HYDROGEOLOGIC ASSESSMENT REPORT

19955 Grange Road
Middletown, CA, 95461
APN 014-290-08

PREPARED FOR:

Rancho Lake, LLC
19955 Grange Road
Middletown, CA 95461

July 1, 2021
Revised August 31, 2023

PREPARED BY:

HURVITZ ENVIRONMENTAL SERVICES INC.
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Certified Hydrogeologist

PROJECT NO. 5148.01

HURVITZ ENVIRONMENTAL

GEOLOGIC & ENVIRONMENTAL CONSULTING

August 31, 2023

Rancho Lake, LLC
19955 Grange Road
Middletown, CA 95461

RE: Hydrogeologic Assessment Report
19955 Grange Road
Middletown, CA
APN 014-290-08, 014-300-02, 014-300-03, 014-300-04
Hurvitz Environmental Project No. 5148.01

Rancho Lake, LLC:

Hurvitz Environmental Services, Inc. (HES) is pleased to submit this Hydrogeologic Assessment Report for the above referenced property. HES prepared this Report in accordance with the Lake County Cannabis Ordinance. The purpose of this Report was to outline the sites proposed water usage rates as well as to evaluate the aquifer beneath the site to determine if it can adequately meet the sites water demands without creating overdraft conditions, significantly affecting neighboring wells or cause a critical reduction in nearby streamflow.

Based on the information and assessments contained herein, we conclude that the proposed well discharge capacity and rate of recharge are sufficient to sustainably provide for the projected annual water use at the site. The quantity of groundwater to be used for the project is unlikely to result in significant decline in regional groundwater availability or depletion of groundwater resources over time. The potential for the project water-use to cause well interference is also considered minimal.

We appreciate the opportunity to provide you with these services. Please do not hesitate to contact us at your convenience, should you have any questions or comments regarding this report or our recommendations.

Sincerely,
HURVITZ ENVIRONMENTAL SERVICES, INC

Lee S. Hurvitz, PG# 7573 CHG #1015
Certified Hydrogeologist

CERTIFIED HYDROGEOLOGIST
LEE S. HURVITZ
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STATE OF CALIFORNIA

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We understand that Rancho Lake LLC (the applicant) is applying to Lake County for approval to develop a commercial cannabis cultivation operation that will ultimately be composed of twenty (20) A-Type, 3 "Medium Outdoor" license types, with up to 854,940ft² (19.63 acres) of outdoor canopy area. Proposed ancillary facilities include five (5) 6,000ft² Harvest Storage & Staging Areas, two (2) 120ft² Pesticides & Agricultural Chemicals Storage Areas, and a 120ft² Security Center/Shed.

The project property is composed of four (4) parcels totaling approximately 1,627 acres (Lake County APN's 014-290-08 and 014-300-02, 03, & 04), all of which are owned by Comstock Ranch, LLC. James Comstock (Managing Member of Comstock Ranch, LLC) has given Rancho Lake permission to establish the proposed cultivation operation on one parcel (014-290-08), and conduct the proposed cannabis cultivation activities, once the appropriate permits and licenses have been obtained.

According to the Lake County Cannabis Ordinance, development of property with the intent to cultivate cannabis requires a Water Use / Water Availability Study. Therefore, on behalf of the applicant Hurvitz Environmental Services (HES) conducted a Hydrogeologic Assessment of the site and prepared this Report in accordance with the Lake County requirements.

This Hydrogeologic Assessment Report includes the following elements:

- Estimates of existing and proposed water uses for the property.
- Characterization of local geologic and hydrogeologic conditions including defining water sheds and sub-basins.
- Review of a well yield test and recharge evaluation.
- Well Completion Report Assessment.
- Discussion on proposed methods for water level and water usage monitoring.
- Calculations on water availability and aquifer recharge.
- Evaluations of existing groundwater monitoring data.
- Assess potential for well interference between the project well and neighboring wells.

2.0 SITE DESCRIPTION

The site lies in the eastern half of Coyote Valley in unincorporated Lake County, California, approximately 4.5 miles northeast of downtown Middletown CA. (**PLATE 1 – SITE LOCATION MAP**). Access to 19955 Grange Road, Middletown is from Comstock Ranch Road, a gravel road which runs north off of the paved Grange Road. Locking metal gates across Grange and Comstock Ranch Roads will control access to the project property and the area of the proposed cultivation operations.

The site consists of four separate parcels identified by Lake County Assessor's Office as Assessor's Parcel Nos. (APN) 014-290-08, 014-300-02, 014-300-03, and 014-300-04. The total assessed acres for the project are 1,626.97. All cultivation will occur on parcel 014-290-08

Current and past land uses of the project property are/were rural residential with intensive and extensive agriculture. The cultivation parcel (APN 014-290-08) has been improved with two groundwater wells (a domestic well and irrigation well), a residence/house, and five accessory structures/buildings (used to store hay, tools, and equipment, and to house livestock). The proposed cultivation operation will be established in portions of the site that have been used to farm oats and hay, as well as for cattle grazing, since at least the early 1900's. Site Photographs are presented in **APPENDIX A**.

2.1 USGS 7.5 - MINUTE QUARDGRANLE MAP

HES reviewed the United States Geological Survey (USGS) Middletown 7.5-minute Quadrangle Map, 2018, (**PLATE 2 – USGS TOPOGRAPHIC MAP**). The approximately 1,627-acre site encompasses a variety of topographic terrains from flat grasslands to rolling hills to a mountain peak at 1,710 feet (ft) above mean sea level (MSL) on parcel APN 014-300-03. The lowest elevation in the project area is 940 feet MSL on the south side of APN 014-290-08.

The proposed cultivation parcel (014-290-08) is bordered to the north by a Class I watercourse identified as Putah Creek. Putah Creek flows from east to west along the northern border of the site before turning northerly just beyond the site's western boundary. Crazy Creek (a Class II stream) flows southerly across the eastern border of the site before turning westerly and flowing westerly across the southern border of the cultivation site. Crazy Creek flows into Putah Creek just west of the cultivation site. Multiple unnamed ephemeral Class III watercourses flow from the southern portions of the site into Crazy Creek and a large complex wetland occupies the floor of a small valley in the southern portion of the cultivation parcel.

The area of the proposed cultivation operation is accessed via a road crossing above Crazy Creek that is composed of a 5-foot diameter CMP culvert with native fill and an 8' wide cattle guard on concrete abutments, **APPENDIX B – ENGINEERED SITE PLANS**.

2.2 GEOLOGICAL CONDITIONS

HES reviewed the Geologic Map of the Santa Rosa Quadrangle, 1982, prepared by the California Division of Mines and Geology. According to the Map reviewed, the site lies within a geologic region characterized by three separate geologic formations. The southeastern portion of the site is underlain by Jurassic aged Serpentinized Ultramafic Rocks (um), the northeastern portion of the site is underlain by the Plio-Pleistocene aged Clear Lake Volcanics, and the northwestern portions of the site is underlain by Quaternary aged Alluvial Deposits. The proposed cannabis operations and the proposed project irrigation well are located in the area delineated as Quaternary aged Alluvial Deposits **PLATE 3 – GEOLOGIC MAP.**

2.3 REGIONAL GROUNDWATER

The project site is located within the Upper Putah Hydrologic Region (sub-basin - HUC-8), the Upper Putah Creek Watershed Region (watershed -HUC-10), and the sub-watershed-HUC-12 Crazy Creek – Putah Creek, (sub-watershed-HUC-12 180201620307) all within the jurisdiction of the Central Valley Regional Water Quality Control Board. The Upper Putah Creek Watershed encompasses 178,477 acres in southeast Lake County and some of Napa and Solano Counties. It is approximately 35 miles in length and 20 miles at its widest point. Elevations range from 440 feet at Lake Berryessa to 4,722 feet at Cobb Mountain.

The project site is also within the Coyote Valley Basin located in the southeastern portion of Lake County along Putah Creek and is part of the Upper Putah Inventory Unit. Coyote Valley Basin is a designated as A very Low Priority Groundwater Basin by the California Department of Water Resources. The basin is 5 miles long and 2.5 miles wide. Clear Lake Volcanics border Coyote Valley Basin to the east, serpentinized ultramafic rocks border the basin to the south and west, and the Franciscan Formation borders the basin to the north. Low hills of basalt are found in the south and southeastern part of the valley. Holocene alluvium is the primary water-bearing unit in the basin and overlies the Cache Formation. The alluvium consists of floodplain and channel deposits of Putah Creek and alluvial fan deposits in the southwestern portion of the valley and at the valley boundaries. The deposits are primarily composed of poorly stratified sand and gravel, with limited fine-grained material. The formation is predominantly interbedded coarse sand and gravel, and ranges from about 100 to 300 feet thick (DWR 1976[1]). Groundwater within the upper 100 feet of the formation is largely unconfined (Peterson 1996[2]). Wells drilled in the alluvium produce on average 1,000 gallons per minute (Aust 2006[3]).

[1] California Department of Water Resources (DWR). September 1976. Southwestern Sacramento Valley Ground Water Investigation. California Department of Water Resources, Northern District. Draft Memorandum Report.
[2] Peterson, David H. 15 October 1996. (Trans Tech Consultants). Memorandum to Robert Wagner of Wagner and Bonsignore Consulting Civil Engineers, Sacramento, California.
[3] Aust Mel. 04 January 2006. (Hidden Valley Lake Community Services District). Telephone conversation with John Ayres of Camp Dresser and McKee Inc., Sacramento, California.

Putah Creek is the main groundwater recharge source for Coyote Valley Basin however some recharge occurs from precipitation on the alluvial plain and from side-stream runoff. Water levels in the basin are typically between 10 to 15 feet below ground surface (bgs) on average in the spring. Spring groundwater levels have been generally stable throughout the valley. Spring to summer drawdown of the water table varies by position in the Coyote Valley Basin, with areas in the west experiencing larger drawdown than the rest of the basin. Spring to summer drawdown in the western areas ranges from 20 to 25 feet, and drawdown on the eastern side of the valley ranges from 5 to 10 feet. The general direction of groundwater flow in the Coyote Valley is to the southeast, in the direction of Putah Creek flow. In 1960 the DWR estimated that there is 29,000-acre-ft of storage capacity in the aquifer and 7,000-acre-ft of useable storage capacity. Historically, the average-year agricultural groundwater demand in the Coyote Valley basin is approximately 671 acre-ft/year and according to the Sustainable Management Act Dashboard Prioritization Site[4] the Coyote Valley Basin has a current groundwater usage rate of 0.49 acre-feet/acre.

2.4 WATER LEVEL ELEVATION DATA

HES Reviewed historical water level data from two (2) nearby observation wells on the State's Water Data Library[5]. The observation well identified as 11N-06W-27M1 is located approximately 900 feet southeast of the proposed project well and is the closest well to the site. The observation well identified as 11N-06-29M1 is located approximately 2 miles southwest of the proposed project well. The locations of the observation wells relative to the site are shown on **APPENDIX C – TIME VS. ELEVATION GRAPHS** and on the **Plate 4A - Site Plan.** Between the time period of 1950 -2009, Well # 11N-06W-27M1 has shown decreasing water levels with an average decline of approximately 9 feet over that time period. Well # 11N-06W-29M1 has also shown a slightly decreasing water level trend during the time period between 1960-2020 with an average decline of approximately 1-2 feet.

While the well 11N-06W- 29M1 has had a fairly stable 60-year water level history, well # 11N06W-27M1 has shown a more consistent decline. Overall, the data suggests that the water levels in the area have slowly been declining over the past sixty to seventy years. The declining water levels observed are not considered significant given the period of time involved, and are likely attributed to the increased residential density in the area, as well as, from irrigation demands for the Hidden Valley Lake Golf Course. The Hidden Valley Lake Golf Course and surrounding residential community were developed in the late 1960's.

[4] https://gis.water.ca.gov/app/bp-dashboard/final/#
[5] https://wdl.water.ca.gov/WaterDataLibrary/

3.0 SITE DEVELOPMENT AND WATER USE

We understand that Rancho Lake LLC (the applicant) is applying to Lake County for approval to develop a commercial cannabis cultivation operation that will ultimately be composed of twenty (20) A-Type, 3 "Medium Outdoor" license types, with up to 854,940,750ft² (19.63 acres) of outdoor canopy area. Proposed ancillary facilities include five (5) 6,000 ft² Harvest Storage & Staging Areas, two (2) 120ft² Pesticides & Agricultural Chemicals Storage Areas, and a 120ft² Security Center/Shed. The project property is composed of four parcels totaling approximately 1,627 acres (Lake County APNs 014-290-08 and 014-300-02, 03, & 04), all of which are owned by Comstock Ranch, LLC.

It is our understanding that there will be two cannabis harvests per year and the cultivation activities will occur between May and November (214 days) each year. The Site irrigation well located on the east side of the cultivation parcel (APN 014-290-08) will provide water for cannabis irrigation. Discussions on the well construction and well yield are presented in Section 3.5 and 3.6 of this Report. The approximate locations of the proposed outdoor cultivation areas, domestic well and other site features are shown on (**PLATE 4A –SITE PLAN OVERVIEW)**.

As part of the site development the Applicant also plans to install twenty (20) 5,000-gallon, poly, water-storage tanks proximate to the cultivation areas. Irrigation of the individual cannabis plants will then be performed from the poly tanks through drip emitter systems.

The estimated annual water usage for the project development (19.63-acre canopy) is approximately 16,000,000 gallons or 49.1 acre-feet. The project plans do not involve any water diversions, or imported water so all project water will be derived from the site irrigation well. Details on the cultivation projects water usage, including breakdowns of average and peak monthly usage, are presented in **TABLE 1A and 1B**.

