

REALM

Engineering

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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.



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

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.

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

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.

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

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 extend of the fractured network.

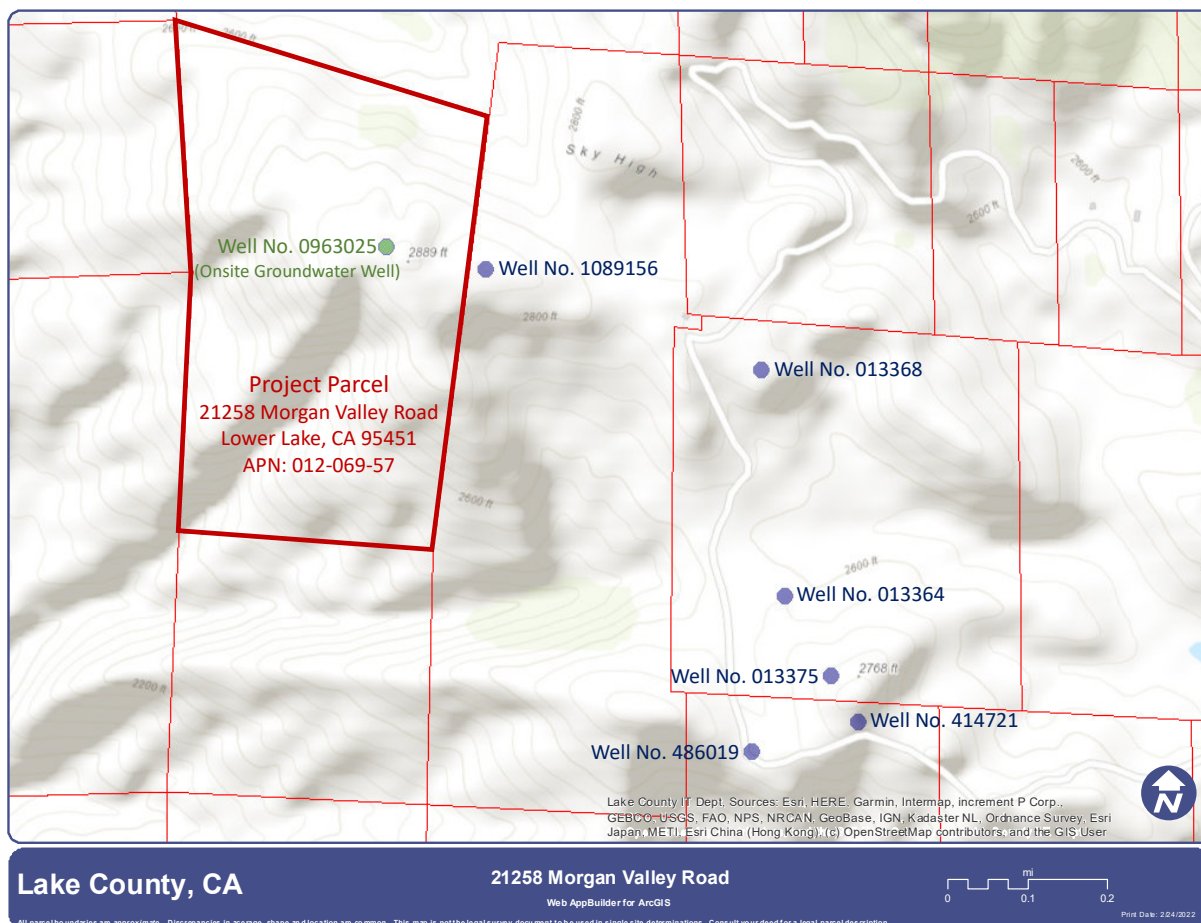


Figure 2 – Nearest Known Wells Location Map

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
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- 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


Supervisor, County of Lake, 2021 (04/15/2021)

