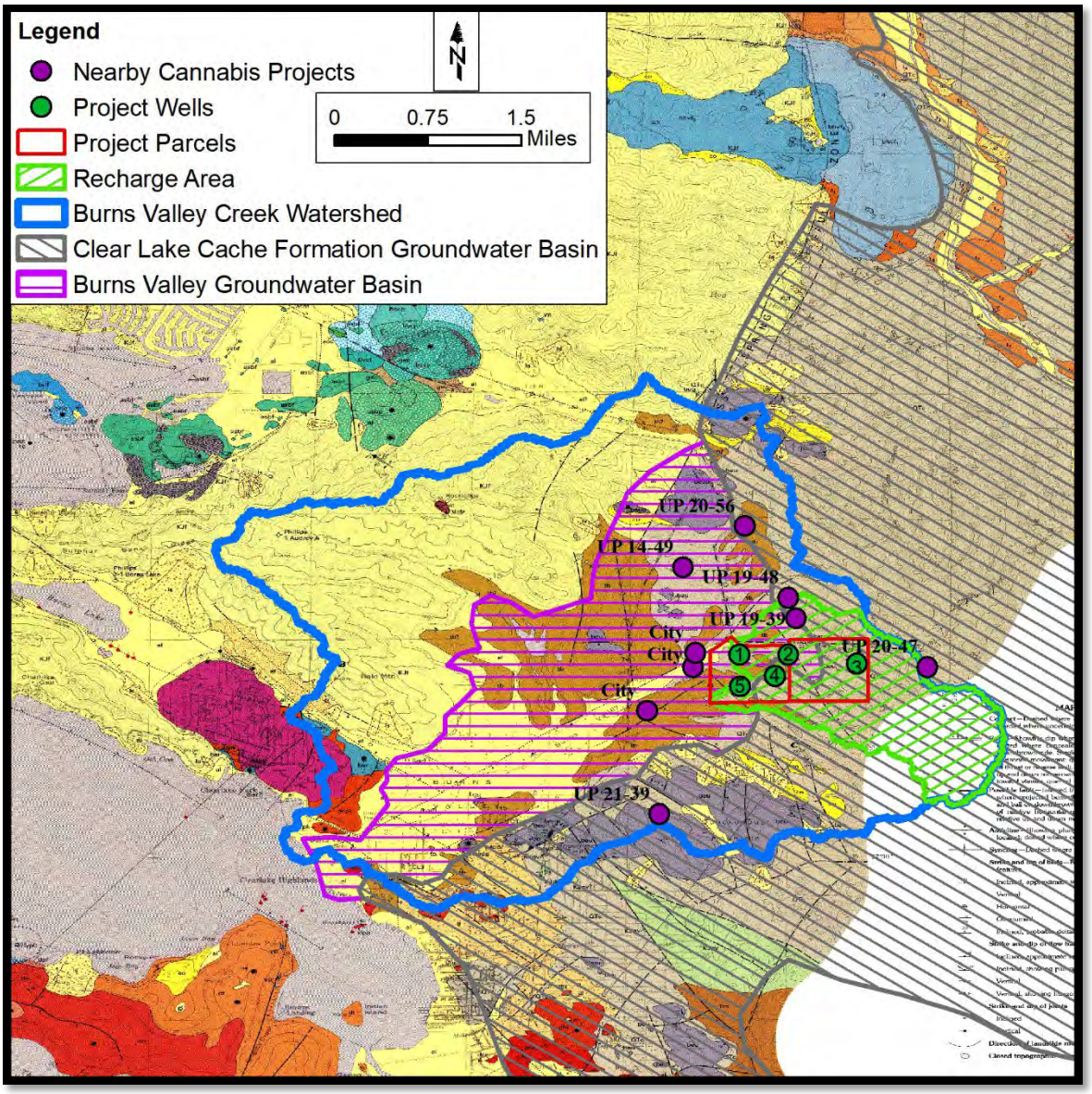

Figure 1. Geologic map of the Burns Valley and Clear Lake Cache Formation Groundwater Basins including the Burns Valley Creek Watershed, the recharge area, location of the project's wells, and nearby cannabis projects.

The BVGB is within the Burns Valley Watershed. The Franciscan Formation borders the BVGB on the north, Clear Lake borders the BVGB on the west, and the Cache Formation borders the BVGB on the south and east. The valley is drained by Burns Valley Creek, flowing southwest, and eventually into Clearlake. There are three water bearing formations in the BVGB, The Quaternary Alluvium ('al'), Quaternary Terrace Deposits ('tb'), and the Cache Formation ('QTc') (Figure 2). The Quaternary Alluvium is in the valley lowlands in the southern end

of the valley are composed of silt, sand, and gravel with a thickness up to 50 feet. Groundwater in this formation is unconfined and typically provides water for domestic use. Quaternary Terrace Deposits have been deposited on the sides of the alluvial plain in the BVGB. The terrace deposits are approximately 15 feet above the valley floor and slope up the valley to a similar elevation as the foothill exposures of the Cache Formation. The Cache Formation underlies the alluvial and terrace deposits in the basin and consists of siltstone, sandstone, and tuff, and has a maximum thickness of 200 feet. The Cache formation has low permeability and provides water to wells with yields ranging from 30 to 335 gpm.

The CLCFGB is the largest groundwater basin in Lake County and has a surface area of 47 square miles. Lower Cretaceous marine and Mesozoic ultrabasic intrusive rocks bound the south of the CLCFGB. Lower Cretaceous marine deposits border the east portion of the basin, and the Franciscan Formation borders the north and west portions of the basin, where it shares a boundary with the BVGB. The CLCFGB is drained by the North Fork

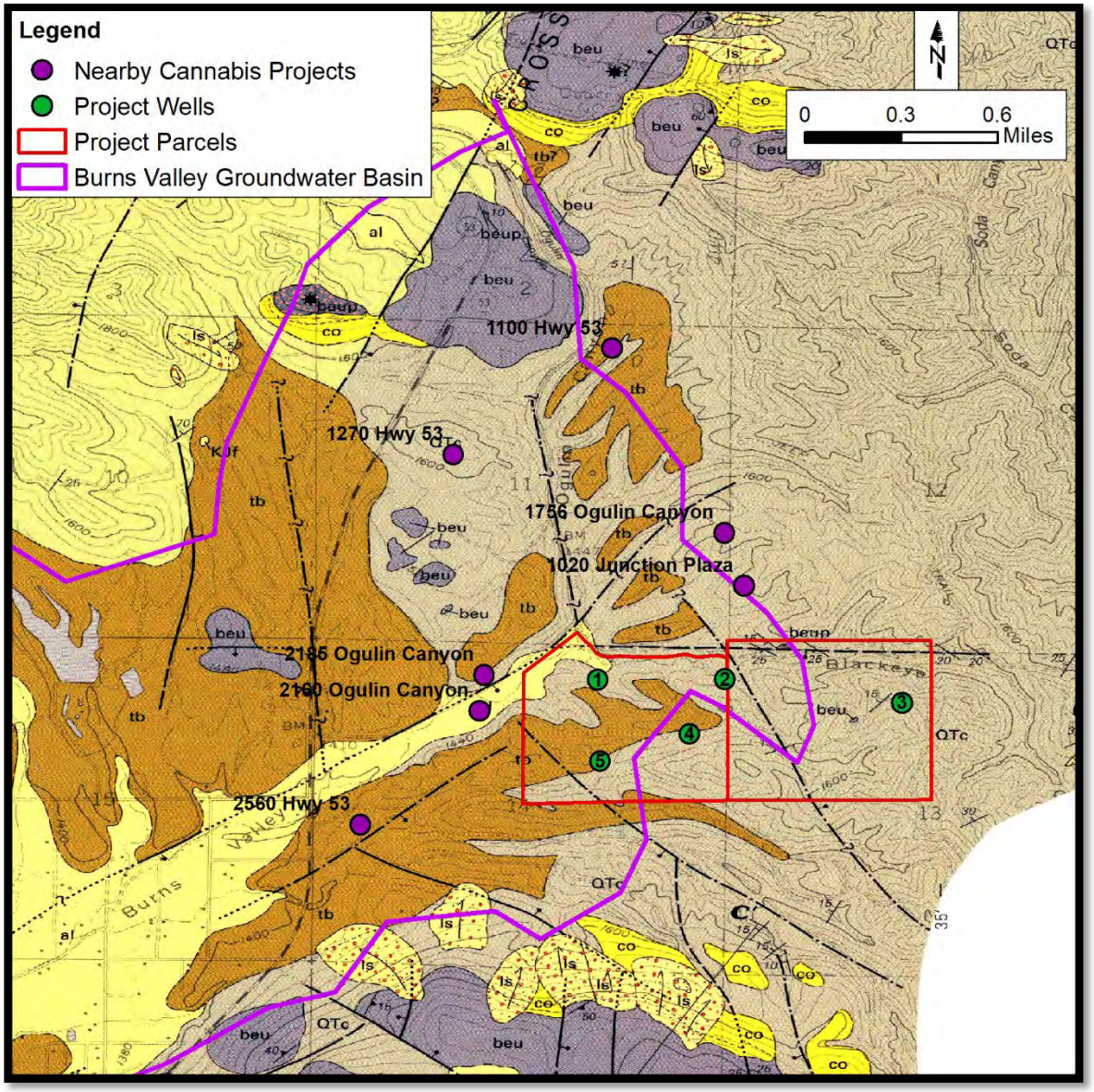

Figure 2. Local geology of project area. ‘QTc’ = Cache Formation, ‘tb’ = nonmarine terrace deposits, and ‘al’ = alluvium (Source: Hearn et al. 1995).

Cache Creek and Cache Creek to the south and east. The primary water-bearing formation is the Cache Formation. The Cache Formation is largely made up of lake deposits and consists of tuffaceous and diatomaceous sands and silts, limestone, gravel, and intercalated volcanic rocks. In some areas the general lithology includes up to 400 feet of blue clay and shale with alternating strata of shale and limestone below 400-feet. The formation has generally low permeability with well yields ranging from 11 to 450 gpm.

According to the geologic logs from the project's WCRs, the water bearing unit of the wells is comprised primarily of shale/green stone (Table 7), which is consistent with the Cache Formation, a confined water bearing unit.

Neither the BVGB nor the CLCFGB have been identified by the California Department of Water Resources (DWR) as critically overdrafted basins. Critically overdrafted is defined by DWR as, "A basin subject to critical overdraft when continuation of present water management practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts." In addition, as part of the California Statewide Groundwater Elevation Monitoring (CASGEM) Program, DWR created the CASGEM Groundwater Basin Prioritization statewide ranking system to prioritize California groundwater basins in order to help identify, evaluate, and determine the need for additional groundwater level monitoring. California's groundwater basins were classified into one of four categories high-, medium-, low-, or very low-priority. Both the Burns Valley and Clear Lake Cache Formation Basins were ranked as very low-priority basins by the CASGEM ranking system. (DWR, 2021)

5. GROUNDWATER RECHARGE AND STORAGE CAPACITY

5.1. GROUNDWATER RECHARGE

The annual recharge can be estimated using a water balance equation, where recharge is equal to precipitation (P) less runoff (Q) and abstractions that do not contribute to infiltration (e.g., evapotranspiration). A simple tool that can be used to estimate runoff and abstractions, that uses readily available data, is the Natural Resources Conservation Service (NRCS) Curve Number (CN) Method (NRCS, 1986). Determination of the CN depends on the watershed's soil and cover conditions, cover type, treatment, and hydrologic condition. The CN Method runoff equation is

$$Q = \frac{(P - I_a)^2}{(P - I_a) + S}$$

Where,

Q = runoff (inches)
P = rainfall (inches)
S = potential maximum retention after runoff begins (inches) and
I_a = initial abstraction (inches)

The initial abstraction (I_a) represents all losses before runoff begins, including initial infiltration, surface depression storage, evapotranspiration, and other factors. The initial abstraction is estimated as $I_a = 0.2S$. S is related to soil and cover conditions of the watershed through the CN, determined as $S = 1000/CN - 10$. Using these relations, the runoff equation becomes:

$$Q = \frac{(P - 0.2S)^2}{(P + 0.8S)}$$

The CN is estimated based on hydrologic soil group (HSG), cover type, condition, and land use over the area of recharge, which is estimated as the area of the watershed contributing to the wells. The recharge area was estimated as the contributing drainage area to the wells associated with the unnamed Class II tributaries to Burns Valley Creek, which is approximately 953 acres (Figure 1), and was delineated using USGS StreamStats (https://streamstats.usgs.gov/ss/).

Soils are classified into four HSGs (A, B, C, and D) according to the soil's ability to infiltrate water; where HSG A has the highest infiltration potential and HSG D has the lowest infiltration potential. HSGs are based on soil type and are determined from the NRCS Web Soil Survey (https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm).

The recharge area is comprised of two HSGs: 940 acres (99%) HSG C and 13 acres (1%) HSG D (Appendix E). The area is dominated by HSG C. The land use is undeveloped with a cover type of brush in fair (50% to 75% ground cover) condition and has CNs of 70 and 77 for HSGs C and D, respectively. The weighted CN for the recharge area is 70.1.

The PRISM Climate Group gathers climate observations from a wide range of monitoring networks and provides time series values of precipitation for individual locations (https://prism.oregonstate.edu/explorer/). Using the annual precipitation from 2000 to 2022, as predicted by PRISM, the annual average precipitation over this period is 27.1 inches and the minimum precipitation over this period is 6.5 inches (Attachment 3).

Using the above information, the estimated annual recharge over the recharge area of 953 acres and the project parcel area of 302.5 acres is summarized in Table 8 for a dry year and an average year.

Table 8. Estimated annual recharge over the recharge area of the project's well and the project's parcel area.

Recharge Area (acres)	**P (inches)**	**CN**	**S (inches)**	**I_a (inches)**	**Q (inches)**	**Recharge = $P - Q - 0.5*I_a$ (inches)**	**Recharge (AF)**
953	6.5	70.1	4.2655	0.85	3.2	2.9	226
953	27.1	70.1	4.2655	0.85	22.6	4.1	325
302.5	6.5	70	4.2655	0.86	3.2	2.9	72
302.5	27.1	70	4.2655	0.86	22.6	4.1	104

The estimated recharge in Table 8 is based on the assumption that recharge is primarily from precipitation percolating or infiltrating down from the ground surface within the recharge area, however, confined aquifers are generally recharged where the aquifer materials are exposed at the surface (e.g. rock outcrop areas). Another method for estimating recharge is based on estimates determined by the USGS (USGS Fact Sheet 2007-3007). Although determined for humid basins in the east, the USGS estimated long-term average groundwater recharge to be between 10 and 66 percent of precipitation. Over the 953-acre recharge area this would equate to 51.4 – 339.1 AFY during a dry year and 215.4 – 1,421.6 AFY during an average year. The recharge estimates in Table 8 fall within these ranges for a dry year and on the lower end for an average year. To be conservative, the lowest estimates of recharge, based on 10 percent of precipitation, are used here to estimate long-term average groundwater recharge.

The PRISM Climate Group precipitation records from 2000 through 2022 indicate that lower precipitation years are typically preceded or followed by near average or above average precipitation years (Figure 3), that there were three drought periods in the last 23 years (one drought period every 7 to 8 years), and the lowest total precipitation over a three-year period occurred from 2007 to 2009. The groundwater recharge over the period 2000 through 2023, based on 10 percent of precipitation, is summarized in (Figure 4) along with the two-year average recharge and the project's demand. The two-year average annual recharge, even during the lowest precipitation years from 2000 through 2023, exceeds the project demand. The long-term average recharge, over a 7-year period, assuming three drought years and 4 average years, would be 46.1 AFY and 145.1 AFY over the project site (302.5 acres) and the contributing recharge area (953 acres), respectively. The average recharge over the project parcel and 953-acre recharge area, based on 10% of precipitation, over the last 23 years was 68.4 AFY and 215.4 AFY, respectively.

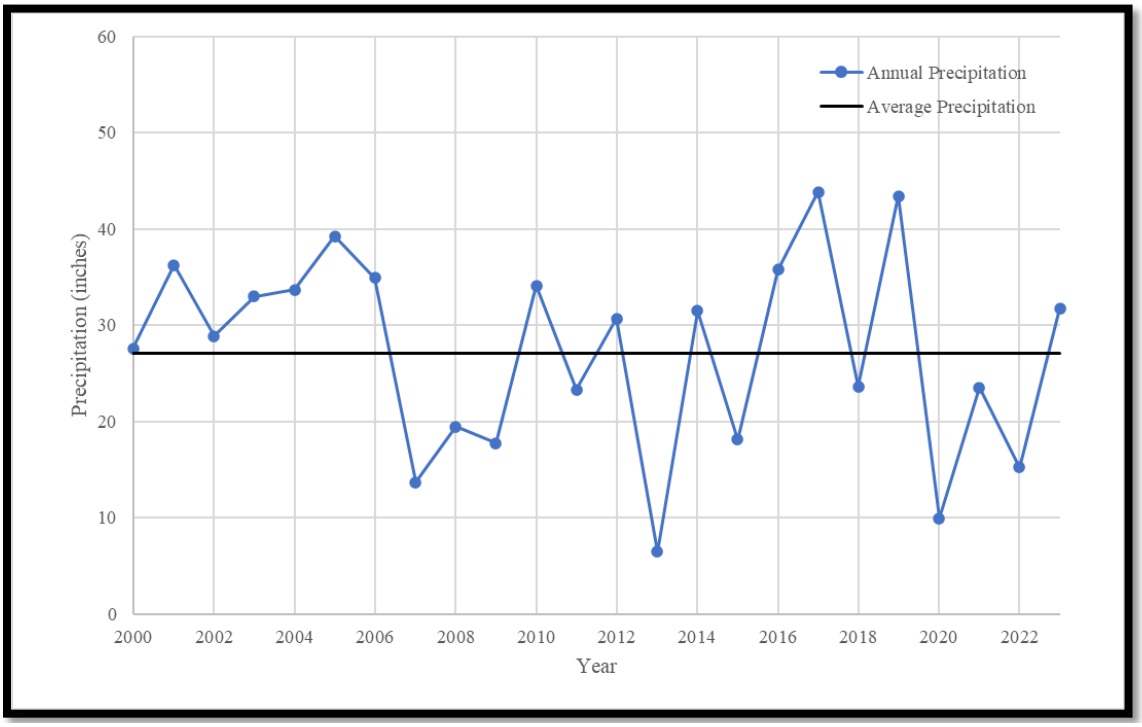

Figure 3. PRISM Climate Group precipitation from 2000 through 2022. 2023 precipitation recorded January 1, 2023 through December 11, 2023 at CoCoRaHS precipitation gauge CA-LK-20 https://maps.cocorahs.org/, 31.77 inches.

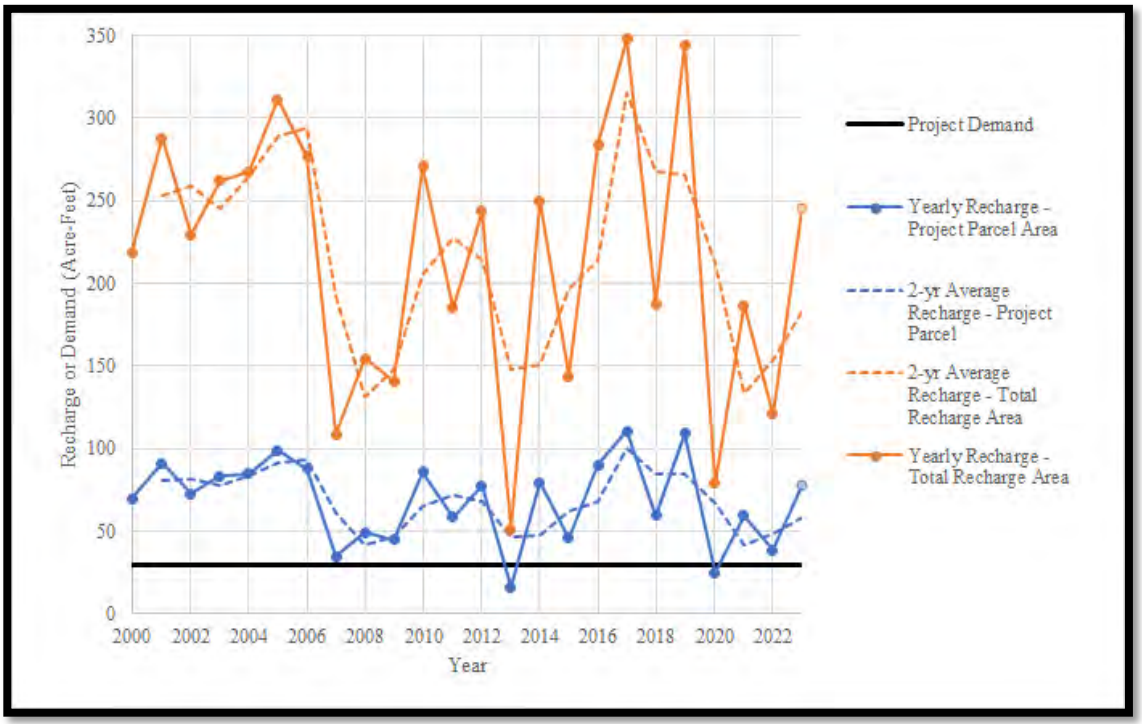

Figure 4. Annual recharge generated over the recharge area (953 acres) and the project parcels (302.5 acres) based on 10% of the annual precipitation (2023 Precipitation recorded January 1, 2023 through December 11, 2023 at CoCoRaHS precipitation gauge CA-LK-20 https://maps.cocorahs.org/, 31.77 inches).