3.1 OUTDOOR CULTIVATION

As discussed, the project will involve a 19.63-acre canopy of outdoor cannabis development with two annual harvests scheduled/year all on parcel (APN 014-290-08). The applicant has not had any specific experience growing cannabis at this location but the applicant is an experienced cannabis cultivator and is designing the system to use minimal amounts of water. The first annual crop will be planted by May and harvested by the end of July followed by a second crop that will be planted in July and harvested in November. All cannabis will be grown utilizing point emitter drip irrigation and irrigate early in the day while temperatures are coolest to minimize evaporation rates.

It is our understanding that the average cannabis water irrigation rate for indoor/ greenhouse farming is 4-acre ft/acre/year, and 2-acre ft/acre/year for outdoor cannabis cultivation. Based on the

proposed farming methods discussed above, and the two scheduled harvest per year, the applicant estimates that they will use approximately 2.5 acre-feet/acre/year for the 19.63 acres of proposed cultivation for a total of 49.1 acre-feet/year. An estimate of monthly water use for cannabis irrigation is presented in **TABLE 1- TOTAL SITE WATER USAGE - IRRIGATION WELL**.

3.2 RESIDENTIAL WATER USE

There is one residential dwelling on the project property. Domestic water use for the residents is supplied by a separate domestic well as shown on **PLATE 4B –SITE PLAN DETAIL** and in the **APPENDIX B – ENGINEERED SITE PLANS**. The existing domestic well is approximately 3,000 feet east of the proposed project irrigation well. Typically, residential water usage is between 0.5 and 1 acre-foot per year. Since the domestic water use at this site is obtained from a separate domestic well that is over ½ mile from the proposed cannabis irrigation well, domestic water use is considered de minimis and was not factored into the water use assessment for this property.

3.3 EMPLOYEE WATER USE

We understand that the Project will require two full-time farm mangers, as well as, several part-time seasonal employees. Therefore, for the purpose of this Assessment we estimate that the project will require an average of ten full-time employees throughout the growing season (214 days). Potable water for farm workers will come from the proposed project irrigation well. Using the Napa County Water Availability Guidance Document[6] estimate of 15 gallons of water utilized per day per cultivation worker on site, we calculated the following groundwater usage for the Project:

- Annual Onsite Worker Water Use = 10 (average number of daily employees) x 15 gallons/day (daily employee water usage) x 214 days/year) = **32,100 gallons /year = 0.13 acre-ft/year = Employee Water Use**

So, the Annual Project Water Use estimate is **49.1 acre-ft/year** (19.63 acres of canopy area) + **0.1 acre-ft/year** (Employee Water Usage) = **49.2 acre-ft/year**

[6] Water Availability Analysis (WAA) Guidance Document, Napa County, Adopted May 12, 2015.

3.4 LIVESTOCK

We understand that the property owner historically grazed cattle on the property but now only occasionally grazes a small herd of cattle on portions of the subject property. We have also estimated that after cannabis planting there will be approximately 300-acres of pasture land onsite suitable for cattle grazing. Sonoma County provides an estimate for livestock water use at 0.05 acre-feet/acre/year[7]. Therefore, using this water use rate we have provided a water use estimate for the total volume of water needed for cattle based on the estimated 300-acres of pasture available onsite.

300 acres (pasture land onsite) x 0.05 acre-feet/year (livestock usage rate) =
15 acre-feet/year – Potential Livestock Usage Rate

TABLE 1A – TOTAL SITE WATER USAGE FOR 19.63-acre CANOPY

Source	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total Gallons/AF
	----------gallons/acre-ft----------												
Cultivation (19.63-acres)	0	0	0	0	2.1M/ 6.5AF	2.4M/ 7.3AF	2.5M/ 7.7AF	2.7M/ 8.3AF	2.5M/ 7.7AF	2.3M/ 7AF	1.5M/ 4.6AF	0	16M/ 49.1AF
Employees	0	0	0	0	4,000	4,000	4,000	5,000	5,000	5,000	5,100	0	32,100/ 0.1AF
Potential Livestock	0	0	0	0	600,000	700,000	700,000	800,000	800,000	700,000	587,765	0	4,887,765 15Af
TOTAL SITE USAGE	**0**	**0**	**0**	**0**	**2,704,000**	**3,104,000**	**3,204,000**	**3,505,000**	**3,305,000**	**3,005,000**	**2,092,865**	**0**	**20,919,865 64.2AF**

Based on these estimates for onsite water use it appears that the total annual water usage for cannabis irrigation and employees is approximately 49.2 acre-ft/year (16,032,100 gallons) and the total potential water use for the site, including future livestock is 64.2 acre-feet/year (20,919,865). The peak water demand for the site will occur annually in August, with the peak daily water demand being approximately 0.35 acre-feet (113,065 gallons/day).

Assuming cannabis operations over 214 days from early May until late November, the average daily water demand for cannabis irrigation is expected to be 0.23 acre-feet (74,916 gallons/day) and peak cannabis irrigation demand will be 0.27 care-feet (87,097 gallons/day).

[7] Sonoma County Permit and Resource Management Department, Policy and Procedure 8-2-1, Appendix A.

3.5 IRRIGATION WELL INFORMATION

Review of the Well Completion Report for the onsite irrigation water well (Well Completion Report No. 002299) indicates the site well was drilled to a total depth of 160 feet and completed at 140 feet (**APPENDIX D - WELL COMPLETION RPEORT**). This well was completed on February 11, 2021 by Weeks Drilling and Pump Co. under Drillers License (C-57) #177681. The driller logged the first 129 feet as alluvial sediments, sand, gravel and clay. The bottom 31 feet was logged as clay. The driller noted that static ground water level was 22 feet below grade (bg). And the well was installed with a 50-foot sanitary seal.

The shallow groundwater elevation indicates that the aquifer is likely unconfined. Further, the well log demonstrated fairly consistent geologic conditions without any thick clay layers or aquitards which also indicates unconfined aquifer conditions. The well screen interval extends from 50 to 130 feet bg, indicating an aquifer thickness of at least 80 feet. The Well Completion Report also noted a well yield of 300 gallons per minute (gpm) from a 1 hour well test with a drawdown of 113 feet. This well log description appears to be consistent with aquifers associated with alluvial basins which tend to store large volumes of water. The Well Completion Report is attached in **APPENDIX D**.

3.6 WELL YIELD TEST

On July 6, 2021, JAK Drilling & Pump performed a well yield test for the proposed cultivation irrigation well (Well No. 002299). The initial water level was measured at 17 feet below the top-of casing. The well did not a have a pump installed so a temporary submersible pump was placed in the well. The well yield test lasted for approximately 6-hours (360 minutes) pumping at an average rate of 355gpm. Approximately 145,869gallons were pumped from the well during the test. Drawdown was 37 ft. after 6-hours of pumping and after pumping was completed, the well recovery data showed that the water level had recovered to 73% in 40-minutes. A Specific Capacity of 9.59 gpm/foot of drawdown (i.e., 355 gpm / 37 feet) was calculated from this test data. The well yield test data and along with the well pump performance datasheet are attached in **APPENDIX E - WELL YIELD TEST**.

The well yield test data suggests that the onsite irrigation well can produce approximately 9.59gpm for every foot of drawdown in the well during six hours of pumping. The well recovery observations demonstrated that the well may be able to produce this water without causing overdraft conditions. With the site aquifer extending to approximately 130 feet bgs, that calculates to approximately 113 ft. of available well drawdown (17ft. (static water level) - 130 ft. (aquifer depth = 113 ft. of available drawdown). This further suggests that well has ample capacity to meet the water demands of the project.

Based on the well yield test and the Well Completion Report information, it does appear that the well can produce a flow rate of at least 355-gpm for 6-hours a day. Based on the Applicants average daily irrigation and employee water demand of 74,916 gallons/day we estimate it would take approximately 3-hours and 31-minutes of pumping at 355-gpm. The peak irrigation/employee water demand at the site of 113,065 gallons per day could be met with approximately 5 hrs. and 18 minutes of pumping at 355gpm. Based on the yield test results and the anticipated water demand for the project is evident that the aquifer beneath the site can sustainably produce the water needed to meet the project demands.

3.7 MONITORING AND REPORTING

The applicant currently does not have a water totalizing meter installed at the well head. Once the project is further developed the applicant plans to design an irrigation system to pump water from the well to the cultivation sites. Once constructed, a water meter will be installed at the well head and utilized to measure total water use associated with cannabis irrigation. Monthly water usage totals will be recorded by the applicant in a log book that will be kept onsite and provided to the oversight agencies upon request.

Depth to water measurements will also be recorded from the project well on a monthly basis during the growing season. A NSF/ANSI 61 compliant positive displacement mechanical brass totalizing meter, and water level meter equipped with data logging capabilities, will be installed on the existing water supply groundwater well prior to cultivation. Inline water meters compliant with California Code of Regulations, Title 23, Division 3, Chapter 2.7 will also be installed on the main water supply lines running between the groundwater well and the storage tanks of the cultivation operation. The applicant will obtain monthly depth to water readings directly from the site well. The readings will be taken on the same day of each month and prior to daily pumping activities. Results of the water level measurements will also be recorded in a log book and stored onsite and provided to the oversight agencies upon request.

4.0 WATER BALANCE INFORMATION

4.1 PRECIPITATION

Precipitation, primarily as rainfall is the major source of inflow to the Coyote Valley Watershed. Though there are no climate stations on site or in the immediate vicinity, we estimate that the seasonal precipitation for the site is 39-inches/year**.** Based on this precipitation it can be reasonably expected that approximately 3.25 acre-ft of rain falls on every acre of the site annually, or 5,288 acre-ft over the 1,627-acres of the cultivation parcel.

4.2 GROUNDWATER RECHARGE

Groundwater recharge is the replenishment of an aquifer with water from the land surface. It is usually expressed as an average rate of inches of water per year, similar to precipitation. Thus, the volume of recharge is the rate times the land area under consideration times the time period, and is usually expressed as acre-ft per year. In addition to precipitation, other sources of recharge to an aquifer are stream and lake or pond seepage, irrigation return flow (both from canals and fields), inter-aquifer flows, and urban recharge (from water mains, septic tanks, sewers, drainage ditches).

For this site, the alluvial aquifer is considered unconfined. Drainage features that intersect and border the site have likely eroded through some of the overlying layers and are contributing to the recharge of the site's aquifer through the stream bottom. However, it is also likely that a portion of the rain water falling directly on the site infiltrates the ground surface and migrates downward through the soil matrix until it recharges the shallow aquifer. In addition, there are nearby wetlands to the southeast and ponds to the south that may be contributing to the recharge of the aquifer as well.

To estimate the groundwater recharge at the site we first assumed that the recharge to the aquifer is primarily through rainfall and that all rainfall accumulated within the 367.38-acre cultivation property drains to Crazy Creek or Putah Creek. Therefore, the annual precipitation available for recharge onsite can initially be estimated using the following data and equation.

> 1,627-acres x 3.25 feet (Annual precipitation in Cumulative Impact Area) =
> **Estimated Annual Precipitation Onsite = 5,288 acre-ft/year**

However, this estimate does not account for surface run-off, stream underflow, and evapo-transpiration that occurs in all watersheds. According to the Santa Rosa Plain Groundwater Management Plan, the long-term average precipitation that is available for groundwater recharge is approximately 15%[8]. However, in steep mountainous areas the groundwater recharge rate can

[8] Santa Rosa Plain Groundwater Management Plan, Sonoma County Water Agency, 2014, Prepared by the Santa Rosa Plain Basin Advisory Panel.

be as low as 1.67%[9]. Since this site has some mixed topography with low-lying areas with alluvial sands and gravels as well as upland areas where runoff is high, we estimate that the long-term average precipitation that recharges groundwater within the entire site is approximately 15%. With this data and the precipitation data presented above, we can re-calculate the groundwater recharge by using the following equation.

5,288 acre-ft/year (annual precipitation onsite) x 0.15 (long term average for recharge) =
793.2 acre-ft/year Estimated Groundwater Recharge

Based on the estimated annual recharge to the site aquifer (~793.2 acre-feet/year) and the estimated annual project usage (49.2 acre-feet/year), it appears that the Applicant will have enough water to meet their demands without causing overdraft conditions.

4.3 DROUGHT CONDITIONS

The recharge assessment presented above is based on a 5-year average from 2013 through 2017. If we were to perform a recharge analysis of one single year using a value that is 50% of the 5-year average presented above, we could estimate the possible low-end value for annual aquifer recharge as follows.

793.2 acre-feet/year (average aquifer recharge) x 0.5 (drought factor) =
396.6 acre-feet/year - Estimated Groundwater Recharge for Severe Drought Year

Based on the estimated annual recharge to the site aquifer during severe drought (396.6) acre-feet/year) and the estimated total Site groundwater usage (64.2 acre-feet/year), it appears that the Site has sufficient groundwater resources to meet the proposed demands of the project and potential livestock grazing without creating an aquifer overdraft condition. Further, the Sites proposed annual groundwater use rate of 0.03acre-feet/Site-acre (49.2 acre-feet/year / 1,627-acres) is well below the Coyote Valley Groundwater Basin usage rate of 0.49 acre-feet/Basin-acre[6]

[9] Metzger, L.F., Farrar, C.D., Koczot, K.M., and Reichard, E.G., 2006, Geohydrology and Water Chemistry of the Alexander Valley, Sonoma County, California: U.S. Geological Survey Scientific Investigations Report 2006-5115, 83 p.

