

REALM

Engineering

1767 Market Street, Suite C, Redding, CA 96001



HYDROLOGY REPORT

21258 MORGAN VALLEY ROAD, LOWER LAKE, CA

FEBRUARY 24, 2022





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INTRODUCTION

The purpose of this Hydrology Study/Report is to provide adequate information regarding the water usage for a proposed cannabis cultivation operation and its impacts to surrounding areas. This report was written to meet the requirements of an Urgency Ordinance requiring land use applicants to provide enhanced water analysis during a declared drought emergency, approved by the Lake County Board of Supervisors on July 27th, 2021 (**Attachment A – Urgency Ordinance No. 3106**).

PROJECT DESCRIPTION

Auto Canna, LLC (“Auto Canna”) is seeking a Major Use Permit from the County of Lake for a proposed Outdoor Commercial Cannabis Cultivation Operation at 21258 Morgan Valley Road, Lower Lake, CA on Lake County APN 012-069-57 (Project Parcel/Property). Auto Canna’s proposed cultivation operation would be composed of three (3) A-Type 3 Medium Outdoor cultivation/canopy areas, with a total combined outdoor cultivation/canopy area of 93,560 ft². Existing improvements on the Project Property include a groundwater well with a solar powered pump, four 5,000-gallon heavy-duty plastic water storage tanks, a 120 ft² Pesticides and Agricultural Chemicals Storage Area (wooden shed), and 53,560 ft² of outdoor cannabis cultivation area. Proposed ancillary facilities include four additional 5,000-gallon plastic water storage tanks, a gravel 20-foot wide access road, and a 5,000 ft² Cannabis Drying & Storage Facility (metal building) with a roof-mounted photovoltaic solar array (**Attachment B: Existing & Proposed Conditions Site Plans**).

The 80-acre APZ-zoned Project Parcel is located on Sky High Ridge/Mountain, approximately 4.5 miles east of Lower Lake, CA in southeastern Lake County. Topography of the Project Property is mountainous, with elevations that range from approximately 2,180 to 2,880 feet above mean sea level. The southern two-thirds of the Project Property is within the Upper Putah Creek Watershed (HUC 10), with ephemeral drainages that flow south towards Soda Creek; and the northern third of the Project Property is located within the Upper Cache Creek Watershed, with ephemeral drainages that flow north towards Dry Creek. All water for the proposed cultivation operation would come from an existing onsite groundwater well located at Latitude: 38.910435° and Longitude: -122.516293°.

Soils of the Project Site are identified as Skyhigh-Millsholm loams by the NRCS Web Soil Survey, and characterized as well drained clay loams derived from weathered sedimentary rock. The United States Geological Survey Map of the Santa Rosa Quadrangle defines the area in the vicinity of the Project Property as the Lower Cretaceous-Upper Jurassic Great Valley Sequence, composed mostly of marine mudstones, siltstones, sandstones, and conglomerate. The Project Property is not located within any of the 13 groundwater basins/source areas identified in the 2006 Lake County Groundwater Management Plan¹.

The cultivation season for the proposed outdoor cannabis cultivation operation would begin in April and end in November of each year. The growing medium of the existing and proposed outdoor cultivation areas is/will be an amended native soil mixture at or below grade, composed of native soil and compost, with drip irrigation systems. The existing and proposed outdoor cultivation areas are/will be surrounded by 6-foot woven galvanized wire fences, with privacy screen/cloth where necessary to screen the cultivation area from public view.



All cannabis waste generated from the existing/proposed cultivation operation is/will be composted on-site. Composted cannabis waste is/will be stored in the designated composting area until it is incorporated into the soils of the cultivation areas as a soil amendment. Chemicals stored and used at/by the cultivation operation include fertilizers/nutrients, pesticides, and petroleum products (Agricultural Chemicals) and chemical sanitation products necessary to maintain a sterile work environment. All chemicals and tools are/will be stored inside a secure 120 ft² wooden building (Pesticides and Agricultural Chemicals Storage Area).

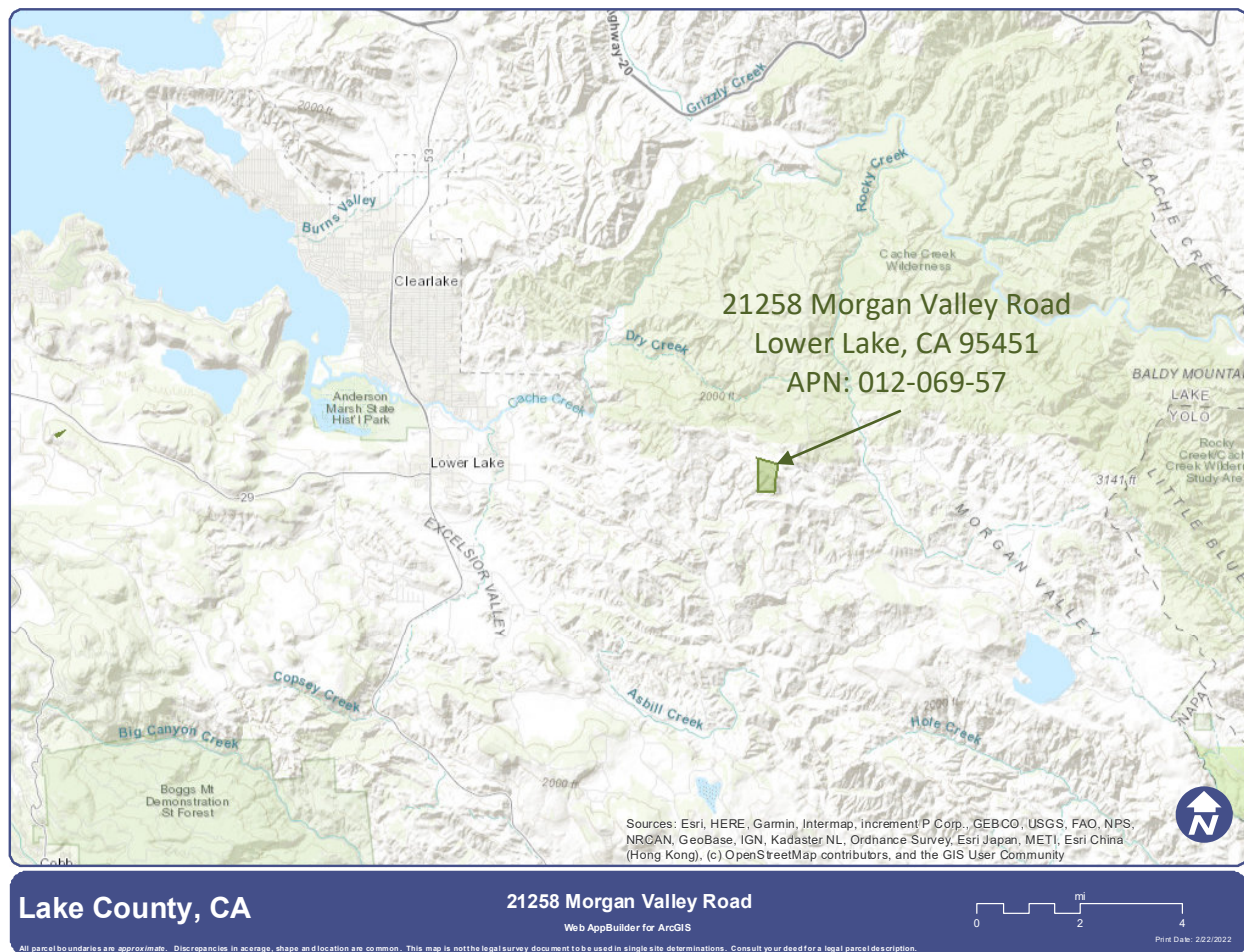


Figure 1 – Site Location Map



WATER USAGE

Cannabis has often been characterized as a high-water-use plant. Bauer et al. (2015)² and Carah et al (2015)³ estimate that cannabis plants can consume up to approximately 6 gallons per plant per day, whereas grapes consume approximately 3.5 gallons per plant per day in the North Coast region of California. Other authors, however, have reported that water use requirement for cannabis plants are similar to those of other agricultural crops, such as corn and hops, with an estimated water use requirement of 25-35 inches per year (Hammon et al. 2015⁴). According to a recent study published in the Journal of Environmental Management (Dillis et al. 2020⁵), outdoor and mixed-light cannabis cultivation uses the most water during the month of August, with an estimated water use of approximately 58,704 gallons per acre during the month of August.

Auto Canna plans to cultivate up to 93,560 ft² (~2.15 acres) of outdoor cultivation/canopy area, between April and November of each year. According to Auto Canna’s management, they cultivated approximately 53,560 ft² of the total proposed cultivation/canopy area, and used approximately 884,000 gallons of water for irrigation (**Attachment D – 2021 Annual Water Usage Report**). If we apply this rate of water usage (~2.2 acre-feet per acre of outdoor canopy/cultivation area), the estimated annual water use for the total proposed cultivation operation would be approximately 4.7 acre-feet (~1,540,000 gallons). The following table presents the expected water use of the proposed cultivation operation in gallons by month during the cultivation season (April through November).

April	May	June	July	August	September	October	November
75,000	150,000	210,000	280,000	320,000	280,000	150,000	75,000

Based on the water use estimates above, we estimate that the proposed cultivation operation would have a maximum water use requirement of approximately 10,667 gallons per day, with an average water demand of approximately 6,420 gallons per day over the course of a 240-day cultivation season.

WATER AVAILABILITY

All water for the proposed cultivation operation would come from an existing onsite groundwater well located directly adjacent to the existing and proposed cultivation areas, at Latitude: 38.910435° and Longitude: -122.516293° (**Attachment B – Existing & Proposed Conditions Site Plans**). Water from the onsite groundwater well would be stored within eight 5,000-gallon heavy-duty plastic water storage tanks, and pumped to the drip irrigation systems of the existing and proposed cultivation areas via HDPE water supply lines. The onsite well was drilled in 2013 to a depth of 220 feet through clay, shale, and sandstone, and had an estimated yield of more than 100 gallons per minute (gpm) at the time it was drilled (**Attachment C – Onsite Well Completion & Pump Test Reports**). The Well Completion Report for the onsite groundwater well indicates that the well was screened between 180 and 220 feet below ground surface (bgs), and that the water bearing zone is composed of gray sandstone. Water was first encountered at 110 feet bgs, and the static water level was 90 feet bgs after the well was completed. This indicates that the aquifer of/under the Project Parcel is semi-confined or confined and under pressure.



On February 17th, 2022, JAK Drilling & Pump (License No.: 1013957) conducted a 6-hour pump test of the onsite groundwater well using a Well Watch 670 sonic water level monitor and mechanical totalizing meter that were previously installed on the well (**Attachment C - Onsite Well Completion and Test Reports**). During the 6-hour pump test, the onsite well was initially pumped at 19 gpm, but was gradually reduced to 17 gpm for the last 2.5 hours of the test. Approximately 6,250 gallons of water were pumped from the well during the 6-hour pump test, for an average pumping rate of approximately 17.4 gpm. The water level in the onsite well dropped from 171.6 to 184 feet bgs during the first four hours of the pump test, and stabilized at approximately 182.8 feet bgs for the last two hours of the pump test, when the pumping rate was reduced to 17 gpm. The water level in the well recovered to 176.9 feet bgs within 24 hours after pumping for the test ceased. Using data from the Well Performance Test, we can calculate a Specific Capacity of 1.5 gpm/foot of drawdown (i.e., 17 gpm / 11.2 feet) for the onsite groundwater well.

The peak anticipated daily demand for water of the proposed cannabis cultivation operation is approximately 10,667 gallons per day, with an average water demand of approximately 6,420 gallons per day during the cultivation season (April through November). Based on data from the Well Completion and Pump Test Reports, it appears that existing onsite groundwater well could consistently produce 17 gpm. At 17 gpm, the onsite groundwater well could meet the average daily water demand of the proposed cultivation operation in 6 hours and 18 minutes. The onsite groundwater well would have to be pumped for 10 hours and 28 minutes at 17 gpm to meet the peak anticipated daily demand of approximately 10,667 gallons. The proposed Project includes 40,000 gallons of existing and proposed water storage capacity, which is over three times the peak anticipated daily water demand of the proposed cultivation operation, and could be used to reduce the amount of water that has to be pumped during the peak irrigation water use periods. Additionally, at the end of the pump test there was still over 37 feet of available drawdown with nearly stabilized pumping. Based on the estimated water usage rates, the measured pumping rates, and the existing and proposed water storage capacity, the site appears to have the water necessary to meet the irrigation water demands of the proposed cultivation operation without creating aquifer overdraft.

AQUIFER/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, and drainage ditches).