5.2. GROUNDWATER STORAGE

5.2.1. STORAGE BENEATH PROJECT PARCELS

The aquifer acts as a storage reservoir that gains water during the rainy season. The depletion in the reservoir depends on the storage capacity of the reservoir. The theoretical storage capacity of the water source's water-bearing formation can be estimated by multiplying the volume of the aquifer by the specific yield. The area of the water-bearing formation is associated with the BVGB. However, to be conservative, only the project parcel's contributing area is used to estimate the parcel's contributing storage area. The thickness is estimated as the difference in the static groundwater level and the maximum aquifer depth. A range in values for the specific yield (effective porosity) was obtained from literature values for shale/stone, ranging between 0.09% to 0.9% (Heath, 1983 and Morris and Johnson 1967). Although the water bearing formation is a confined aquifer, well yields in the formation are indicative of higher end range of specific yields, however, to be conservative, the lower value is used here. The results are summarized below.

- Aquifer Area: 302.5 acres (project's contributing area)
- Static Groundwater Level: 177.2 ft bgs (source: project's well logs)
- Aquifer Depth: 302.4 ft bgs (source: project's well logs)
- Aquifer Thickness: 125.2 ft
- Specific Yield: 0.0009
- Approximate Storage Capacity: 34.1 AF

5.2.2. GROUNDWATER BASIN STORAGE AND RECHARGE

The estimated storage capacity of the alluvial formation of BVGB is 4,000 AF, with a usable storage capacity of 1,400 AF. However, the deeper Cache Formation, from which the project draws water, has between 50,000 and 75,000 acre-feet of storage (Upson and Kunkel, 1955). Excluding the Cache Formation storage, to be conservative, the total potential demand is 55% of the usable storage capacity of the BVGB alluvial formation. According to DWR, groundwater in the BVGB is derived from rain that falls within the 12.5 square mile Burns Valley Watershed drainage area. The recharge over this area, based on 10% of the precipitation, is 431.3 AFY and 1,808.3 AFY during a drought year and average year, respectively. Based on rainfall data, a drought occurs once every 7 to 8 years and can last up to three years, the average recharge over a 7-year period, assuming three drought years and 4 average years, the long-term average recharge would be 1,218.2 AFY.

6. IMPACTS TO SURROUNDING AREAS

6.1. HISTORICAL WATER USE – PROJECT AREA

As discussed above, historical water demand within the project area, starting in approximately 2009, to irrigate approximately 13.6 acres of hops was approximately 36.4 AFY. Groundwater monitoring has occurred in the BVGB since the 1950's to monitor long-term groundwater trends. Monitoring data is reported by the Lake County Department of Water Resources and the California Statewide Groundwater Monitoring (CASGEM) Program (refer to CASGEM well ID: 39925, located at Lat/Long 38.96535, -122.63186). The monitoring well has a depth of 177 feet bgs (bottom elevation at approximately 1,183 ft per the WCR). Groundwater levels are measured twice annually, approximately every April and November, to visualize the fall drawdown (November) and the spring recharge (April). The spring/fall monitoring data over the period hop crops were cultivated, from 2009 through 2019, are provided in Figure 5. Note that vineyards in the northern portion of BVGB, which cover an area of approximately 450 acres, were well established prior to 2009. There is a very slight decrease in depth to groundwater over the period when groundwater was used to irrigate the hops, indicating the groundwater aquifer was recharging, not being depleted, during this period.

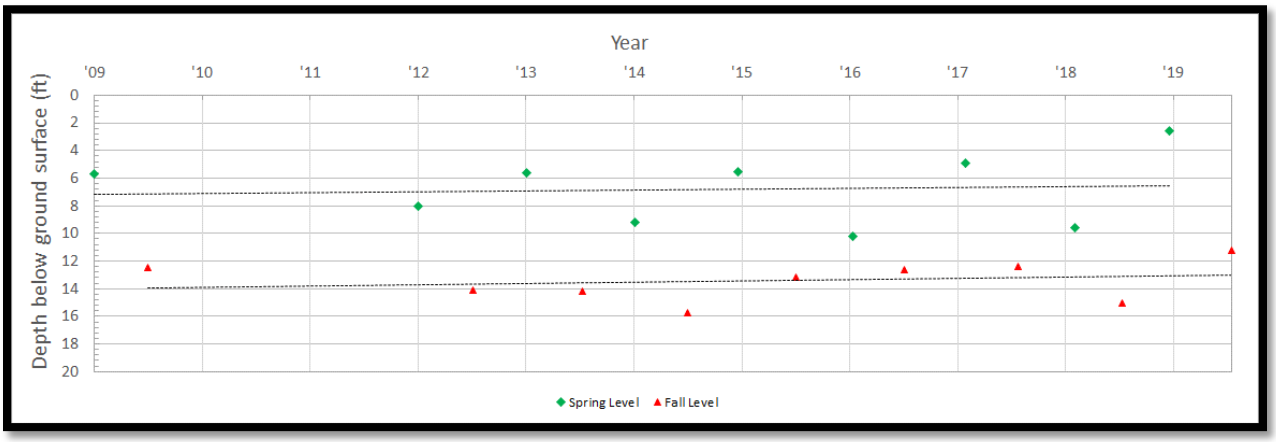

Figure 5. Spring/Fall groundwater levels in the BVGB from 2009 through 2019 (dashed lines represent the trend over the period)

6.2. GROUNDWATER USE AND TRENDS IN THE BVGB

Review of Google Earth Imagery shows extensive agricultural development, in the form of walnut/pear orchards and vineyards, in the BVGB since at least 1985. According to the Lake County Water Demand Forecast, the average annual water demand for vineyards and walnut/pear orchards in Lake County is 0.5 acre-feet per acre and 2.2 acre-feet per acre, respectively. Using current Google Earth imagery, there are roughly 450 acres of existing vineyards and 150 acres of orchards in the BVGB. Orchard production in the valley has decreased over time. Accounting for existing vineyards and orchards, the approximate agricultural demand in the valley is about 555 acre-feet per year which is supplied via existing groundwater wells. The estimate of existing agricultural demand of 555 acre-feet per year is likely a high estimate because most of the orchards and some of the vineyards are likely being dry farmed.

The northern residential district of the City of Clearlake relies on groundwater wells as the main source of water. The Highlands Mutual Water Company supplies the majority of residents in the lower part of the BVGB. According to the Lake County Agency Formation Commission 2021 Report on Clearlake Water Providers (ClearlakeH20 MSR-SOI 2021EDIT-2. cl docx (lakelafco.org)), the Highlands Mutual Water Company serves 6,072 people with water via 2,568 services connections using water drawn from Clear Lake. Approximately 120 residential parcels are not served by HMWC and are assumed to rely on groundwater wells. According to the Environmental Protection Agency (EPA, https://www.epa.gov/watersense/how-we-use-water), the average

American family uses 300 gallons of water per day, which equates to an annual demand of 40 acre-feet per year for 120 residences.

The main sources of groundwater in the BVGB are within the Quaternary Alluvium Formation and the Lower Lake Formation. The Quaternary Alluvium dominates the southwestern portion of the BVGB, where both residential development and well development are most dense. The alluvium has a thickness of up to 50 feet; groundwater in this formation is unconfined and typically provides water for domestic use. Wells screened in unconfined aquifers are more directly influenced by lack of rain than those screened in deeper, confined aquifers. The Lower Lake Formation underlies the alluvial deposits in the BVGB. This formation has low permeability and provides water to wells at up to a few hundred gallons per minute and is the dominant source of agricultural water demand in the BVGB. Note that the existing vineyards and the existing and proposed cannabis projects are located outside of the alluvial valley in the northern half of the BVGB.

Well production loss in the Alluvium Formation, within wells screened in the shallower, unconfined aquifer, are more directly influenced by lack of rain and were effected during the drought of 2020 through 2022. It is likely that shallow groundwater in the southern portion of the BVGB is hydrologically coupled to surface water levels in Clear Lake. As a result of the drought, surface water levels in the lake recorded in 2021 and 2022 were the lowest on record since 2000, which would have a direct impact on shallow groundwater well production (Figure 6). Lake levels have recovered with recent rainfall amounts in 2023.

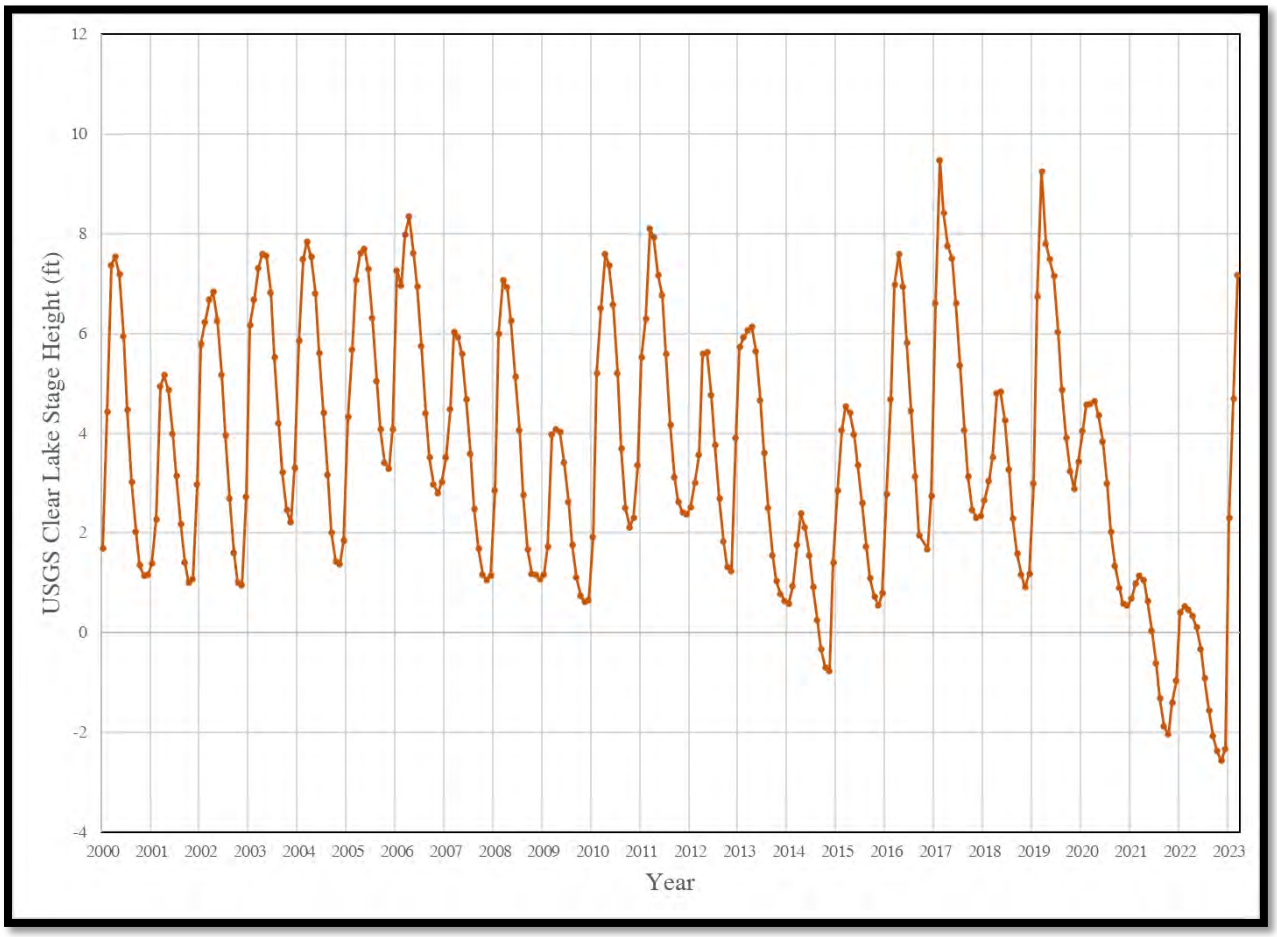

Figure 6. Clear Lake stage height 2000 through early 2023 (USGS Gage 11450000)

6.3. FUTURE GROUNDWATER USE

As discussed above, the current groundwater agricultural demand in the BVGB is roughly 555 acre-feet per year. Approximately 225 acre-feet is from existing vineyards in the upper portion of the BVGB and 330 acre-feet is from orchards located within the lower portion the BVGB. The current residential demand, located in the central portion of the BVGB, is approximately 40 acre-feet per year. A summary of proposed cannabis projects and the approximate annual water demand is provided in Table 9. All the proposed projects are located in the upper portion of the BVGB east of State Highway 53 (Figure 1).

To assess the potential for additional cannabis cultivation within the BVGB, not included in Table 9, a parcel inventory analysis was completed (Figure 7 and Table 10) to identify those parcels that meet requirements for potential cannabis cultivation with an approved permit from Lake County or the City of Clearlake (City).

The Lake County Zoning Ordinance allows 1-acre of outdoor canopy for each 20 acres of parcel size for these zones. There are 40 parcels that are within or intersect the BVGB with a cumulative parcel area of about 1920 acres (total parcel area, not the intersected area, was used for conservativeness). Of these parcels, 10 parcels or 596 acres are existing vineyards and 10 parcels, or 957.1 acres have proposed cultivation shown in Table 9. Excluding these parcels, there are 20 parcels or 367 acres of base zoning that could be eligible for outdoor cultivation with a County permit. Thus, there is the potential for up to 18 acres of potentially new outdoor cultivation (the County allows only 1-acre of cultivation for each 20 acres of parcel area). However, accounting for existing development, steep topography, oak tree areas, waterbody setbacks, flood zones, residential setbacks, and parcel setbacks, there is limited area for development and only approximately 10 acres of new outdoor cultivation would likely be possible. The increased irrigation demand could be up to approximately 20 acre-feet per year assuming 3,560 gallons per day per acre for 180 days.

Table 9. Approximate water demand of proposed cannabis projects within the BVGB (information obtained from the City of Clearlake and Lake County websites and CEQAnet Database). Refer to Figure 1 for approximate locations.

Location (jurisdiction)	APN(s)	UP #	Status	Parcel Area (acres)	Cultivation (Acres)	Approximate Annual Demand (acre-feet)
1756 Ogulin Canyon Road (County)	010-055-46	19-48	Expired	46.5	n/a	n/a
2050 Ogulin Canyon Road (County) (Clearpath Canyon)	**010-053-01, 02**	**n/a**	**Pending**	**302.4**	**15.0**	**29.8**
1270 Highway 53 (County)	010-055-26, 27	19-49	Approved	105.6	5.0	5.5
1020 Junction Plaza (County)	010-055-45	19-39	Approved	49.5	1.7	3.3
1850 Ogulin Canyon Road (County)	010-053-03 010-011-01	20-47	Approved	Not in BVGB		
19073 E State Highway 20 (County)	010-009-21	21-12	Pending	Not in BVGB		
1100 Highway 53 (County)	010-055-39, 40, 41	20-56	Pending	288.4	14	27.5
3000 Highway 53 (County)	010-053-28	21-39	Pending	164.7	8	15.7
2185 Ogulin Canyon Road (City)	010-044-17	n/a	Approved	21.3	0.5	1.8
2160 Ogulin Canyon Road (City)	010-044-21	n/a	Approved	9.6	0	n/a
2560 Highway 53 (City)	010-048-05	n/a	Approved	15.4	1.3	4.3
2250 Ogulin Canyon Road (City)	010-044-19	n/a	Approved	13.0	0.4	1.6
				Total	45.9	89.5

Table 10. Base zones designations, total areas associated with each base zone designation, parcel count, and base zone eligibility for potential cannabis cultivation within the BVGB.

Zone	Description	Total Parcel Area (acres)*	# of Parcels
RL	Rural Lands	1105.9	18
RR	Rural Residential	677.3	18
Split	Combined Zoning (Dominant Zones are A and RL)	136.5	4
City	Cannabis District	242	23
*This is the total area of the parcel, not just the portion within the BVGB			

The City of Clearlake Zoning Ordinance allows for mixed-light/indoor cultivation in the BVGB, with a City Cannabis Permit, on 23 parcels with a total area of 242 acres. Accounting for the proposed projects listed in Table 9, existing development, steep topography, waterbody setbacks, and flood zones, only approximately 18

to 20 acres of this area could have the potential for mixed-light/indoor cultivation. The increased irrigation demand could be up to approximately 65.6 acre-feet assuming 3,560 gallons per day per acre for 300 days.

The total potential demand from both the County and City for cannabis cultivation could be up to 175.1 acre-feet per year, which includes the proposed projects listed in Table 9 and a conservative (high) estimate of total potential cultivation. This does not account for the fact that the project at 2050 Ogulin Canyon Road is replacing a 13.6-acre hops farm that utilized approximately 36.4 acre-feet per year of water, creating a **reduction** in water use of 6.9 acre-feet per year over the project area.

Thus, the total potential agricultural demand within the BVGB is the existing demand of approximately 555 acre-feet, plus proposed, 175.1 acre-feet, is approximately 730.1 acre-feet per year, with residential demand, the total groundwater demand is approximately 770.1 acre-feet per year. The dominant demand in the BVGB is associated with residential development and orchards in the lower part of BVGB and vineyards in the upper part of the BVGB.

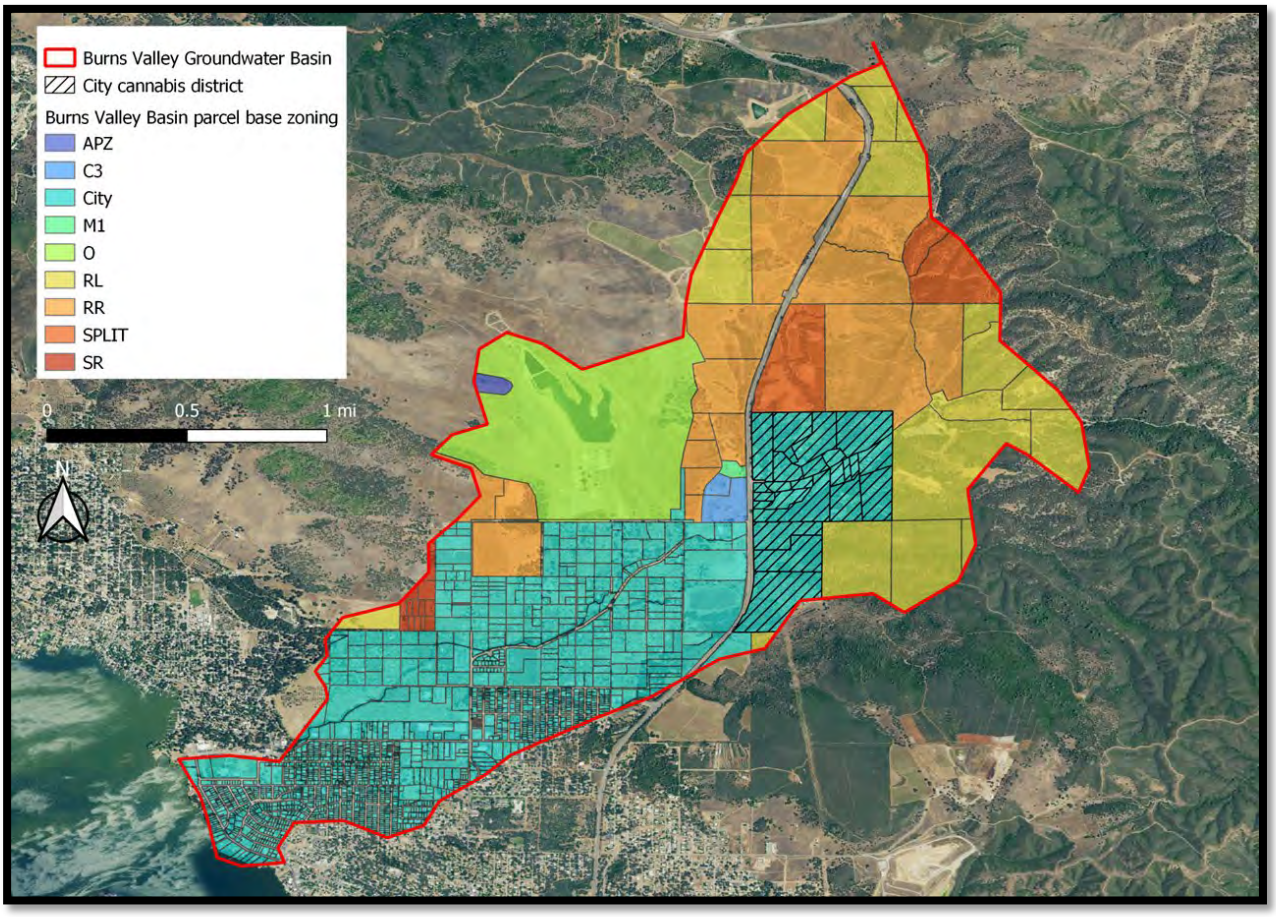

Figure 7. City of Clearlake Cannabis District and Lake County parcel base zoning designations.

6.4. SURROUNDING WELLS

The project is located in a rural area, northeast of Clearlake. WCR's maintained by the California Department of Water Resources (DWR) on the Well Completion Report Map Application were reviewed (Figure 8, Figure 9, Appendix D). Wells are mapped by Public Land Survey System (PLSS) grid section and within a 1-mile radius of the project site. There are a total of twenty-four (24) wells (including the project wells) within the PLSS

sections for which the project wells are located (Figure 9). The overall average depth and yield of these wells is 252 ft and 85 gpm, respectively. The five (5) closest neighboring, offsite wells within the BVGB are shown in Figure 10.