5.0 POTENTIAL IMPACTS TO STREAMS AND NEIGHBORING WELLS

To evaluate potential well pumping impacts to surface water bodies or wells on other properties, the potential lateral extent of pumping from the planned project well was estimated. Using general relationships discussed in Driscoll (1986)[10]**,** we estimated the lateral pumping influence using information from the 2021 well yield test performed by JAK Drilling and Pump. An approximate relationship between specific capacity calculated from the well yield test and aquifer transmissivity was used to obtain aquifer characteristics and estimate a potential radius of pumping influence. Transmissivity was estimated for an unconfined aquifer, using the relationship of specific capacity (yield/drawdown) x the coefficient of 1,500 (unconfined aquifer). To develop the slope of the drawdown curve from the pumping well, the value of Δs (drawdown over one log graph cycle) was calculated for a distance-drawdown relationship, where $T = 528Q/\Delta s$ (Driscoll,1986, Equation 9.11). The analysis is shown on the attached semi-log plot, **APPENDIX F – RADIUS OF PUMPING INFLUENCE**

As estimated, pumping the project well at 355 gpm with a drawdown of 37 feet indicates a specific capacity of 9.59 gpm/foot drawdown. Using this data and applying it to the site, we calculated a zone of pumping influence extending approximately 220 feet from the well for an unconfined aquifer. No neighboring wells were identified within the 220 radius of pumping influence. Therefore, it does not appear that pumping for cultivation will have a significant effect on nearby domestic wells.

According to the Engineered Site Plan (**APPENDIX B**), the irrigation well is located approximately 180 feet from the flood zone for Putah Creek and approximately 230 feet from the current Putah Creek channel. The radius of pumping influence graphs suggest that pumping would not have a direct effect on stream flow at this distance. However, for the purposes of this analysis, streamflow depletion is defined as the reduction in streamflow resulting from groundwater pumping. Streamflow depletion is a consequence of the law of physics requiring the conservation of mass applied to water balance models describing the movement of water in watersheds and groundwater aquifers. In such water balance models, inflows to an aquifer must be balanced by outflows from the aquifer adjusted for changes in the volume of water in storage. In most watersheds, streamflow accounts for the majority of outflow; as groundwater pumping proceeds, the volume of water supplied to wells is largely balanced by decreases in streamflow and/or aquifer storage. In the short-term, water supplied to wells is derived primarily from decreases in aquifer storage. Over longer periods these storage changes generally stabilize and streamflow depletion becomes the primary source of water pumped from wells[11].

[10] Groundwater and Wells, Second Edition, Fletcher G. Discoll, 1986, published by Johnson Division, St. Paul Minnesota, 1089p.

[11] Barlow, P.M., & Leake, S.A., 2012. Streamflow Depletion by Wells – Understanding and Managing the Effects of Groundwater Pumping on Streamflow, U.S. Geological Survey Circular 1376, 84 p.

For a conceptual watershed water balance with a control volume including groundwater aquifers, the status of the hydrologic system can be expressed most simply as:

Inflow = Outflow +/- Change in Storage

For a water balance describing a groundwater system, inflows to an aquifer typically include groundwater recharge and subsurface inflow. Outflow terms typically include streamflow, groundwater pumping, evapotranspiration from groundwater, and subsurface outflow[12]. Over long periods of time (years or decades), groundwater recharge generally represents the majority of inflow to an aquifer and stream baseflow (streamflow) and groundwater pumping generally represent the majority of outflow. Consequently, an approximate aquifer water balance can be restated as:

Groundwater Recharge ≈ Streamflow + Groundwater Pumping +/- Change in Storage

As groundwater pumping increases, those increases must be balanced by either reduction in streamflow (streamflow depletion), reductions in storage, or increases in groundwater recharge. Over the long-term, changes in storage and recharge generally stabilize such that the majority of water supplied to wells is balanced by streamflow depletion[8].

As the rate of groundwater pumping approaches the rate of groundwater recharge, streamflow approaches zero; this scenario is equivalent to a ratio of groundwater pumping to groundwater recharge equal to one. From these relationships, it can be seen that the ratio of groundwater pumping to groundwater recharge (i.e., groundwater pumping divided by groundwater recharge) provides an objective, hydrologically significant, indicator of the relative magnitude of streamflow depletion occurring in a given watershed. To determine the stream depletion for the Site itself, HES used available data from the USGS Special Bulletin 118[13] and the parameters and values that were discussed in the Site Water Use and Water Balance Sections of this Assessment Report.

Site Specific Groundwater Data

- Mean annual groundwater use = 0.03 acre-feet/acre/year
- Groundwater Recharge = 0.4875 acre-feet/acre/year
  (3.25 feet/year (average rainfall) x 0.15 (estimated recharge rate)
- Pumping Ratio (Water Use/Recharge) **6.15%**

[12] Healy, R.W. (2010) Estimating Groundwater Recharge. Cambridge University Press, Cambridge.
[13] https://gis.water.ca.gov/app/bp-dashboard/final/#

To classify each subwatershed as having a Low, Medium, or High level of streamflow depletion we used the findings of Richter et al. (2012)[14] who proposed presumptive standards for environmental flow protection in the absence of detailed studies evaluating site-specific environmental flow needs. A high level of ecological protection is presumed to be provided when flow alterations are no greater than 10% and a moderate level of protection is provided when flow alterations are in the 11-20% range[12]. The distributed model scenarios indicate that streamflow depletion of 10% or less occurs when the groundwater pumping ratio remains below ~5% and streamflow depletion of 11-20% occurs when the groundwater pumping ratio remains below ~10%.

Based on this criterion, the Site is located within a range that provides a "high level of ecological protection" and is significantly below the Coyote Valley Basin Usage rate of 0.49 acre-feet/acre/year and pumping ratio of 68%[15]. As proposed, the Sites proposed pumping ratio will be 56% less than the Basin Average and appears to be consistent with the Coyote Valley Basin Basin Prioritization Assessments. As a result, stream depletion is not considered a significant concern for this project at this time.

[14] Richter, B.D., Davis, M.M., Aspe, C., and Konrad, C., 2012. A Presumptive Standard for Environmental Flow Protection, River Research and Applications 28: 1312-1321.
[15] https://gis.water.ca.gov/app/bp-dashboard/final/#

6.0 WATER QUALITY

On March 1, 2021, water samples were collected from the on-site irrigation well and tested for Hardness, Iron, pH, and total dissolved solids (TDS). Results of the water sampling are presented below in **TABLE 2 – WATER QUALITY DATA and APPENDIX D - WELL YIELD TEST**.

TABLE 2 – WATER QUALITY DATA

Location (APN)	**Hardness (gpg)**	**Iron (mg/L)**	**TDS (mg/L)**	**pH**
Project well (014-290-08)	**41**	**1.6**	**690**	**6.8**
Comments	Very Hard softener recommended if >7 gpg	Higher than 0.3 can cause rust staining	Less than 500 ppm is acceptable	7.0 is neutral

7.0 CONCLUSIONS

The project site is located in the Coyote Valley Groundwater Basin and the Upper Putah Creek Watershed within an unconfined aquifer consisting primarily of Quaternary aged Alluvial Deposits. Recharge to the relatively shallow aquifer likely occurs primarily through underflow from nearby Crazy Creek and Putah Creek as well as from direct precipitation and percolation. The estimated groundwater usage for the entire site including development of 33.08 acres of cannabis and potential livestock raising is approximately 97.8 acre-ft/year. This value includes the estimated cannabis irrigation/employee water usage of 82.8 acre-ft/year. Average annual recharge to the Site aquifer is estimated at 898.96 acre-ft/year. Based on well yield test data collected at the site, it appears that the aquifer storage and recharge area are sufficient to provide for sustainable annual water use at the site and within the area.

In summary:

Estimated Water Usage Cannabis Development (19.63-acre canopy) = 49.1 acre-ft/year
Additional Cannabis Water Use (employees) = 0.1 acre-ft/year
Potential Future Livestock (300-acres) = 15 acre-feet/year
Total Estimated Site Water Use = 64.2 acre-feet/year
Estimated Annual Onsite Aquifer Recharge = 793.2 acre-ft/year
Sustained Well Yield after 6 hours of pumping = ~ 355 gpm
Peak Daily Water Demand for Cannabis = 0.27 acre-ft/day
Peak Daily Water Demand for Entire Property = 0.35 acre-feet/day

The results of this Assessment indicate that the groundwater to be used for the project, compared to the quantity of available groundwater is sustainable and is unlikely to result in significant declines in groundwater elevations or depletion of groundwater resources over time. The estimated water usage rate/project acre (0.03 acre-feet/acre) is well below the average for the Coyote Valley Groundwater Basin and the estimated pumping ratio (water use/groundwater recharge) of 6.15% is considered to provide a high level of ecological protection. In addition, the horizontal and vertical separations between the irrigation well and the nearest domestic well are sufficient and well interference is not considered a concern.

8.0 LIMITATIONS

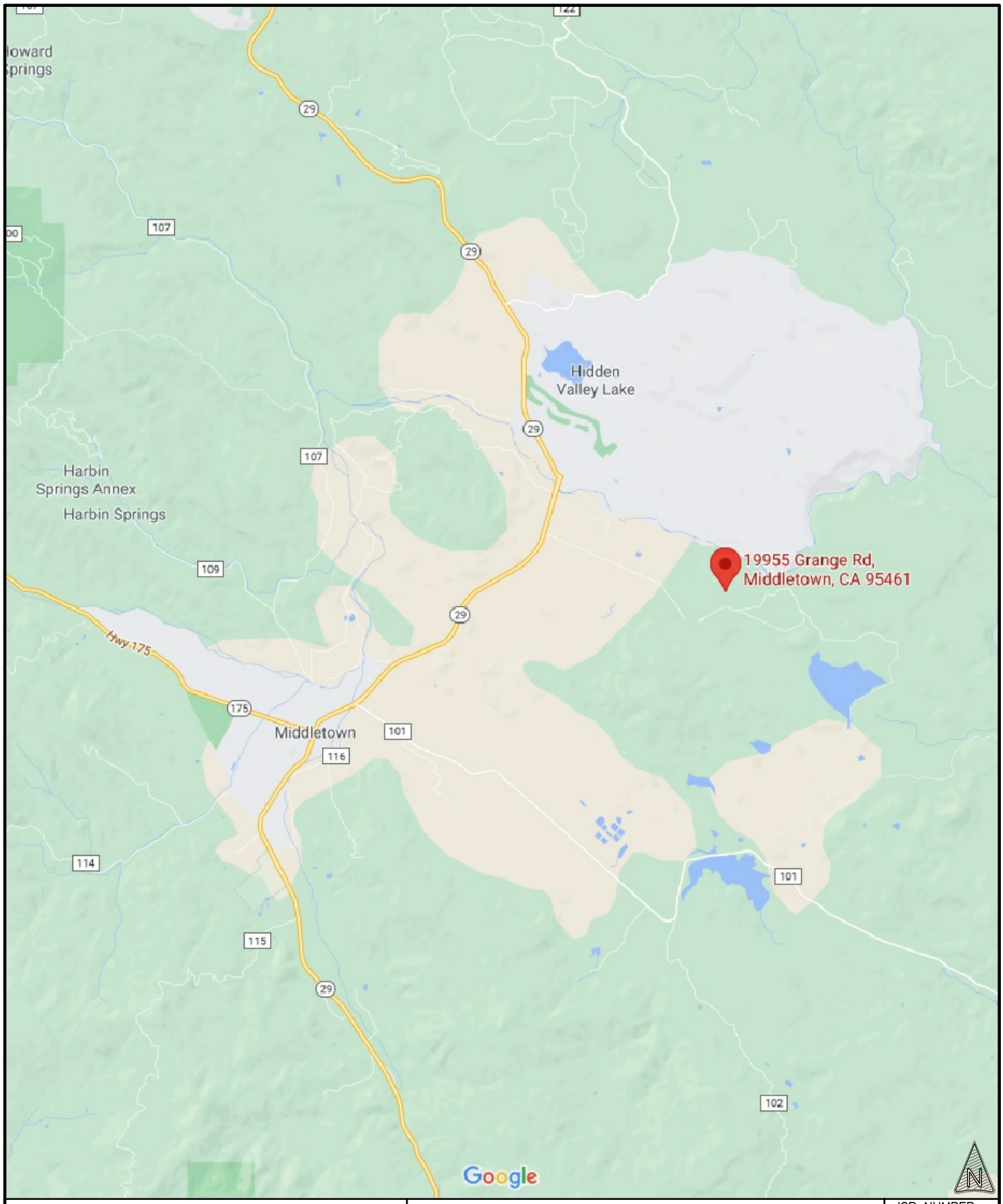
HES is not responsible for the independent conclusions, opinions or recommendations made by others based on the records review, site inspection, field exploration, laboratory test data and interpretations presented in this report.

Groundwater systems of Lake County are typically complex, and available data rarely allows for more than general assessment of groundwater conditions and delineation of aquifers. Hydrogeologic interpretations are based on the drillers' reports made available to us through the California Department of Water Resources, available geologic maps and hydrogeologic studies and professional judgment. This analysis is based on limited available data and relies significantly on interpretation of data from disparate sources of disparate quality.

It should be noted that hydro-geological assessments are inherently limited in the sense that conclusions are drawn and recommendations developed from information obtained from limited research and site evaluation. Additionally, the passage of time may result in a change in the environmental characteristics at this site and surrounding properties. This report does not warrant against future operations or conditions, nor does this warrant operations or conditions present of a type or at a location not investigated.

This study is not intended to assess if any soil contamination, waste emplacement, or groundwater contamination exists by subsurface sampling through the completion of soil borings and the installation of monitoring wells. The scope of work, determined by the client, did not include these activities.

This Report is for the exclusive use of Rancho Lake LLC, their affiliates, designates and assignees and no other party shall have any right to rely on any service provided by Hurvitz Environmental Services without prior written consent.