To estimate the groundwater recharge at the site, we first must assume that the recharge to the aquifer is primarily through rainfall across the 80-acre Project Parcel. Therefore, the annual precipitation available for recharge onsite can initially be estimated using the following data and equation.



$$80 \text{ acres} \times 2.75 \text{ feet (Average Annual Precipitation for Clearlake, CA)} = 220 \text{ acre-feet}$$
$$\underline{\text{Estimated Annual Precipitation Onsite} = 220 \text{ acre-feet/year}}$$

However, this estimate does not account for surface run-off, stream underflow, and evapotranspiration that occurs in all watersheds. According to the USGS, the long-term average precipitation that recharges groundwater in the northern California region is approximately 15 percent, but can be as low as 1.67 percent. Since the Project Property is mountainous, but covered in well drained clay loam soils and vegetation, we estimate that the long-term average precipitation that recharges groundwater within the entire site is slightly below the regional average at 10%. With this data and the precipitation data presented above, we can estimate the groundwater recharge of the Project Parcel by using the following equation.

$$220 \text{ acre-feet/year (annual precipitation onsite)} \times 0.1 \text{ (long term average recharge)} =$$
$$\underline{\text{Estimated Groundwater Recharge} = 22 \text{ acre-feet/year}}$$

Based on the estimated average annual recharge to the aquifer(s) of the Project Property (22 acre-feet/year) and the estimated annual water usage of the proposed cannabis cultivation operation (4.7 acre-feet), it appears that proposed cultivation operation would have enough water to meet its demands without causing overdraft conditions.

However, the estimates above do not account for severe drought conditions, as we have seen over the last decade. The California Department of Water Resources ranked Water Year 2021 (October 1st, 2020 through September 30th, 2021) as the State's fourth driest on record. During Water Year 2021, less than 10 inches (approximately 9.5 inches) of precipitation fell on the USGS Cache Creek Precipitation Gage near Lower Lake, CA (closest USGS Precipitation Gage to the Project Property). If we rerun the calculations above using this precipitation data, we can obtain the following estimate for groundwater recharge during Water Year 2021.

$$80 \text{ acres} \times 0.8 \text{ feet (Water Year 2021 Precipitation for Lower Lake, CA)} = 64 \text{ acre-feet}$$
$$64 \text{ acre-feet (Water Year 2021 Onsite Precip)} \times 0.10 \text{ (long term average recharge)} =$$
$$\underline{\text{Estimated Severe Drought Value for Groundwater Recharge} = 6.4 \text{ acre-feet}}$$

The estimated amount of water available to recharge the aquifer under the Project Property during a severe drought year (~6.4 acre-feet) is still greater than the estimated annual water usage of the proposed cultivation operation (4.7 acre-feet).

POTENTIAL IMPACTS TO STREAMS & NEIGHBORING WELLS

Urgency Ordinance 3106 requires analysis of the “Cumulative impact of water use to surrounding areas due to project” implementation. To do this, we must first identify surrounding areas and uses that could be impacted from the project's well pumping/water usage. As outlined in previous sections of this report, all water for the proposed cultivation operation would come from an existing onsite groundwater well, and the proposed cultivation operation would have an annual water use requirement of approximately 4.7 acre-feet (~1,540,000 gallons) per year/cultivation season.

Multiple ephemeral Class III watercourses form on the Project Parcel and flow south towards Soda Creek, and northwest towards Dry Creek. The ephemeral watercourses of the Project Property do not support aquatic habitat and are typically dry by April of each year, when pumping for the



proposed cultivation operation would begin. Therefore, the potential for stream depletion as a result of the proposed onsite groundwater usage is not considered a concern to this assessment.

Six groundwater wells were identified on parcels surrounding the Project Property, and their approximate location is shown on **Figure 2 – Nearest Known Wells Location Map** (next page). Additionally, the well completion reports for these groundwater wells are included in **Attachment E – Well Completion Reports for Nearest Known Wells** of this report, and summarized in **Table 1 – Well Inventory**, below.

Well Number	APN	Year Drilled	Total Depth (feet)	Screen Interval (feet)	Aquifer Material
0963025	Onsite Well	2013	220	180-220	Sandstone
1089156	012-069-08	2008	375	160-375	Shale
013364	012-069-17	2021	472	72-452	Shale w/ Clay & Ash
013368	012-069-17	2021	303	63-283	Shale w/ some Basalt
013375	012-069-17	2021	328	218-318	Shale
414721	012-069-20	1994	188	148-188	Sandstone & Shale
486018	012-069-20	1992	220	100-220	Shale

Table 1 – Well Inventory

To evaluate potential well pumping impacts to surrounding areas and uses, the potential lateral extent of pumping from the onsite groundwater well was estimated. Using general relationships discussed in *Groundwater and Wells, Second Edition* (Driscoll 1986⁶), we estimated the lateral pumping influence using information from the 6-hour pump test performed by JAK Drilling & Pump (License No.: 1013957) on February 17th, 2022. An approximate relationship between specific capacity calculated from the pump test and aquifer transmissivity was used to obtain aquifer characteristics and estimate a potential radius of pumping influence. Transmissivity was estimated for an unconfined and confined aquifer, using the relationship of Specific Capacity (yield/drawdown) multiplied by the coefficient of 1,500 (unconfined) and 2,000 (confined). To develop the slope of the drawdown curve from the pumping well, the value of Δs (drawdown over on log graph cycle) was calculated for a distance-drawdown relationship, where $T = 528Q/\Delta s$ (Driscoll 1986, equation 9.11⁶). The analysis is shown on the attached semi-log plot (**Attachment F – Radius of Influence Analysis**).



The specific capacity for the onsite groundwater well was calculated to be 1.5 gpm/foot drawdown (17 gpm / 11.2 feet drawdown) from the 6-hour pump test. Using this data and the general relationships outlined above, we calculated a zone of pumping influence extending approximately 100 feet from the onsite groundwater well for an unconfined aquifer, and 900 feet for a confined aquifer. While this model demonstrates a potential radius of pumping influence for homogeneous aquifer settings, it may not be completely representative of a fractured bedrock aquifer system. Fractured bedrock systems rely on fractured networks as well as secondary permeability caused by faulting and weathering, and therefore the actual radius of pumping influence is primarily limited to the lateral extent of the fractured network.

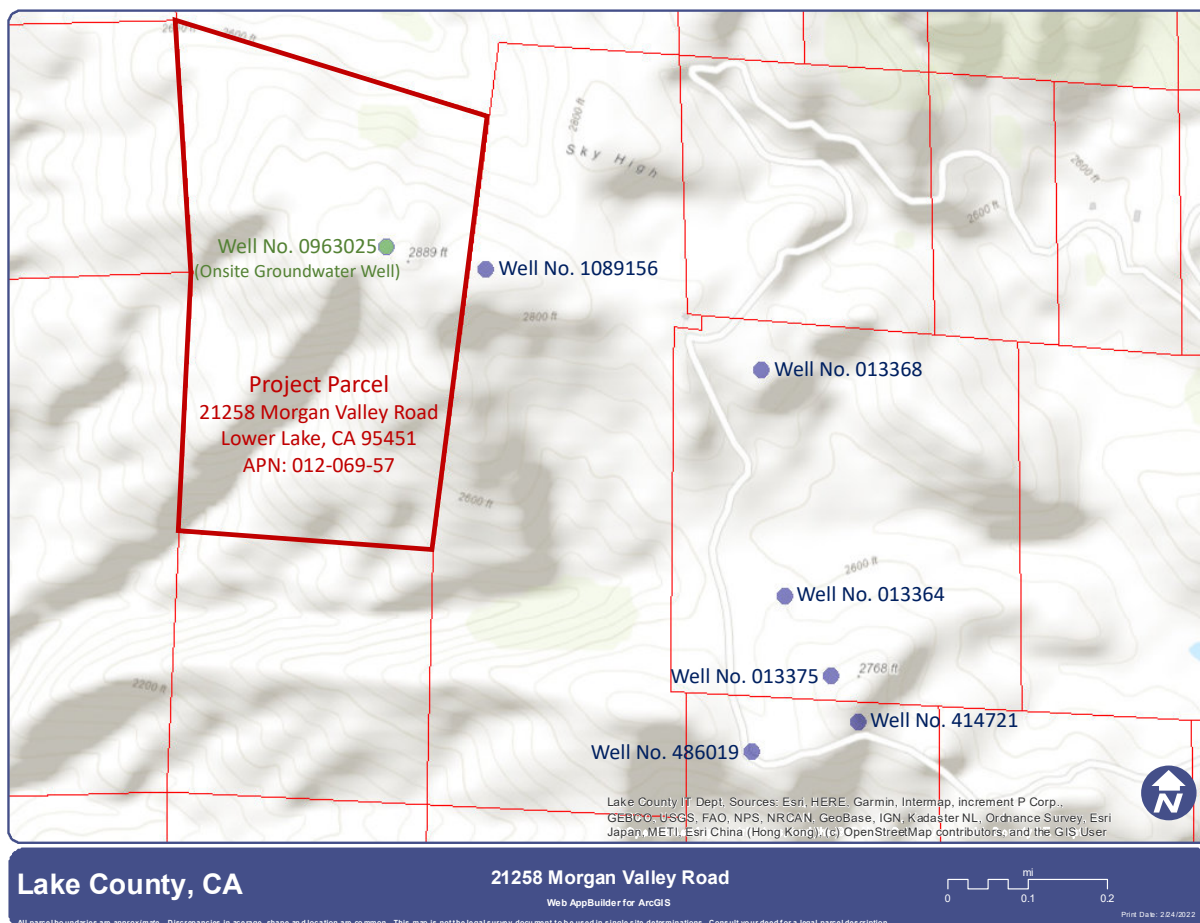


Figure 2 – Nearest Known Wells Location Map

The wellhead of the onsite groundwater well is located at approximately 2,875 feet above mean sea level, and the well is screened between 180 and 220 feet bgs, or approximately 2,695 to 2,655 feet above mean sea level (**Attachment C - Onsite Well Completion and Test Reports**). The nearest known groundwater well, Well Number 1089156 on Lake County APN 012-064-08, is located approximately 500 feet east of the onsite groundwater well. The wellhead of this well is located at approximately 2,845 feet above mean sea level, and the well is screened between 160 and 375 feet bgs, or approximately 2,685 to 2,470 feet above mean sea level (**Attachment E –**



Well Completion Reports for Nearest Known Wells). Both the onsite groundwater well and the nearest known neighboring groundwater well were drilled by Dan McMullen Well Drilling (License No. 533157). Dan McMullen Well Drilling described the aquifer in which the onsite groundwater well was screened as “Gray Sandstone”, and described the aquifer in which the nearest neighboring groundwater well was screened as “Gray Shale”. Based on the information provided in the Well Completion Reports, it appears that the onsite well and nearest neighboring well predominantly draw water from two different aquifers. While there is likely some hydraulic connectivity between the two aquifers, we do not anticipate significant well interference due to differences in the transmissivity, porosity, and permeability of sandstone aquifers and shale aquifers⁷.

DROUGHT MANAGEMENT PLAN

The Urgency Ordinance approved by the Lake County Board of Supervisors on July 27th, 2021 (Ordinance No. 3106) requires applicants to provide a plan depicting how the applicants plan to reduce water use during a declared drought emergency. The proposed cultivation operation would be composed of 93,560 ft² of outdoor cultivation/canopy area and a 5,000 ft² Drying and Harvest Storage Facility. All water for the proposed cultivation operation would come from an existing onsite groundwater well located at Latitude: 38.910435° and Longitude: -122.516293°, and the proposed cultivation operation would have an annual water use requirement of approximately 4.7 acre-feet per year/cultivation season.

Per the Water Conservation and Use requirements outlined in the State Water Resources Control Board’s Cannabis General Order, Auto Canna shall implement the following Best Practical Treatment and Control (BPTC) measures to conserve water resources:

- Regularly inspect the entire water delivery system for leaks and immediately repair any leaky faucets, pipes, connectors, or other leaks;
- Apply weed-free mulch in cultivation areas that do not have ground cover to conserve soil moisture and minimize evaporative loss;
- Implement water conserving irrigation methods (drip or trickle and micro-spray irrigation);
- Maintain daily records of all water used for irrigation of cannabis. Daily records will be calculated by using a measuring device (inline water meter) installed on the main irrigation supply line between the water storage area and cultivation area(s);
- Install float valves on all water storage tanks to keep them from overflowing onto the ground.