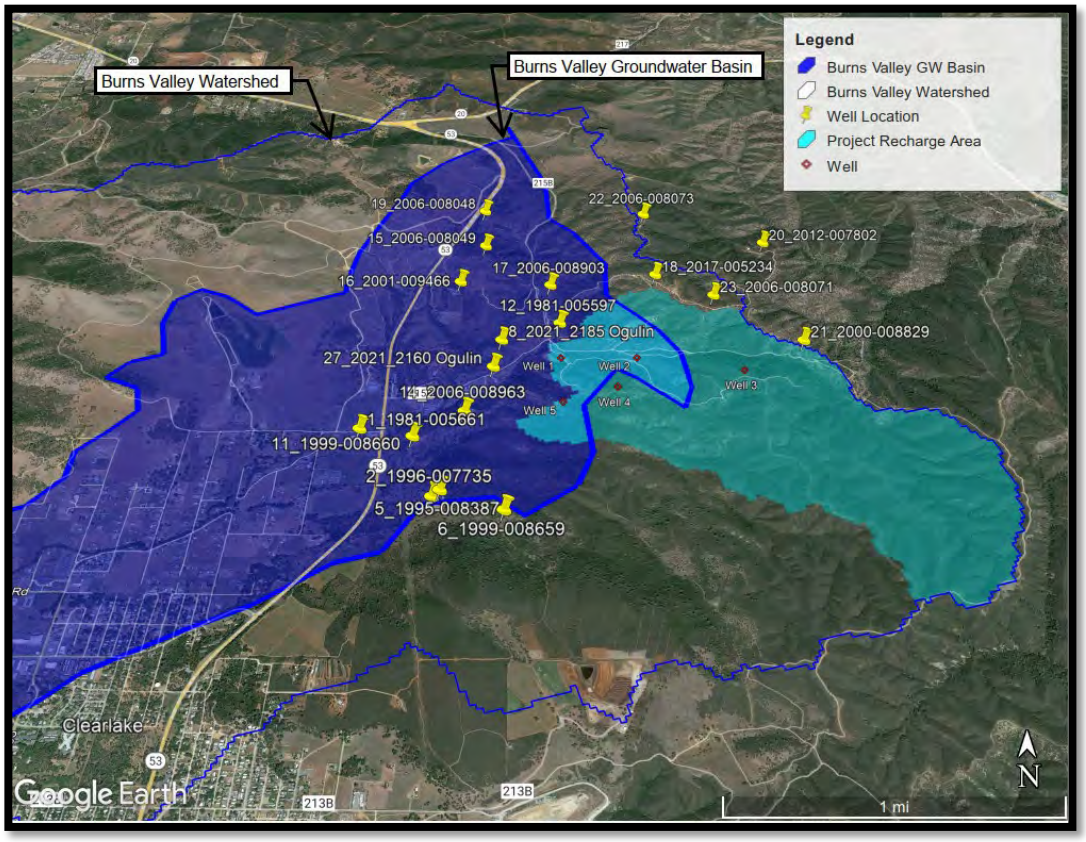

Figure 8. Groundwater wells in PLSS Sections surrounding the project's wells (Appendix D).

6.5. PROJECT WELLS

The maximum daily demand is 73,425 gallons, which occurs during about 35% of the cultivation season (approximately 117 days). The pumping rate to replace the maximum daily demand in 12-hours is 20.4 gpm from each well. The pump tests conducted in February 2022 demonstrated that, after pumping 38 gpm for 4 hours, each of the wells tested recovered before 24 hours. The proposed storage represents 3-days of the maximum daily demand, providing sufficient recovery time for each well.

A radius of influence evaluation was conducted on the project wells using the Theis equation. The Theis equation was developed to model the response of a confined aquifer to pumping (Fetter, 2001). Using the Theis equation, the drawdown at a specific distance from each well can be estimated based on the project's maximum daily pumping demand, 20.4 gpm, over a duration of 12 hours. The drawdown was used to estimate the specific capacity (SC) and transmissivity (T) for a confined aquifer as follows:

SC (gpm/ft) = Well Yield (gpm) ÷ Drawdown (ft)

T (gpd/ft) = 2000 × SC (gpm/ft) [Confined Aquifer, Source: Driscoll, 1986]

The drawdown from the project's wells after 12-hours of pumping at 20.4 gpm, for various distances from each well, is provided in Figure 11. Calculations are provided in Appendix G. The radius of influence is estimated to be less than 700 feet based, which is the distance where the modeled cone of depression from groundwater extraction under these conditions is negligible (less than 6-inches). None of the nearby wells are within the modeled cone of depression. In addition, since the project proposes 230,000 gallons of storage, which is approximately 3 to 5 days of water storage, each well would have approximately one (1) to two (2) days to recover, depending on the pumping and irrigation schedule.

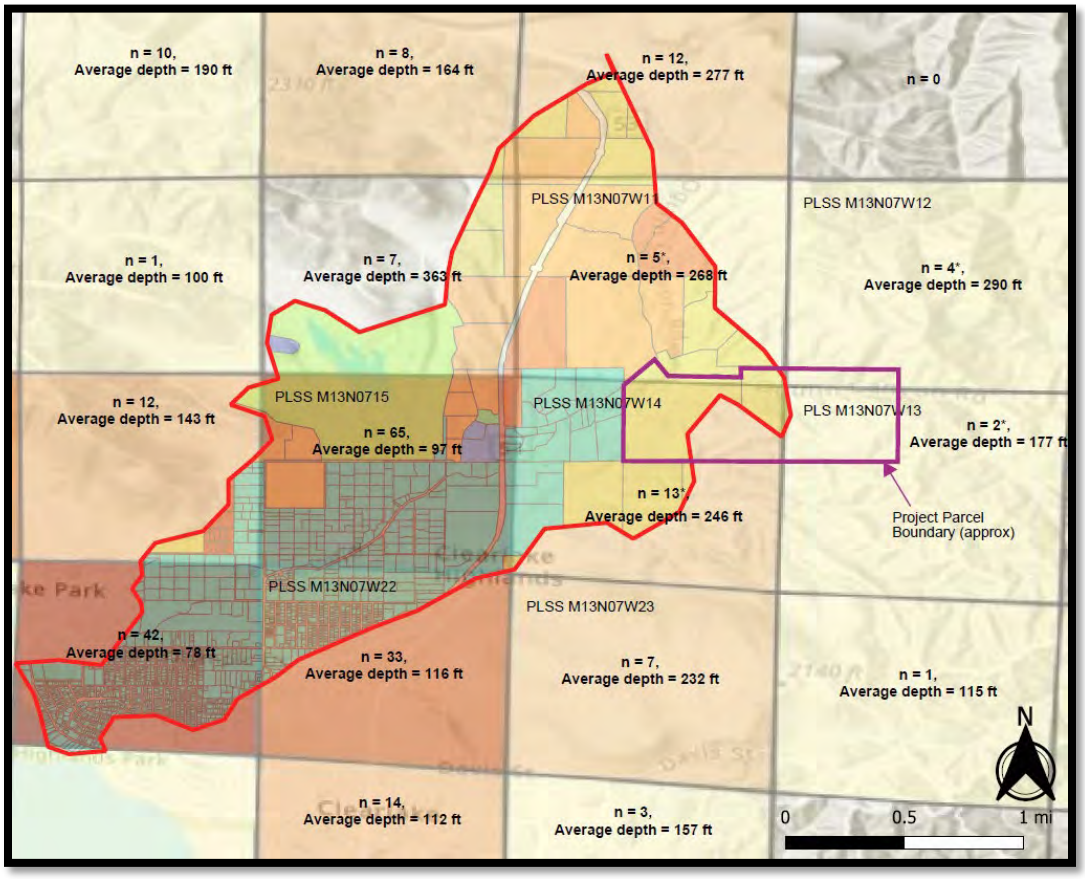

Figure 9. Map of # (n) of WCRs within each PLSS section and average well depth. The BVGB is outlined in red. (*used updated WCRs)

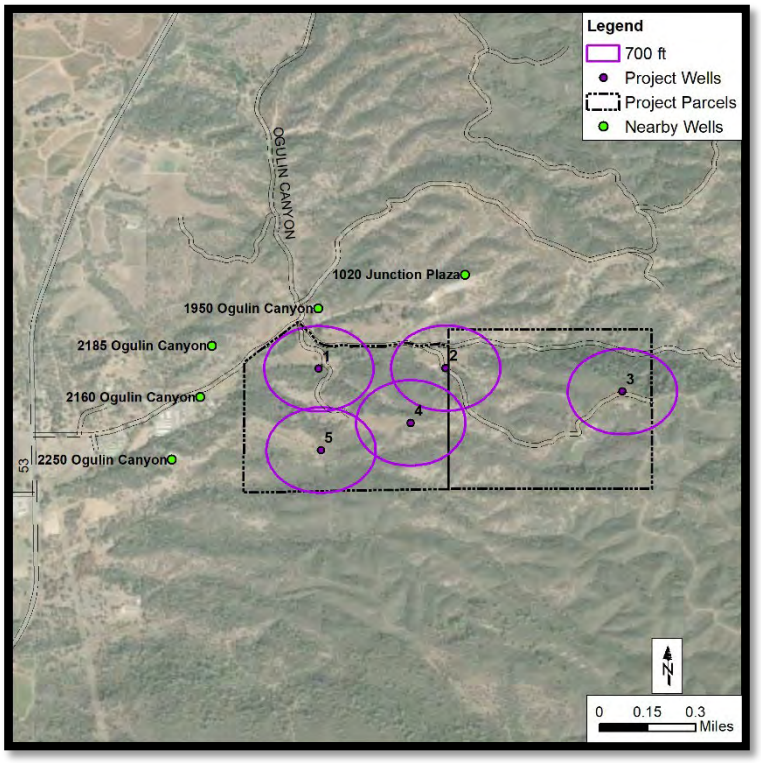

Figure 10. Wells in the vicinity of the project's wells with 700-foot radius of influence shown.

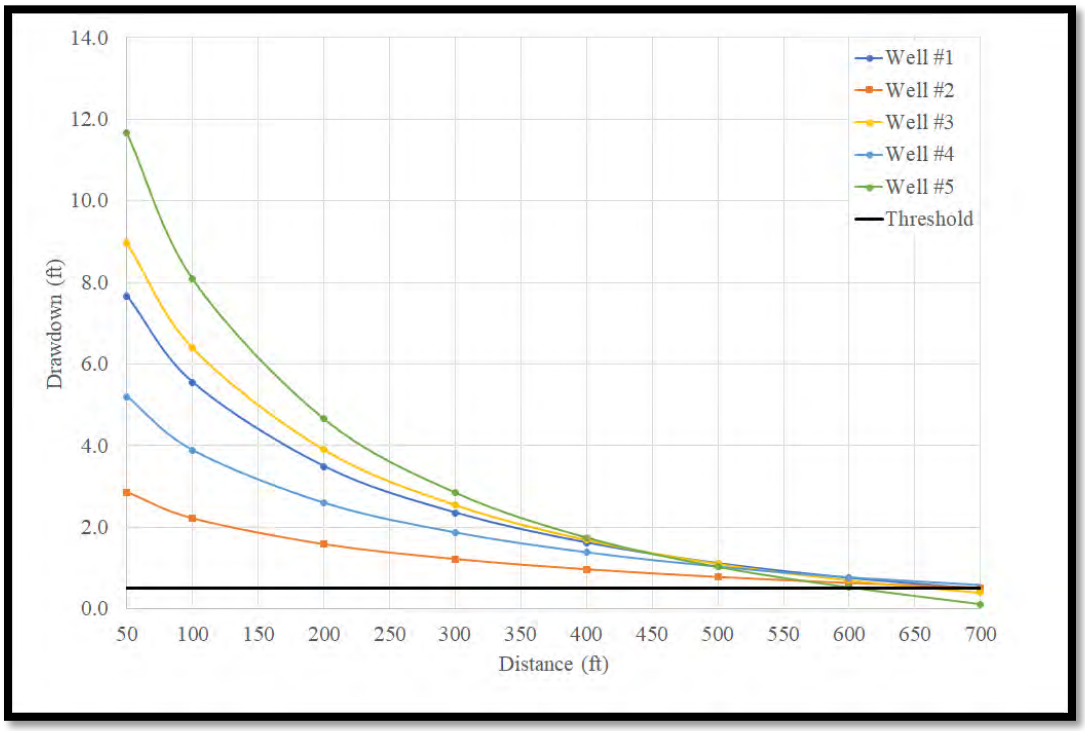

Figure 11. Estimated radius of influence (distance) associated with the project's wells (Threshold = 6-inches).

6.1. SURFACE WATER

The closest surface water body, Burns Valley Creek, is an ephemeral/intermittent stream in the vicinity of the project and is located approximately 700 feet west of Well #1 and approximately 320 feet north of Well #2. The elevation of Burns Valley Creek ranges between approximately 1,520 ft at the upper end of the project parcels and 1,420 ft as it leaves the project parcels. The project wells extract water from the confined Cache Formation water bearing unit, at elevations well below Burns Valley Creek and are not likely hydrologically connected to the creek. (Table 7, Figure 12)

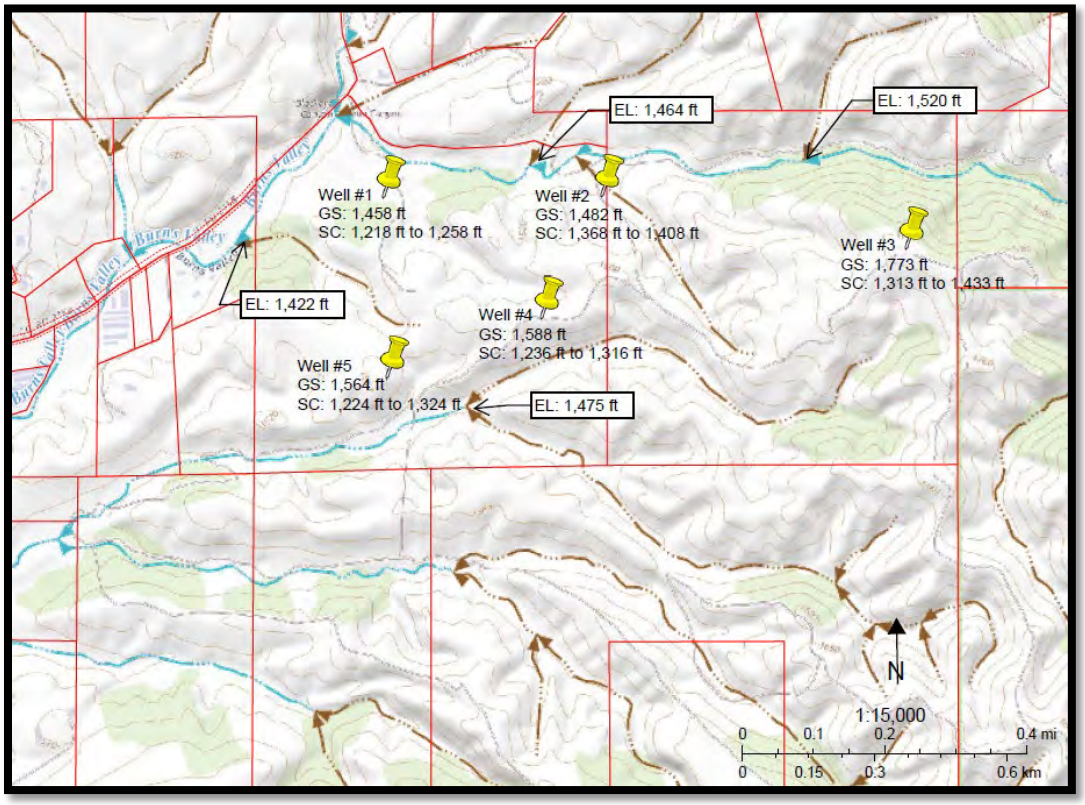

Figure 12. Screened well interval (SC) elevations (Table 7) compared to ground (GE) and surface water (EL) elevations.

7. OPERATIONAL WATER MONITORING, CONSERVATION MEASURES, AND DROUGHT MANAGEMENT

7.1. STANDARD OPERATIONAL MEASURES

Standard operational procedures are recommended, regardless of whether the project is in an area experiencing drought conditions, including ongoing water monitoring and conservation measures that would reduce the overall use of water. These measures should be incorporated into the Water Use section of the project's Property Management Plan. Water Use includes information on water sources and metering, estimated water use, water conservation, and the irrigation system. Recommended on-going water conservation measures include, but may not be limited to, the following:

- No surface water diversion;
- Selection of plant varieties that are suitable for the climate of the region;
- The use of drip irrigation (instead of spray irrigation);
- Cover drip lines with straw mulch or similar to reduce evaporation;
- Water application rates modified from data from soil moisture meters and weather monitoring;
- Shutoff valves on hoses and water pipes;
- Daily visual inspections of irrigation systems;
- Immediate repair of leaking or malfunctioning equipment; and
- Water use metering and budgeting.

In addition to water use metering, water level monitoring is also required by the Lake County Zoning Ordinance. Ordinance Article 27 Section 27.11(at) 3.v.e. requires the wells to have a meter to measure the amount of water pumped as well as a water level monitor. In addition to the above measures, well water level monitoring and reporting shall be performed as follows:

Seasonal Static Water Level Monitoring: The purpose of seasonal monitoring of the water level in the wells is to provide information regarding long-term groundwater elevation trends. It is recommended that the water level in the wells be measured and recorded once in the Spring (March/April), before cultivation activities begin, and once in the fall (October) after cultivation is complete. (note: The California Statewide Groundwater Monitoring Program (CASGEM) monitors semi-annually around April 15 and October 15). Records shall be kept, and elevations reported to the County as part of the project's annual reporting requirements. Reporting shall include a hydrograph plot of all seasonal water level measurements to-date, beginning with the initial measurement. Seasonal water level trends will aid in the evaluation of the recharge rate of the well. For example, if the water level measured during the Spring remains relatively constant from year to year, then the water source is recharging each year.

Water Level Monitoring During Extraction: The purpose of monitoring the water level in the Project Well during extraction is to evaluate the performance of the wells to determine the effect of the pumping rate on the water source during each cultivation season. This information shall be used to determine the capacity and yield of the well to aid the cultivators in determining pump rates and the need for water storage. The frequency of water level monitoring will depend on the source, the source's capacity, and the pumping rate. It is recommended that initially the water level be monitored twice per week or more, and that the frequency be adjusted as needed depending on the impact the pumping rate has on well water levels. Records shall be kept, and elevations reported to the County as part of the project's annual reporting requirements. Reporting shall include a hydrograph plot of the water level measurements during the cultivation season and compared to prior seasons.

Measuring a water level in a well can be difficult and the level of difficulty will depend on site-specific conditions. As part of the well monitoring program, the well owner/operator shall work with a well expert to determine the appropriate methodology and equipment to measure the water level in their well(s) as well as who will conduct the monitoring and recording of the well level data. The methodology of the well monitoring program shall be described and provided in the project's annual report to the County.

The groundwater level monitoring protocol is recommended to provide a framework for the early detection and response if there is groundwater depletion or inadequate recharge. Thus, in addition to monitoring and reporting, an analysis of the water level monitoring data shall be provided and included in the project's annual report, demonstrating whether use of the well is causing significant drawdown and/or impacts to the surrounding area and what measures were taken to reduce impacts. If there are impacts, a revised Water Management Plan, including a revised water budget, shall be prepared and submitted to the County, for review and approval, demonstrating how the project will operate and mitigate the impacts in the future, including changes in operation, if necessary.

7.2. DROUGHT MANAGEMENT/EMERGENCY WATER CONSERVATION MEASURES

Drought can reduce both water availability and water quality necessary for productive farming, ranches, and grazing lands, resulting in significant negative direct and indirect economic impacts to the farm. As discussed above, recommended project monitoring will help detect if seasonal groundwater depletion is occurring, which is especially important during periods of drought. In addition, project reporting requires a revised Water Management Plan that demonstrates how the project will operate to address groundwater depletion.

To plan and prepare for drought conditions, the project will follow recommendations for monitoring, planning, and preparedness provided by the National Integrated Drought Information System - https://www.drought.gov/sectors/agriculture.

In addition to the above ongoing conservation measures, water metering, and reporting, during times of drought emergencies or water scarcity, the project will implement the following additional measures, as needed or appropriate to the site, to reduce water use and ensure both success and decreased impacts to surrounding areas:

- Install additional water storage and/or implement a rainwater catchment system;
- Install moisture meters to monitor how much water is in the soil at the root level and reduce watering to only what is needed to avoid excess;
- Cover the soil and drip-lines with removable plastic covers or similar to reduce evaporation;
- Irrigate only in the early morning hours or before sunset;
- Cover plants with shaded meshes during peak summer heat to reduce plant water needs; and/or
- Use a growing medium that retains water in a way to conserve water and aid plant growth. Organic soil ingredients like peat moss, coco coir, compost and other substances like perlite and vermiculite retain water and provide a good environment for cannabis to grow.

In the event the well cannot supply the water needed for the project, the following measures may be taken:

- Reduce the amount of cultivation and/or length of cultivation season;
    - The amount of cultivation would be determined based on available water
    - Early crop harvest, if water becomes limited
- Install additional storage and/or implement a rainwater catchment system, installation of a rainwater catchment pond could provide additional storage and catchment area if the existing groundwater source becomes depleted; and/or
- If possible, develop an alternative, legal, water source that meets the requirements of Lake County Codes and Ordinances.

8. SUMMARY AND CONCLUSIONS

The project property has five existing groundwater wells, strategically located adjacent to each proposed cultivation area. Well information is summarized in Table 2,

- Table 3, and Table 7. The total combined well yields, reported on the WCRs, is 720 gpm or 1,161 AFY. Pump tests conducted in 2022 on three of the wells confirmed yields of at least 38 gpm, using a rate of 38 gpm for all five wells, would result in an annual yield of 307 AF.
- The historical demand, including historical hops cultivation, was 36.7 AFY. The proposed project water demand, including the projected residential use, is 29.8 AFY, which is 6.9 AFY less than historical use. The maximum daily demand, 73,425 gpd, would occur during the flowering period, approximately 63 days out of an approximate 180-day cultivation season. The remainder of the season, the daily demand is approximately 53,470 gpd. The overall project demand is 2.5% of the overall project well yield.