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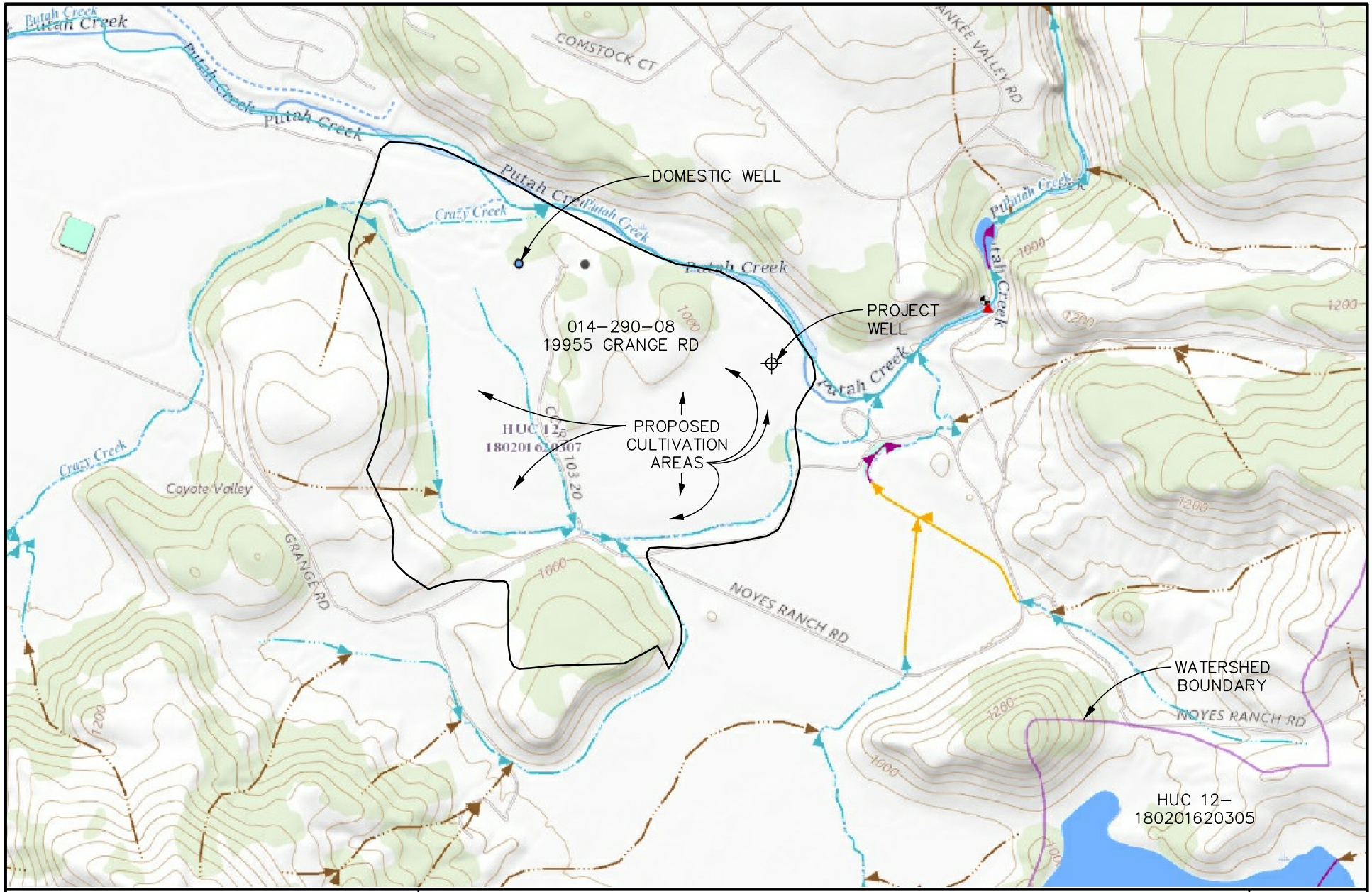
FX: 707.824.2675
HURVITZ.ENVIRONMENTAL@GMAIL.COM
CA PG# 7573

SITE LOCATION MAP

19955 GRANGE RD
MIDDLETOWN, CALIFORNIA 95461

JOB NUMBER: 5148.01
DATE: 6/30/21
PLATE: 1



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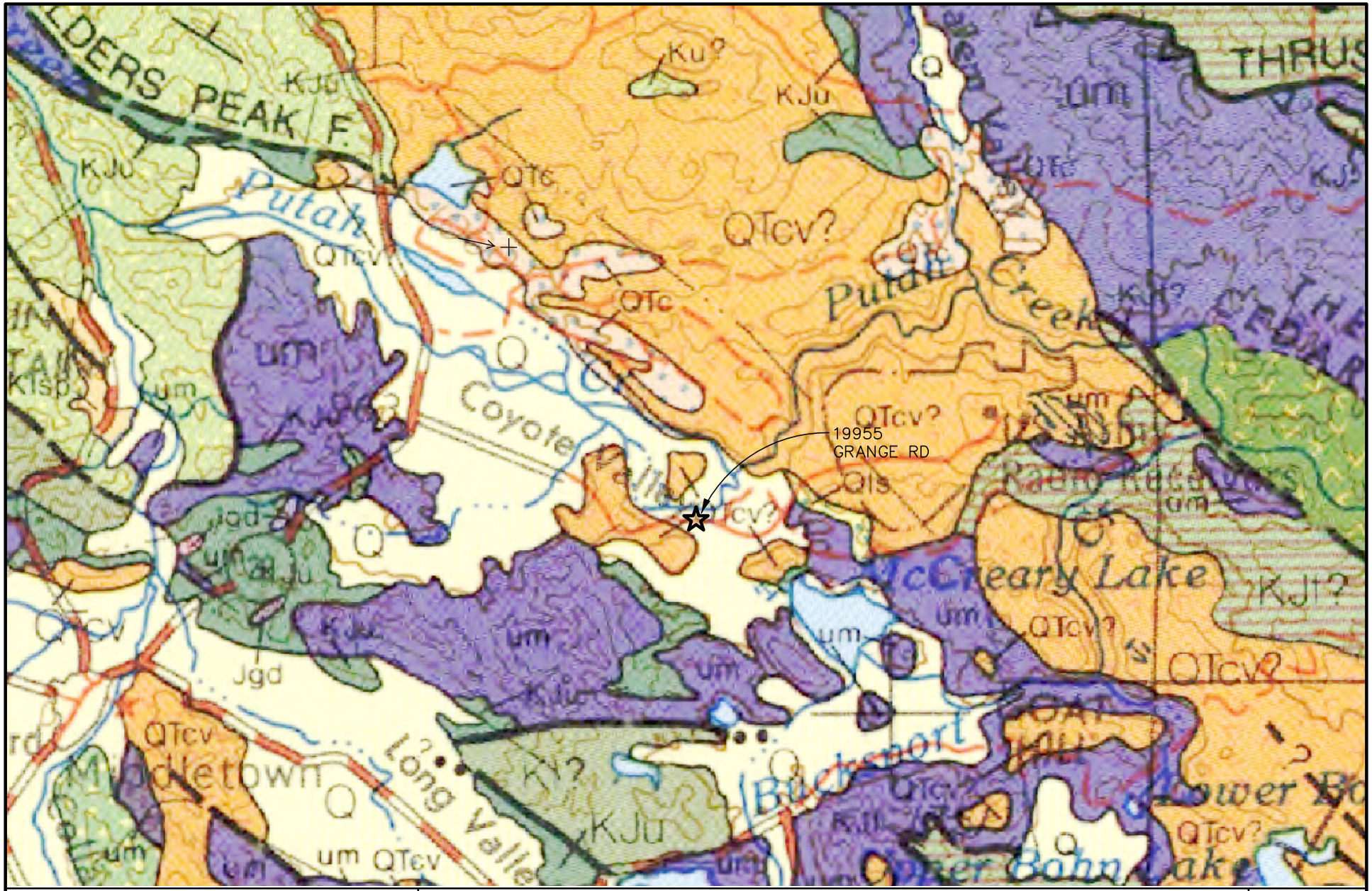
TOPOGRAPHIC MAP

19955 GRANGE RD
MIDDLETOWN, CALIFORNIA 95461

JOB NUMBER: 5148.01
DATE: 6/30/21
PLATE: 2



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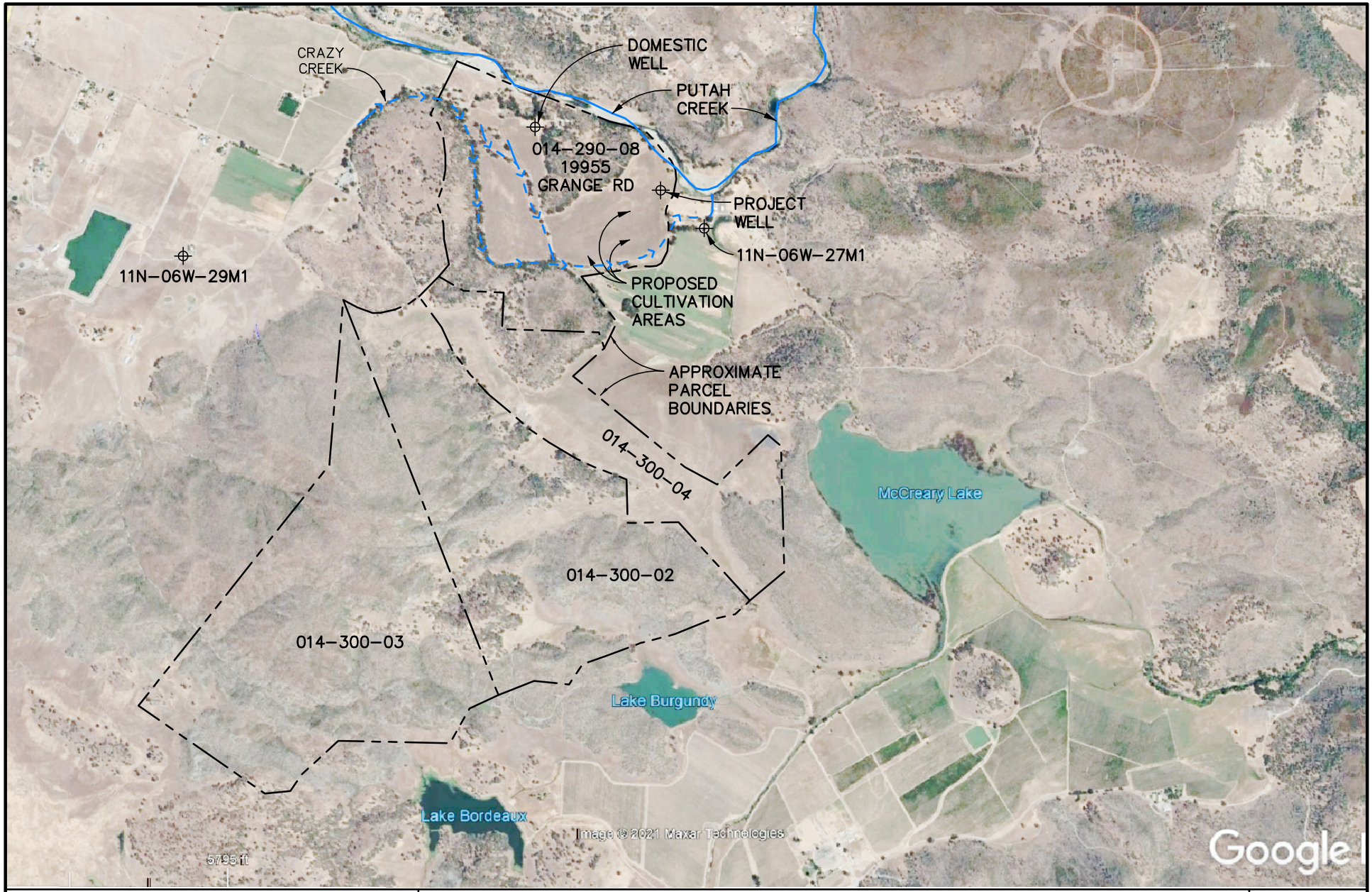
GEOLOGIC MAP