With the Water Conservation and Use requirements outlined above, the proposed cultivation operation would efficiently use water resources at all times. Additionally, Article 27 Section 27.11 of the Lake County Zoning Ordinance requires commercial cannabis cultivators using water from a groundwater well to install a water level monitor on their water supply well, and to regularly record readings from the continuous water level monitor. Well water level monitoring and reporting shall be performed as follows:

Seasonal Static Water Level Monitoring

Seasonal monitoring of well water levels provides information regarding long-term groundwater elevation trends. The water level in the onsite groundwater well shall be measured and recorded



prior to the start of the cultivation season (March/April), and once in the fall (November) after the cultivation season has ended. Data reported to the Lake County Community Development Department as part of the Project's annual reporting requirements shall include a hydrograph plot of all seasonal water level measurements for the onsite groundwater well.

Water Level Monitoring During Extraction

The purpose of monitoring the water level in a well during extraction is to evaluate the performance of the well to determine the effect of the pumping rate on the water source during each cultivation season. This information can be used to determine the capacity and yield of the onsite groundwater well for 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 the well water level. Data reported to the Lake County Community Development Department as part of the Project's annual reporting requirements shall include a hydrograph plot of the water level readings during the cultivation season.

In addition to the monitoring and reporting described above, the Project's annual report shall include an analysis of the water level monitoring data, demonstrating whether or not use of the onsite groundwater 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 shall be prepared and submitted to the Lake County Community Development Department, for review and approval, demonstrating how the project will mitigate the impacts in the future.

DROUGHT EMERGENCY RESPONSE

When a drought emergency has been declared for the area of the proposed cultivation operation, Auto Canna may implement the following additional measures, as needed or appropriate to the site, to reduce water use and ensure both success of the cultivation operation and decreased impacts to surrounding areas:

- 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 mulch 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 stress and water needs;
- Add a soil amendments/ingredients to growing medium that retains water in a way to conserve water and aid plant growth/health. Soil amendments/ingredients such as peat moss, coco coir, compost, perlite, and vermiculite retain water and provide a good environment for cannabis to grow.

Additionally, to ensure both success and decreased impacts to the surrounding areas, Auto Canna plans to reduce their outdoor cultivation/canopy area and water usage by more than 10 percent, when a drought emergency has been declared for their region. To reduce their water usage by more than 10 percent, Auto Canna will not plant 10,000 ft² of their proposed cultivation/canopy area. The cultivation/canopy area(s) to be left fallow will depend on when a drought emergency is declared (before or after the proposed cultivation/canopy areas have been planted), and Auto Canna will prioritize the preferred cultivation/canopy areas over less desirable cultivation/canopy



areas (based on cultivation experience). By implementing the Drought Management Plan outlined above, Auto Canna would reduce the estimated annual water demand for the proposed cultivation operation from approximately 1,540,000 gallons to 1,375,400 gallons during periods of drought.

CONCLUSIONS

All water for the proposed cultivation operation would come from an existing onsite groundwater well located at Latitude: 38.910435° and Longitude: -122.516293°. This well was drilled in 2013 to a depth of 220 feet through clay, shale, and sandstone, and had an estimated yield of more than 100 gallons per minute (gpm) at the time it was drilled. A well performance test performed in February of 2022, indicates that the onsite groundwater well can sustainably produce 17 gallons per minute. From the well performance test data we calculated a Specific Capacity of approximately 1.5 gpm/foot for the onsite groundwater well. The total estimated annual water use requirement for the proposed cultivation operation is approximately 1,540,000 gallons per year.

Based on data from the recent pump test and the estimated water use requirement(s) for the proposed cultivation operation, it appears that the onsite groundwater well is a sufficient water source for the proposed cultivation operation. Based on the estimated average annual recharge to the aquifer under the Project Property (~22 acre-feet/year) and the estimated annual water usage of the proposed cultivation operation (4.7 acre-feet/year), it appears that the aquifer storage and recharge area are sufficient to provide for sustainable annual water use at the site and on the Project Property.

The calculated a zone of pumping influence for the proposed cultivation operation extends as far as 900 feet from the onsite groundwater well. There is a neighboring well within 900 feet of the onsite well, but this well appears to receive water from an aquifer that is different from the aquifer from which the onsite well receives groundwater (based on the Well Completion Reports for the two wells). Therefore, it does not appear that pumping for the proposed cultivation operation would impact neighboring wells, given the horizontal and vertical separations between the onsite groundwater well and the nearest known wells. Pumping for the proposed cultivation operation should not impact nearby ephemeral watercourses, as they are typically dry by April of each year, when pumping for the proposed cultivation operation would start.

Auto Canna's Drought Management Plan is to reduce their outdoor cultivation/canopy area and water usage by more than 10 percent, to ensure both success and decreased impacts to the surrounding areas during a drought emergency. To reduce their water usage by more than 10 percent, Auto Canna will not plant 10,000 ft² of their proposed cultivation/canopy area. The cultivation/canopy area(s) to be left fallow will depend on when a drought emergency is declared, prioritizing the preferred cultivation/canopy areas over less desirable cultivation/canopy areas. By implementing their Drought Management Plan, Auto Canna would reduce the estimated annual water demand for the proposed cultivation operation from approximately 1,540,000 gallons to 1,375,400 gallons during periods of drought.



LIMITATIONS

Realm Engineering is not responsible for the independent conclusions, opinions or recommendations made by others based on the records review, site inspection, field exploration, 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. Hydrologic interpretations are based on Well Completion Reports made available to us through the California Department of Water Resources, available geologic maps and hydrological 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 hydrological 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 or a type or at a location not investigated.

This report is for the exclusive use of Auto Canna, LLC, their affiliates, designates and assignees, and no other party shall have any right to rely on any service provided by Realm Engineering without prior written consent.

Please feel free to contact me with any questions that you may have regarding this Hydrology Study/Report.

Sincerely,
Jason Vine, P.E. 67800



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REFERENCES

¹Lake County Watershed Protection District, Lake County Groundwater Management Plan, 2006

²Bauer, S., Olson, J., Cockrill, A., et al. 2015. Impacts of surface water diversions for marijuana cultivation on aquatic habitat in four northwestern California watersheds. PLOS ONE, 10(9): e0137935

³Carah, J.K., Howard, J.K., Thompson, S.E., *et al.* 2015. High time for conservation: adding the environment to the debate on marijuana liberalization. Bioscience, 65, pp.822-829

⁴Hammon, B., Rizza, J. and Dean, D. 2015. Current impacts of outdoor growth of cannabis in Colorado. Colorado State University Extension, Fact Sheet No. 0.308

⁵Dillis, C.R., Grantham, T.E., McIntee, C., McFadin, B., Grady, K.V. 2020. Water storage and irrigation practices for cannabis drive seasonal patterns of water extraction and use in Northern California. Journal of Environmental Management, Volume 272, 15 October 2020, 110955

⁶Driscoll, Fletcher G., 1986, Groundwater and Wells, Second Edition, Johnson Division, St. Paul Minnesota, 1089p.

⁷Freeze, R.A. and Cherry, J.A. 1979. Groundwater. Prentice-Hall, Inc.

ATTACHEMENT A

URGENCY ORDINANCE NO. 3106

BOARD OF SUPERVISORS, COUNTY OF LAKE, STATE OF CALIFORNIA

ORDINANCE NO. 3106

AN URGENCY ORDINANCE REQUIRING LAND USE APPLICANTS TO PROVIDE ENHANCED WATER ANALYSIS DURING A DECLARED DROUGHT EMERGENCY

WHEREAS, the Sheriff, acting as the OES Director of Lake County, declared a local emergency due to drought conditions on May 6, 2021; and

WHEREAS, the Lake County Board of Supervisors approved the ratification of the declaration of a local emergency due to drought conditions on May 11, 2021; and

WHEREAS, the Board of Supervisors wish to ensure continued access to drinking water from private wells or from water purveyors throughout the county; and

WHEREAS, the Board of Supervisors wish to ensure that all current agricultural activities and projects find success during this declared drought emergency; and

WHEREAS, the Board of Supervisors of the County of Lake finds that additional information is critical to ensuring that the Planning Commission approves projects based on evidence of water use and water impacts and the analysis of the impacts to the surrounding areas.

NOW THEREFORE, the Board of Supervisors of the County of Lake hereby ordains as follows:

Section One: Due to the exceptional drought that we are experiencing and the declaration of a drought emergency, any land use approvals are required to provide adequate information regarding water usage for the project being considered and its impacts to surrounding areas. All projects that require a CEQA analysis of water use must include these additional items:

- A. Hydrology report prepared by a California licensed civil engineer, hydro-geologist, hydrologist, or geologist experienced in water resources
 - a. Approximate amount of water available for the project's identified water source
 - b. Approximate recharge rate for the project's identified water source
 - c. Cumulative impact of water use to surrounding areas due to project
- B. Drought Management Plan
 - a. Provide a plan depicting how the applicants plan to reduce water use during a declared drought emergency, to ensure both success and decreased impacts to the surrounding areas

Section Two: This urgency ordinance, if approved, shall take effect on all future Planning Commission considerations until the declared drought emergency has expired or if the Board of Supervisors revokes the ordinance.

Section Three: It can be seen with certainty that there is no possibility that this urgency Ordinance may have a significant effect on the environment.

Section Four: All ordinances or parts of ordinances or resolutions or parts of resolutions in conflict herewith are hereby repealed to the extent of such conflict and no further.

Section Five: This ordinance shall go into effect immediately, and before the expiration of fifteen days after its passage, it shall be published at least once in a newspaper of general circulation printed and published in the County of Lake.

Section Six: This Ordinance is adopted as an urgency Ordinance pursuant to the provisions of Government Code sections 25123 and 25131 and shall be effective immediately upon adoption. Based on the declaration of purpose and facts constituting the urgency set forth above in Section One of this Ordinance, the Board of Supervisors finds and determines that the adoption of this Ordinance as an urgency Ordinance is necessary for the immediate preservation of the public peace, health and safety to address critical groundwater conditions in Lake County.

The Foregoing Ordinance was introduced before the Board of Supervisors on the 27th day of July, 2021, and passed by the following vote on the 7th day of July, 2021.

AYES: Supervisors Simon, Crandell, Scott, Pyska, and Sabatier

NOES: None

ABSENT OR NOT VOTING: None

COUNTY OF LAKE


OFFICIAL SEAL OF THE COUNTY OF LAKE

Chair, Board of Supervisors

ATTEST: CAROL J. HUCHINGSON
Clerk of the Board of Supervisors

By: _____
Deputy

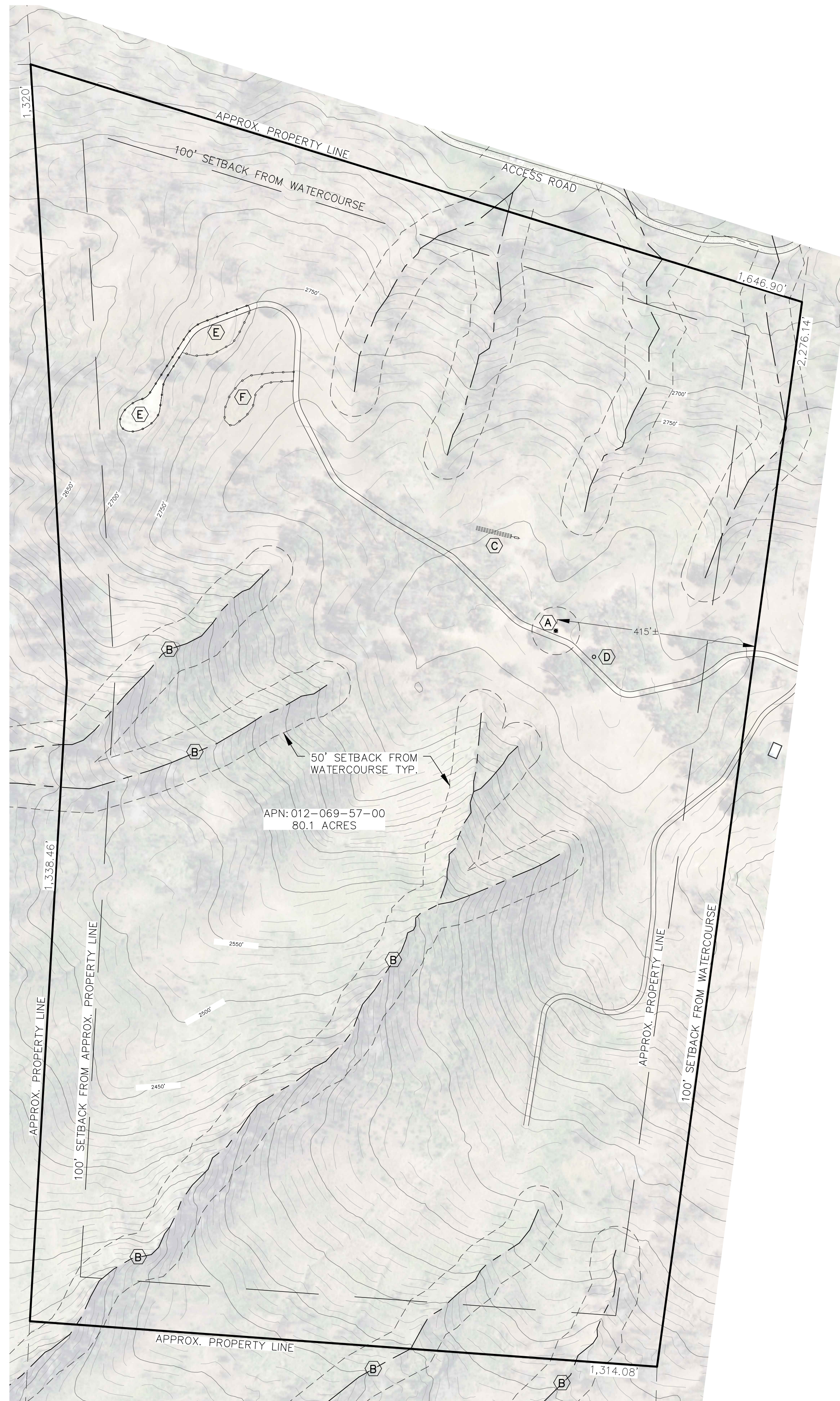
APPROVED AS TO FORM:

ANITA L. GRANT
County Counsel

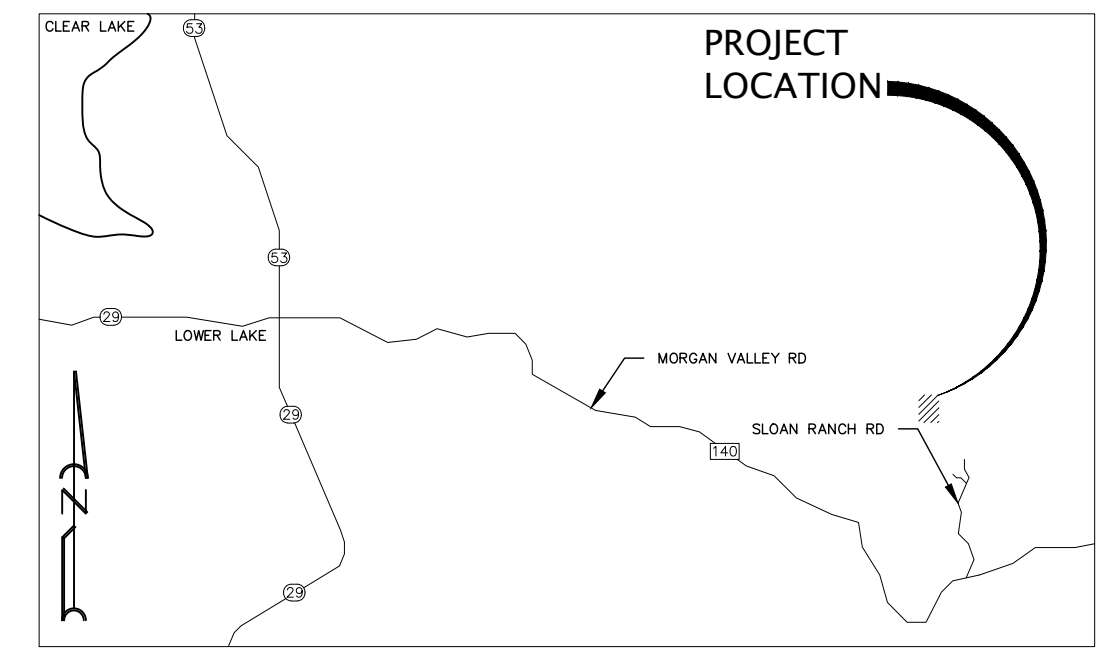
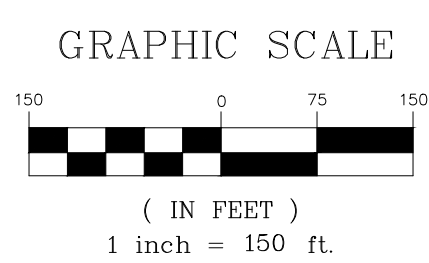
By: _____

ATTACHEMENT B

EXISTING AND PROPOSED CONDITIONS SITE PLANS



EXISTING CONDITIONS SITE PLAN



AutoCanna, LLC
 21258 MORGAN VALLEY ROAD
 LOWER LAKE, CA 95457 - LAKE COUNTY
 APN:012-069-57-00

LEGEND:

- 1530 CONTOUR ELEVATION
- FENCE
- LIMITS OF DISTURBED AREA
- ASPHALT
- GRAVEL
- EARTH
- FLOOD ZONE
- CREEK / SWALE
- (E) POWER POLE
- APN ASSESSOR'S PARCEL NUMBER
- APPROX APPROXIMATELY
- DWY DRIVEWAY
- (E) EXISTING
- (P) PROPOSED
- RD ROAD
- SF SQUARE FEET

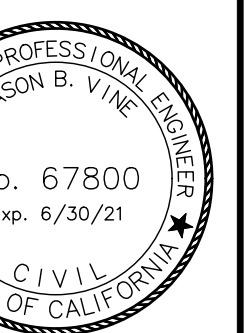
NOTES:

1. CONTOUR INTERVAL IS 10'

- (A) (E) GROUNDWATER WELL:
LAT: 38.910435°
LONG: -122.516293°
- (B) (E) EPHEMERAL CLASS III WATERCOURSE
- (C) (E) SEPTIC / LEACH LINES
- (D) (E) 5,000 GALLON WATER STORAGE TANK
- (E) (E) LEGACY CULTIVATION AREA
- (F) (E) LEGACY CULTIVATION AREA

Revisions:

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



EXISTING CONDITIONS SITE PLAN

AutoCanna, LLC
 21258 MORGAN VALLEY ROAD
 LOWER LAKE, CA 95457
 LAKE COUNTY APN:012-069-57-00

PLOTTED BY:

DATE PLOTTED:

5/25/21

SCALE OF DRAWING:

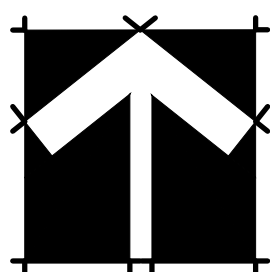
SEE PLAN

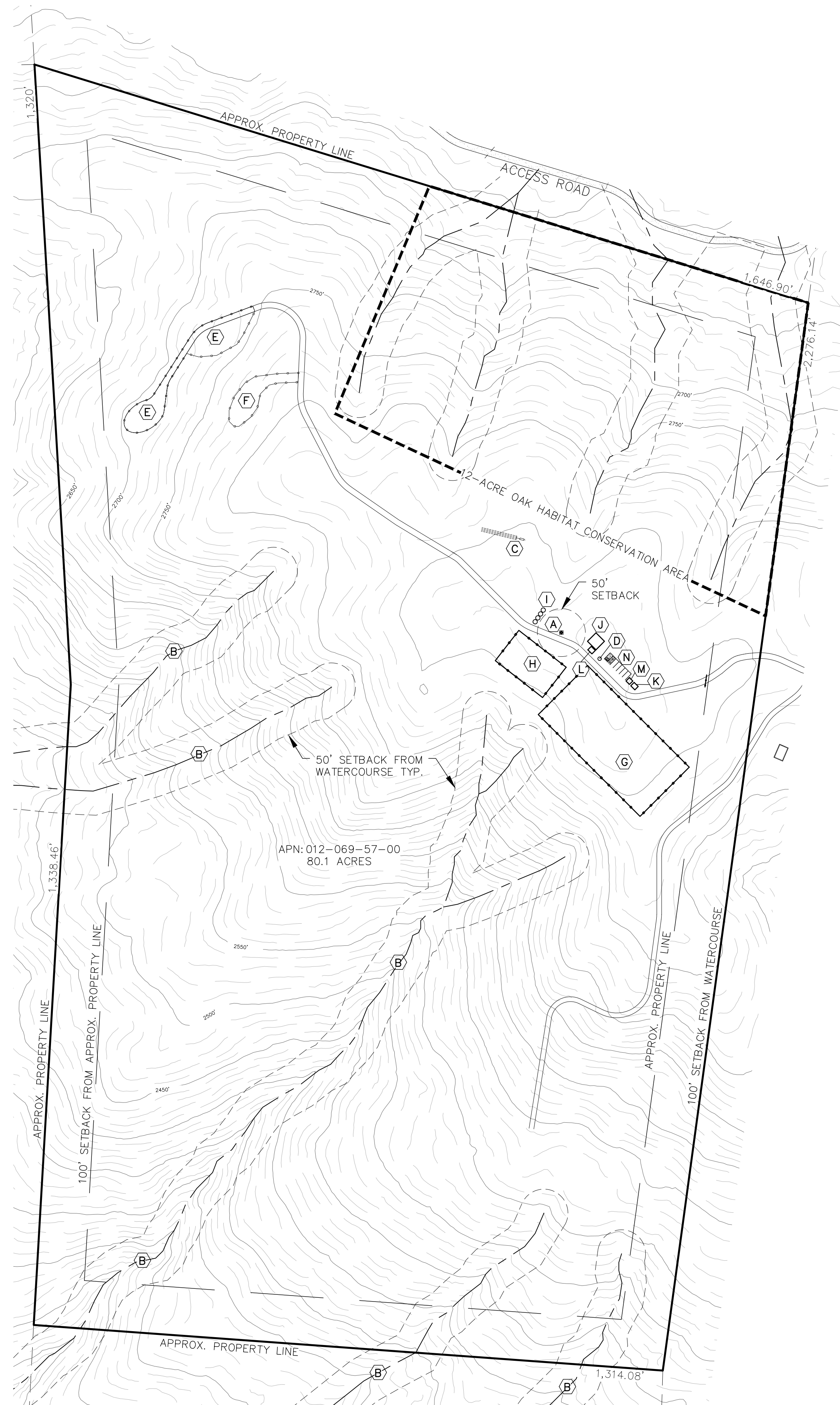
JOB NUMBER:

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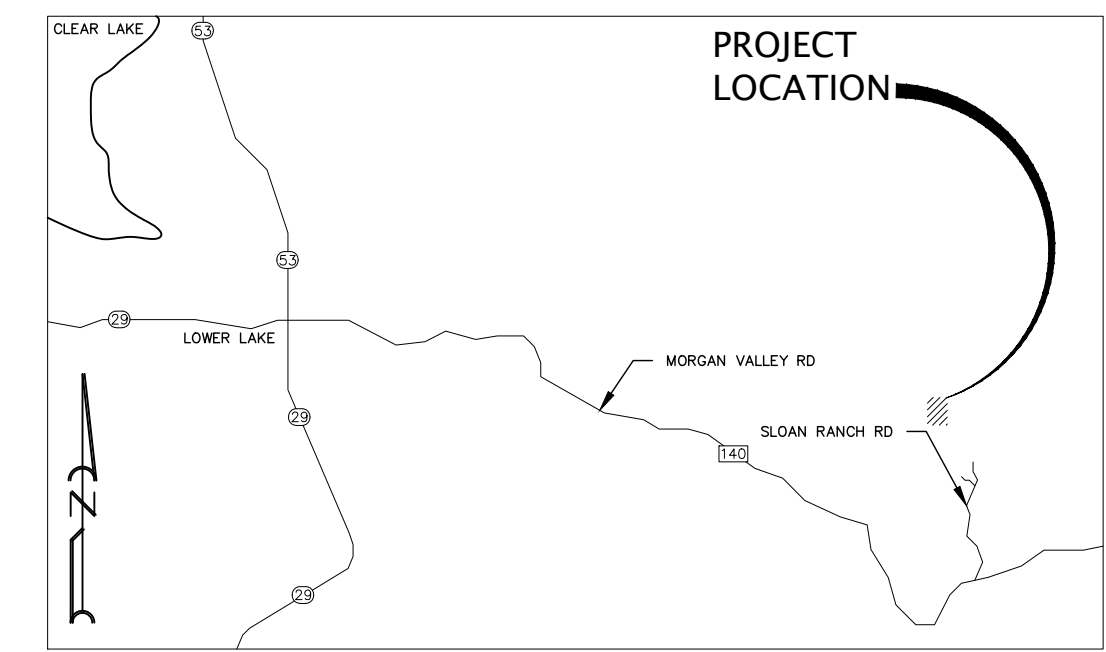
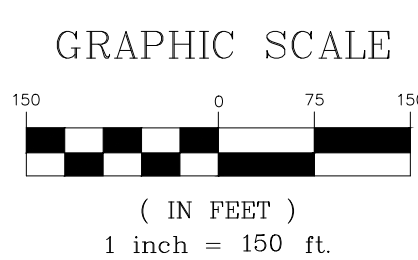
SHEET:

1





PROPOSED CONDITIONS SITE PLAN
(PHASE 1)



AutoCanna, LLC
21258 MORGAN VALLEY ROAD
LOWER LAKE, CA 95457 - LAKE COUNTY
APN:012-069-57-00

LEGEND:

- 1530 CONTOUR ELEVATION
- FENCE
- LIMITS OF DISTURBED AREA
- ASPHALT
- GRAVEL
- EARTH
- FLOOD ZONE
- CREEK / SWALE
- (E) POWER POLE
- APN ASSESSOR'S PARCEL NUMBER
- APPROX APPROXIMATELY
- DWY DRIVEWAY
- (E) EXISTING
- (P) PROPOSED
- RD ROAD
- SF SQUARE FEET

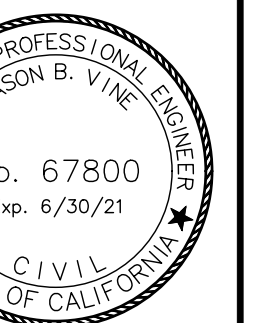
NOTES:

1. CONTOUR INTERVAL IS 10'

- (A) (E) GROUNDWATER WELL:
LAT: 38.910435°
LONG: -122.516293°
- (B) (E) EPHEMERAL CLASS III WATERCOURSE
- (C) (E) SEPTIC / LEACH LINES
- (D) (E) 5,000 GALLON WATER STORAGE TANK
- (E) (E) LEGACY CULTIVATION AREA
- (F) (E) LEGACY CULTIVATION AREA
- (G) (P) 1 ACRE OUTDOOR CULTIVATION AREA
- (H) (P) 10,000 SF OUTDOOR CULTIVATION AREA
- (I) (P) 4 - 5,000 GALLON WATER STORAGE TANKS
- (J) (P) 25'x25' COMPOSTING AREA
- (K) (P) 10'x12' SECURITY BUILDING
- (L) (P) PESTICIDE & AGRICULTURAL CHEMICALS STORAGE AREA
- (M) (P) DESIGNATED REFUSE AREA
- (N) (P) EMPLOYEE PARKING / A.D.A.

Revisions:

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



PROPOSED CONDITIONS SITE PLAN
PHASE 1
AutoCanna, LLC
21258 MORGAN VALLEY ROAD
LOWER LAKE, CA 95457
LAKE COUNTY APN:012-069-57-00

PLOTTED BY:

DATE PLOTTED:

5/25/21

SCALE OF DRAWING:

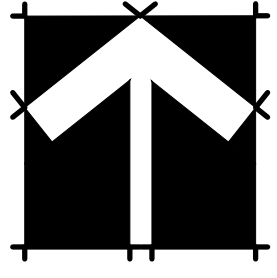
SEE PLAN

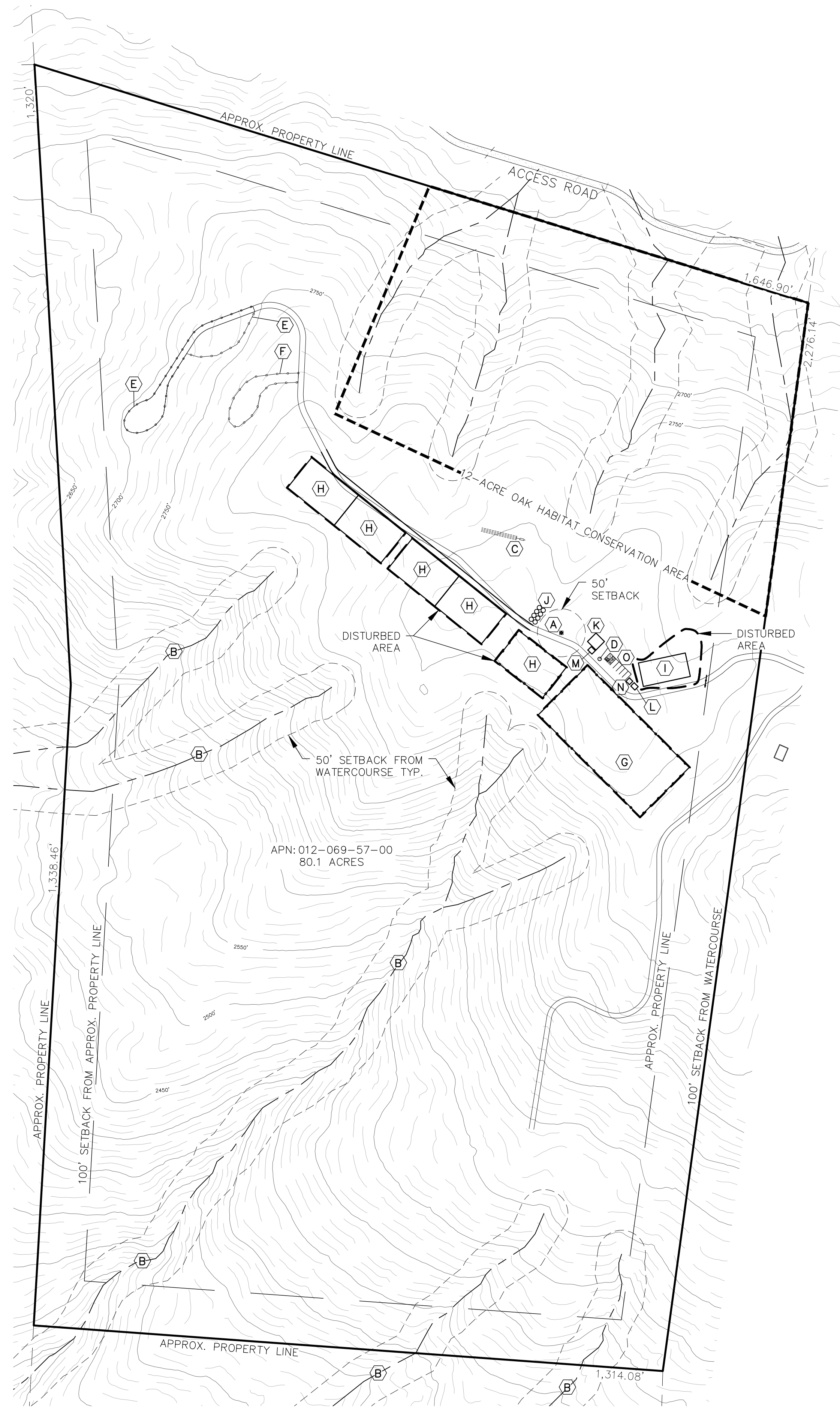
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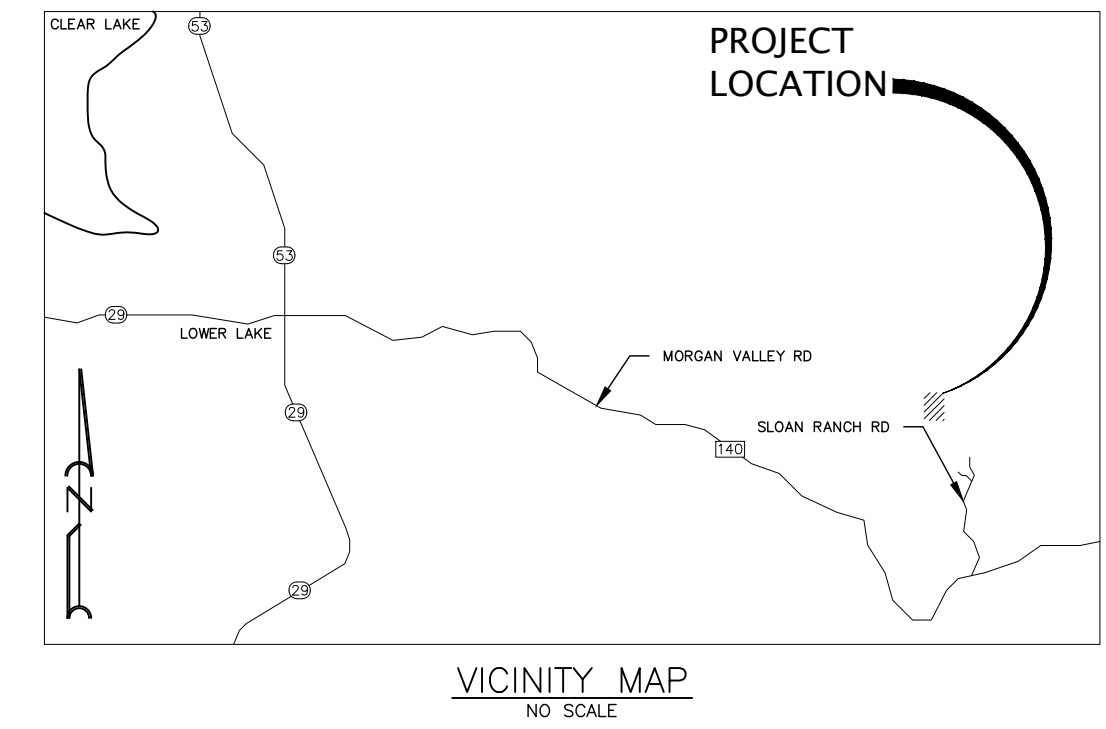
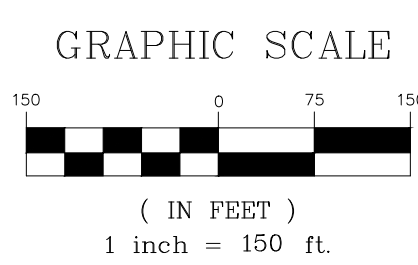
SHEET:

1





PROPOSED CONDITIONS SITE PLAN
(PHASE 2)



AutoCanna, LLC
21258 MORGAN VALLEY ROAD
LOWER LAKE, CA 95457 - LAKE COUNTY
APN:012-069-57-00

LEGEND:

- 1530 CONTOUR ELEVATION
- FENCE
- LIMITS OF DISTURBED AREA
- ASPHALT
- GRAVEL
- EARTH
- FLOOD ZONE
- CREEK / SWALE
- (E) POWER POLE
- APN ASSESSOR'S PARCEL NUMBER
- APPROX APPROXIMATELY
- DWY DRIVEWAY
- (E) EXISTING
- (P) PROPOSED
- RD ROAD
- SF SQUARE FEET

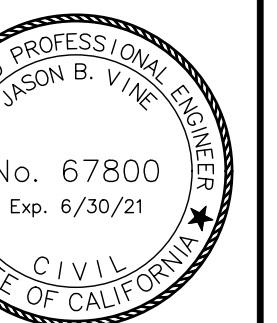
NOTES:

1. CONTOUR INTERVAL IS 10'

- (A) (E) GROUNDWATER WELL:
LAT: 38.910435°
LONG: -122.516293°
- (B) (E) EPHEMERAL CLASS III WATERCOURSE
- (C) (E) SEPTIC / LEACH LINES
- (D) (E) 5,000 GALLON WATER STORAGE TANK
- (E) (E) LEGACY CULTIVATION AREA
- (F) (E) LEGACY CULTIVATION AREA
- (G) (P) 1 ACRE OUTDOOR CULTIVATION AREA
- (H) (P) 10,000 SF OUTDOOR CULTIVATION AREA
- (I) (P) 5,000 SF CANNABIS DRYING & STORAGE FACILITY
- (J) (P) 8 - 5,000 GALLON WATER STORAGE TANKS
- (K) (P) 25'x25' COMPOSTING AREA
- (L) (P) 10'x12' SECURITY BUILDING
- (M) (P) PESTICIDE & AGRICULTURAL CHEMICALS STORAGE AREA
- (N) (P) DESIGNATED REFUSE AREA
- (O) (P) EMPLOYEE PARKING / A.D.A.