- The project proposes a minimum of 3-days of storage at each cultivation site, totaling 230,000 gallons of storage.
- According to the geologic logs from the project's WCRs, the water bearing unit of the wells is comprised primarily of green stone, which is consistent with the Cache Formation water bearing unit. Wells drilled in this formation have yields up to 450 gpm.
- The long-term average recharge, based on the most conservative estimates presented herein (based on 10% of precipitation per USGS Fact Sheet 2007-3007), is approximately 46.1 AFY and 145.1 AFY over the project site (302.5 acres) and the contributing recharge area (953 acres), respectively. Both of which are sufficient to meet the project's demand.
- The average recharge over the project parcel and 953-acre recharge area, based on 10% of the precipitation, over the last 23 years was 68.4 AFY and 215.4 AFY, respectively. Both of which are sufficient to meet the project's demand.
- The estimated groundwater storage beneath the project parcels, over an area of 302.5 acres, is 34.1 AF. The project's groundwater supply, both recharge and storage, is sufficient to meet the project's demand.
- The estimated storage capacity of the alluvial formation of BVGB is 4,000 AF, with a usable storage capacity of 1,400 AF. However, the deeper Cache Formation, from which the project draws water, has between 50,000 and 75,000 acre-feet of storage. The long-term average recharge over the BVGB is 1,218 AFY.
- The total potential agricultural demand within the BVGB is the existing demand of approximately 555 acre-feet, plus proposed, 175.1 acre-feet, is approximately 730.1 acre-feet per year, with residential demand, the total groundwater demand is approximately 770.1 acre-feet per year. The dominant demand in the BVGB is associated with residential development and orchards in the lower part of BVGB and vineyards in the upper part of the BVGB. The long-term average recharge, including drought years, is sufficient to meet this demand. In addition, the projected demand represents only 19% of the BVGB alluvial storage and less than 2% of the deeper Cache Formation storage.
- The project area and surrounding area has had a historical use of vineyard and hops irrigation demand.
- Historical water demand within the project area, starting in approximately 2009, to irrigate approximately 13.6 acres of hops was approximately 36.4 AFY. Groundwater monitoring was conducted during this period by monitoring groundwater levels twice annually, approximately every April and November, to visualize the fall drawdown (November) and the spring recharge (April). The spring/fall monitoring data over the period hop crops were cultivated, from 2009 through 2019, are provided in Figure 5. Note that vineyards in the northern portion of BVGB, which cover an area of approximately 450 acres, were well established prior to 2009. There is a very slight decrease in depth to groundwater over the period when groundwater was used to irrigate the hops, indicating the groundwater aquifer was recharging, not being depleted, during this period. The proposed water use for cannabis cultivation would be 6.9 AFY less than that historically used for hops, this is in addition to 230,000 gallons of water storage for cannabis operations.
- There are 24 wells within a 1-mile radius of the project site. The overall average depth and yield of these wells is 252 ft and 85 gpm, respectively.
- Drawdown was estimated using the Theis equation. The radius of influence is estimated to be less than 700 feet based, which is the distance where the modeled cone of depression from groundwater extraction under these conditions is negligible. None of the nearby wells are within the modeled cone of depression. In addition, since the project proposes 230,000 gallons of storage, which is approximately 3 to 5 days of water storage, each well would have approximately one (1) to two (2) days to recover, depending on the pumping and irrigation schedule.
- The project wells extract water from the confined Cache Formation water bearing unit, at elevations well below Burns Valley Creek and are not likely hydrologically connected to the creek.

Since the recorded and tested yields of the project's wells are much greater than the project's demand; the project proposes at least three (3) of water storage; the long-term average annual recharge exceeds the project's annual demand; the aquifer storage below the project area and within the overall aquifer is sufficient to meet the project's demand and cumulative future basin demand, the project is required to comply with the County's groundwater monitoring and reporting requirements, the potential drawdown due to the project is unlikely to result in appreciable drawdown of off-site wells, and the project wells are not likely hydrologically connected to Burns Valley Creek; the project would have sufficient water and would not have a significant impact on the surrounding area.

9. LIMITATIONS

The study of groundwater hydrology is very complex and often relies on limited data, especially in rural areas. Recommendations and conclusions provided herein are based on professional judgment made using information of the groundwater systems and geology in Lake County, which is limited and allows only for a general assessment of groundwater aquifer conditions and recharge. NorthPoint Consulting Group, Inc. is making analyses, recommendations, and conclusions based on readily available data, including studies and reports conducted by other professionals, Lake County, the State of California, and other consultants hired by the project proponent to prepare technical studies for the proposed project. If additional information or data becomes available for the project area, the recommendations and conclusions presented herein may be subject to change.

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APPENDIX A: SITE PLANS

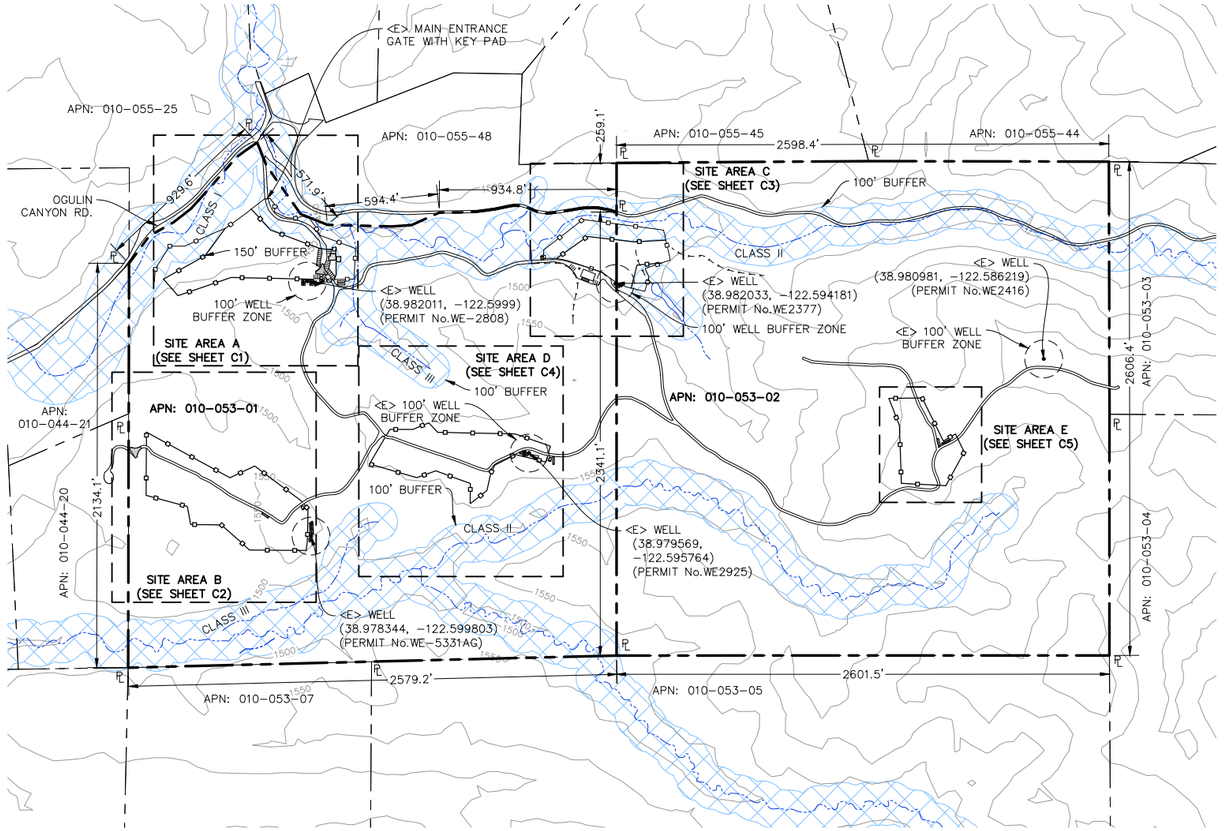
CLEARPATH CANYON LLC
MAJOR USE PERMIT
APN: 010-053-01 & 010-053-02

VICINITY MAP
NOT TO SCALE

DIRECTIONS TO SITE:
FROM CLEARLAKE, CA
- TAKE CA-53 N (0.8 MI)
- TURN RIGHT ONTO OGULIN CANYON RD. (0.8 MI)
- TURN RIGHT ONTO UNNAMED ROAD (0.3 MI)

PROJECT DESCRIPTION:
THE PROPOSED PROJECT IS TO PERMIT COMMERCIAL CANNABIS CULTIVATION IN ACCORDANCE WITH THE LAKE COUNTY ZONING ORDINANCE (ARTICLE 27). THE PROPOSAL IS FOR A TOTAL OF 653,400 SQ. FT. (15 ACRES) OF OUTDOOR CANOPY AREA AND A TYPE 13 SELF-DISTRIBUTION. THE PROJECT PROPOSES 15-ACRES OF OUTDOOR CANNABIS CULTIVATION. THE PROPOSAL INCLUDES THE DEVELOPMENT OF FACILITIES APPURTENANT TO OUTDOOR CANNABIS CULTIVATION, INCLUDING FACILITIES FOR DRYING AND CURING OF HARVESTED CANNABIS, ANCILLARY NURSERY, STORAGE SHEDS, AND IRRIGATION INFRASTRUCTURE.

GENERAL NOTES:
1. DRAWING SCALE AS NOTED. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS.
2. THIS IS NOT A BOUNDARY SURVEY. BOUNDARY INFORMATION DEPICTED HAS BEEN OBTAINED FROM LAKE COUNTY 2015 GIS DATA. NORTHPOINT CONSULTING GROUP, INC. HAS NOT VERIFIED THIS PROPERTY BOUNDARY.
3. THERE ARE NO NEARBY SCHOOLS, SCHOOL BUS STOPS, PLACES OF WORSHIP, PUBLIC PARKS OR TRIBAL RESOURCES WITHIN 1,000 FEET OF THE PROPOSED CULTIVATION AREA.
4. THERE ARE NO RESIDENCES ON ADJOINING PARCELS WITHIN 200 FEET OF THE PROPOSED CULTIVATION AREAS.
5. ANY EXISTING DEVELOPMENT CONSTRUCTED WITHOUT THE BENEFIT OF COUNTY REVIEW WILL BE SUBJECT TO THE LAKE COUNTY BUILDING DEPARTMENT UPON APPROVAL OF THE USE PERMIT.
6. THE PROJECT SITE IS W/IN 1,000 FEET OF THE CITY OF CLEARLAKE SPHERE OF INFLUENCE. CANNABIS CULTIVATION IS PROHIBITED WITHIN 1,000 FEET OF AN INCORPORATED CITY SPHERE OF INFLUENCE UNLESS THE APPLICANT CAN PROVIDE A LETTER OF SUPPORT FROM THE CITY. A LETTER OF SUPPORT HAS BEEN OBTAINED FROM THE CITY.
7. POWER SOURCE: THE PROPOSED PROJECT WOULD USE A COMBINATION OF EXISTING POWER SUPPLIED BY PG&E AND SOLAR POWER. THE OUTDOOR CULTIVATION AREAS WOULD HAVE MINIMAL NEED FOR POWER. THE PROPOSED ANCILLARY NURSERY AND ANCILLARY DRYING WOULD REQUIRE POWER FOR LIGHTING AND CLIMATE CONTROL. OTHER USES THAT WOULD REQUIRE POWER INCLUDE THE SECURITY SYSTEM, SECURITY LIGHTING, AND WELL PUMPS. NO GENERATORS ARE PROPOSED, EXCEPT FOR BACKUP POWER DURING POWER OUTAGES OR AN EMERGENCY. A POWER UPGRADE IS NOT NEEDED FOR OPERATIONS, THE EXISTING PG&E SERVICE IS SUFFICIENT.



PLOT PLAN
22x34 SHEET: 1"=400'
11x17 SHEET: 1"=800'
0 200 400 800

PROJECT INFORMATION:
APPLICANT:
CLEARPATH CANYON LLC
637 LINDARO STREET, SUITE 201
SAN RAFAEL, CA 94901-6027

PROPERTY OWNER:
CLEARPATH CANYON LLC
637 LINDARO STREET, SUITE 201
SAN RAFAEL, CA 94901-6027

APPLICANTS AGENT:
NORTHPOINT CONSULTING GROUP, INC
1117 SAMOA BLVD.
ARCATA, CA 95521
(707) 798-6438

SITE ADDRESS:
APN: 010-053-01 & 010-053-02
2050/2122 OGULIN CANYON ROAD,
CLEARLAKE CA 95422

WATER	= PRIVATE
SEWER	= PRIVATE
PROPERTY SIZE	
APN: 010-053-01	= ±145.81 ACRES
APN: 010-053-02	= ±156.64 ACRES
TOTAL	= ±302.45 ACRES
ZONING	= RL-WW
GENERAL PLAN DESIGNATION	= RL

SHEET INDEX:

DRAWN BY | REVISIONS | DATE

NORTHPOINT CONSULTING GROUP, INC.
1117 Samoa Blvd., Arcata, CA 95521

CLEARPATH CANYON LLC
APN:010-053-01 & 010-053-02
PLOT PLAN, VICINITY MAP & PROJECT NOTES

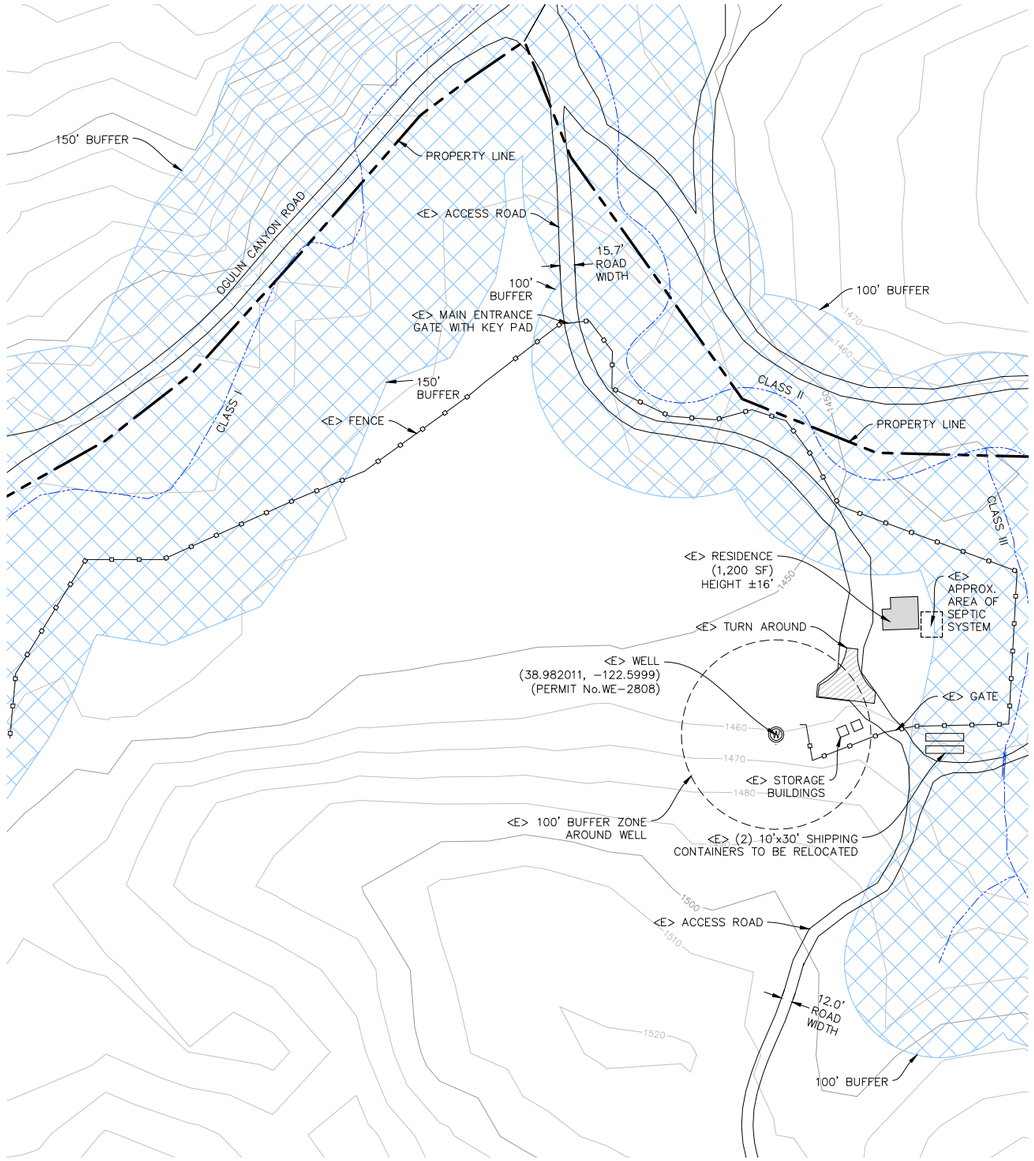
PROJ. MGR.: AD
DRAWN BY: LJM
DATE: 11/17/23
SCALE: AS SHOWN
SHEET C0
20-098

November 20, 2023 - 11:45 Dwn Name: P:\Richard Knox Consulting - Lake Vista Farms - 20-098\CAD\CLEARPATH CANYON LLC - MAJOR USE PERMIT.dwt Updated By: TorSmith

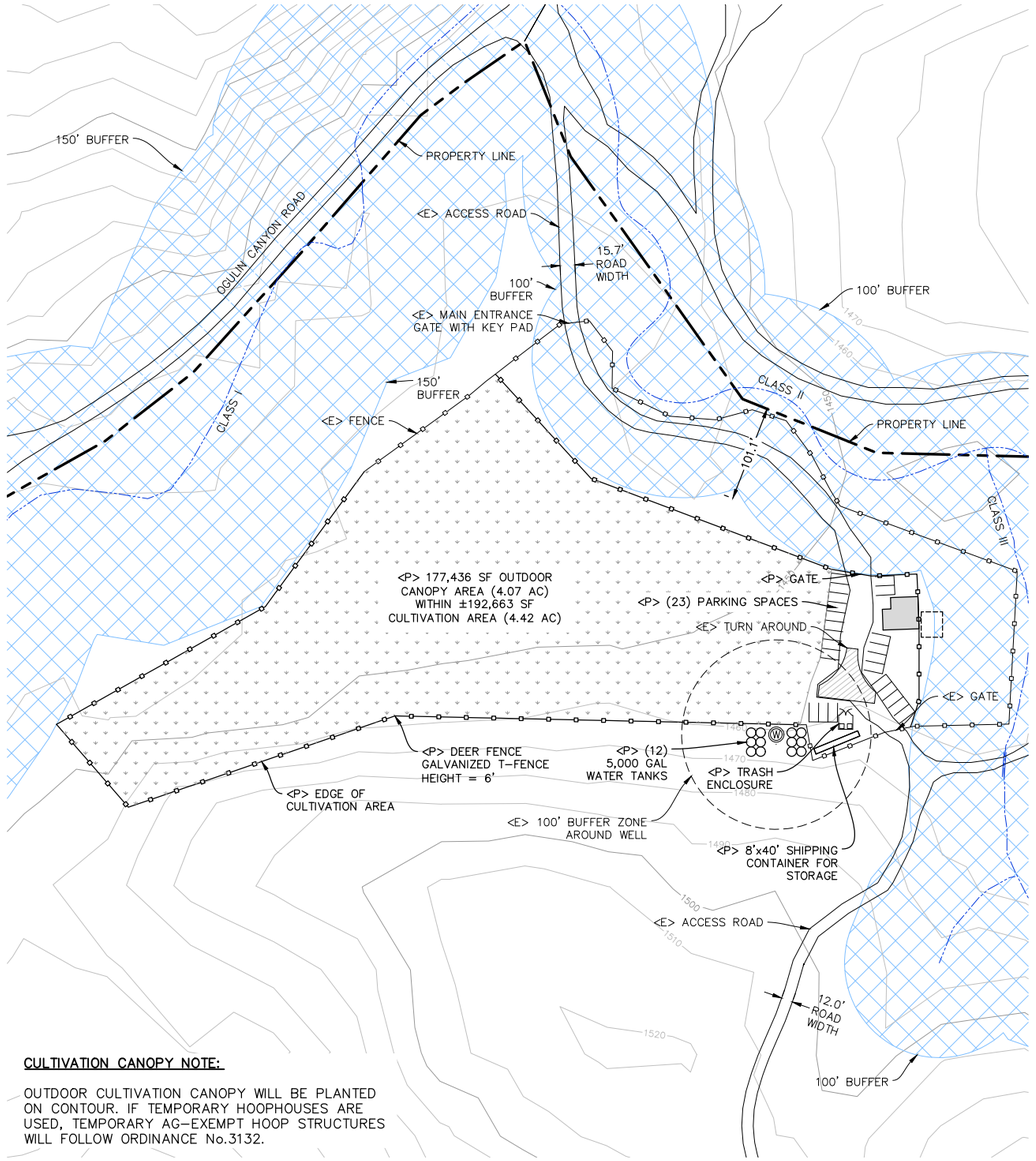
CLEARPATH CANYON LLC

SITE 'A' DETAILED AREA

APN: 010-053-01 & 010-053-02



EXISTING SITE PLAN



CULTIVATION CANOPY NOTE:

OUTDOOR CULTIVATION CANOPY WILL BE PLANTED ON CONTOUR. IF TEMPORARY HOOPHOUSES ARE USED, TEMPORARY AG-EXEMPT HOOP STRUCTURES WILL FOLLOW ORDINANCE No.3132.