19955 GRANGE RD
MIDDLETOWN, CALIFORNIA 95461

JOB NUMBER: 5148.01
DATE: 6/30/21
PLATE: 3



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CA PG# 7573

SITE PLAN OVERVIEW

19955 GRANGE RD
MIDDLETOWN, CALIFORNIA 95461

JOB NUMBER: 5148.01
DATE: 6/30/21
PLATE: 4A

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CA PG# 7573

SITE PLAN DETAIL

19955 GRANGE RD
MIDDLETOWN, CALIFORNIA 95461

JOB NUMBER: 5148.01
DATE: 6/30/21
PLATE: 4B

APPENDIX A
SITE PHOTOGRAPHS

SITE PHOTOGRAPHS

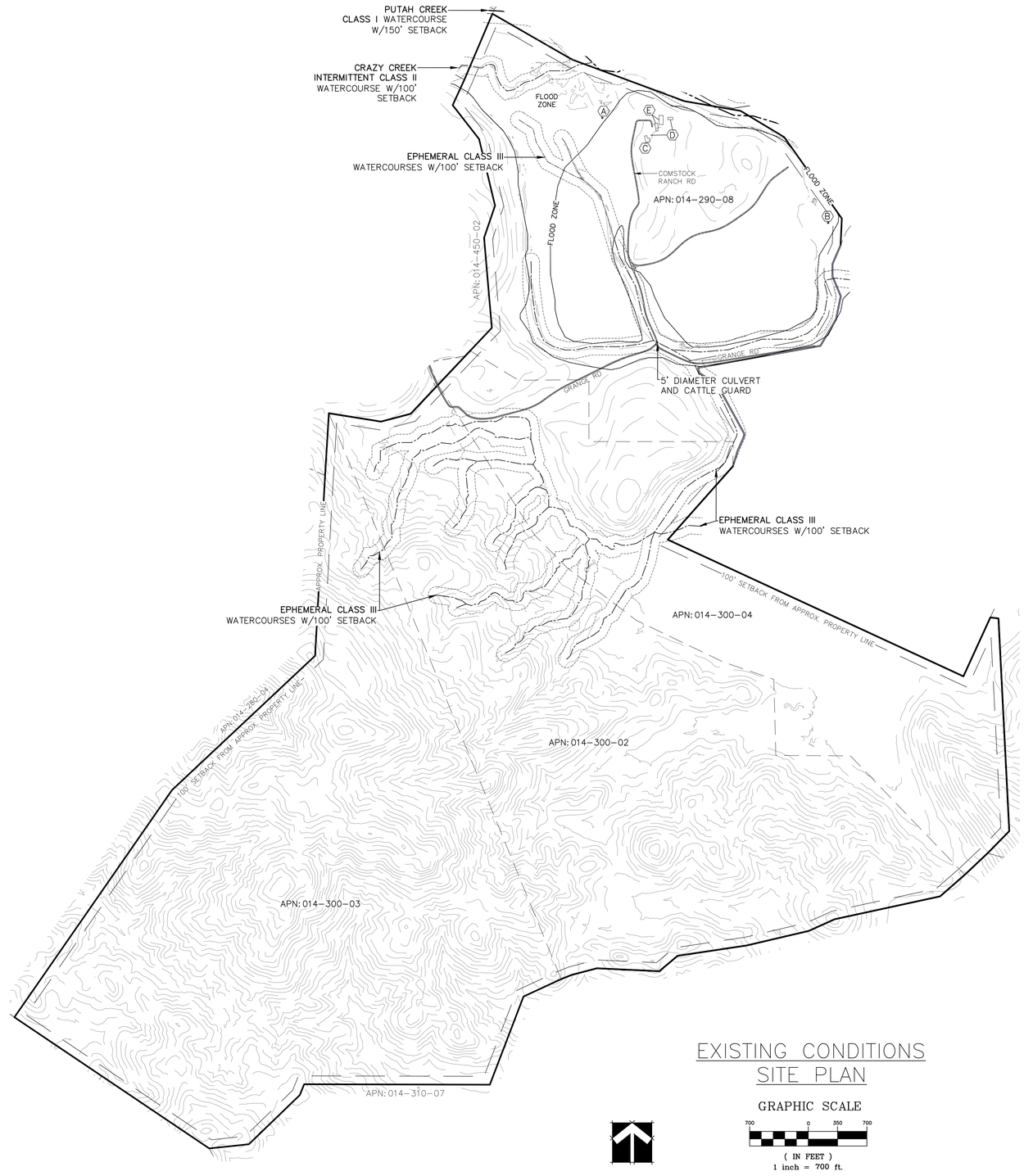
Photo 1: View of proposed cultivation area

Photo 2: View of proposed cannabis irrigation well.

Photo 3: View of domestic well.

Photo 4: View of Putah Creek from the cultivation parcel.

APPENDIX B
ENGINEERED SITE PLANS



EXISTING CONDITIONS SITE PLAN

GRAPHIC SCALE

700 0 350 700

(IN FEET)
1 inch = 700 ft.

VICINITY MAP
NO SCALE

RANCHO LAKE, LLC
19955 GRANGE ROAD
MIDDLETOWN, CA 95461
APNs:014-290-08 AND
014-300-02, 03, & 04

LEGEND:

1530	CONTOUR ELEVATION
	FENCE
	ASPHALT
	GRAVEL
	CREEK / SWALE
APN	ASSESSOR'S PARCEL NUMBER
APPROX	APPROXIMATELY
DWY	DRIVEWAY
(E)	EXISTING
(P)	PROPOSED
RD	ROAD
SF	SQUARE FEET

NOTES:
1. CONTOUR INTERVAL IS 20'

(A) (E) GROUNDWATER WELL
LAT: 38.77970°
LONG: -122.53429°
BENEFICIAL USES: DOMESTIC & FIRE PROTECTION

(B) (E) GROUNDWATER WELL
LAT: 38.77697°
LONG: -122.52711°
BENEFICIAL USES: IRRIGATION

(C) (E) RESIDENCE

(D) (E) ACCESSORY AG STRUCTURE(S)

(E) (E) BARN(S)

Revisions:

REALM ENGINEERING
CIVIL ENGINEERING, SURVEYING & PLANNING
1767 MARKET STREET SUITE c
REDDING, CA. 96001
530-526-7493

PLANS PREPARED UNDER THE SUPERVISION OF:

REGISTERED PROFESSIONAL ENGINEER
JASON B. VINE
No. 67800
exp 06/30/25
CIVIL
STATE OF CALIFORNIA

EXISTING CONDITIONS SITE PLAN
RANCHO LAKE, LLC
19955 GRANGE RD.
MIDDLETOWN, CA 95461
LAKE COUNTY
APNs:014-290-08 & 12 AND 014-300-02, 03, & 04

PLOTTED BY: ---
DATE PLOTTED: 6/26/23
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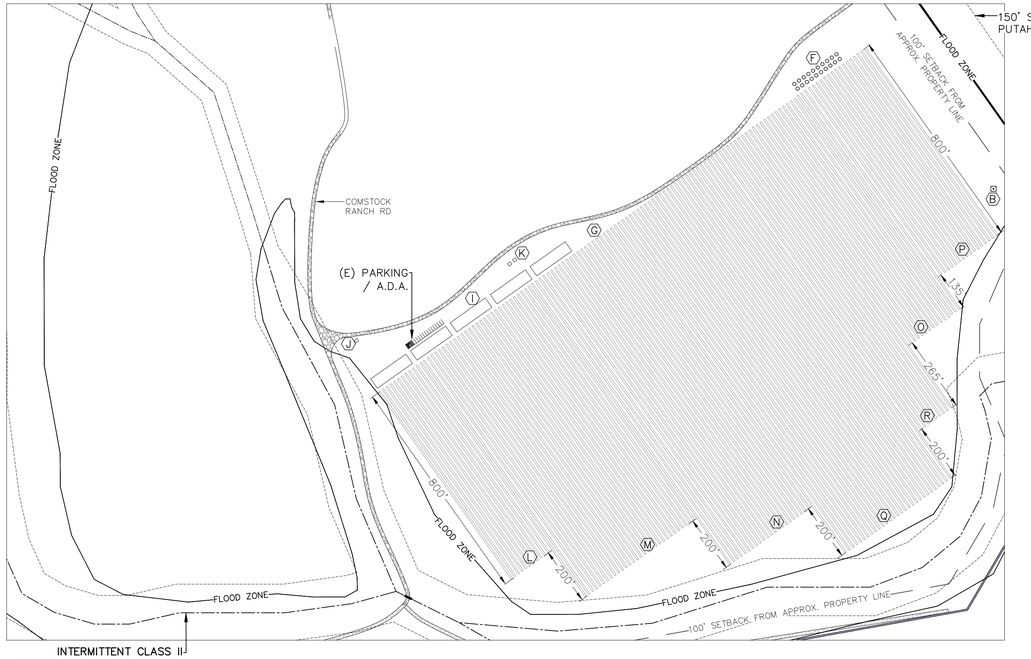
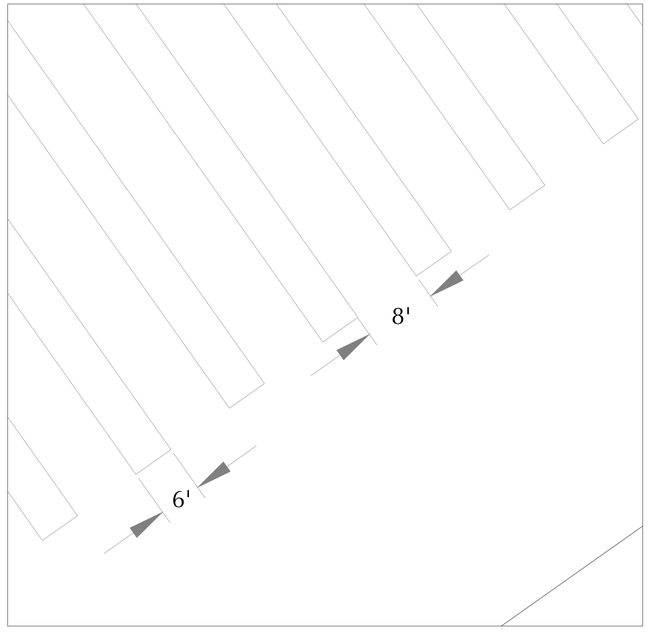


CULTIVATION SITE PLAN WITH CANOPY

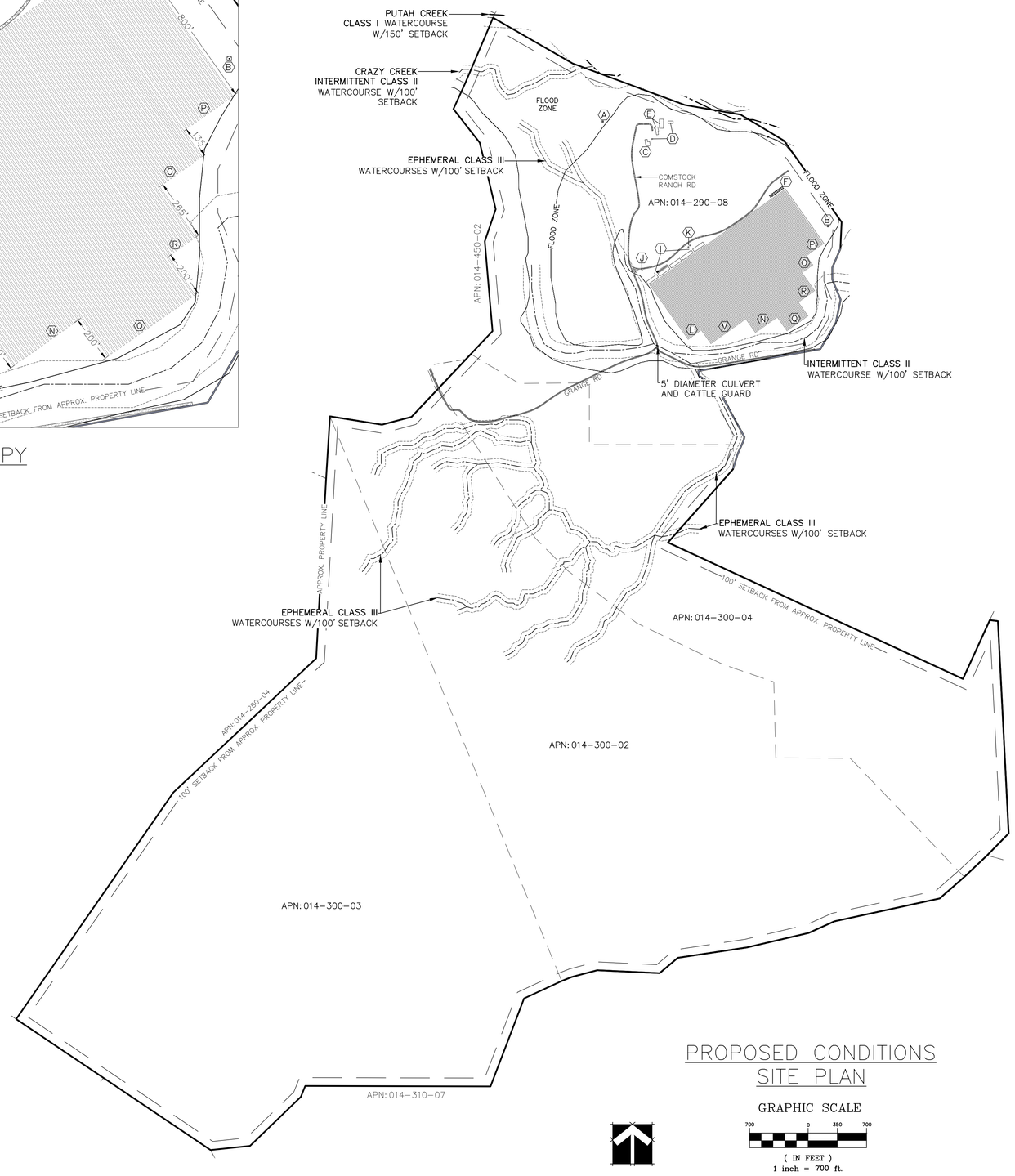
GRAPHIC SCALE

250 0 125 250

(IN FEET)
1 inch = 250 ft.



CANOPY ROW DETAIL (TYP)



PROPOSED CONDITIONS SITE PLAN

GRAPHIC SCALE

700 0 350 700

(IN FEET)
1 inch = 700 ft.