Revisions:

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



PROPOSED CONDITIONS SITE PLAN
PHASE 2

AutoCanna, LLC
21258 MORGAN VALLEY ROAD
LOWER LAKE, CA 95457
LAKE COUNTY APN:012-069-57-00

PLOTTED BY:

DATE PLOTTED:

5/25/21

SCALE OF DRAWING:

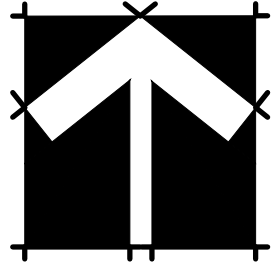
SEE PLAN

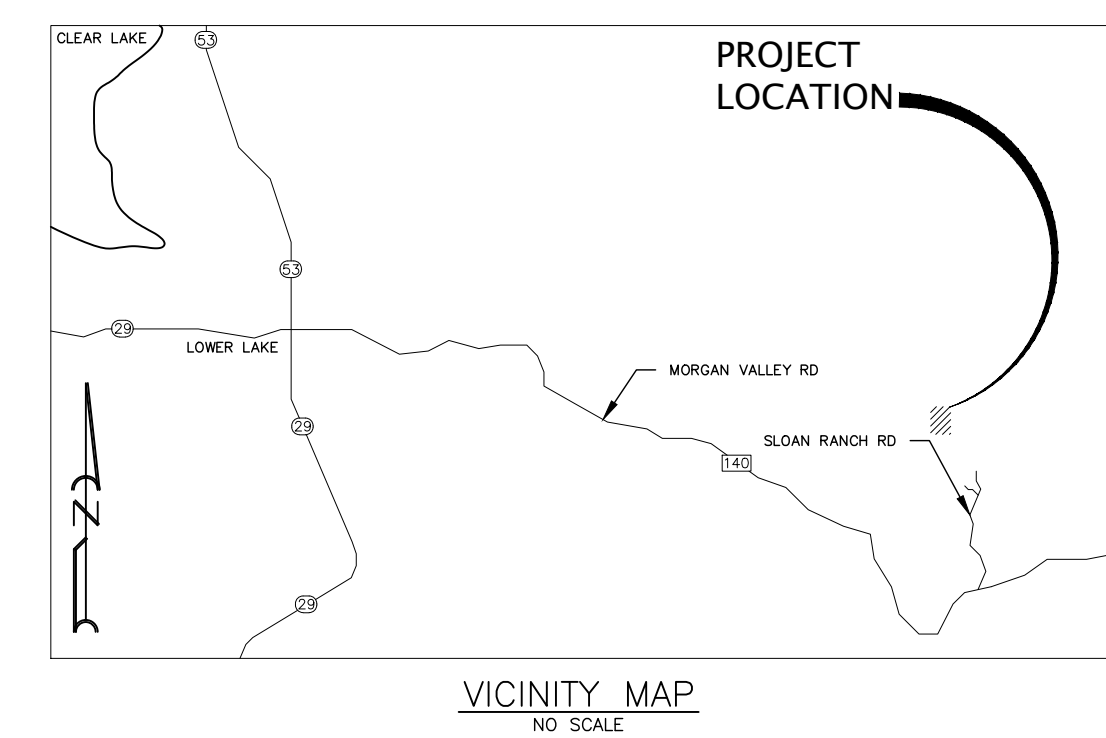
JOB NUMBER:

CADD FILE:

SHEET:

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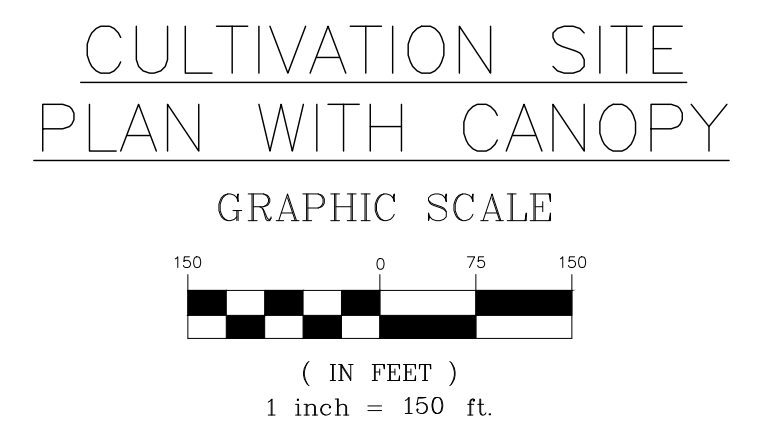
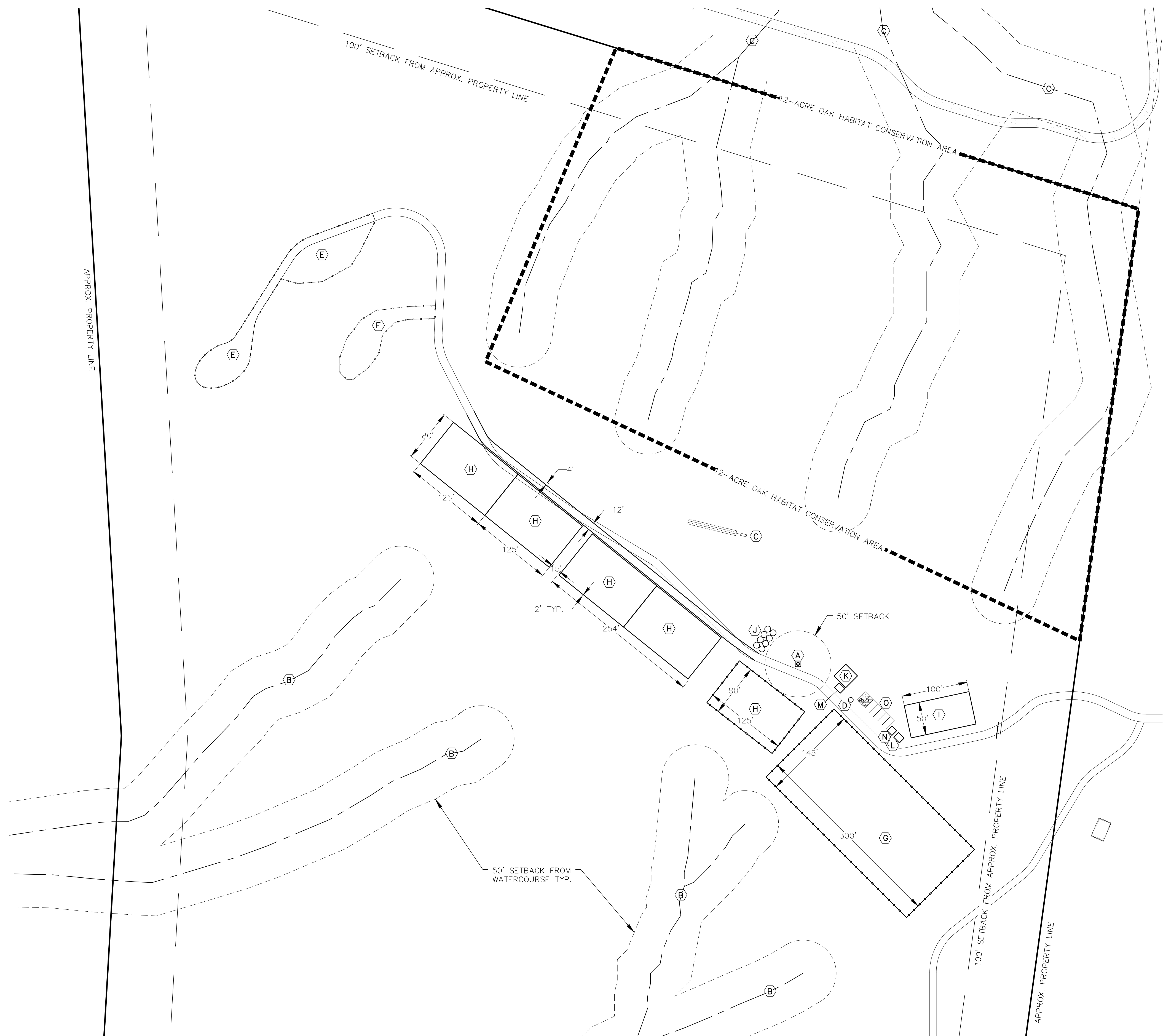




AutoCanna, LLC
 21258 MORGAN VALLEY ROAD
 LOWER LAKE, CA 95457 - LAKE COUNTY
 APN:012-069-57-00

- LEGEND:**
- 1530 CONTOUR ELEVATION
 - FENCE
 - LIMITS OF DISTURBED AREA
 - ASPHALT
 - GRAVEL
 - EARTH
 - FLOOD ZONE
 - CREEK / SWALE
 - (E) POWER POLE
 - APN ASSESSOR'S PARCEL NUMBER
 - APPROX APPROXIMATELY
 - DWY DRIVEWAY
 - (E) EXISTING
 - (P) PROPOSED
 - RD ROAD
 - SF SQUARE FEET

- NOTES:**
1. CONTOUR INTERVAL IS 10'
- (A) (E) GROUNDWATER WELL:
LAT: 38.910435°
LONG: -122.516293°
 - (B) (E) EPHEMERAL CLASS III WATERCOURSE
 - (C) (E) SEPTIC / LEACH LINES
 - (D) (E) 5,000 GALLON WATER STORAGE TANK
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 - (K) (P) 25'x25' COMPOSTING AREA
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 - (M) (P) PESTICIDE & AGRICULTURAL CHEMICALS STORAGE AREA
 - (N) (P) DESIGNATED REFUSE AREA
 - (O) (P) EMPLOYEE PARKING / A.D.A.



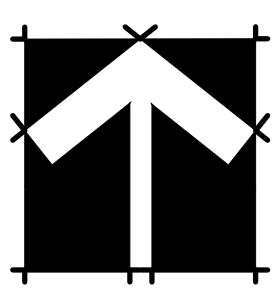
Revisions:

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

CULTIVATION SITE PLAN WITH CANOPY

AutoCanna, LLC
 21258 MORGAN VALLEY ROAD
 LOWER LAKE, CA 95457
 LAKE COUNTY APN:012-069-57-00

PLOTTED BY: ---
 DATE PLOTTED: 5/25/21
 SCALE OF DRAWING: SEE PLAN
 JOB NUMBER: ---
 CADD FILE: ---
 SHEET: 1



ATTACHEMENT C

ONSITE WELL COMPLETION AND PERFORMANCE TEST REPORTS

ORIGINAL
File with DWR

MAR - 8 2013

STATE OF CALIFORNIA
WELL COMPLETION REPORT

Refer to Instruction Pamphlet

DWR USE ONLY — DO NOT FILL IN

12N | 06W - 10
STATE WELL NO./STATION NO.

LATITUDE _____ LONGITUDE _____

APN/TRS/OTHER _____

Page _____ of _____

Owner's Well No. _____

No. **0963025**

Date Work Began **2/20/2013** Ended **2/22/2013**

Local Permit Agency **Lake County Environmental Health**

Permit No. **WE2882**

Permit Date **2/19/2013**

GEOLOGIC LOG

DEPTH FROM SURFACE		DESCRIPTION
Ft.	to Ft.	
0	3	Brown Soil
3	16	Brown Clay
16	34	Brown Shale
34	165	Gray and Black Sandstone and Shale
165	220	Gray Sandstone

ORIENTATION () VERTICAL _____ HORIZONTAL _____ ANGLE _____ (SPECIFY)

DRILLING METHOD **Rotary** FLUID **Air**

Describe material, grain size, color, etc.

WELL LOCATION

Address **21258 Morgan Valley Rd.**
City **Lower Lake**
County **Lake**
APN Book **012** Page **069** Parcel **570**
Township **12N** Range **06W** Section **10**

Lat _____ N Long _____ W

LOCATION SKETCH

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 _____

REMIEDIATION _____

OTHER (SPECIFY) _____

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.**

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER **110'** (Ft.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL **90'** (Ft.) & DATE MEASURED **2/22/2013**

ESTIMATED YIELD **100+** (GPM) & TEST TYPE **Air Lift**

TEST LENGTH **1/2** (Hrs.) TOTAL DRAWDOWN _____ (Ft.)

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

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING (S)					
		TYPE ()	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	
0 to 40	9	X	PVC F480	4 1/2	SDR26		
40 to 180	7	X	PVC F480	4 1/2	SDR26		
180 to 220	7	X	PVC F480	4 1/2	SDR26	.032	

DEPTH FROM SURFACE	ANNULAR MATERIAL			
	CE-MENT ()	BEN-TONITE ()	FILL ()	FILTER PACK (TYPE/SIZE)
0 to 1	X			
1 to 22		X		
22 to 220				Drain 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 Mc Mullen Well Drilling**
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS **P.O. Box 951 Lower Lake CA 95423**
CITY STATE ZIP

Signed **Dan Mc Mullen** DATE SIGNED **3/7/2013** C-57 LICENSE NUMBER **533152**



Date: 2/17/2022		Technician: Jim Jackson	
Client Name: AutoCanna			
Site Address: 21258 Morgan Valley Road, Lower Lake, CA		APN: 012-069-57	
Well Pump Info (size, type, brand, etc.): Solar pump			
Power Source (hardwired, generator, solar only, solar with generator back up): Generator for test			
Total Depth of Well? 220-Feet		Static Water Level? 171.61-Feet	
Diameter of Well? 5-inches		Casing Type? PVC	
Last time the water was pumped from the well? At least 24-hours			
Was the pumping level measured from ground surface or top of casing? Top of Casing			
Interval	Time	Flow Rate*	Pumping Level
5	8:00	19.0	173.36
5	8:05	19.0	174.10
5	8:10	19.0	174.89
5	8:15	19.0	175.28
5	8:20	18.0	175.68
5	8:25	18.0	176.07
10	8:35	17.5	176.69
10	8:45	17.5	177.37
10	8:55	17.5	177.59
10	9:05	17.5	178.44
10	9:15	17.5	178.84
10	9:25	17.5	179.01
30	9:55	17.5	180.36
30	10:25	17.5	181.43
30	10:55	17.5	182.61
30	11:25	17.5	183.63
30	11:55	17.0	183.98
30	12:25	17.0	183.29
30	12:55	17.0	182.78
30	13:25	17.0	182.44
30	13:55	17.0	182.61
STOP			
24Hrs	13:12	RECHARGE	176.9
*Flow Rate Measured via Bucket or Meter			
Meter Start:		1193554	
Meter Stop:		1199804	
Total Gallons Produced:		6250	
Average GPM:		17.36	
NOTE: Average GPM is total gallons produced divided by 360. The programming in the subdrive caused the pump to slow every 30-minutes while the test was being conducted. The pumping level was recorded off the enoscience meter.			
Recharge Rate:		57.20%	
Field Quality Test Completed:			
pH:		7.9	
TDS:		138 ppm	
Hardness:		42 grains per gallon	
Iron:		1 ppm	
GPS:		38.882312°, -122.580289°	
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.			