PROPOSED SITE PLAN

" " - OUTDOOR CANOPY AREA

22x34 SHEET: 1"=80'
11x17 SHEET: 1"=160'
0 40 80 160

N

REVISIONS	DATE	DRAWN BY

NORTHPOINT CONSULTING GROUP, INC.
1117 Samoa Blvd., Arcata, CA 95521

CLEARPATH CANYON LLC
APN:010-053-01 & 010-053-02
SITE 'A' DETAILED AREA

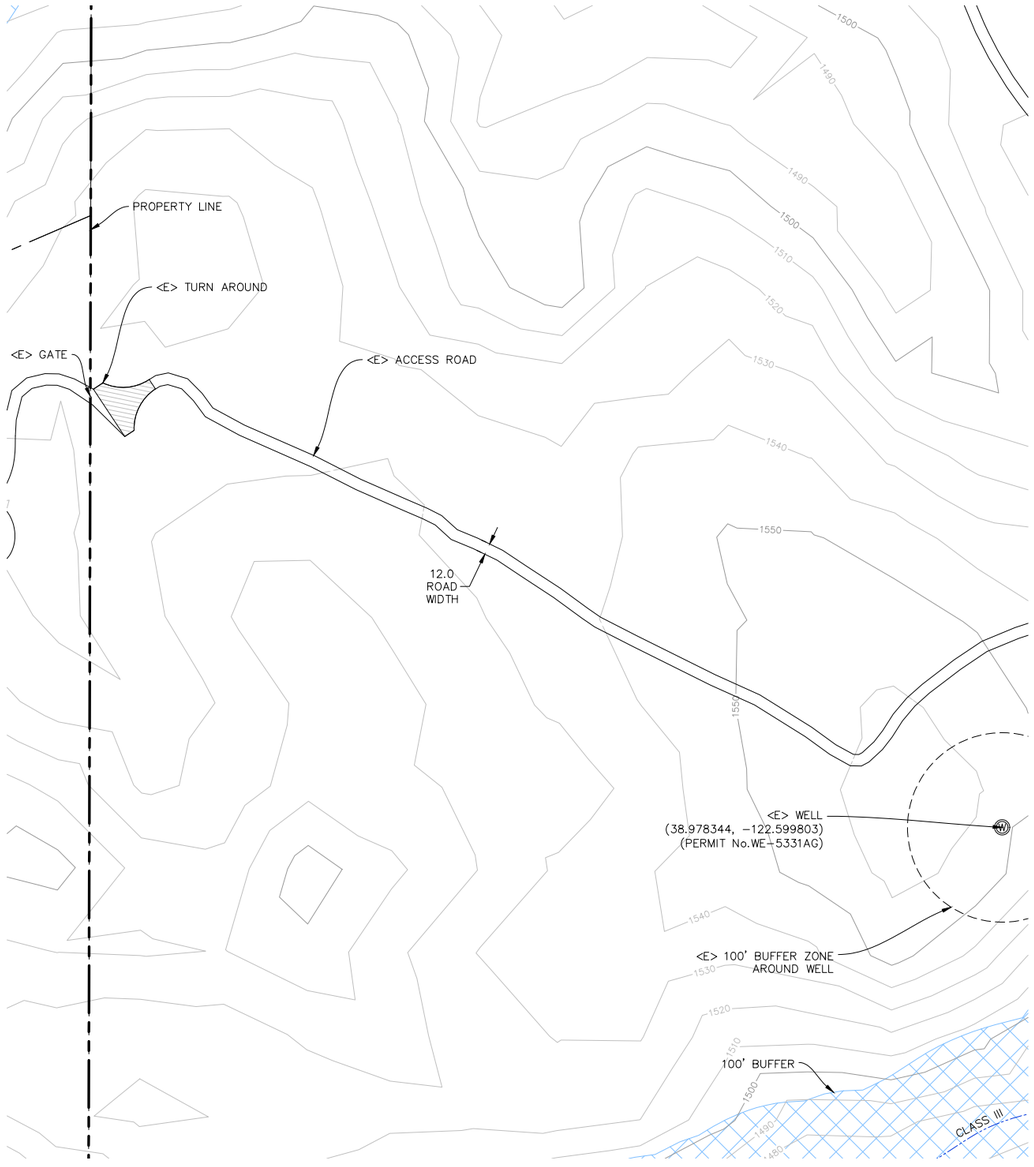
PROJ. MGR.: AD
DRAWN BY: LJM
DATE: 11/17/23
SCALE: AS SHOWN

SHEET
C1
20-098

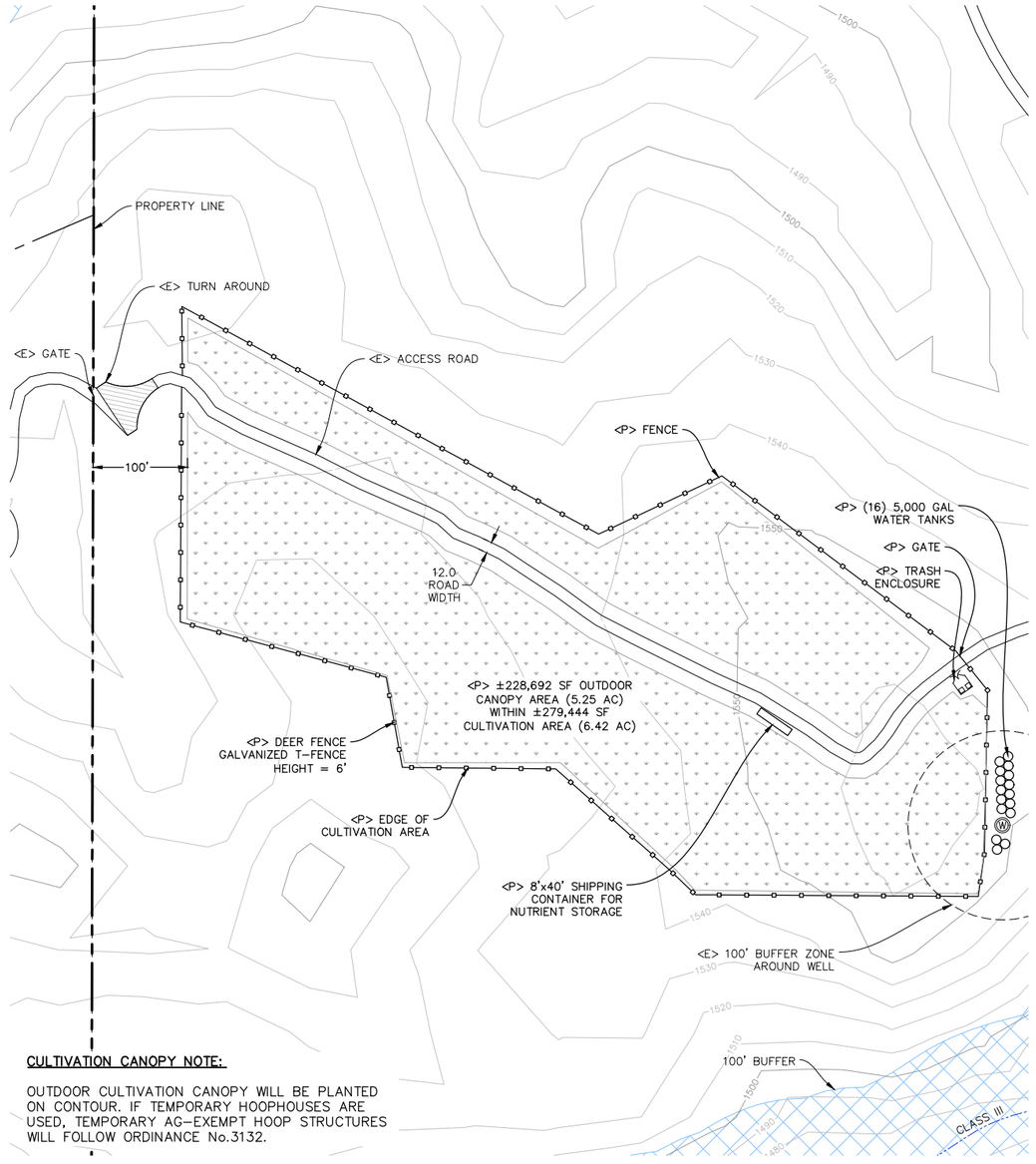
CLEARPATH CANYON LLC

SITE 'B' DETAILED AREA

APN: 010-053-01 & 010-053-02



EXISTING SITE PLAN



PROPOSED SITE PLAN

CULTIVATION CANOPY NOTE:

OUTDOOR CULTIVATION CANOPY WILL BE PLANTED ON CONTOUR. IF TEMPORARY HOOPHOUSES ARE USED, TEMPORARY AG-EXEMPT HOOP STRUCTURES WILL FOLLOW ORDINANCE No.3132.

" " - OUTDOOR CANOPY AREA

22x34 SHEET: 1"=80'
11x17 SHEET: 1"=160'

0 40 80 160

N

DATE	REVISIONS	DRAWN BY

NORTHPOINT CONSULTING GROUP, INC.
1117 Samoa Blvd., Arcata, CA 95521

CLEARPATH CANYON LLC
APN:010-053-01 & 010-053-02
SITE "B" DETAILED AREA

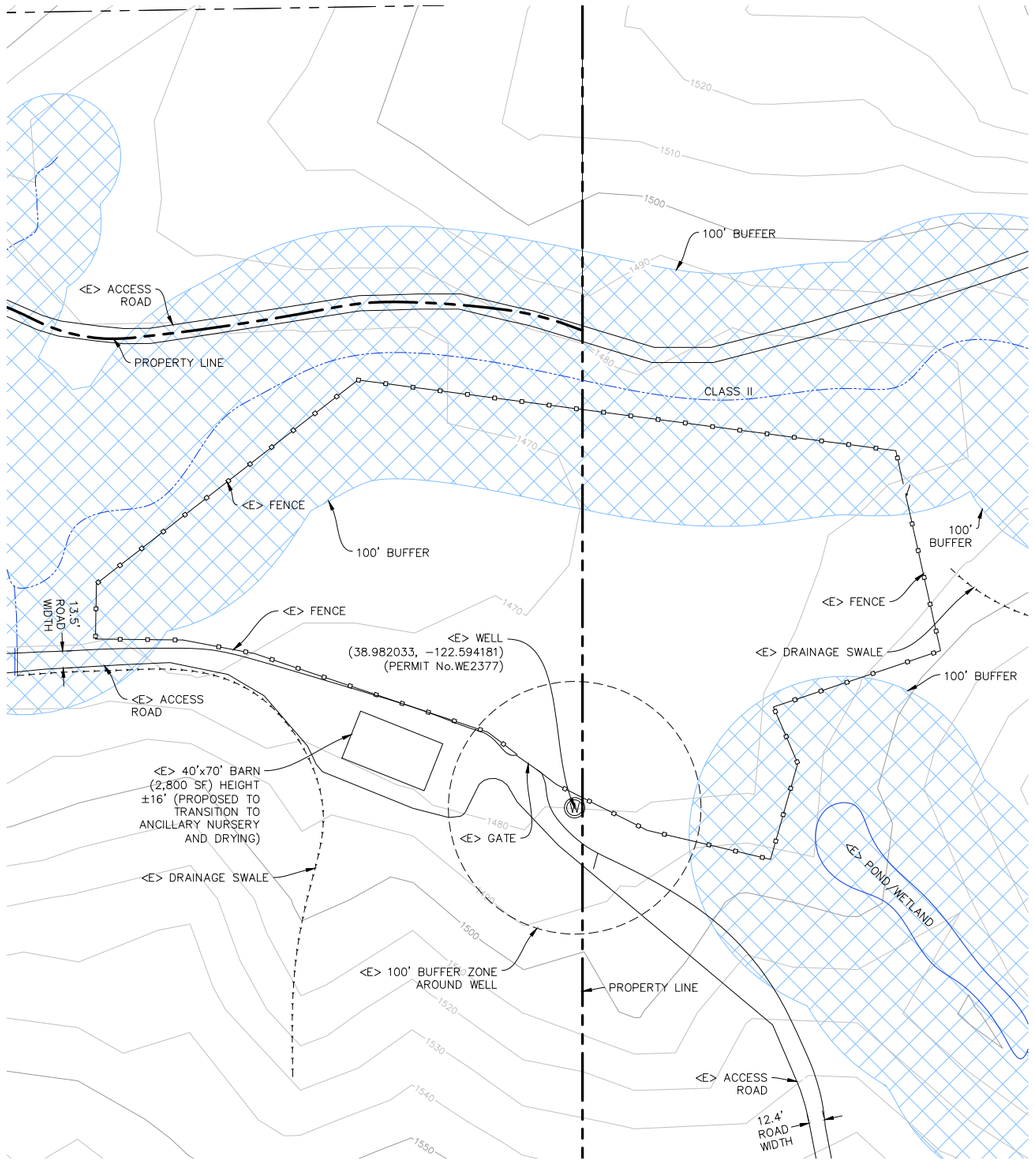
PROJ. MGR.: AD
DRAWN BY: LJM
DATE: 11/17/23
SCALE: AS SHOWN

SHEET
C2
20-098

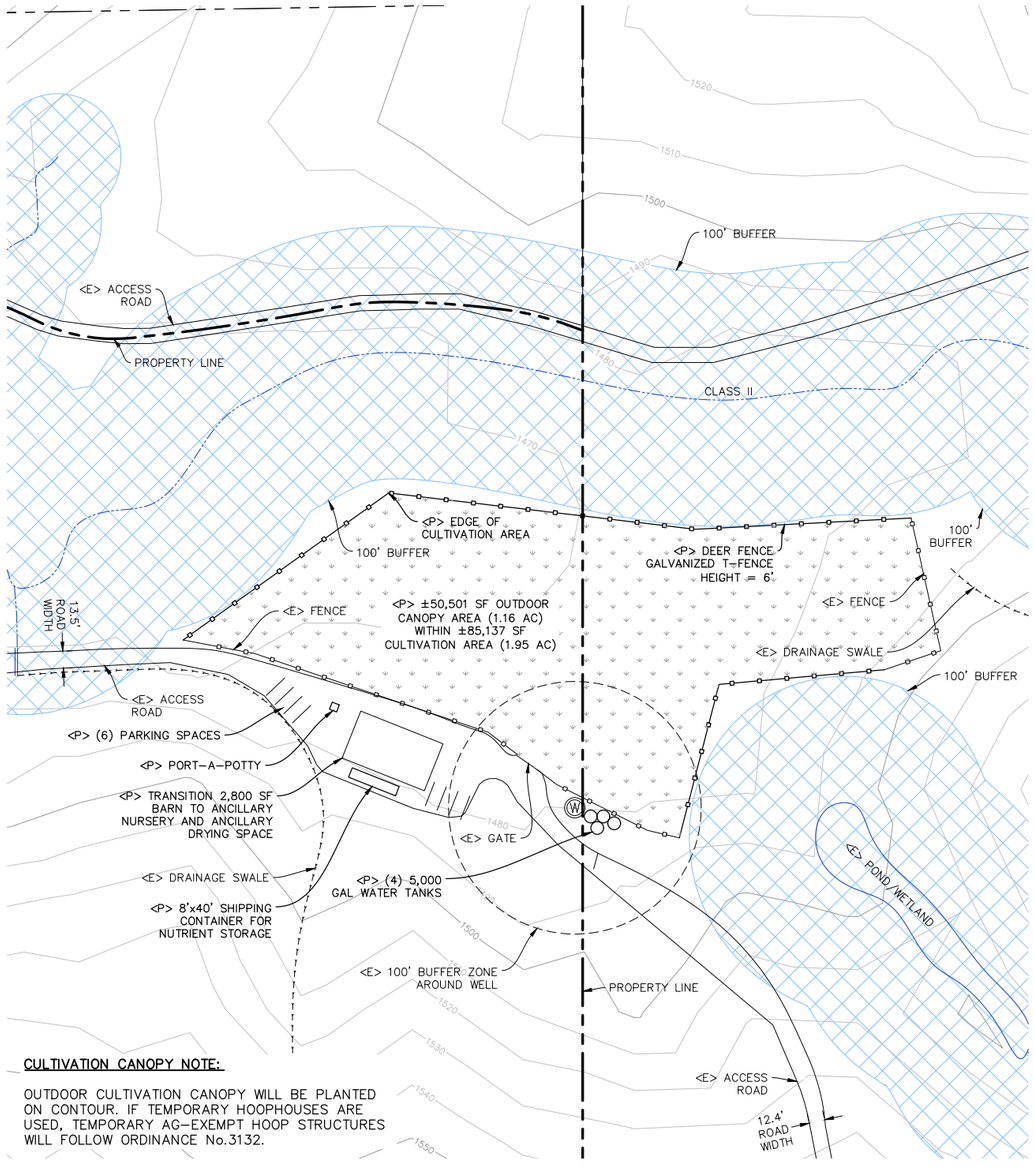
CLEARPATH CANYON LLC

SITE 'C' DETAILED AREA

APN: 010-053-01 & 010-053-02



EXISTING SITE PLAN



CULTIVATION CANOPY NOTE:

OUTDOOR CULTIVATION CANOPY WILL BE PLANTED ON CONTOUR. IF TEMPORARY HOOPHOUSES ARE USED, TEMPORARY AG-EXEMPT HOOP STRUCTURES WILL FOLLOW ORDINANCE No.3132.

PROPOSED SITE PLAN

" " - OUTDOOR CANOPY AREA

22x34 SHEET: 1"=60'
11x17 SHEET: 1"=120'

0 30 60 120

N

DRAWN BY	REVISIONS	DATE

NORTHPOINT CONSULTING GROUP, INC.
1117 Samoa Blvd., Arcata, CA 95521

CLEARPATH CANYON LLC
APN:010-053-01 & 010-053-02
SITE "C" DETAILED AREA

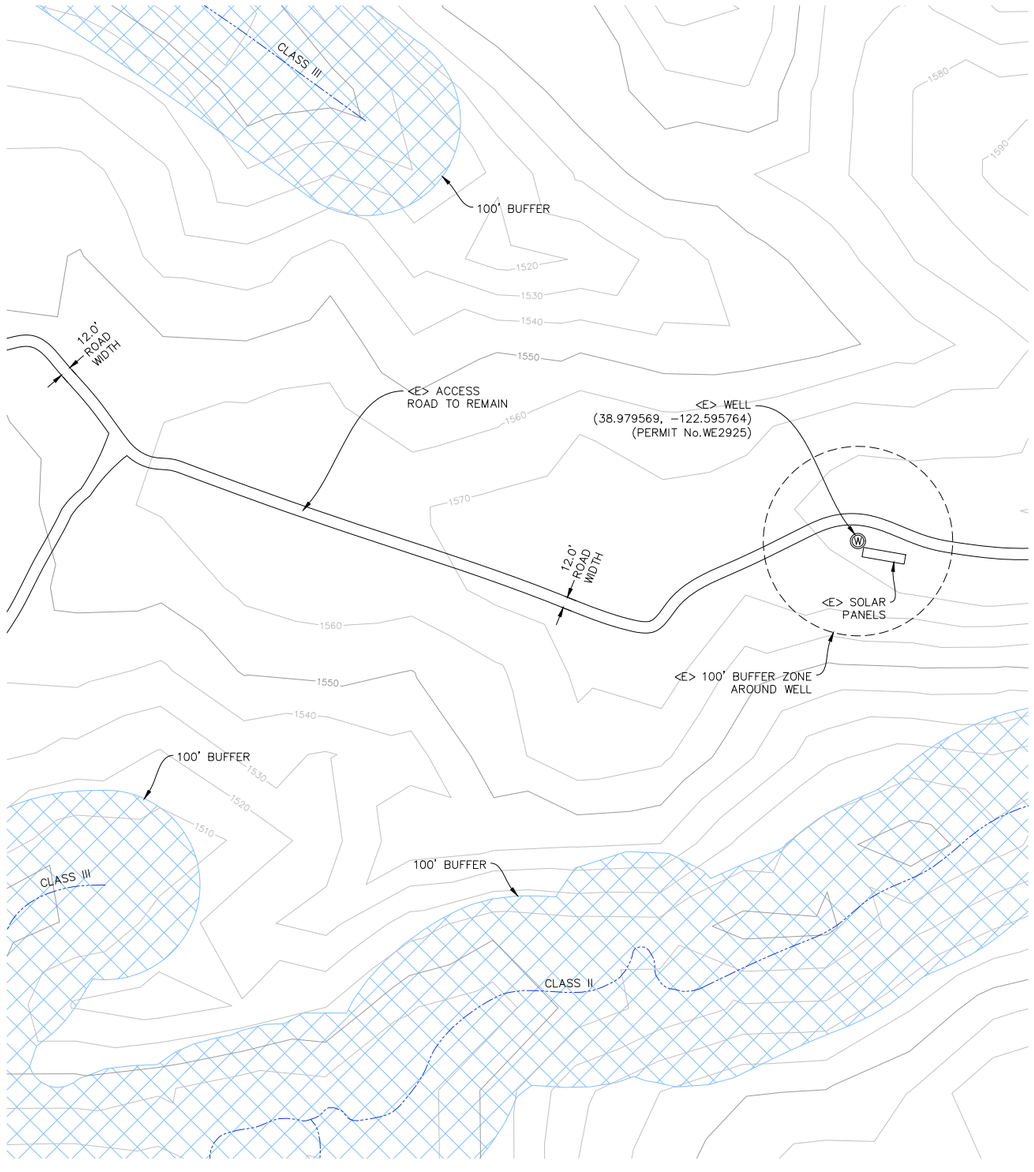
PROJ. MGR.: AD
DRAWN BY: LJM
DATE: 11/17/23
SCALE: AS SHOWN