VICINITY MAP
NO SCALE

RANCHO LAKE, LLC
19955 GRANGE ROAD
MIDDLETOWN, CA 95461
APNs:014-290-08 AND
014-300-02, 03, & 04

LEGEND:

1530	CONTOUR ELEVATION
	FENCE
	ASPHALT
	GRAVEL
	CREEK / SWALE
APN	ASSESSOR'S PARCEL NUMBER
APPROX	APPROXIMATELY
DWY	DRIVEWAY
(E)	EXISTING
(P)	PROPOSED
RD	ROAD
SF	SQUARE FEET

NOTES:
1. CONTOUR INTFRVAL IS 20'

Ⓐ (E) GROUNDWATER WELL
LAT: 38.77970°
LONG: -122.53429°
BENEFICIAL USES: DOMESTIC & FIRE PROTECTION

Ⓑ (E) GROUNDWATER WELL
LAT: 38.77697°
LONG: -122.52711°
BENEFICIAL USES: IRRIGATION

Ⓒ (E) RESIDENCE

Ⓓ (E) ACCESSORY AG STRUCTURE(S)

Ⓔ (E) BARN(S)

Ⓕ (P) TWENTY 5,000 GALLON HEAVY-DUTY WATER STORAGE TANKS

Ⓖ (P) OUTDOOR CULTIVATION AREA

Ⓘ (P) FIVE 40'x50' (6000SF) HARVEST STORAGE AND STAGING AREAS

Ⓙ (P) 10'x12' (120SF) SECURITY CENTER/SHED

Ⓚ (P) TWO 10'x12' (120SF) PESTICIDES & AGRICULTURAL CHEMICALS STORAGE AREA

OUTDOOR CANOPY AREAS

Ⓛ **(P) ELEVEN 6'X800' (4,800 SF) CANOPY AREAS**

Ⓜ **(P) THIRTY 6'X1,000' (6,000 SF) CANOPY AREAS**

Ⓝ **(P) TWENTY-TWO 6'X1,200 (7,200 SF) CANOPY AREAS**

Ⓞ **(P) FOURTEEN 6'X935' (5,610 SF) CANOPY AREAS**

Ⓟ **(P) SIXTEEN 6'X800' (4,800 SF) CANOPY AREAS**

Ⓠ **(P) TWENTY-NINE 6'X1,400' (8,400 SF) CANOPY AREAS**

Ⓡ **(P) NINE 6'X1,200' (7,200 SF) CANOPY AREAS**

Revisions:

REALM ENGINEERING
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530-526-7493

PLANS PREPARED UNDER THE SUPERVISION OF:

REGISTERED PROFESSIONAL ENGINEER
JASON B. VINE
No. 67800
EXP. 06/30/21
CIVIL
STATE OF CALIFORNIA

PROPOSED CONDITIONS SITE PLAN - PHASE II

RANCHO LAKE, LLC

19955 GRANGE RD.
MIDDLETOWN, CA 95461
LAKE COUNTY
APNs:014-290-08 & 12 AND 014-300-02, 03, & 04

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DATE PLOTTED:
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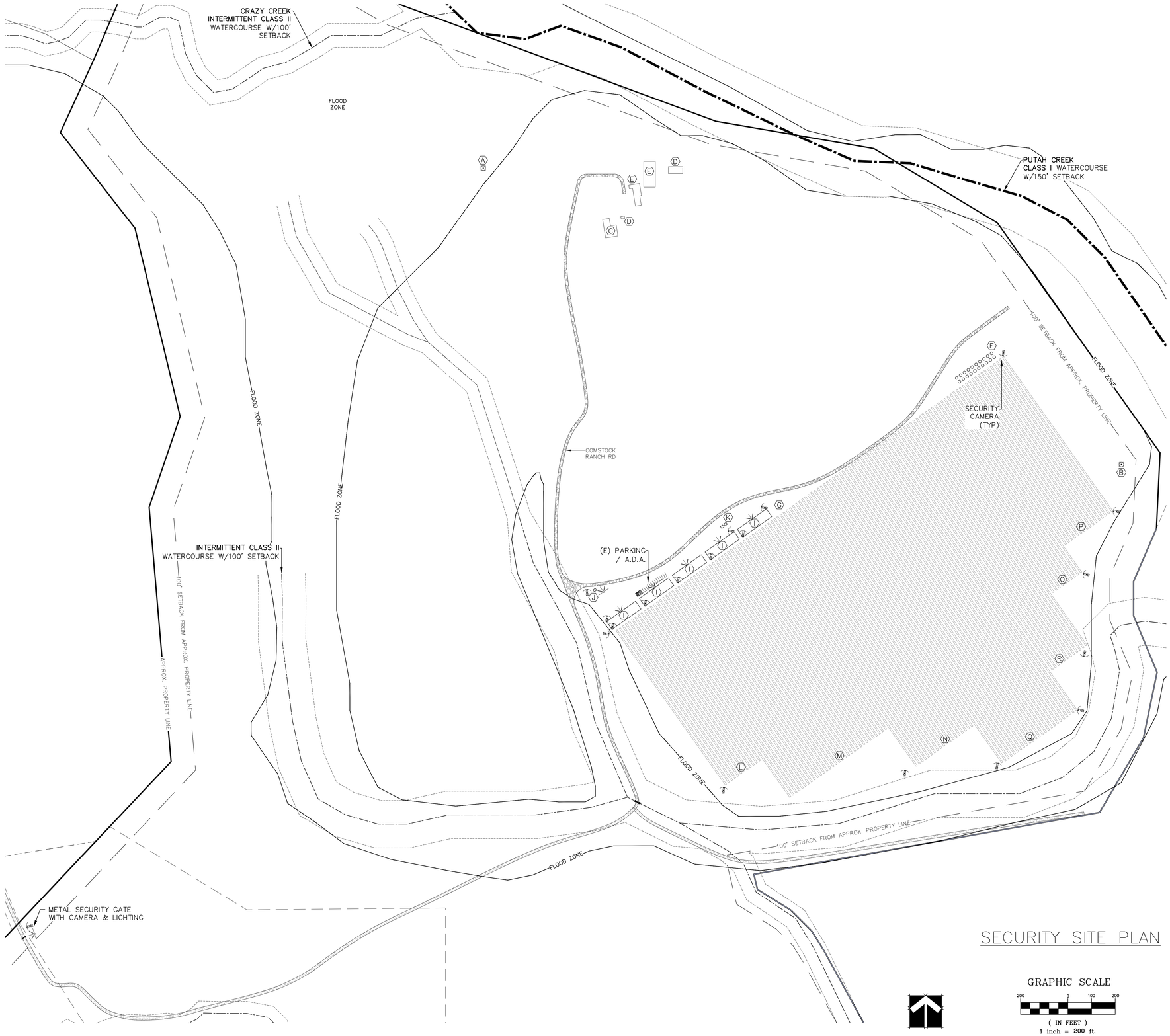

SECURITY SITE PLAN

GRAPHIC SCALE

200 0 100 200

(IN FEET)
1 inch = 200 ft.

VICINITY MAP
NO SCALE

RANCHO LAKE, LLC
19955 GRANGE ROAD
MIDDLETOWN, CA 95461
APNs:014-290-08 AND
014-300-02, 03, & 04

LEGEND:

1530	CONTOUR ELEVATION
	FENCE
	(P) SECURITY LIGHTS
	(P) SECURITY CAMERAS
APN	ASSESSOR'S PARCEL NUMBER
APPROX	APPROXIMATE
DWY	DRIVEWAY
(E)	EXISTING
(P)	PROPOSED
RD	ROAD
SF	SQUARE FEET

NOTES:
1. CONTOUR INTERVAL IS 20'

Ⓐ (E) GROUNDWATER WELL
LAT: 38.77970°
LONG: -122.53429°
BENEFICIAL USES: DOMESTIC & FIRE PROTECTION

Ⓑ (E) GROUNDWATER WELL
LAT: 38.77697°
LONG: -122.52711°
BENEFICIAL USES: IRRIGATION

Ⓒ (E) RESIDENCE

Ⓓ (E) ACCESSORY AG STRUCTURE(S)

Ⓔ (E) BARN(S)

Ⓕ (P) TWENTY 5,000 GALLON HEAVY-DUTY WATER STORAGE TANKS

Ⓖ (P) OUTDOOR CULTIVATION AREA

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Ⓡ (P) NINE 6'X1,200' (7,200 SF) CANOPY AREAS

Revisions:

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PLANS PREPARED UNDER THE SUPERVISION OF:

REGISTERED PROFESSIONAL ENGINEER
JASON B. VINE
No. 67800
exp.06/30/21
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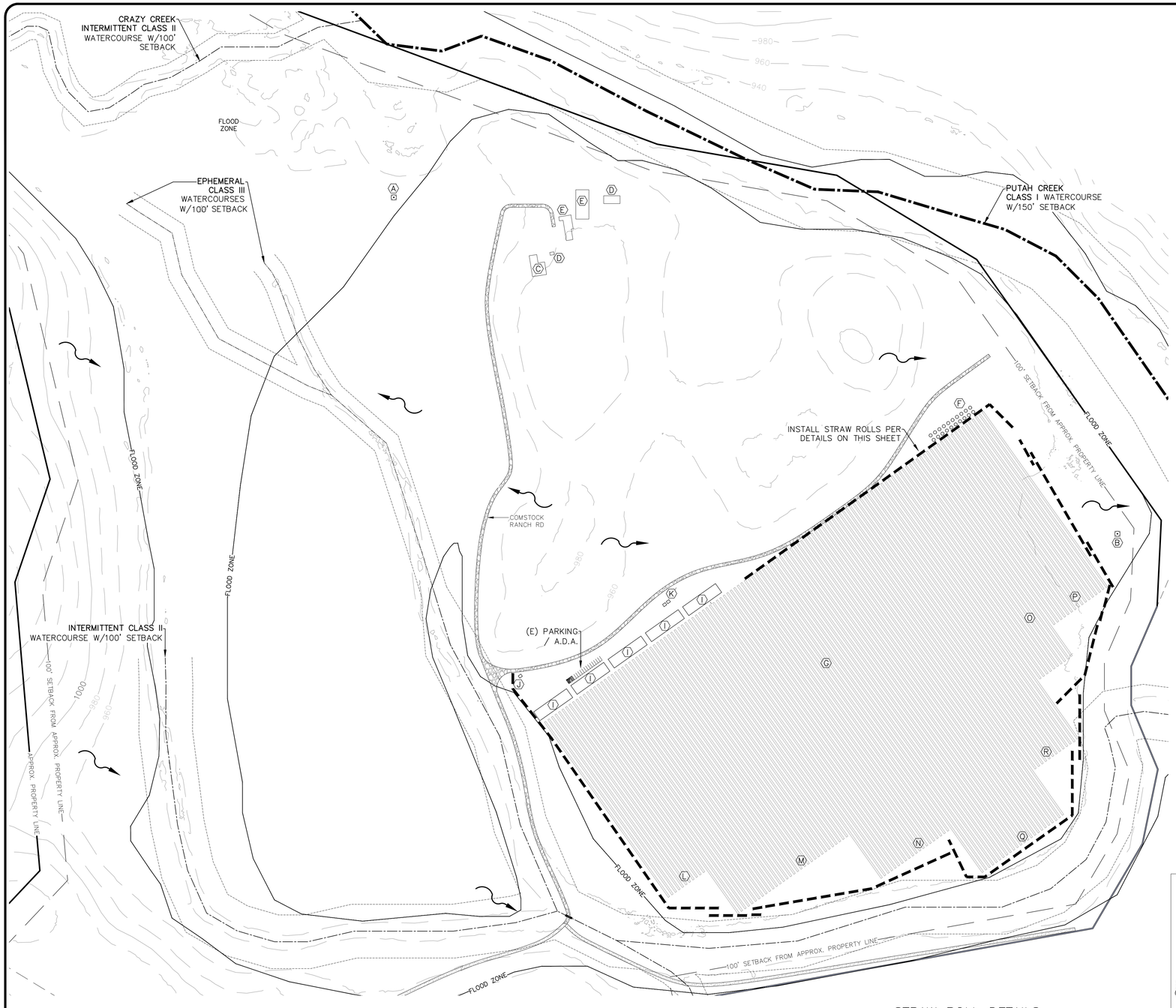
STATE OF CALIFORNIA

SECURITY SITE PLAN
RANCHO LAKE, LLC
19955 GRANGE RD.
MIDDLETOWN, CA 95461
LAKE COUNTY
APNs:014-290-08 & 12 AND 014-300-02, 03, & 04

PLOTTED BY: ---
DATE PLOTTED:
SCALE OF DRAWING: SEE PLAN
JOB NUMBER:
CADD FILE:
SHEET: 1



NOTES:

1. STRAW ROLL INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE ROLL IN A TRENCH, 3"–5" (75–125mm) DEEP, DUG ON CONTOUR. RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND ROLL.
2. STRAW ROLLS MUST BE PLACED ALONG SLOPE CONTOURS

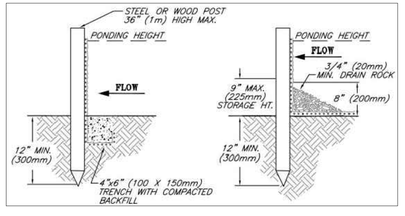
EROSION & SEDIMENT CONTROL NOTES:

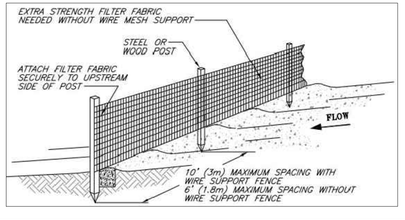
1. CONTRACTOR IS TO IMPLEMENT BEST MANAGEMENT PRACTICES (BMPS) TO CONTROL EROSION CONTROL AND REDUCE THE OFF–SITE DISCHARGE OF SEDIMENT TO THE MAXIMUM EXTENT PRACTICABLE.
2. EROSION CONTROL BMPS SHALL BE IN PLACE AND MAINTAINED ALL YEAR ROUND.
3. HE CONTRACTOR SHALL FOLLOW THE GUIDELINES FROM THE "CALIFORNIA STORMWATER BMP HANDBOOK" FOR THE MEASURES SHOWN OR STATED ON THESE PLANS.
4. CONTRACTOR MUST ENSURE THAT THE CONSTRUCTION SITE IS PREPARED PRIOR TO THE ONSET OF ANY STORM.
5. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED UNTIL DISTURBED AREAS ARE STABILIZED. CHANGES TO THIS EROSION AND SEDIMENT CONTROL PLAN SHALL BE MADE TO MEET FIELD CONDITIONS ONLY WITH THE APPROVAL OF OR AT THE DIRECTION OF THE QUALIFIED SWPPP PRACTITIONER (QSP).
6. THIS PLAN MAY NOT COVER ALL THE SITUATIONS THAT ARISE DURING CONSTRUCTION DUE TO ANTICIPATED FIELD CONDITIONS. VARIATIONS MAY BE MADE TO THE PLAN IN THE FIELD SUBJECT TO THE APPROVAL OF OR AT THE DIRECTION OF A REPRESENTATIVE OF LAKE COUNTY.
7. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CHECKED BEFORE AND AFTER ALL STORMS TO ENSURE MEASURES ARE FUNCTIONING PROPERLY.
8. CONTRACTOR SHALL MAINTAIN A LOG AT THE SITE OF ALL INSPECTIONS OR MAINTENANCE OF BMPS, AS WELL AS, ANY CORRECTIVE CHANGES TO THE BMPS OR EROSION AND SEDIMENT CONTROL PLAN.
9. THE CONTRACTOR SHALL INSTALL THE STABILIZED CONSTRUCTION ENTRANCE PRIOR TO COMMENCEMENT OF GRADING. LOCATION OF THE ENTRANCE MAY BE ADJUSTED BY THE CONTRACTOR TO FACILITATE GRADING OPERATIONS. ALL CONSTRUCTION TRAFFIC ENTERING THE PAVED ROAD MUST CROSS THE STABILIZED CONSTRUCTION ENTRANCE.
10. ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE SWEPT AT THE END OF EACH WORKING DAY OR AS NECESSARY.
11. ANY LOOSE GROUND FROM EXCAVATING GRADING OPERATIONS SHALL BE SECURED PRIOR TO ANY RAIN EVENT. STRAW OR TARP ALL DISTURBED OR EXCAVATED GROUND.
12. CONTRACTOR SHALL PLACE GRAVEL BAGS AROUND ALL NEW DRAINAGE STRUCTURE OPENINGS IMMEDIATELY AFTER THE STRUCTURE OPENING IS CONSTRUCTED. THESE GRAVEL BAGS SHALL BE MAINTAINED AND REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETED.
13. AS A MINIMUM, ALL GRADED AREAS AND EXPOSED SOIL WITHIN THE PROJECT SHALL BE SEEDED PER THE REQUIREMENTS OF LAKE COUNTY.
14. DUST GENERATION MUST BE MINIMIZED AND A WATER TRUCK MUST BE AVAILABLE ON–SITE FOR ADEQUATE DUST CONTROL.