ATTACHEMENT D

2021 ANNUAL WATER USAGE REPORT

**2021 ANNUAL WATER USAGE REPORT
 AUTO CANNA, LLC
 EARLY ACTIVATION OF USE (EA 19-69)**

Week	Water Meter Reading	Water Usage (Gallons)	Monthly Water Usage (Gallons)	
3/29 - 4/4	309,500	0	33,900	April
4/5 - 4/11	310,600	1,100		
4/12 - 4/18	311,200	600		
4/19 - 4/25	312,500	1,300		
4/26 - 5/2	343,400	30,900	96,300	May
5/3 - 5/9	362,700	19,300		
5/10 - 5/16	385,800	23,100		
5/17 - 5/23	412,400	26,600		
5/24 - 5/30	439,700	27,300	135,300	June
5/31 - 6/6	472,600	32,900		
6/7 - 6/13	505,800	33,200		
6/14 - 6/20	547,700	41,900		
6/21 - 6/27	575,000	27,300	170,200	July
6/28 - 7/4	608,300	33,300		
7/5 - 7/11	647,700	39,400		
7/12 - 7/18	677,600	29,900		
7/19 - 7/25	712,500	34,900	188,600	August
7/26 - 8/1	745,200	32,700		
8/2 - 8/8	793,800	48,600		
8/9 - 8/15	836,300	42,500		
8/16 - 8/22	884,400	48,100	173,700	September
8/23 - 8/29	933,800	49,400		
8/30 - 9/5	977,900	44,100		
9/6 - 9/12	1,014,500	36,600		
9/13 - 9/19	1,046,500	32,000	83,500	October
9/20 - 9/26	1,070,700	24,200		
9/27 - 10/3	1,107,500	36,800		
10/4 - 10/10	1,141,900	34,400		
10/11 - 10/17	1,168,400	26,500	2,500	November
10/18 - 10/24	1,191,000	22,600		
10/25 - 10/31	1,191,000	0		
11/1 - 11/7	1,191,000	0		
11/8 - 11/14	1,192,800	1,800		
11/15 - 11/21	1,193,500	700		
11/22 - 11/28	1,193,500	0		

ATTACHEMENT E

**WELL COMPLETION REPORTS FOR
NEAREST KNOWN NEIGHBORING WELLS**

JUN 17 2009

STATE OF CALIFORNIA
WELL COMPLETION REPORT

Refer to Instruction Pamphlet

DWR USE ONLY - DO NOT FILL IN

12N/06W+11

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

Page 1 of 1

Owner's Well No. DWR NO. 1089156

Date Work Began 4/29/08 Ended 5/7/08

Local Permit Agency Lake County Environmental Health

Permit No. WE 2606 Permit Date 5/5/08

GEOLOGIC LOG

ORIENTATION (≠)		<input checked="" type="checkbox"/> VERTICAL	HORIZONTAL	ANGLE	(SPECIFY)
DEPTH FROM SURFACE		DRILLING METHOD			
Ft.	to	FLUID			
0	4	Rotary			
4	6	Mud			
6	35	Brown sandy soil			
35	375	Yellow sandy clay Brown sandy soil Gray shale			
DESCRIBE material, grain size, color, etc.					

WELL LOCATION

Address 21242 Morgan Valley Rd

City Chico Lake Lower Lake

County Lake

APN Book 072 Page 069 Parcel 080

Township 12N Range 6W Section 11

Lat. _____ N Long. _____ W

LOCATION SKETCH

WEST EAST

Property line ← 100' → well

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 ___

REMIEDIATION ___

OTHER (SPECIFY) ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 120 (Ft.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL 59 (Ft.) & DATE MEASURED 5/7/08

ESTIMATED YIELD * 40 (GPM) & TEST TYPE Air Lift

TEST LENGTH 1 (Hrs.) TOTAL DRAWDOWN _____ (Ft.)

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

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING (S)						ANNULAR MATERIAL					
		TYPE (≠)				MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	TYPE			
Ft.	to	BLANK	SCREEN	CON. DUCTOR	FILL PIPE					Ft.	to	Ft.	CE-MENT (≠)
0	160	8 1/2	X			PVC F400	4 1/2	SDR26					
160	375	8 1/2	X			PVC F400	4 1/2	SDR26	.032				Per 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 Mc Muller Well Drilling

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

ADDRESS 1487 Old Long Valley Rd. Chico Lake Oaks CA CITY Chico Lake STATE CA ZIP 95423

Signed Dan Mc Muller DATE SIGNED 5/9/08 C-57 LICENSE NUMBER 533152

State of California
Well Completion Report
 Form DWR 188 Submitted 10/15/2021
 WCR2021-013364

Owner's Well Number Ag Well 1 Date Work Began 09/04/2021 Date Work Ended 09/06/2021
 Local Permit Agency Lake County Health Services Department - Environmental Health Division
 Secondary Permit Agency _____ Permit Number WP0003795 Permit Date 06/10/2021

Well Owner (must remain confidential pursuant to Water Code 13752)	Planned Use and Activity
Name <u>FIRE MOUNTAIN LLC, Fabricio Esquivel</u>	Activity <u>New Well</u>
Mailing Address <u>21506 Morgan Valley Road</u>	Planned Use <u>Water Supply Irrigation - Agriculture</u>
City <u>Lower Lake</u> State <u>CA</u> Zip <u>95457</u>	

Well Location	
Address <u>21506 Morgan Valley RD</u>	APN <u>012-069-17</u>
City <u>Lower Lake</u> Zip <u>95457</u> County <u>Lake</u>	Township <u>12 N</u>
Latitude <u>38 54 19.8899 N</u> Longitude <u>-122 30 33.0228 W</u>	Range <u>06 W</u>
Deg. Min. Sec. Deg. Min. Sec.	Section <u>10</u>
Dec. Lat. <u>38.905525</u> Dec. Long. <u>-122.509173</u>	Baseline Meridian <u>Mount Diablo</u>
Vertical Datum _____ Horizontal Datum <u>WGS84</u>	Ground Surface Elevation _____
Location Accuracy <u>Unknown</u> Location Determination Method <u>GPS</u>	Elevation Accuracy _____
	Elevation Determination Method _____

Borehole Information	
Orientation <u>Vertical</u> Specify _____	
Drilling Method <u>Other - Air-rotary</u> Drilling Fluid <u>Foam</u>	
Total Depth of Boring <u>508</u> Feet	
Total Depth of Completed Well <u>472</u> Feet	

Water Level and Yield of Completed Well	
Depth to first water <u>77</u> (Feet below surface)	
Depth to Static _____	
Water Level <u>69</u> (Feet) Date Measured <u>09/23/2021</u>	
Estimated Yield* <u>7</u> (GPM) Test Type <u>Pump</u>	
Test Length <u>6</u> (Hours) Total Drawdown <u>157</u> (feet)	
*May not be representative of a well's long term yield.	

Geologic Log - Free Form		
Depth from Surface	Feet to Feet	Description
0	43	red top soil with rock
43	245	shale with clay and some rock
245	258	tan and grey clays
258	320	grey clay with ash
320	400	shale clay layered
400	508	soft shale, wet and goopy

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	72	Blank	PVC	N/A	0.265	5.563			Solid
1	72	452	Screen	PVC	N/A	0.265	5.563	Milled Slots	0.032	Screen
1	452	472	Blank	PVC	N/A	0.265	5.563			solid with cap

Annular Material

Depth from Surface Feet to Feet		Fill	Fill Type Details	Filter Pack Size	Description
0	21	Bentonite	Other Bentonite		hydrated bentonite seal
21	472	Filter Pack	Other Gravel Pack	pea gravel	double washed

Other Observations:

Borehole Specifications

Depth from Surface Feet to Feet		Borehole Diameter (inches)
0	25	10.875
25	508	8

Certification Statement

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

Name JAK DRILLING AND PUMP, Kharom Hellwege
 Person, Firm or Corporation

PO Box 250 Middletown CA 95461
 Address City State Zip

Signed electronic signature received 10/15/2021 1013957
 C-57 Licensed Water Well Contractor Date Signed C-57 License Number

Attachments

Ag Well 1 Location - WP0003795.pdf - Location Map

DWR Use Only

CSG #	State Well Number	Site Code	Local Well Number

<table border="1" style="width: 100%;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%; text-align: center;">N</td> </tr> </table> <p style="text-align: center;">Latitude Deg/Min/Sec</p>				N	<table border="1" style="width: 100%;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%; text-align: center;">W</td> </tr> </table> <p style="text-align: center;">Longitude Deg/Min/Sec</p>				W
			N						
			W						

TRS:

APN:

State of California
Well Completion Report
 Form DWR 188 Submitted 10/15/2021
 WCR2021-013368

Owner's Well Number Ag Well 2 Date Work Began 09/23/2021 Date Work Ended 09/23/2021
 Local Permit Agency Lake County Health Services Department - Environmental Health Division
 Secondary Permit Agency _____ Permit Number WP0003865 Permit Date 09/17/2021

Well Owner (must remain confidential pursuant to Water Code 13752)	Planned Use and Activity
Name <u>FIRE MOUNTAIN LLC, Fabricio Esquivel</u>	Activity <u>New Well</u>
Mailing Address <u>21506 Morgan Valley Road</u>	Planned Use <u>Water Supply Irrigation - Agriculture</u>
City <u>Lower Lake</u> State <u>CA</u> Zip <u>95457</u>	

Well Location	
Address <u>21506 Morgan Valley RD</u>	APN <u>012-069-17</u>
City <u>Lower Lake</u> Zip <u>95457</u> County <u>Lake</u>	Township <u>12 N</u>
Latitude <u>38 54 31.1363 N</u> Longitude <u>-122 30 34.9956 W</u>	Range <u>06 W</u>
Deg. Min. Sec.	Section <u>10</u>
Dec. Lat. <u>38.908649</u> Dec. Long. <u>-122.509721</u>	Baseline Meridian <u>Mount Diablo</u>
Vertical Datum _____ Horizontal Datum <u>WGS84</u>	Ground Surface Elevation _____
Location Accuracy <u>Unknown</u> Location Determination Method <u>GPS</u>	Elevation Accuracy _____
	Elevation Determination Method _____

Borehole Information	
Orientation <u>Vertical</u> Specify _____	
Drilling Method <u>Other - Air-rotary</u> Drilling Fluid <u>Foam</u>	
Total Depth of Boring <u>309</u> Feet	
Total Depth of Completed Well <u>303</u> Feet	

Water Level and Yield of Completed Well	
Depth to first water <u>80</u> (Feet below surface)	
Depth to Static _____	
Water Level <u>99</u> (Feet) Date Measured <u>09/25/2021</u>	
Estimated Yield* <u>16</u> (GPM) Test Type <u>Pump</u>	
Test Length <u>6</u> (Hours) Total Drawdown <u>89</u> (feet)	
*May not be representative of a well's long term yield.	