SHEET
C3
20-098

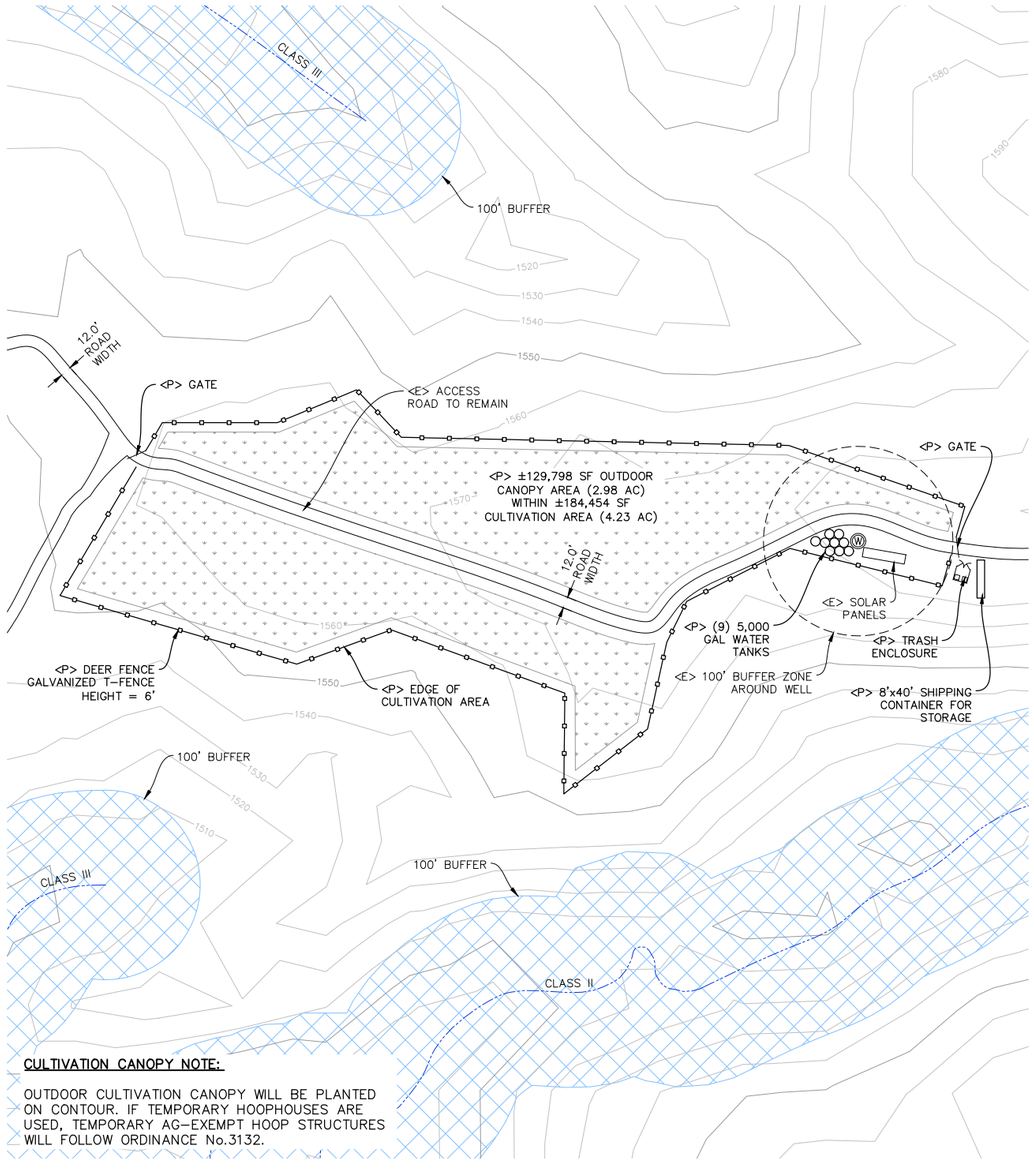
CLEARPATH CANYON LLC

SITE 'D' DETAILED AREA

APN: 010-053-01 & 010-053-02



EXISTING SITE PLAN



CULTIVATION CANOPY NOTE:

OUTDOOR CULTIVATION CANOPY WILL BE PLANTED ON CONTOUR. IF TEMPORARY HOOPHOUSES ARE USED, TEMPORARY AG-EXEMPT HOOP STRUCTURES WILL FOLLOW ORDINANCE No.3132.

PROPOSED SITE PLAN

- OUTDOOR CANOPY AREA

22x34 SHEET: 1"=80'
11x17 SHEET: 1"=160'

0 40 80 160

N

DRAWN BY	REVISIONS	DATE

NORTHPOINT CONSULTING GROUP, INC.
1117 Samoa Blvd., Arcata, CA 95521

CLEARPATH CANYON LLC
APN:010-053-01 & 010-053-02
SITE "D" DETAILED AREA

PROJ. MGR.: AD
DRAWN BY: LJM
DATE: 11/17/23
SCALE: AS SHOWN

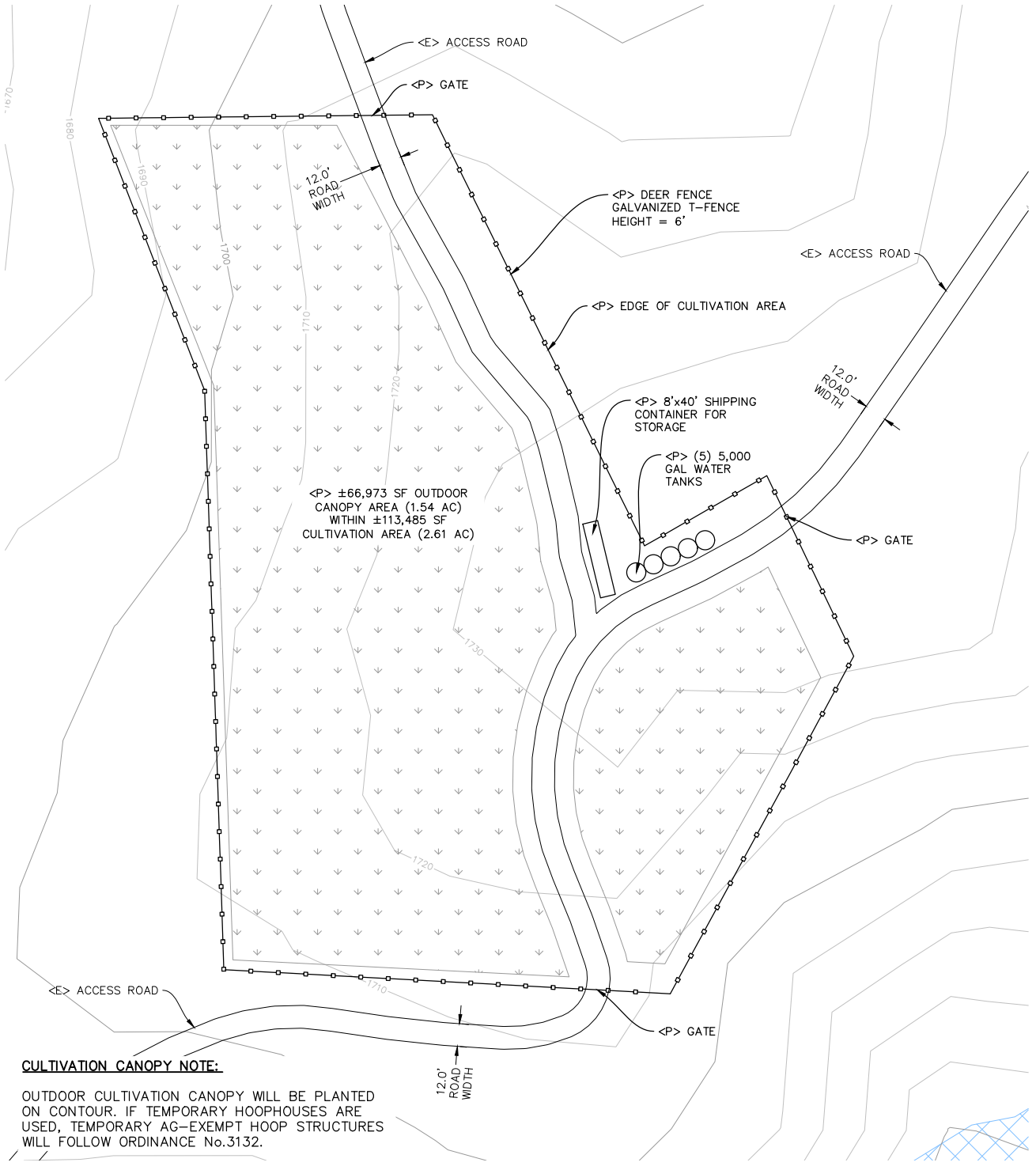
SHEET
C4
20-098

CLEARPATH CANYON LLC

SITE 'E' DETAILED AREA

APN: 010-053-01 & 010-053-02

EXISTING SITE PLAN



CULTIVATION CANOPY NOTE:

OUTDOOR CULTIVATION CANOPY WILL BE PLANTED ON CONTOUR. IF TEMPORARY HOOPHOUSES ARE USED, TEMPORARY AG-EXEMPT HOOP STRUCTURES WILL FOLLOW ORDINANCE No.3132.

PROPOSED SITE PLAN

- OUTDOOR CANOPY AREA

22x34 SHEET: 1"=40'
11x17 SHEET: 1"=80'

0 20 40 80

DRAWN BY | REVISIONS | DATE

NORTHPOINT
CONSULTING GROUP, INC.
1117 Samoa Blvd., Arcata, CA 95521

CLEARPATH CANYON LLC
APN:010-053-01 & 010-053-02
SITE "E" DETAILED AREA

PROJ. MGR.: AD
DRAWN BY: LJM
DATE: 11/17/23
SCALE: AS SHOWN

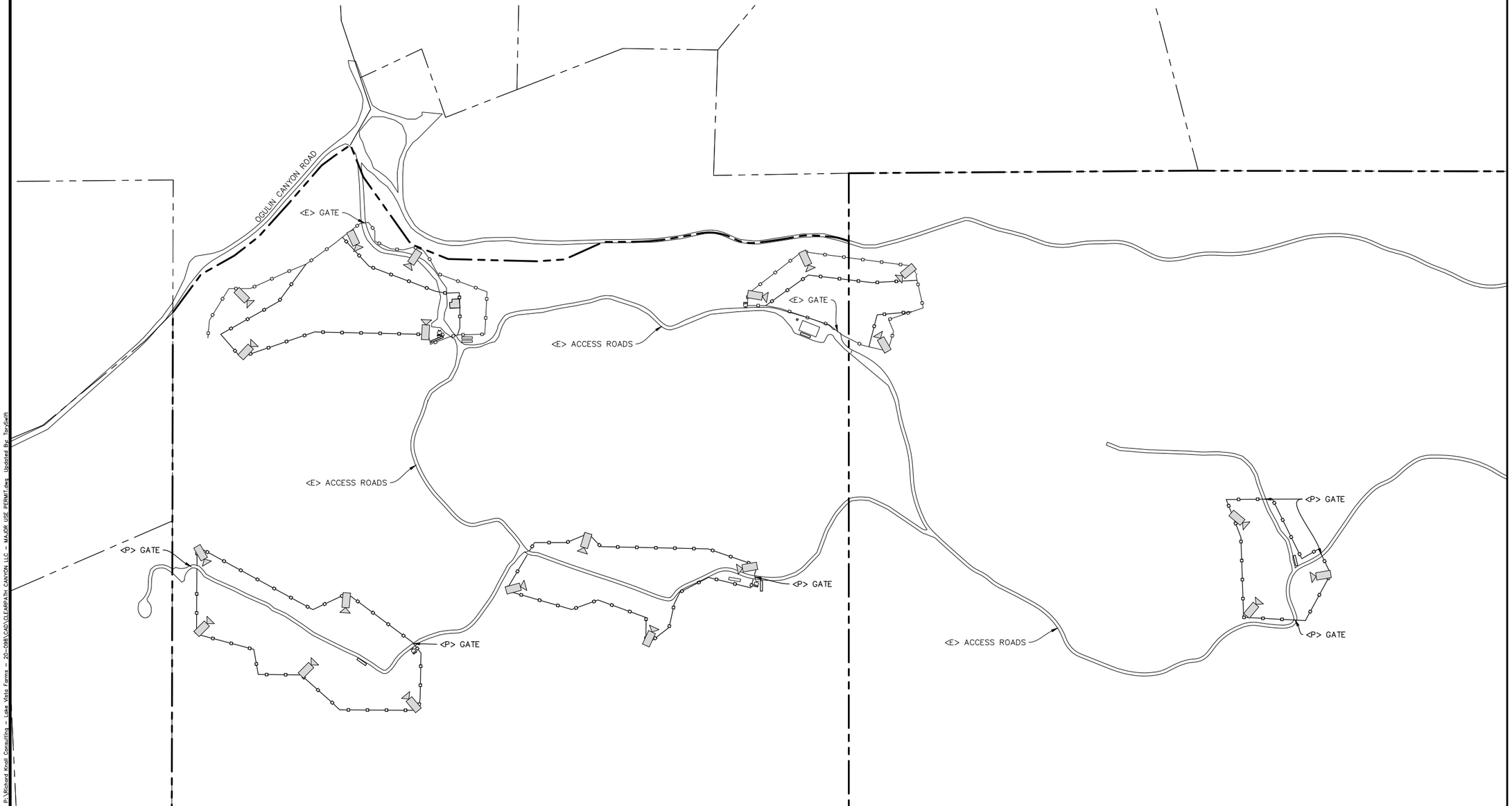
SHEET
C5
20-098

November 29, 2023 - 11:45 Dwg Name: P:\Richard Knoll Consulting - Lake Vista Farms - 20-098\CAD\CLEARPATH CANYON LLC - MAJOR USE PERMIT.dwg Updated By: TaySmith

CLEARPATH CANYON LLC

SECURITY PLAN

APN: 010-053-01 & 010-053-02



PLOT PLAN

22x34 SHEET: 1"=200'
11x17 SHEET: 1"=400'

0 100 200 400

N

LEGEND

– FENCE

– MOTION SENSOR, LIGHTING & SECURITY CAMERA

DRAWN BY | REVISIONS | DATE

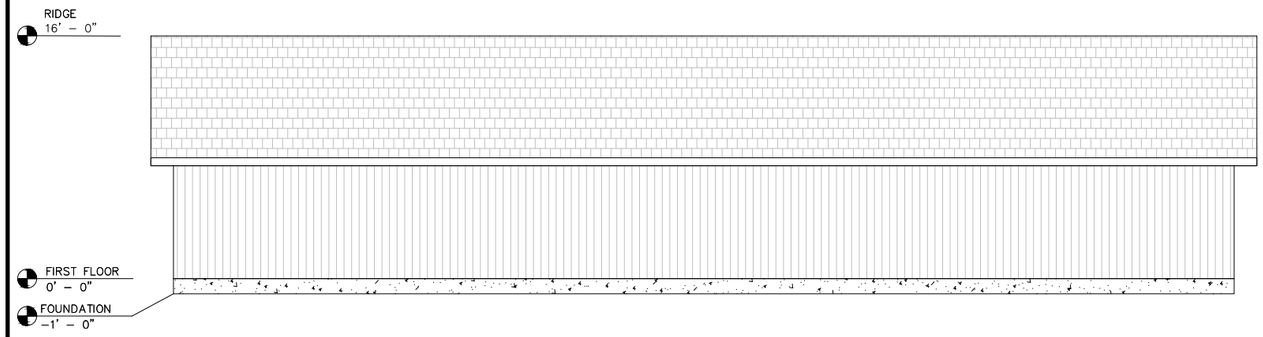
NORTHPOINT CONSULTING GROUP, INC.
1117 Samoa Blvd., Arcata, CA 95521

CLEARPATH CANYON LLC
APN:010-053-01 & 010-053-02
SECURITY PLAN

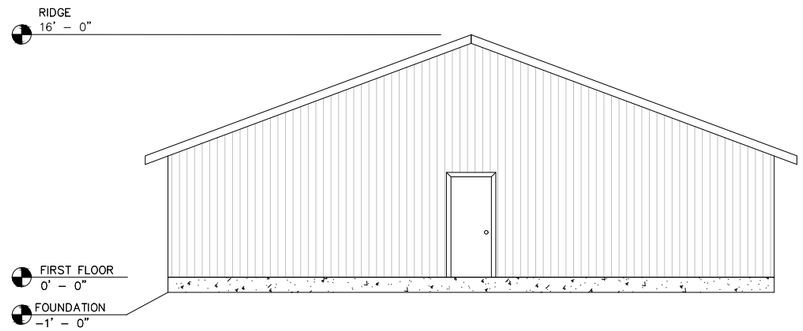
PROJ. MGR.: AD
DRAWN BY: LJM
DATE: 11/17/23
SCALE: AS SHOWN

SHEET
C6
20-098

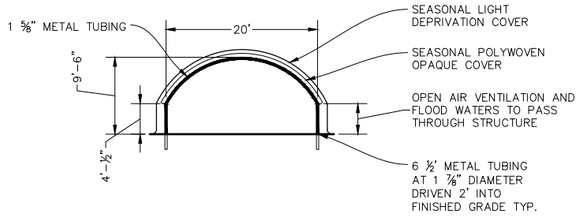
November 20, 2023 - 11:45 Dwg Name: P:\Richard Knoll Consulting - Lake Vista Farms - 20-098\CAD\CLEARPATH CANYON LLC - MAJOR USE PERMIT.dwg Updated By: TorSmith

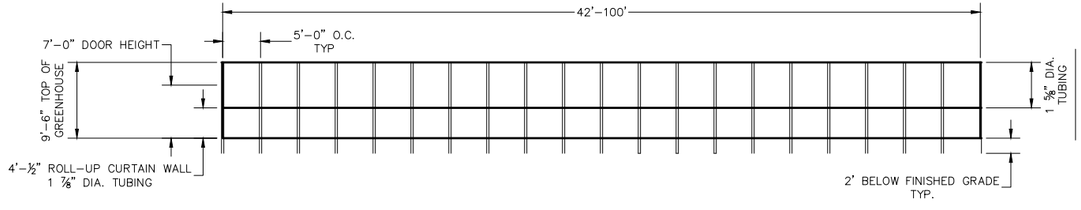


EXISTING 40'x70' BARN ELEVATIONS | **SCALE: 1"=5' (11X17 SHEET: 1"=10')**



EXISTING 40'x70' BARN ELEVATIONS | **SCALE: 1"=5' (11X17 SHEET: 1"=10')**





TYP. HOOP STRUCTURE ELEVATIONS

NTS

NOTE: TEMPORARY AG EXEMPT HOOP STRUCTURES WILL FOLLOW ORDINANCE No.3132

TYPICAL HOOP STRUCTURE ELEVATION | **SCALE: NTS**

DRAWN BY | REVISIONS | DATE

NORTHPOINT CONSULTING GROUP, INC.
1117 Samoa Blvd., Arcata, CA 95521

CLEARPATH CANYON LLC

APN:010-053-01 & 010-053-02

STRUCTURE ELEVATIONS

PROJ. MGR.: AD
DRAWN BY: LJM
DATE: 11/17/23
SCALE: AS SHOWN

SHEET
C7
20–098

APPENDIX B: PROJECT WELL COMPLETION REPORTS

Well #1, Field A

ORIGINAL
File with DWR

MAR -5 2012

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 0950518

Page ___ of ___
Owner's Well No. ___
Date Work Began 6-30-11 Ended 7-1-11
Local Permit Agency Health Dept
Permit No. WE-1808 Permit Date 6-30-11

DWR USE ONLY — DO NOT FILL IN
13N/07W-14
STATE WELL NO./STATION NO.
LATITUDE ___ LONGITUDE ___
APN/TRS/OTHER

Well #1, Field A - Identified by Applicant as House Field

GEOLOGIC LOG

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

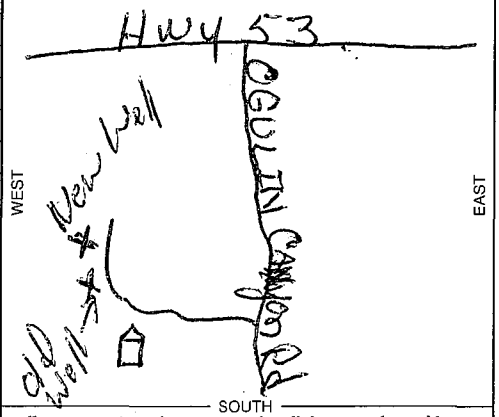
DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	20	Brown Clay
20	130	Brown Clay w/Red Chert
130	240	Green Clay w/Greenstone

TOTAL DEPTH OF BORING 240 (Feet)
TOTAL DEPTH OF COMPLETED WELL 240 (Feet)

WELL LOCATION

Address 2050 OGULIN Canyon Rd
City Clearlake Ca 95422
County Lake
APN Book 010 Page 053 Parcel 01
Township 13N Range 7W Section 13 14
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 (✓)

✓ 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 60 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 150+ (Ft.) & DATE MEASURED 7-1-11
ESTIMATED YIELD * 60 (GPM) & TEST TYPE Air Lift
TEST LENGTH 2 (Hrs.) TOTAL DRAWDOWN ___ (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	160	7"					PVC	4½"	160	
160	200	7"					PVC	4½"		
200	240	7"		X			PVC	4½"	200	.030

DEPTH FROM SURFACE Ft.	to Ft.	ANNULAR MATERIAL TYPE CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	20	✓			
20	240	5/16			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 Larry Herman Drilling (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS P.O. Box 1152 CITY Lower Lake STATE Ca ZIP 95457
Signed [signature] C-57 LICENSED WATER WELL CONTRACTOR
DATE SIGNED 7-3-2011 C-57 LICENSE NUMBER 465071

DWR 188 REV. 05-03 IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM OSP 03 78836

Well #2, Field C

DUPLICATE
Owner's Copy
Page ___ of ___
Owner's Well No. ___
Date Work Began 11-4-04, Ended 11-11-04
Local Permit Agency Health Dept.
Permit No. WE 2377 Permit Date 10-7-04

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 1075331

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 Air Rotary FLUID ___

DEPTH FROM SURFACE Ft. to Ft.	DESCRIPTION Describe material, grain size, color, etc.
0 : 50	Cemented Gravel
50 : 90	Green Stone
90 : 120	Black Rock

Barn FIELD

TOTAL DEPTH OF BORING 120 (Feet)
TOTAL DEPTH OF COMPLETED WELL 114 (Feet)

WELL OWNER

Name Claudia Kay-[illegible]
Mailing Address P.O. Box 536
Cobb Madera CA 95426
CITY STATE ZIP

WELL LOCATION

Address 2122 Oquilin Canyon [illegible]
City Clearlake Ca 95422
County Lake
APN Book 010 Page 053 Parcel 02
Township 13N Range 7W Section 12
Lat ___ N Long ___ W
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 (✓)

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

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 90 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 68 (Ft.) & DATE MEASURED 11-[illegible]-04
ESTIMATED YIELD * 60 (GPM) & TEST TYPE Air Lift
TEST LENGTH 2 (Hrs.) TOTAL DRAWDOWN ___ (Ft.)
* May not be representative of a well's long-term yield.