SILT FENCE DETAILS

NOTES:

1. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.
2. INSPECT & REPAIR FENCE AFTER EACH STORM EVENT & REMOVE SEDIMENT WHEN NECESSARY.
3. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF–SITE AND CAN BE PERMANENTLY STABILIZED.





- DRAINAGE PATTERNS
- STRAW ROLLS (ADJUST TO SUIT FIELD CONDITIONS)
- DISCHARGE POINT
- S-1 SAMPLING LOCATION
- CMS CONSTRUCTION MATERIALS STORAGE AREA

LEGEND:

1530	CONTOUR ELEVATION
	FENCE
	ASPHALT
	GRAVEL
	CREEK / SWALE
APN	ASSESSOR'S PARCEL NUMBER
APPROX	APPROXIMATELY
DWY	DRIVEWAY
(E)	EXISTING
(P)	PROPOSED
RD	ROAD
SF	SQUARE FEET

NOTES:

1. CONTOUR INTERVAL IS 20'

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LAT: 38.77970°
LONG: –122.53429°
BENEFICIAL USES: DOMESTIC & FIRE PROTECTION

Ⓑ (E) GROUNDWATER WELL
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LONG: –122.52711°
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Ⓓ (E) ACCESSORY AG STRUCTURE(S)

Ⓔ (E) BARN(S)

Ⓕ (P) TWENTY 5,000 GALLON HEAVY–DUTY WATER STORAGE TANKS

Ⓖ (P) OUTDOOR CULTIVATION AREA

Ⓘ (P) FIVE 40'x50' (6000SF) HARVEST STORAGE AND STAGING AREAS

Ⓙ (P) 10'x12' (120SF) SECURITY CENTER/SHED

Ⓚ (P) TWO 10'x12' (120SF) PESTICIDES & AGRICULTURAL CHEMICALS STORAGE AREAS

OUTDOOR CANOPY AREAS

Ⓛ (P) ELEVEN 6'X800' (4,800 SF) CANOPY AREAS

Ⓜ (P) THIRTY 6'X1,000' (6,000 SF) CANOPY AREAS

Ⓝ (P) TWENTY-TWO 6'X1,200 (7,200 SF) CANOPY AREAS

Ⓞ (P) FOURTEEN 6'X935' (5,610 SF) CANOPY AREAS

Ⓟ (P) SIXTEEN 6'X800' (4,800 SF) CANOPY AREAS

Ⓠ (P) TWENTY-NINE 6'X1,400' (8,400 SF) CANOPY AREAS

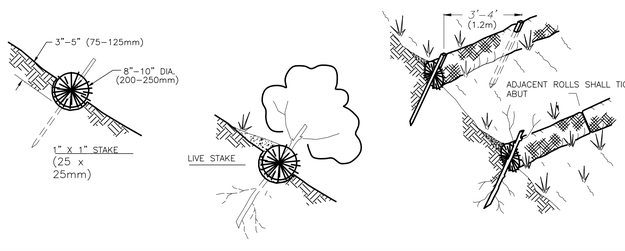
Ⓡ (P) NINE 6'X1,200' (7,200 SF) CANOPY AREAS

EROSION & SEDIMENT CONTROL PLAN

GRAPHIC SCALE

200 0 100 200
(IN FEET)
1 inch = 200 ft.

STRAW ROLL DETAILS



Revisions:

REALM ENGINEERING
CIVIL ENGINEERING, SURVEYING & PLANNING
1767 MARKET STREET SUITE c
REDDING, CA. 96001
530-526-7493

PLANS PREPARED UNDER THE SUPERVISION OF:

REGISTERED PROFESSIONAL ENGINEER
JASON B. VINE
No. 67800
exp.06/30/21
CIVIL
STATE OF CALIFORNIA

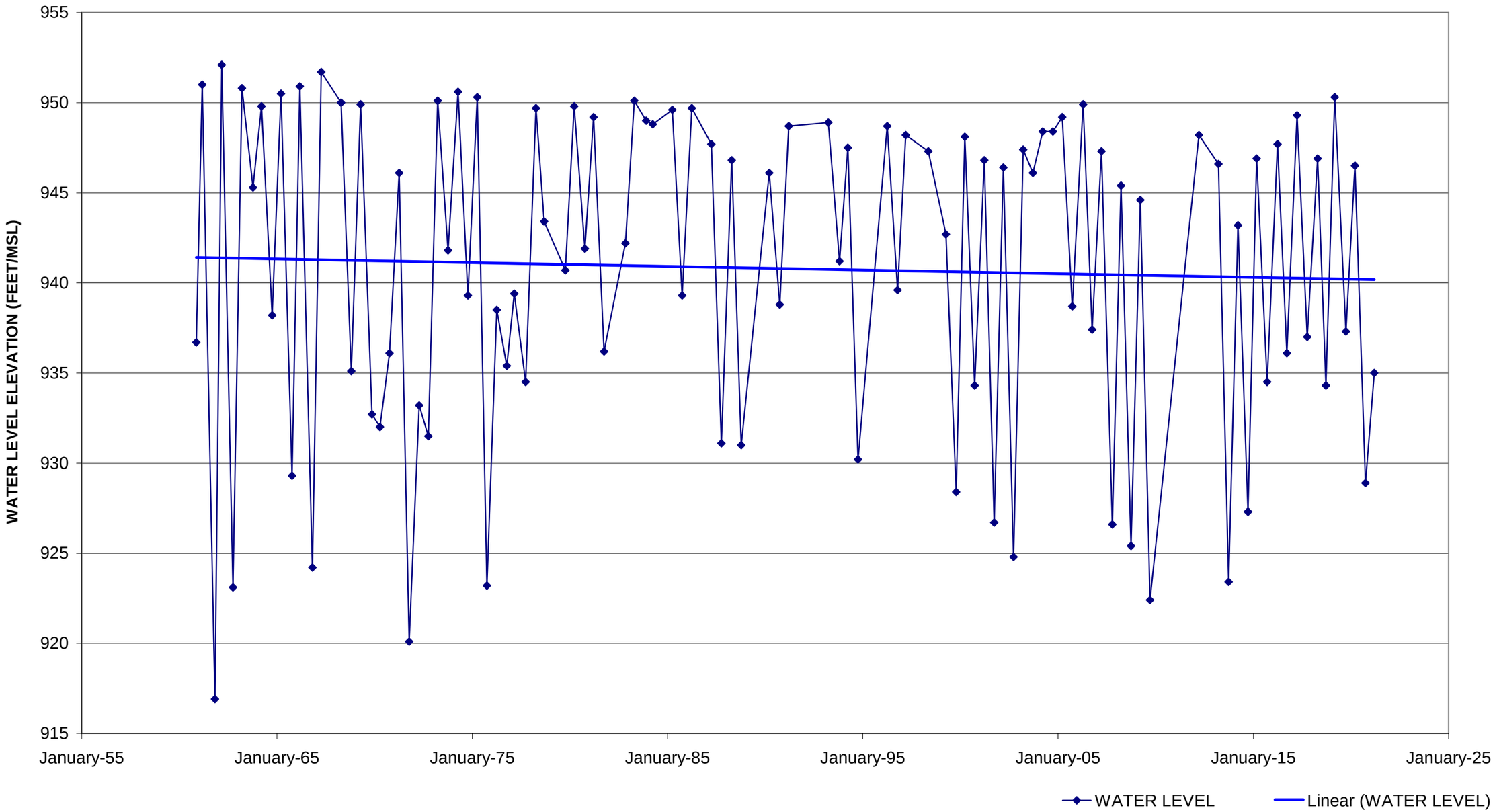
EROSION & SEDIMENT CONTROL PLAN
RANCHO LAKE, LLC

19955 GRANGE RD.
MIDDLETOWN, CA 95461
LAKE COUNTY
APNs:014-290-08 & 12 AND 014-300-02, 03, & 04

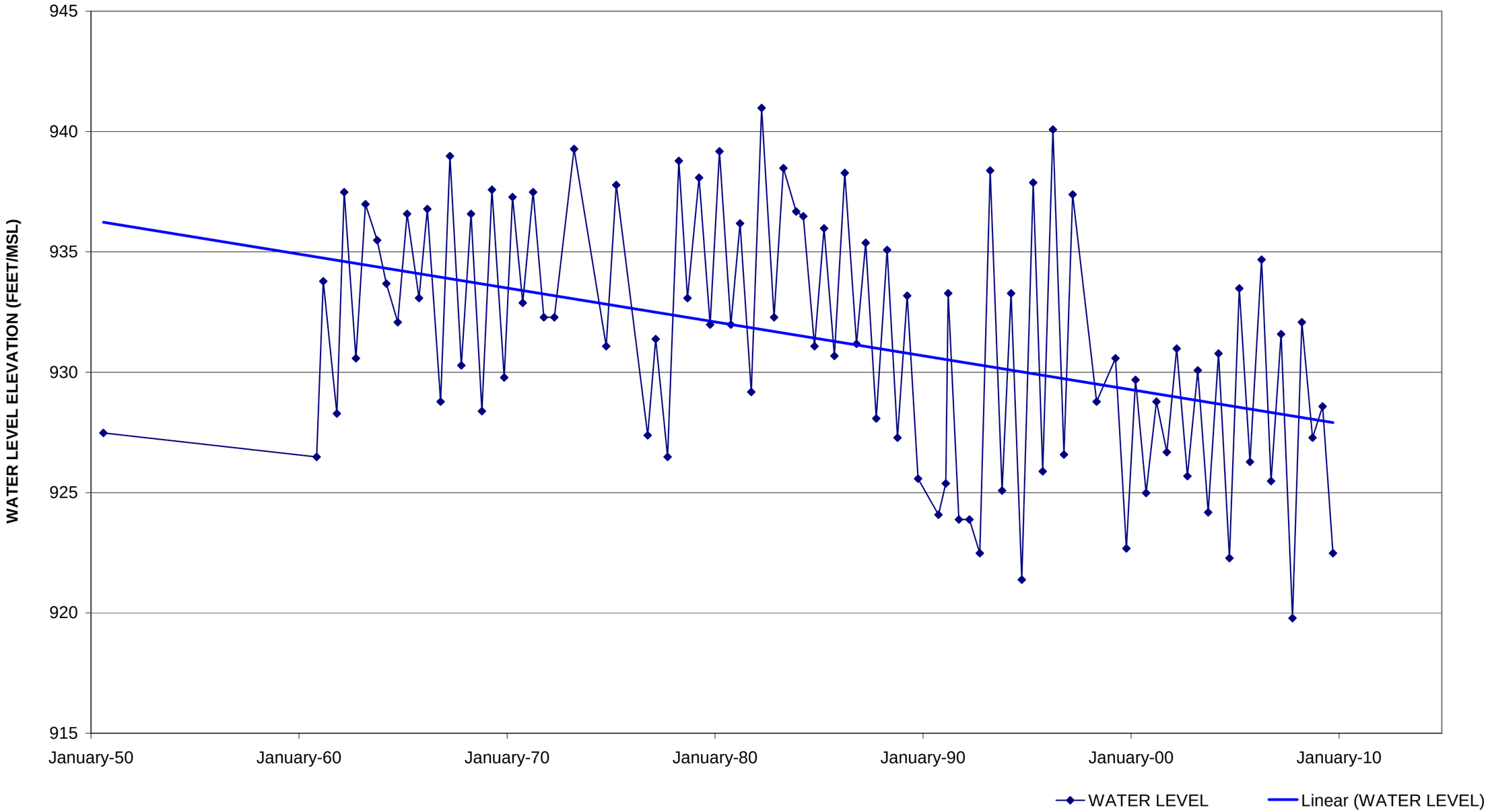
PLOTTED BY: ---
DATE PLOTTED:
SCALE OF DRAWING: SEE PLAN
JOB NUMBER:
CADD FILE:
SHEET: 1

APPENDIX C
TIME VS. ELEVATION GRAPHS

TIME VS WATER LEVEL ELEVATION 11N-06-29M1



TIME VS WATER LEVEL ELEVATION 11N-06W-27M1



APPENDIX D
WELL COMPLETION REPORT

State of California

Well Completion Report

Form DWR 188 Submitted 2/23/2021

WCR2021-002299

Owner's Well Number | Date Work Began 02/02/2021 | Date Work Ended 02/11/2021

Local Permit Agency Lake County Health Services Department - Environmental Health Division