Geologic Log - Free Form		
Depth from Surface	Feet to Feet	Description
0	50	yellow top soil with rock
50	70	dark tan rock
70	140	shale with clay
140	309	harder shale with some basalt intermixed with thin layers of shale and 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	63	Blank	PVC	N/A	0.265	5.563			Solid
1	63	283	Screen	PVC	N/A	0.265	5.563	Milled Slots	0.032	Screen
1	283	303	Blank	PVC	N/A	0.265	5.563			solid with cap

Annular Material

Depth from Surface Feet to Feet		Fill	Fill Type Details	Filter Pack Size	Description
0	21	Bentonite	Other Bentonite		hydrated bentonite seal
0	303	Filter Pack	Other Gravel Pack	pea gravel	double washed

Other Observations:

Borehole Specifications

Depth from Surface Feet to Feet		Borehole Diameter (inches)
0	25	10
25	309	8

Certification Statement

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

Name JAK DRILLING AND PUMP, Kharom Hellwege
Person, Firm or Corporation

PO Box 250 Middletown CA 95461
Address City State Zip

Signed electronic signature received 10/15/2021 1013957
C-57 Licensed Water Well Contractor Date Signed C-57 License Number

Attachments

Ag Well 2 Location_WP0003865.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:

State of California
Well Completion Report
 Form DWR 188 Submitted 10/15/2021
 WCR2021-013375

Owner's Well Number Ag Well 3 Date Work Began 10/12/2021 Date Work Ended 10/15/2021
 Local Permit Agency Lake County Health Services Department - Environmental Health Division
 Secondary Permit Agency _____ Permit Number WP0003866 Permit Date 09/17/2021

Well Owner (must remain confidential pursuant to Water Code 13752)	Planned Use and Activity
Name <u>FIRE MOUNTAIN LLC, Fabricio Esquivel</u>	Activity <u>New Well</u>
Mailing Address <u>21506 Morgan Valley Road</u>	Planned Use <u>Water Supply Irrigation - Agriculture</u>
City <u>Lower Lake</u> State <u>CA</u> Zip <u>95457</u>	

Well Location	
Address <u>21506 Morgan Valley RD</u>	APN <u>012-069-17</u>
City <u>Lower Lake</u> Zip <u>95457</u> County <u>Lake</u>	Township <u>12 N</u>
Latitude <u>38 54 15.4443 N</u> Longitude <u>-122 30 28.0087 W</u>	Range <u>06 W</u>
Deg. Min. Sec. Deg. Min. Sec.	Section <u>10</u>
Dec. Lat. <u>38.9042901</u> Dec. Long. <u>-122.5077802</u>	Baseline Meridian <u>Mount Diablo</u>
Vertical Datum _____ Horizontal Datum <u>WGS84</u>	Ground Surface Elevation _____
Location Accuracy <u>Unknown</u> Location Determination Method <u>GPS</u>	Elevation Accuracy _____
	Elevation Determination Method _____

Borehole Information	
Orientation <u>Vertical</u> Specify _____	
Drilling Method <u>Other - Air-rotary</u> Drilling Fluid <u>Foam</u>	
Total Depth of Boring <u>330</u> Feet	
Total Depth of Completed Well <u>328</u> Feet	

Water Level and Yield of Completed Well	
Depth to first water <u>70</u> (Feet below surface)	
Depth to Static _____	
Water Level <u>151</u> (Feet) Date Measured <u>10/15/2021</u>	
Estimated Yield* <u>15</u> (GPM) Test Type <u>Air Lift</u>	
Test Length <u>2</u> (Hours) Total Drawdown _____ (feet)	
*May not be representative of a well's long term yield.	

Geologic Log - Free Form		
Depth from Surface	Feet to Feet	Description
0	25	red top soil with rock
25	70	shale with some water
70	270	lite grey rock
270	330	soft shale with some rock

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	218	Blank	PVC	N/A	0.265	5.563			Solid
1	218	318	Screen	PVC	N/A	0.265	5.563	Milled Slots	0.032	Screen
1	318	328	Blank	PVC	N/A	0.265	5.563			solid with cap

Annular Material

Depth from Surface Feet to Feet		Fill	Fill Type Details	Filter Pack Size	Description
0	25	Bentonite	Other Bentonite		hydrated bentonite seal
25	328	Filter Pack	Other Gravel Pack	pea gravel	double washed

Other Observations:

Borehole Specifications

Depth from Surface Feet to Feet		Borehole Diameter (inches)
0	25	10
25	330	8

Certification Statement

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

Name JAK DRILLING AND PUMP, Kharom Hellwege
 Person, Firm or Corporation

PO Box 250 Middletown CA 95461
 Address City State Zip

Signed electronic signature received 10/15/2021 1013957
 C-57 Licensed Water Well Contractor Date Signed C-57 License Number

Attachments

Ag Well 3 Location_WP0003866.pdf - Location Map

DWR Use Only

CSG #	State Well Number	Site Code	Local Well Number

N	W
---	---

Latitude Deg/Min/Sec

Longitude Deg/Min/Sec

TRS:

APN:

ORIGINAL
File with DWR

RECEIVED

SEP 02 1994

STATE OF CALIFORNIA
WELL COMPLETION REPORT

Refer to Instruction Pamphlet

Page ___ of ___

Owner's Well No. _____

Date Work Began: 8-14-94 Ended: 8-16-94 No. 414721

Local Permit Agency: Lake County Environmental Health

Permit No. WE 1100 Permit Date: 7-20-94

DWR USE ONLY - DO NOT FILL IN

12N/06W-10M
STATE WELL REGISTRATION NO.

LATITUDE _____ LONGITUDE _____

APRIL 1988 EDITION

GEOLOGIC LOG

DEPTH FROM SURFACE		DESCRIPTION <i>Describe material, grain size, color, etc.</i>
Fl.	to Fl.	
0	2	Bra. Soil
2	8	Bra. Clay
8	30	Bra. Sandstone
30	130	Black Shale
130	190	Gray Sandstone
190	210	Black Shale

WELL LOCATION

Address: 21504 Morgan Valley Rd.
City: Lower Lake
County: Lake
APN Book: 12 Page: 09 Parcel: 9B
Township: 12N Range: 06W Section: 10M
Latitude: _____ Longitude: _____

LOCATION SKETCH

ACTIVITY (✓)

NEW WELL

MODIFICATION/REPAIR

— Deepen

— Other (Specify) _____

DESTROY (Describe Procedure and Materials Under "GEOLOGIC LOG")

PLANNED USE(S) (✓)

— MONITORING

WATER SUPPLY

Domestic

— Public

— Irrigation

— Industrial

— "TEST WELL"

— CATHODIC PROTECTION

— OTHER (Specify) _____

DRILLING METHOD: Air Rotary FLUID _____

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF STATIC WATER LEVEL: 119' (Fe.) & DATE MEASURED: 8-14-94

ESTIMATED YIELD: 5 (GPM) & TEST TYPE: AirLift

TEST LENGTH: 1 (Hrs.) TOTAL DRAWDOWN: _____ (Fe.)

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

TOTAL DEPTH OF BORING: 210 (Feet)

TOTAL DEPTH OF COMPLETED WELL: 188 (Feet)

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING(S)				ANNULAR MATERIAL						
		TYPE (✓)	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	TYPE	CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)	
0 to 148	9	X	PVC F480	4 1/2	SDR26				X			
148 to 188	9	X	PVC F480	4 1/2	SDR26	2 x 1/8			X			Pea Gravel

ATTACHMENTS (✓)

— Geologic Log

— Well Construction Diagram

— Geophysical Log(s)

— Soil/Water Chemical Analysis

— Other _____

ATTACH ADDITIONAL INFORMATION IF IT EXISTS

CERTIFICATION STATEMENT

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

NAME: Dan Mc Mullen Well Drilling 1603

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

ADDRESS: 1487 Old Long Valley Rd. Charlake Oaks CA 95423

SIGNATURE: Dan M. Mullen DATE: 8-17-94 533152

ORIGINAL
File with DWR

RECEIVED

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Insurance Policies

DWR USE ONLY - DO NOT FILL IN
12/17/06W-1014
STATE WELL NO./STATION NO.
LATITUDE
LONGITUDE
APR/ITS/OTHER

Page ___ of ___ JUL 03 1992

Owner's Well No. No. 486018

Date Work Began 5-26-92, Ended 5-29-92

Local Permit Agency Lake County Environmental Health

Permit No. WE 687 Permit Date 5-20-92

GEOLOGIC LOG

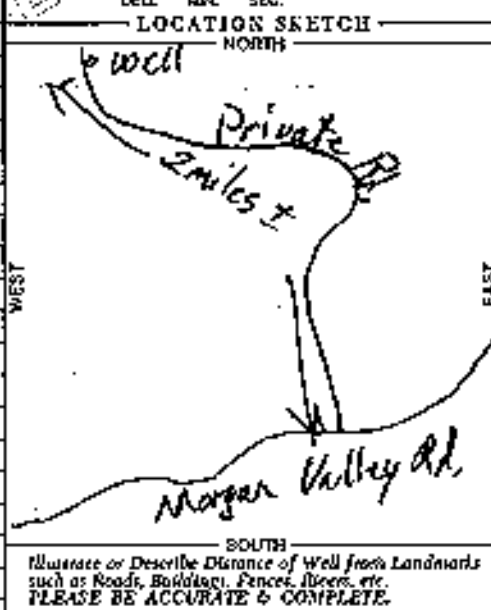
ORIENTATION (✓) VERTICAL HORIZONTAL ANGLE _____ (SPECIFY)

DEPTH TO FIRST WATER 102 (FL) BELOW SURFACE

DESCRIPTION

DEPTH FROM SURFACE		Describe material, grain size, color, etc.
Fl.	to Fl.	
0	3	Brown Soil
3	6	Brown Clay
6	25	Brown Shale
25	220	Gray Shale

WELL LOCATION
Address: 21504 Morgan Valley Rd.
City: Lower Lake
County: Lake
APN Book 12 Page 009 Parcel 98
Township 12N Range 06W Section 10.7
Latitude: _____ NORTH Longitude: _____ WEST



ACTIVITY (✓)
 NEW WELL
 MODIFICATION/REPAIR
— Deepen
— Other (Specify)
 DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")
PLANNED USE(S)
(✓)
— MONITORING
WATER SUPPLY
 Domestic
— Public
— Irrigation
— Industrial
— "TEST WELL"
— CATHODIC PROTECTION
— OTHER (Specify)

DRILLING METHOD Air FLUID Air
WATER LEVEL & YIELD OF COMPLETED WELL
DEPTH OF STATIC WATER LEVEL 80' (FL) & DATE MEASURED 5-29-92
ESTIMATED YIELD 7 (GPM) & TEST TYPE 90 min
TEST LENGTH 4 (hrs) TOTAL DRAWDOWN 121' (FL)
* May not be representative of a well's long-term yield.

TOTAL DEPTH OF BORING 220 (Feet)
TOTAL DEPTH OF COMPLETED WELL 220 (Feet)

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING(S)				INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	ANNULAR MATERIAL						
		TYPE (✓)	MATERIAL GRADE	DEPTH FROM SURFACE	TYPE				CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)			
Fl.	to Fl.	Blank	Screen	Open	Disrupt	Fill Pipe			Fl.	to Fl.					
0	100						PVC	4 1/2	160						
100	220						PVC	4 1/2	160	40	220	K			3/8 Pea Gr

ATTACHMENTS (✓)
 Geologic Log
 Well Construction Diagram
 Geophysical Log(s)
 Soil/Water Chemical Analysis
 Other
 ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT
 I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.
 NAME Dan Mc Muller Well Drilling 1603
 (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINTED)
 ADDRESS 1487 Old Long Valley Rd. Cherokee Oaks CA 95423
 OFF STAIL
 Signed Dan M. Muller 6-29-92 533152
 WELL COMPLETION REPORT DATE SIGNATURE

ATTACHEMENT F

RADIUS OF INFLUENCE ANALYSIS

Radius of Influence Analysis

Well Radius (from Well Completion Report) = $4.5''/2 \times 1' / 12'' = 0.2$ feet

Specific Capacity (using data from 2/17/22 Pump Test)
 $17 \text{ gpm (yield)} / 11.2 \text{ feet (drawdown)} = 1.5 \text{ gpm/foot of drawdown}$
 Specific Capacity (SC) = 1.5

Modified Jacob's equation from Driscoll Appendix 16-D (Driscoll 1986⁷)
 Transmissivity Unconfined Aquifer $T = SC \times 1500 = 2,250 \text{ gpft/day}$
 Transmissivity Confined Aquifer $T = SC \times 2000; T = 3,000 \text{ gpft/day}$

Distance Drawdown Equation Driscoll 9.11 (Driscoll 1986⁷) $T = 528Q / \Delta s$
 $\Delta s = 528Q / T$
 Unconfined Aquifer $\Delta s = 528 \times 17 \text{ gpm} / 2,250 = 4.0$ over one log cycle
 Confined Aquifer $\Delta s = 528 \times 17 \text{ gpm} / 3,000 = 3.0$ over one log cycle

From Distance Drawdown Graph (below)
 Approximate Radius of Pumping Influence (unconfined) = 100 feet
 Approximate Radius of Pumping Influence (confined) = 900 feet