CASING (S)

DEPTH FROM SURFACE Ft. to Ft.	BORE-HOLE DIA. (Inches)	BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0 : 20	9	X				PVC	4½	160	
20 : 74	7	X				PVC	4½	160	
74 : 114	7		X			PVC	4½	200	.030

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft. to Ft.	CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0 : 20	X			
20 : 74			F/I	
74 : 114			F/I	Pea[illegible]

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ Other ___

CERTIFICATION STATEMENT

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

NAME Larry Herman Drilling
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
P.O. Box 1102 Lower Lake [illegible]
ADDRESS CITY STATE ZIP
11-11-04 [illegible]

Well #3, Field E

ORIGINAL
File with DWR

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. 1093073

DWR USE ONLY — DO NOT FILL IN
13N/07W/13
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

Page ___ of ___
Owner's Well No. ___
Date Work Began 6-5-06 Ended 6-6-06
Local Permit Agency Health Dept.
Permit No. WE-2417 Permit Date 10-3-05

Well #1, Field A - Identified by Applicant as Ridge Top Well

GEOLOGIC LOG

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

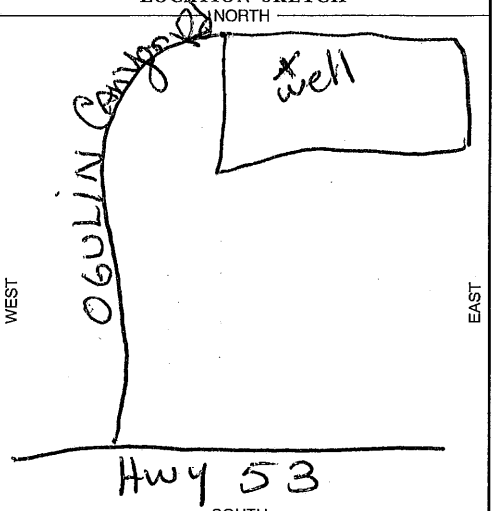
DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	160	Franciscan
160	180	Green Stone
180	240	Green Stone

TOTAL DEPTH OF BORING 240 (Feet)
TOTAL DEPTH OF COMPLETED WELL 240 (Feet)

WELL LOCATION

Address 2122 Ogulin Canyon Road
City Clearlake Ca 95422
County Lake
APN Book 010 Page 053 Parcel 020
Township 13N Range 7W Section 13
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 (✓)

✓ 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 180 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 175 (Ft.) & DATE MEASURED 6-6-06
ESTIMATED YIELD * 50 (GPM) & TEST TYPE Air Lift
TEST LENGTH 2 (Hrs.) TOTAL DRAWDOWN ___ (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	200	9"	X				PVC	4½"	160	
200	240	7⅞		X			PVC	4½"	200	.030

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	30	✓			
30	240				5/16 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 Larry Herman Drilling (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS PO Box 1152 CITY Lower Lake STATE Ca ZIP 95457
Signed Larry Herman C-57 LICENSED WATER WELL CONTRACTOR
DATE SIGNED 6-9-06 C-57 LICENSE NUMBER 465071

DWR 188 REV. 05-03 IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM OSP 03 78836

Well #3, Field E - Duplicate WCR - Wrong PLSS

ORIGINAL
File with DWR

Page ____ of ____
Owner's Well No. ____
Date Work Began 6-6-06 Ended 6-7-06
Local Permit Agency Health Dept.
Permit No. WE-2416 Permit Date 10-3-05

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 1093074

DWR USE ONLY — DO NOT FILL IN
13N/07W/14
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) ✓ VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD Air Rotary FLUID ____

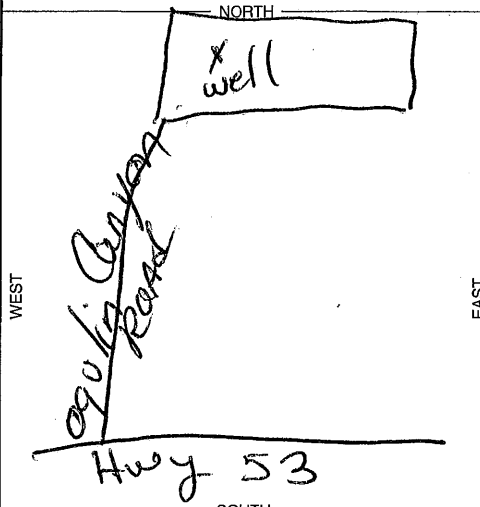
DEPTH FROM SURFACE Ft. to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0 60	Cement Gravel
60 100	Clay w/some Gravel
100 130	Clay with some Gravel
130 220	Cement Gravel
220 400	Green Stone

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

WELL LOCATION

Address 2050 Ogulin Canyon Rd.
City Clearlake Ca 95422
County Lake
APN Book 010 Page 053 Parcel 010
Township 13N Range 7W Section 13 14
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 (✓)

___ 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 320 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 300 (Ft.) & DATE MEASURED 6-7-06
ESTIMATED YIELD * 100+ (GPM) & TEST TYPE Airlift
TEST LENGTH 2 (Hrs.) TOTAL DRAWDOWN ____ (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)
0 340	7 7/8	X				PVC	4 1/2"	160	
340 400	7 7/8		X			PVC	4 1/2"	200	.030

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft. to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0 20	X			
20 40				5/16 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 Larry Herman Drilling (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS P.O. Box 1152 CITY Lower Lake STATE Ca ZIP 95457
Signed Larry Herman C-57 LICENSED WATER WELL CONTRACTOR
DATE SIGNED 6-9-06 C-57 LICENSE NUMBER 465071

DWR 188 REV. 05-03 IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM OSP 03 78836

Well #4, Field D

TRIPLICATE
Owner's Copy

Page ___ of ___
Owner's Well No. ___
Date Work Began 6/26/2013 Ended 6/28/2013
Local Permit Agency Lake County Environmental Health
Permit No. WE 2925 Permit Date 6/25/2013

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 0963040

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 Air

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	5	Brown Soil
5	130	Soft Tan Clay like Rock
130	195	Brown Clay and Gravel
195	347	Greenish Brown Clay
347	352	green Stone
352	370	Soft Tan Clay like Rock

UPPER FIELD

Old well
0 ← 175' → well

TOTAL DEPTH OF BORING 370 (Feet)
TOTAL DEPTH OF COMPLETED WELL 358 (Feet)

WELL OWNER

Name Claudia Kay Kwidzinski
Mailing Address PO Box 586
City Corta Madera CA State 94926 Zip

WELL LOCATION

Address 2050 Oguita Canyon Rd,
City Clearlake
County Lake
APN Book 010 Page 053 Parcel 01
Township ___ Range ___ Section ___
Lat ___ DEG. ___ MIN. ___ SEC. N
Long ___ DEG. ___ MIN. ___ SEC. W

LOCATION SKETCH

NORTH
WEST
EAST
SOUTH

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

ACTIVITY (✓)

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 280 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 195 (Ft.) & DATE MEASURED 6/28/2013
ESTIMATED YIELD * 200+ (GPM) & TEST TYPE Air Lift
TEST LENGTH 1 (Hrs.) TOTAL DRAWDOWN ___ (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	120	9	X				PVC F480	4½	SDR26	
120	272	8	X				"	"	"	
272	352	8		X			"	"	"	.032
352	358	8	X				"	"	"	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	1	X			
1	21		X		
21	356				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 Dan McMullen Well Drilling (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS P.O. Box 951 City Lower Lake State CA Zip 95457
Signed Dan McMullen C-57 LICENSED WATER WELL CONTRACTOR Date Signed 6/28/2013 C57 License Number 571152

DWR 188 REV. 05-03

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

Well #5, Field B

*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. XXXXXXX

Page 1 of 1
Owner's Well Number 2
Date Work Began 4-8-20 Date Work Ended 4-10-20
Local Permit Agency Lake County Environmental Health
Permit Number WE-5331 AG Permit Date 3-17-20

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 Air Rotary Drilling Fluid —

Depth from Surface Feet	to Feet	Description Describe material, grain size, color, etc
0	30	Brown Clay
30	60	Brown Gravely clay
60	100	Brown Shale
100	240	Brown Gravely clay & Shale
24	280	Green stone (Soft)
280	300	Franciscan Gravels cemented
300	340	Green stone / Green shale

Total Depth of Boring 345 Feet
Total Depth of Completed Well 340 Feet

Well Owner

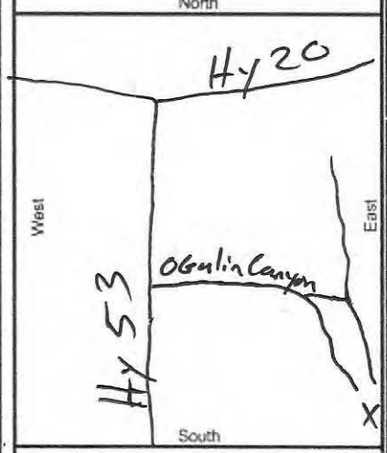
Name Lake Vista Farms
Mailing Address 405 Clear View Place
City Petaluma State CA Zip 94952

Well Location

Address 2050 Ogulin Canyon Rd.
City Clear lake County LAKE
Latitude Deg. Min. Sec. N Longitude Deg. Min. Sec. W
Datum Dec. Lat. Dec. Long.
APN Book 010 Page 053 Parcel 01
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 200' (Feet below surface)
Depth to Static Water Level 173 (Feet) Date Measured 4-9-20
Estimated Yield * 300+ (GPM) Test Type Air lift
Test Length 2 HRS (Hours) Total Drawdown (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	240	10 5/8	F-480	PVC	.340	6"	Blank	—
240	340	10 5/8	F-480	PVC	.340	6"	Perfs.	.032

Annular Material

Depth from Surface Feet	to Feet	Fill	Description
0	1	Concrete	SEAL
1	21	Bentonite	
21	340	5/16 Pea	Gravel 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 Will Peterson Well Drilling (Person, Firm or Corporation)
P.O. Box 695 (Address) Kelseyville CA 95451 (City, State, Zip)
Signed [signature] (C-57 Licensed Water Well Contractor) 4-10-20 (Date Signed) 1009053 (C-57 License Number)

DWR 188 REV. 1/2006

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

APPENDIX C: WELL PUMP TEST RESULTS

Well #1, Site A

POLLACK & SONS PUMP

707.987.0917
19280 Deer Hill
Hidden Valley Lake
CA., 95467

"Your one stop water shop 24 hours"
Iron and Chlorine Removal
Softeners • Filters • Pumps • Tanks

LAKE USTA

Name OGOLIN CAMPER Phone

Address 2050 OGOLIN RD City Clear lake

State CA Zip Date 2-1-22 2-2-22

WATER ANALYSIS

Hardness (lime) gpg. . . . . Iron (rust) ppm

Manganese ppm. . . . . PH (acid)

Gal Per Min. . . 38 GPM

Well Depth. . . 240 Casing Size 4½ PVC

Static Level. . . 150

Before Pumping. . 150

After Pumping 2 HRS. 180' . . . 4 HRS. 200' . . . 24 HRS. 150'

Water Supply Garden ☒ Private Well ☐ 100% RECOVERY

EXISTING EQUIPMENT

COMMENTS/RECOMMENDATIONS

Will pump more w/ larger pump

Well #5, Site B

POLLACK & SONS PUMP

707.987.0917
19280 Deer Hill
Hidden Valley Lake
CA., 95467

"Your one stop water shop 24 hours"
Iron and Chlorine Removal
Softeners • Filters • Pumps • Tanks

Name LYLE USTA Phone

Address 2050 OSWIN CAVE RD City CLEARLAKE

State CA Zip Date 1-31-22 2-1-22

WATER ANALYSIS

Hardness (lime) gpg. / Iron (rust) ppm /

Manganese ppm. / PH (acid) /

Gal Per Min. 150 ++

Well Depth. 340' Casing Size 6" PVC

Static Level. 175'

Before Pumping. 175'

After Pumping 2 HRS. 210' 4 HRS. 260' 24 HRS. 175'

Water Supply Garden ☒ Private Well ☐

EXISTING EQUIPMENT

100% Recovery

COMMENTS/RECOMMENDATIONS

add pkg mesh over wt layer pkg

(new well)

Well #2, Site C

POLLACK & SONS PUMP

707.987.0917
19280 Deer Hill
Hidden Valley Lake
CA., 95467

"Your one stop water shop 24 hours"
Iron and Chlorine Removal
Softeners • Filters • Pumps • Tanks

LAKE VISTA

Name OGDEN CANYON Phone

Address 2122 OGDEN CANYON Rd. City Clearlake

State CA Zip Date 2-1-22 2-2-22

WATER ANALYSIS

Hardness (lime) gpg. . . . . Iron (rust) ppm

Manganese ppm. . . . . PH (acid)

Gal Per Min. . . 38 . . 6GPM . . . . . .

Well Depth. . . . 114' . . . . . Casing Size 4½ PVC

Static Level. . . 70' . . . . . .

Before Pumping. . 70' . . . . . .

After Pumping 2 HRS. 80' . . . . . 4 HRS. 85' . . . . . 24 HRS. 70' . . . .

Water Supply Garden ☒ Private Well ☐ 100% recovery

EXISTING EQUIPMENT

COMMENTS/RECOMMENDATIONS

Will pump more with lower pump

APPENDIX D: NEIGHBORING WELL COMPLETION REPORTS

PLSS Section **M13N07W14**
Reported 14
Actual 13

Saved Ref #	WCR Number	Legacy #	Well Location	APN	Use	Date	Depth (ft)	Perforated Interval Top (Depth, ft)	Perforated Interval Bottom (Depth, ft)	Yield (gpm)	Note
1	WCR1981-005661	228689	2510 Old Hwy 53	010-048-02	Industrial	11/14/1981	361	154	354	30	0.9 miles SW
2	WCR1996-007735	445212	2511 Hwy 53	010-048-09	Domestic	5/17/1996	190	150	190	18	0.7 miles SW
~~3 (duplicate WCR)~~	~~WCR2006-008902~~	~~1093074~~	~~2050 Ogulin~~	~~010-053-02~~	~~Not Checked~~	~~67/06~~	~~400~~	~~340~~	~~400~~	~~100~~	Project Well #3, Field E - Duplicate of WCR2006-008901, 1093074 Refer to Ref #24
4	WCR1980-006392	84076	Ogulin Rd & Hwy	??	Domestic	3/27/1980	110	70	110	20	0.7 mi SW?, Location uncertain
5	WCR1995-008387	555494	2511 Hwy 53	10-048-09	Domestic	9/5/1995	183	143	183	30	0.7 miles SW
6	WCR1999-008659	705609	2580 Hwy 53	010-048-10	Irrigation	6/23/1999	240	??	??	245	0.6 miles S
~~7 DNE~~	~~WCR2007-008038~~	~~1093138~~	~~2050 Ogulin~~	~~010-053-01~~	~~Domestic~~	~~4/26/2007~~	~~180~~	~~140~~	~~180~~	~~60~~	Replaced by Well #1. Refer to Ref #12.
~~8a DNE~~	~~WCR2007-008044~~	~~1080452~~	~~2185 Ogulin~~	~~010-044-17~~	~~Domestic~~	~~8/9/2007~~	~~200~~	~~40~~	~~200~~	~~50~~	Replaced by new well in 2021? Refer to Reference #8.
~~9 No Info~~	~~WCR1776-003338~~	~~241~~	~~Unknown~~	~~Unknown~~	~~Unknown~~	~~Unknown~~	~~80~~	~~??~~	~~??~~	~~??~~	Unknown
10	WCR2013-008387	963040	2050 Ogulin	010-053-01	Irrigation	6/28/2013	358	272	352	200	Project Well #4, Field D
11	WCR1999-008660	705610	2560 Hwy 53	010-048-05	Irrigation	6/12/1999	230	180	230	14	0.6 miles SW
12	WCR1981-005597	13363	1950 Ogulin Rd	010-055-48	Domestic	7/16/1981	69	29	69	15	0.2 miles N
13	WCR2011-008013	950518	2050 Ogulin	010-053-01	Domestic	7/1/2011	240	200	240	60	Project Well #1, Field A
14	WCR2006-008963	1096367	2250 Ogulin	010-044-19	Domestic	2/11/2006	200	120	200	30	0.4 miles SW
26	Project Well #5	n/a	2050 Ogulin	010-053-01	Irrigation	4/10/2020	340	240	340	300	Project Well #5, Field B
8	2185 Ogulin	n/a	2185 Ogulin	010-044-17	Irrigation	3/25/2021	375	280	375	80	0.25 miles W
27	2160 Ogulin	n/a	2160 Ogulin	010-044-21	Dom&Irr	10/1/2021	300	80	300	100	0.3 miles W
						Average	**246**		**Average**	**88**	

PLSS Section **M13N07W11**
Reported 5
Actual 5

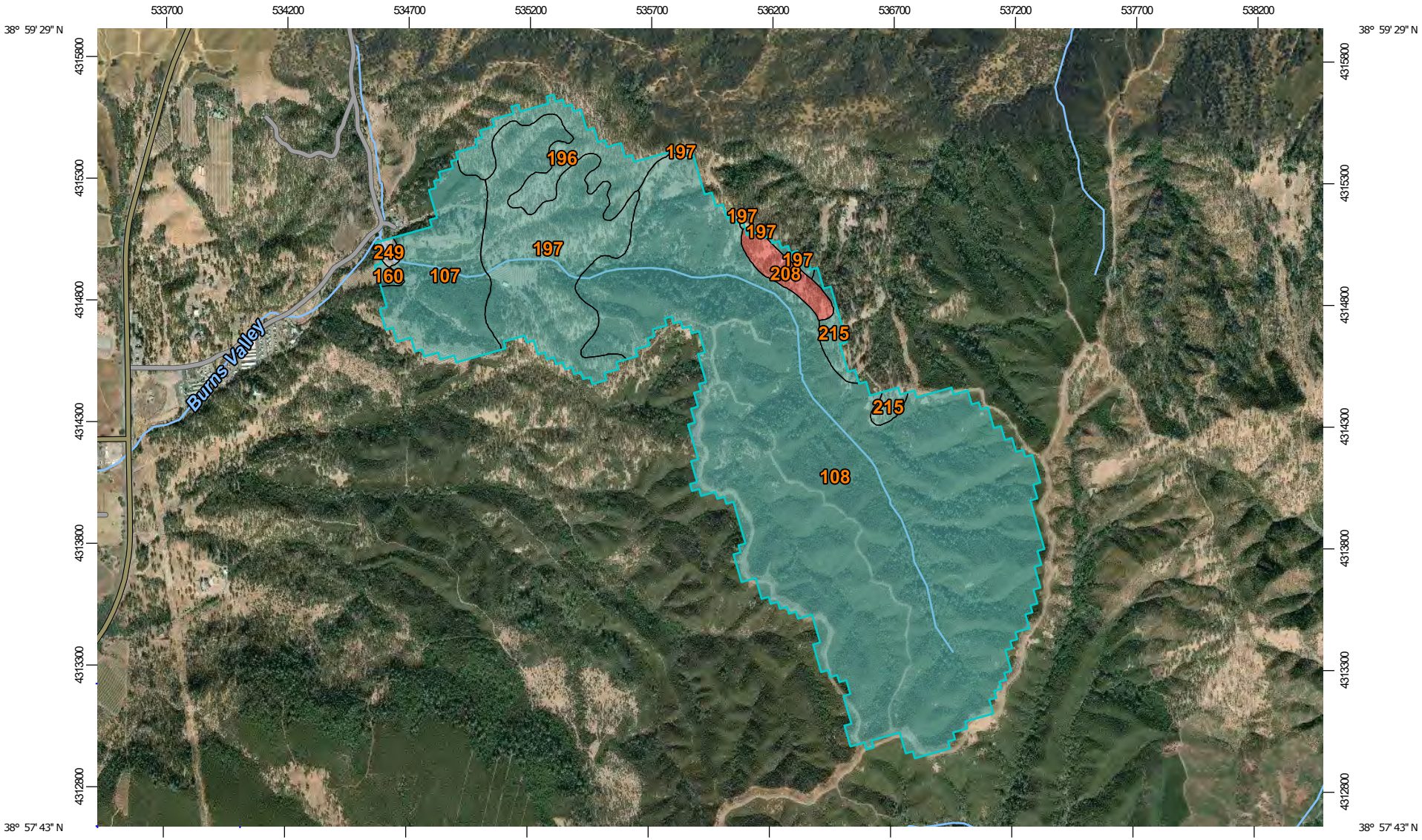
	WCR Number	Legacy #	Well Location	APN	Use	Date	Depth (ft)	Perforated Interval Top (Depth, ft)	Perforated Interval Bottom (Depth, ft)	Yield (gpm)	Note
15	WCR2006-008049	1089142	1270 Hwy 53	010-055-26	Domestic	10/2/2006	380	360	380	6	0.75 miles NW
16	WCR2001-009466	761881	1780 State Hwy	010-055-24	Irrigation	3/22/2001	220	115	195	300	0.6 miles NW
17	WCR2006-008903	1093075	1750 Ogulin	010-055-47	Domestic	6/8/2006	107	67	107	50	0.4 miles N
18	WCR2017-005234	e0345527	1756 Ogulin	010-055-46	Domestic	3/14/2017	372	292	372	50	0.5 miles NE
19	WCR2006-008048	1089141	1000 Hwy 53	010-055-27	Domestic	10/2/2006	260	220	260	100	1.1 miles NW
						Average	**268**		**Average**	**106**	