Secondary Permit Agency | Permit Number WE-5548 | Permit Date 01/20/2021

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

Name James Comstock

Mailing Address C/O All Good LLC

2349 Circadian Way

City Santa Rosa State Ca Zip 95407

Planned Use and Activity

Activity New Well

Planned Use Water Supply Irrigation - Agriculture

Well Location

Address 19955 Grange RD

City Middletown Zip 95461 County Lake

Latitude 38 Deg. 46 Min. 34.7 Sec. N Longitude -122 Deg. 31 Min. 28 Sec. W

Dec. Lat. 38.7763056 Dec. Long. -122.5244444

Vertical Datum | Horizontal Datum WGS84

Location Accuracy 20 Ft | Location Determination Method

APN 014-029-08

Township 11 N

Range 06 W

Section 28

Baseline Meridian Mount Diablo

Ground Surface Elevation

Elevation Accuracy

Elevation Determination Method

Borehole Information

Orientation Vertical Specify

Drilling Method Direct Rotary Drilling Fluid Bentonite

Total Depth of Boring 160 Feet

Total Depth of Completed Well 140 Feet

Water Level and Yield of Completed Well

Depth to first water | (Feet below surface)

Depth to Static Water Level 22 (Feet) Date Measured 02/11/2021

Estimated Yield* 300 (GPM) Test Type Air Lift

Test Length 1 (Hours) Total Drawdown 113 (feet)

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

Geologic Log - Free Form

Depth from Surface Feet to Feet		Description
0	20	Sand, soil and gravel
20	79	Sand and gravel
79	90	Sand and clay
90	112	Gravel and sand
112	129	Gravel
129	160	Clay

Casings

Casing #	Depth from Surface Feet to Feet		Casing Type	Material	Casings Specificatons	Wall Thickness (inches)	Outside Diameter (inches)	Screen Type	Slot Size if any (inches)	Description
1	0	50	Blank	PVC	OD: 8.625 in. | SDR: 17 | Thickness: 0.508 in.	0.508	8.625			
1	50	130	Screen	PVC	OD: 8.625 in. | SDR: 17 | Thickness: 0.508 in.	0.508	8.625	Milled Slots	0.032	
1	130	140	Blank	PVC	OD: 8.625 in. | SDR: 17 | Thickness: 0.508 in.	0.508	8.625			

Annular Material

Depth from Surface Feet to Feet		Fill	Fill Type Details	Filter Pack Size	Description
0	50	Cement	Portland Cement/Neat Cement		Seal
50	160	Filter Pack	Other Gravel Pack	3/8	Pea Gravel

Other Observations:

Borehole Specifications

Depth from Surface Feet to Feet		Borehole Diameter (inches)
0	50	14.75
50	160	12.25

Certification Statement

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

Name: WEEKS DRILLING AND PUMP CO (Person, Firm or Corporation)

PO BOX 176 (Address) | SEBASTOPOL (City) | CA (State) | 94573- (Zip)

Signed: *electronic signature received* (C-57 Licensed Water Well Contractor) | 02/23/2021 (Date Signed) | 177681 (C-57 License Number)

Attachments

014-290-08.pdf - Location Map

DWR Use Only

CSG #	State Well Number	Site Code	Local Well Number

N

Latitude Deg/Min/Sec

W

Longitude Deg/Min/Sec

TRS:

APN:

APPENDIX E
WELL YIELD TEST

JAK Drilling & Pump

Well Drilling Pumps Water Treatment

Hole to Home

WELL PERFORMANCE TEST REPORT

Client Name: Somarosa Farms Attn: Melissa Huynh
Property Location: 19955 Grange Road, Middletown, CA
Parcel Number: 014-290-08
Number of Wells Evaluated: One
Well Performance Test Completion Date: March 12, 2021
Water Samples Collected: No
Pump Technician: Quinn Beckens

Location Description: 38.7763056, -122.524444
Total Depth: 140-feet below top of casing
Depth to Static Water Level: 17-feet below the top of casing
Diameter of well: 8-inches
Casing type: PVC
Test Duration: 6+ hours
Test Type: Pump
Pumping Rate: 360.24-Gallons Per Minute (GPM)

Observations: The well is located south of the property boundary in the northeast corner of the parcel (see attached Parcel Boundary and Well Location Maps). Per the attached Well Completion Report, the well was completed on February 11, 2021, by Week's Drilling and Pump Company.

As referenced on the well drilling report, while airlifting for approximately 1-hour, the well purportedly produced 300-GPM. Due to time constraints associated with obtaining a test pump capable of producing flows of 300+ GPM, an initial well performance test was conducted using a 100-GPM series submersible test pump. Due to the limitations of the test pump, JAK observed an average pumping rate of 129.69-GPM during that test conducted on March 12, 2021. On July 2, 202, JAK installed a 25-horsepower 300-GPM series submersible pump in the well and then followed up the installation with an additional six-hour pump test.

Well Performance Pump Test: The six-hour pump test was conducted on July 6, 2021, using the newly installed 25-horse 300-GPM submersible test pump set in accordance with industry standards. Per the pump curve, the submersible pump can produce flows of 350+GPM at a pumping level of 140-feet below the top of casing, this is the maximum recommended rate of flow for the 300-GPM series pump at that pumping level. The static water level within the well was measured prior to the start of the test. Once the performance test began, the depth-to-water or pumping level was measured manually with a Powers Water Meter in the well every 15-minutes during the first hour of the test and then every 30-minutes for the next two hours followed by every 60-minutes for the remainder of the test. The pumping rate was measured by timing the flow into a volume verified holding tank. The pumping rate was measured at the same intervals as the pumping level. Both the depth-to-water/pumping level and pumping rate measurements are summarized in the attached table.

The static water level was measured at 17-feet below the top of casing at the start of the performance test. The pumping level decreased immediately to 53-feet below the top of casing within the first 15-minutes of starting the test. The pumping level then stabilized at 54-feet below the top of casing after the first hour where it remained for the duration of the test. The pumping rate, measured by timing the flow into a volume verified holding tank, measured at 487.50-GPM at the beginning of the test. Per the manufacturer's specifications, the pump should not be operated at that rate for any extended period of time. Therefore, using a gate valve installed on the discharge side, the flow was restricted to 355-GPM which corresponds to the manufacturer's pump curve with an intake set at 140-feet below the top of casing. After six hours of pumping, the well produced 145,897.5-gallons which averages out to a pumping rate of 360.24-GPM.

After six hours of pumping, well pump was shut off and the well was then allowed to rest and recharge. The depth-to-water was measured in the well after 10-minutes at 34.5-feet and then again in the well after 30-minutes at 27-feet below the top of casing, resulting in a recharge rate of 73.33% after resting 40-minutes. At the observed rate of recharge, the well would be fully recharged within an hour of turning off the pump. At 355-GPM, assuming all variables remain constant, the well can produce 186,588,000-gallons of water annually.

Water Quality: During the performance test, JAK collected a water sample for the purpose of a field quality test with the following results:

Parameter	Concentration	Discussion
Hardness	41-Grains per gallon	VERY HARD, a softener is recommended when the hardness is greater than 7-gpg
Iron (ferrous)	1.5-part per million	EPA suggests a concentration of less than 0.3ppm for public drinking water system, higher concentrations can cause rust staining over time
pH	6.6	A pH of 7.0 is considered neutral
Total Dissolved Solids	876-part per million	Less than 500-ppm is acceptable, the higher the concentration the harder the water typically

Disclaimer:
Observations made of the well(s) are strictly limited to the date and time that the test(s) was conducted and are in no way a guarantee of future conditions, including but not limited to the quantity and/or quality of the water produced by this well. Please feel free to contact our office if there are any questions regarding the well test and/or well test report.

Sincerely,

Jessica Moreno
JAK Drilling & Pump

Attachments:
Parcel Boundary Map
Well Location Map
Well Completion Report
Table 1: Well Performance Test Data

PARCEL BOUNDARY MAP

19955 Grange Road

Middletown, CA

WELL LOCATION MAP

19955 Grange Road

Middletown, CA

TABLE 1
WELL PERFORMANCE TEST DATA
19955 Grange Road
July 6, 2021

Time	Gallons Per Minute	Depth to Water In Feet Below Top of Casing
5:55	Static	17.00
6:10	250.00	53.00
6:25	369.00	55.00
6:40	350.00	54.50
6:55	355.00	54.50
7:10	355.00	54.00
7:40	355.00	54.00
8:10	355.00	54.00
8:40	355.00	54.00
9:10	355.00	54.00
9:40	355.00	54.00
10:40	355.00	54.00
11:40	355.00	54.00
12:40	355.00	53.50
12:50	RECHARGE	34.50
13:20	RECHARGE	27.00

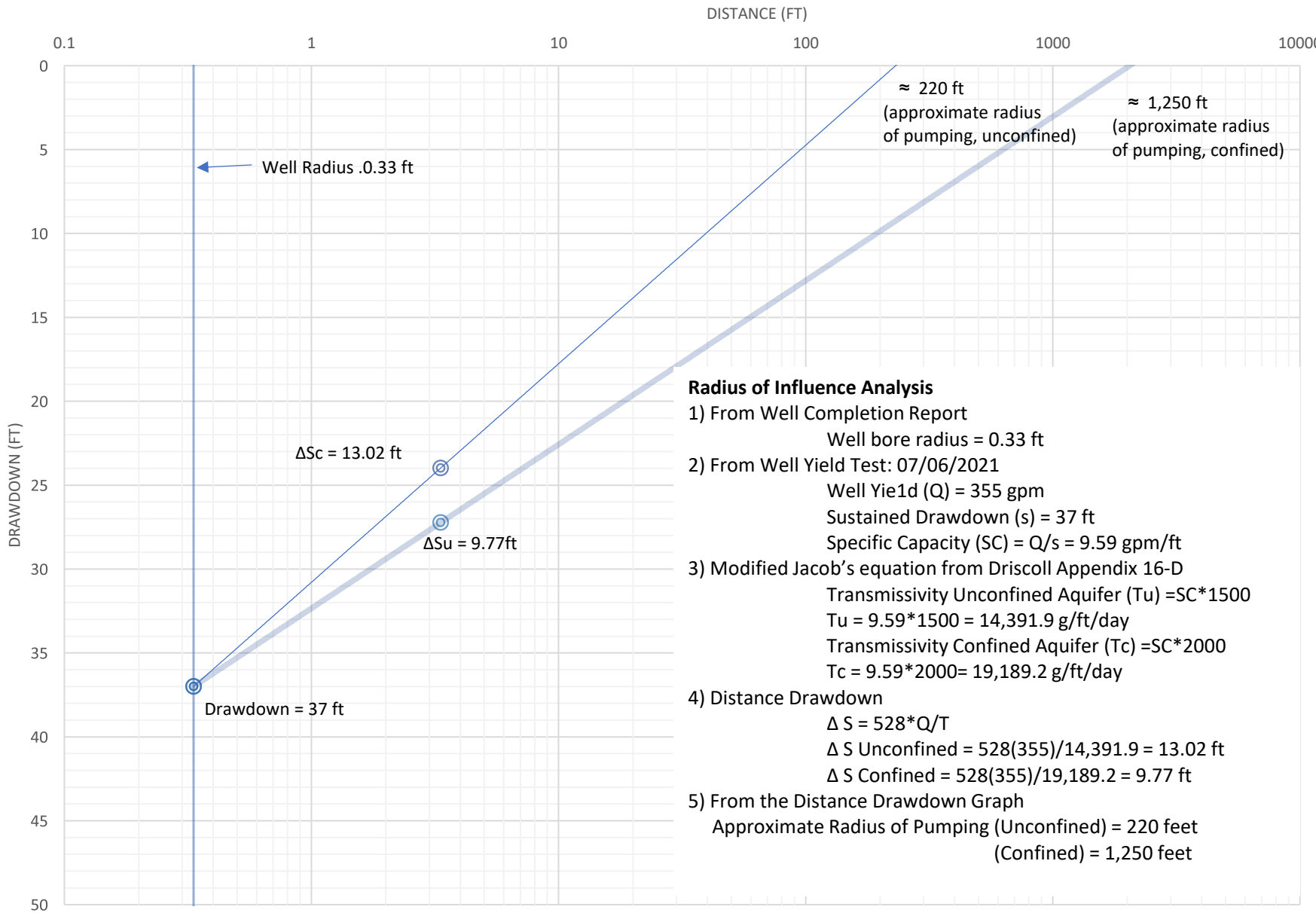
NOTES:
Discharge measured by timing flow into a volume verified tank.

Recharge Rate = (((54.5-27.0) ÷ (54.5-17.0)) x 100) = 73.33%

APPENDIX F
RADIUS OF PUMPING INFLUENCE

Radius of Pumping Influence

19955 Grange Road, Middletown, CA
APN 014-290-08



Radius of Influence Analysis

1) From Well Completion Report
   Well bore radius = 0.33 ft
2) From Well Yield Test: 07/06/2021
   Well Yie1d (Q) = 355 gpm
   Sustained Drawdown (s) = 37 ft
   Specific Capacity (SC) = Q/s = 9.59 gpm/ft
3) Modified Jacob's equation from Driscoll Appendix 16-D
   Transmissivity Unconfined Aquifer (Tu) =SC*1500
   Tu = 9.59*1500 = 14,391.9 g/ft/day
   Transmissivity Confined Aquifer (Tc) =SC*2000
   Tc = 9.59*2000= 19,189.2 g/ft/day
4) Distance Drawdown
   Δ S = 528*Q/T
   Δ S Unconfined = 528(355)/14,391.9 = 13.02 ft
   Δ S Confined = 528(355)/19,189.2 = 9.77 ft
5) From the Distance Drawdown Graph
   Approximate Radius of Pumping (Unconfined) = 220 feet
   (Confined) = 1,250 feet