PLSS Section	**M13N07W12**										
# Reported	6										
# Actual	4										
								Perforated Interval			
								Top	Bottom		
	WCR Number	Legacy #	Well Location	APN	Use	Date	Depth (ft)	(Depth, ft)	(Depth, ft)	Yield (gpm)	Note
20	WCR2012-007802	0963006	9900 Jnctn Plaza	010-055-42	Domestic	5/11/2012	420	320	420	25	0.8 miles NE
21	WCR2000-008829	713341	2388 Hwy 53	010-053-03	Domestic	11/8/2000	170	150	170	200	Address is off, used WCR map for parcel at end of road.
22	WCR2006-008073	1089186	950 Jnctn Plaza	010-055-39	Domestic	10/20/2006	165	125	165	20	1 mile N
23	WCR2006-008071	1089188	1030 Jnctn Plaza	010-055-44	Domestic	10/20/2006	403	363	403	42	0.5 mile N
~~Mapped Wrong~~	~~WCR2008-007939~~	~~1075152~~				~~1/29/2008~~	~~n/a~~	~~10~~	~~25~~		
~~Mapped Wrong~~	~~WCR2000-009704~~	~~228021~~				~~12/31/1999~~	~~n/a~~	~~200~~	~~240~~		
						Average	**290**		**Average**	**94**	

PLSS Section	**M13N07W13**										
# Reported	1										
# Actual	2										
								Perforated Interval			
								Top	Bottom		
	WCR Number	Legacy #	Well Location	APN	Use	Date	Depth (ft)	(Depth, ft)	(Depth, ft)	Yield (gpm)	Note
24	WCR2006-008901	1093073	2122 Ogulin	010-053-02	Domestic	6/6/2006	240	200	240	50	Duplicate of Legacy 1093074
25	WCR2004-009866	1075331	2122 Ogulin	010-053-02	Domestic	11/4/2004	114	74	114	60	Project Well #2
						Average	**177**		**Average**	**75**	
							Depth (ft)			**Yield (gpm)**	
					Overall Average		**252**	**Overall Average**		**85**	

APPENDIX E: WEB SOIL SURVEY-HYDROLGIC SOIL GROUP

Custom Soil Resource Report
Map—Hydrologic Soil Group (North Basin)



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lake County, California
Survey Area Data: Version 17, Jun 1, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 18, 2016—May 10, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group (North Basin)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
107	Bally-Phipps complex, 15 to 30 percent slopes	C	61.8	8.5%
108	Bally-Phipps-Haploxeralfs association, 30 to 75 percent slopes	C	507.5	69.4%
160	Manzanita loam, 5 to 15 percent slopes	C	1.9	0.3%
196	Phipps complex, 15 to 30 percent slopes	C	34.0	4.6%
197	Phipps complex, 30 to 50 percent slopes	C	102.3	14.0%
208	Skyhigh-Asbill complex, 15 to 50 percent slopes	D	11.5	1.6%
215	Sleeper variant-Sleeper loams, 30 to 50 percent slopes	C	10.0	1.4%
249	Xerofluvents-Riverwash complex		2.0	0.3%
Totals for Area of Interest			**731.0**	**100.0%**

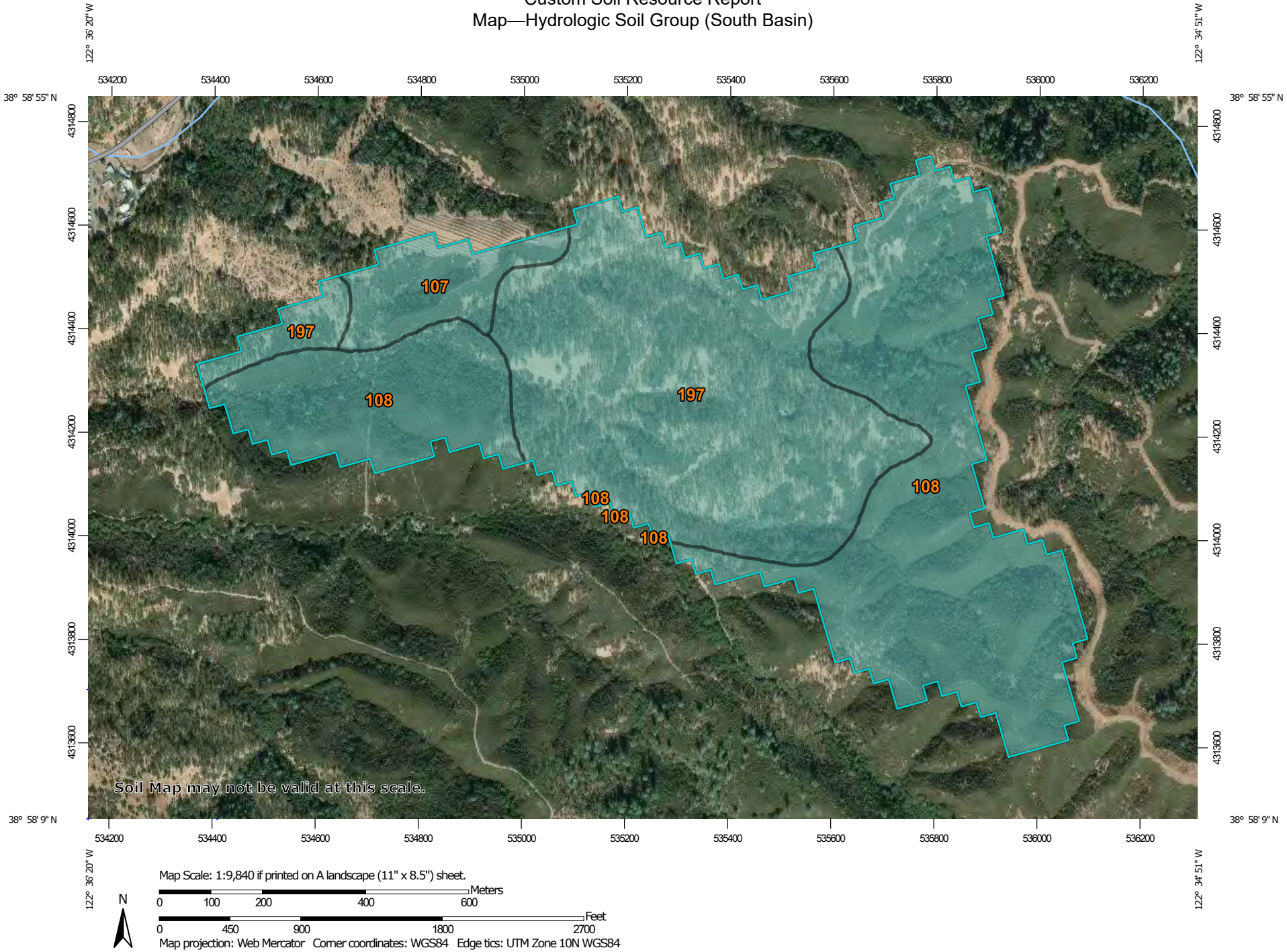
Rating Options—Hydrologic Soil Group (North Basin)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Custom Soil Resource Report
Map—Hydrologic Soil Group (South Basin)



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lake County, California
Survey Area Data: Version 17, Jun 1, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 18, 2016—Nov 4, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group (South Basin)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
107	Bally-Phipps complex, 15 to 30 percent slopes	C	13.8	6.2%
108	Bally-Phipps-Haploxeralfs association, 30 to 75 percent slopes	C	112.3	50.6%
197	Phipps complex, 30 to 50 percent slopes	C	95.8	43.2%
Totals for Area of Interest			**222.0**	**100.0%**

Rating Options—Hydrologic Soil Group (South Basin)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX F: PRISM CLIMATE GROUP PRECIPITATION 1895 TO 2022

PRISM Time Series Data
Location: Lat: 38.9795 Lon: -122.5974 Elev: 1640ft
Climate variable: ppt
Spatial resolution: 4km
Period: 1895 - 2022
Dataset: AN81m
PRISM day definition: 24 hours ending at 1200 UTC on the day shown
Grid Cell Interpolation: On
Time series generated: 2023-Oct-24
Details: http://www.prism.oregonstate.edu/documents/PRISM_datasets.pdf

Date	ppt (inches)
2022	15.22
2021	23.51
2020	9.96
2019	43.41
2018	23.64
2017	43.82
2016	35.78
2015	18.11
2014	31.46
2013	6.47
2012	30.7
2011	23.3
2010	34.1
2009	17.74
2008	19.47
2007	13.69
2006	34.88
2005	39.22
2004	33.67
2003	33
2002	28.88
2001	36.25
2000	27.57
1999	23.61
1998	52.63
1997	30.28
1996	37.16
1995	55.61
1994	21.35
1993	36.44
1992	30
1991	24.16
1990	16.83
1989	21.03
1988	17.65
1987	27.95

	ppt (in)	Period
Average	27.1	2000-2022
Minimum	6.5	2000-2022

Average	27.8	1895-2022
Minimum	6.5	1895-2022

1986	38.75
1985	16.72
1984	21.28
1983	62.55
1982	33.71
1981	31.37
1980	24.72
1979	35.12
1978	30.32
1977	19.26
1976	8.68
1975	24.4
1974	24.1
1973	41.73
1972	19.44
1971	17.76
1970	35.46
1969	34.18
1968	30.57
1967	27.64
1966	22.75
1965	26.01
1964	23.12
1963	28.58
1962	27.15
1961	20.11
1960	27.18
1959	20.71
1958	35.75
1957	30.94
1956	21.24
1955	25.12
1954	29.52
1953	21.3
1952	34.59
1951	29.88
1950	34.47
1949	16.88
1948	23.48
1947	16.86
1946	14.26
1945	29.37
1944	26.58
1943	21.34
1942	32.42
1941	45.3
1940	46.22

1939	12.71
1938	31.94
1937	34.52
1936	25.6
1935	25.57
1934	18.96
1933	20.95
1932	12.81
1931	25.09
1930	17.44
1929	15.37
1928	20.68
1927	28.57
1926	34.61
1925	26.23
1924	21.11
1923	14.71
1922	27.6
1921	24.22
1920	29.93
1919	23.09
1918	20.69
1917	13.07
1916	30.11
1915	35.75
1914	31.28
1913	26.33
1912	20.54
1911	33.97
1910	17.48
1909	45.5
1908	18.79
1907	35.81
1906	43.25
1905	23.19
1904	43.01
1903	26.85
1902	34.55
1901	26.29
1900	24.88
1899	36.11
1898	15.09
1897	26.48
1896	39.54
1895	33.64

APPENDIX G: THEIS EQUATION DRAWDOWN CALCULATIONS FOR THE PROJECT WELLS

	Well #1								Well #2								Notes:
Storativity	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	Storativity - Average of Multiple Sources (see below)
Test Drawdown (ft)	50	50	50	50	50	50	50	50	15	15	15	15	15	15	15	15	Drawdown during pump test
Yield Q (gpm)	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	Pump rate during pump test
SC Specific Capacity	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	2.53	2.53	2.53	2.53	2.53	2.53	2.53	2.53	Well Yield / Available Drawdown
T (gpd/ft)	1520.0	1520.0	1520.0	1520.0	1520.0	1520.0	1520.0	1520.0	5066.7	5066.7	5066.7	5066.7	5066.7	5066.7	5066.7	5066.7	Driscoll's (1968) Estimate for confined aquifer of T = 2000*Q/SC
T (ft^2/day)	203.2	203.2	203.2	203.2	203.2	203.2	203.2	203.2	677.3	677.3	677.3	677.3	677.3	677.3	677.3	677.3	gallon = 0.133681 cubic foot
Project Q (gpm)	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	Based on 24 hour storage refill rate during maximum daily demand
Q (ft^3/d)	3927	3927	3927	3927	3927	3927	3927	3927	3927	3927	3927	3927	3927	3927	3927	3927	conversion ft^3/d = 0.00519481 gpm
Time (days)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
r (ft)	50	100	200	300	400	500	600	700	50	100	200	300	400	500	600	700	
u	0.00385	0.01540	0.06160	0.13861	0.24642	0.38503	0.55444	0.75466	0.00116	0.00462	0.01848	0.04158	0.07393	0.11551	0.16633	0.22640	Fetter (2001) Equation 5.10
w(u)	4.9863	3.6115	2.2705	1.5327	1.0548	0.7252	0.4902	0.3166	6.1875	4.8047	3.4322	2.6440	2.1001	1.6934	1.3760	1.1218	Fetter (2001) Equation 5.11: W(u) ~ -0.5772-ln(u)+u-u^2/(2*fact2)
Drawdown [h-ho] (ft)	7.7	5.6	3.5	2.4	1.6	1.1	0.8	0.5	2.9	2.2	1.6	1.2	1.0	0.8	0.6	0.5	Fetter (2001) Equation 5.11
Drawdown [h-ho] (in)	92.0	66.7	41.9	28.3	19.5	13.4	9.0	5.8	34.3	26.6	19.0	14.6	11.6	9.4	7.6	6.2	
Available Drawdown (ft)	90	90	90	90	90	90	90	90	46	46	46	46	46	46	46	46	Total water depth measured at time of drilling
5% of Available Drawdown (ft)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	5% of total water depth

Sources: Applied Hydrogeology, Fourth Edition, C.W. Fetter. 2001

Groundwater Wells, Second Edition, F.G. Driscoll 1986. (https://sehydrogeology.com/using-specific-capacity-monitor-well-performance/#:~:text=The%20Specific%20Capacity%20of%20a,penetrated%20by%20the%20well%20screens.)

Storativity - Confined Aquifer (Sources)

Minimum	Maximum	**Average**	
0.00005	0.005	**0.0006259**	Average of all six estimates of Storativity
0.00001	0.0001		

Well #1 (using 2nd Source below)	0.00005	Aquifer Thickness*0.000001
Well #2 (using 2nd Source below)	0.000015	Aquifer Thickness*0.000001
Well #3 (using 2nd Source below)	0.00016	
Well #4 (using 2nd Source below)	0.000163	
Well #5 (using 2nd Source below)	0.000085	

Source: http://www.aqtesolv.com/aquifer-tests/aquifer_properties.htm

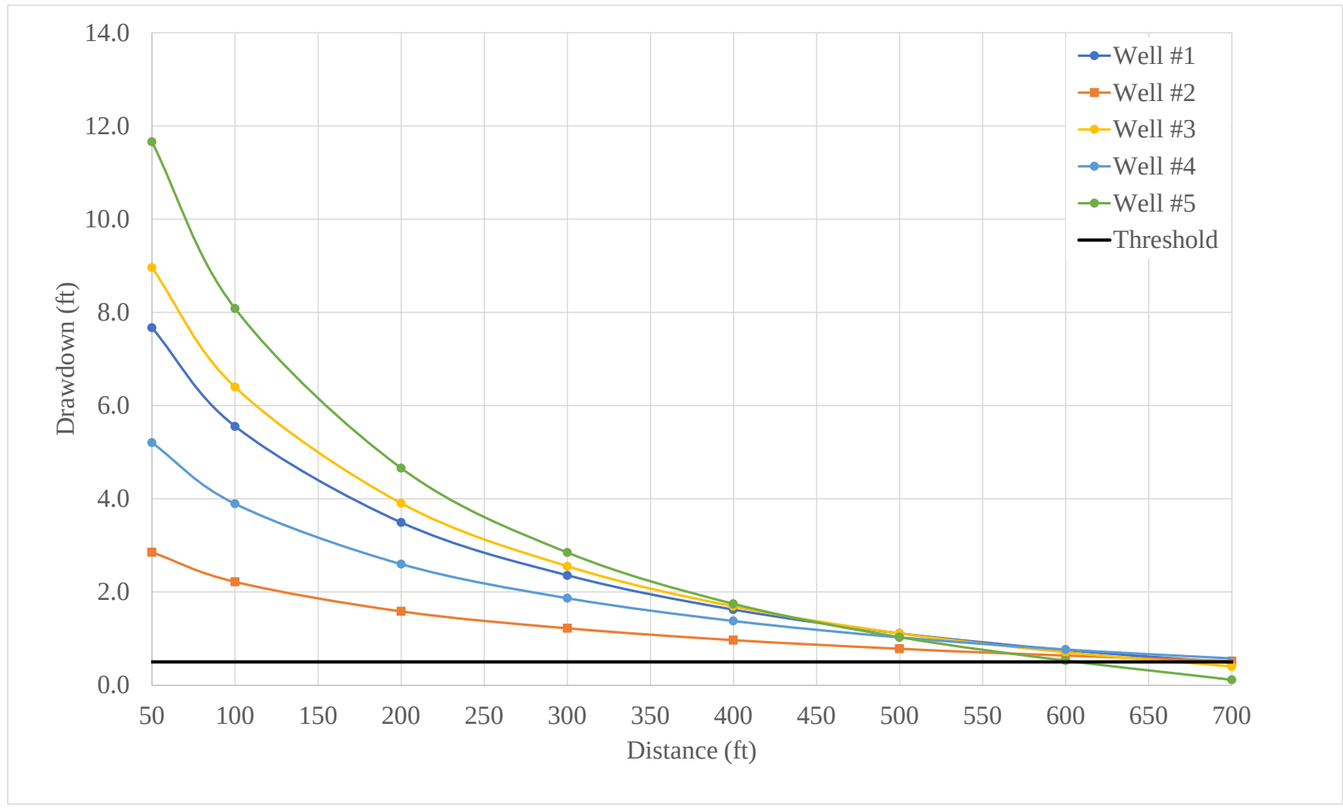
aquifer (or aquitard) thickness [L].

The typical storativity of a confined aquifer, which varies with specific storage and aquifer thickness, ranges from 5×10^{-5} to 5×10^{-3} (Todd 1980).

Specific storage is the volume of water that a unit volume of aquifer (or

Source: https://www.sciencedirect.com/topics/earth-and-planetary-

from the expansion of water and compaction of the aquifer, both of which are exceedingly small. For confined aquifers the storativity generally ranges between 0.0001 and 0.00001, and for leaky confined aquifers it is in the range of 0.001. One method to estimate storativity for confined aquifers is to multiply the aquifer thickness by 0.000001. The small storativity for confined aquifers means that to obtain a sufficient supply from a well there must be a large pressure change throughout a wide area. This is not the case with unconfined aquifers because the water derived is not related to expansion and compression but comes instead from gravity drainage and dewatering of the aquifer.



	Well #3								Well #4							
Storativity	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006
Well Drawdown (ft)	160	160	160	160	160	160	160	160	163	163	163	163	163	163	163	163
Yield Q (gpm)	100	100	100	100	100	100	100	100	200	200	200	200	200	200	200	200
SC Specific Capacity	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23
T (gpd/ft)	1250.0	1250.0	1250.0	1250.0	1250.0	1250.0	1250.0	1250.0	2454.0	2454.0	2454.0	2454.0	2454.0	2454.0	2454.0	2454.0
T (ft^2/day)	167.1	167.1	167.1	167.1	167.1	167.1	167.1	167.1	328.1	328.1	328.1	328.1	328.1	328.1	328.1	328.1
Project Q (gpm)	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4
Q (ft^3/d)	3927	3927	3927	3927	3927	3927	3927	3927	3927	3927	3927	3927	3927	3927	3927	3927
Time (days)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
r (ft)	50	100	200	300	400	500	600	700	50	100	200	300	400	500	600	750
u	0.00468	0.01873	0.07491	0.16855	0.29965	0.46820	0.67420	0.91766	0.00238	0.00954	0.03816	0.08586	0.15263	0.23849	0.34342	0.53660
w(u)	4.7915	3.4192	2.0878	1.3648	0.9052	0.5951	0.3776	0.2159	5.4638	4.0846	2.7266	1.9619	1.4493	1.0805	0.8055	0.5099
Drawdown [h-ho] (ft)	9.0	6.4	3.9	2.6	1.7	1.1	0.7	0.4	5.2	3.9	2.6	1.9	1.4	1.0	0.8	0.5
Drawdown [h-ho] (in)	107.5	76.7	46.9	30.6	20.3	13.4	8.5	4.8	62.5	46.7	31.2	22.4	16.6	12.4	9.2	5.8
Available Drawdown (ft)	160	160	160	160	160	160	160	160	163	163	163	163	163	163	163	163
5% of Available Drawdown (ft)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2

For well 3 & 4 used available drawdown = WCR depth - WCR static water level

	Well #5							
Storativity	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006
Test Drawdown (ft)	85	85	85	85	85	85	85	85
Yield Q (gpm)	38	38	38	38	38	38	38	38
SC Specific Capacity	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
T (gpd/ft)	894.1	894.1	894.1	894.1	894.1	894.1	894.1	894.1
T (ft^2/day)	119.5	119.5	119.5	119.5	119.5	119.5	119.5	119.5
Project Q (gpm)	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4
Q (ft^3/d)	3927	3927	3927	3927	3927	3927	3927	3927
Time (days)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
r (ft)	50	100	200	300	400	500	600	700
u	0.00655	0.02618	0.10473	0.23564	0.41891	0.65455	0.94255	1.28292
w(u)	4.4583	3.0915	1.7812	1.0900	0.6679	0.3940	0.2024	0.0451
Drawdown [h-ho] (ft)	11.7	8.1	4.7	2.8	1.7	1.0	0.5	0.1
Drawdown [h-ho] (in)	139.9	97.0	55.9	34.2	21.0	12.4	6.4	1.4
Available Drawdown (ft)	167	167	167	167	167	167	167	167
5% of Available Drawdown (ft)	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4

Drawdown during pump test
Pump rate during pump test