Chair, Board of Supervisors

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

By: _____
Deputy

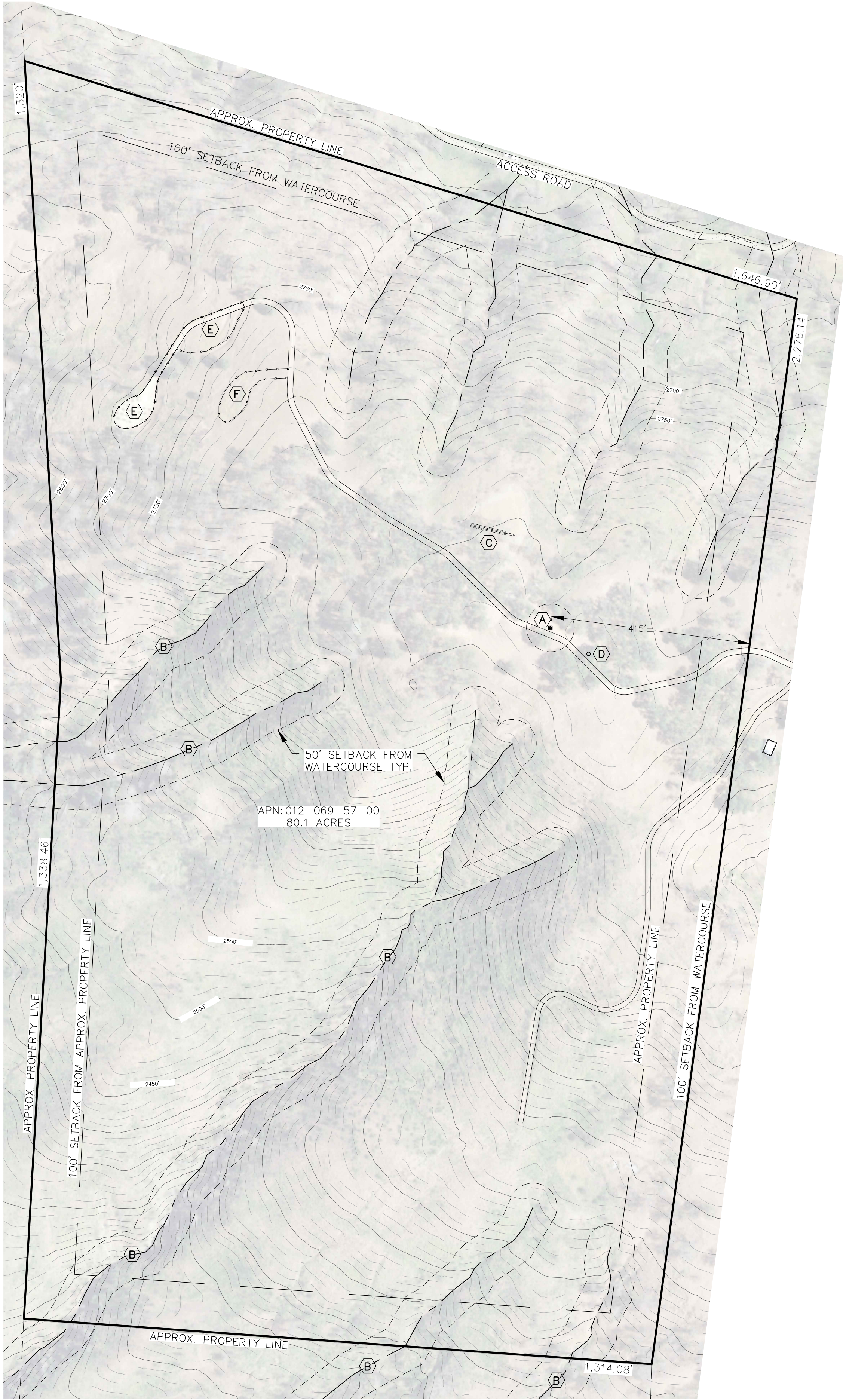
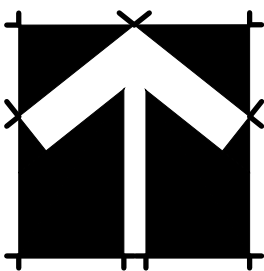
APPROVED AS TO FORM:

ANITA L. GRANT
County Counsel

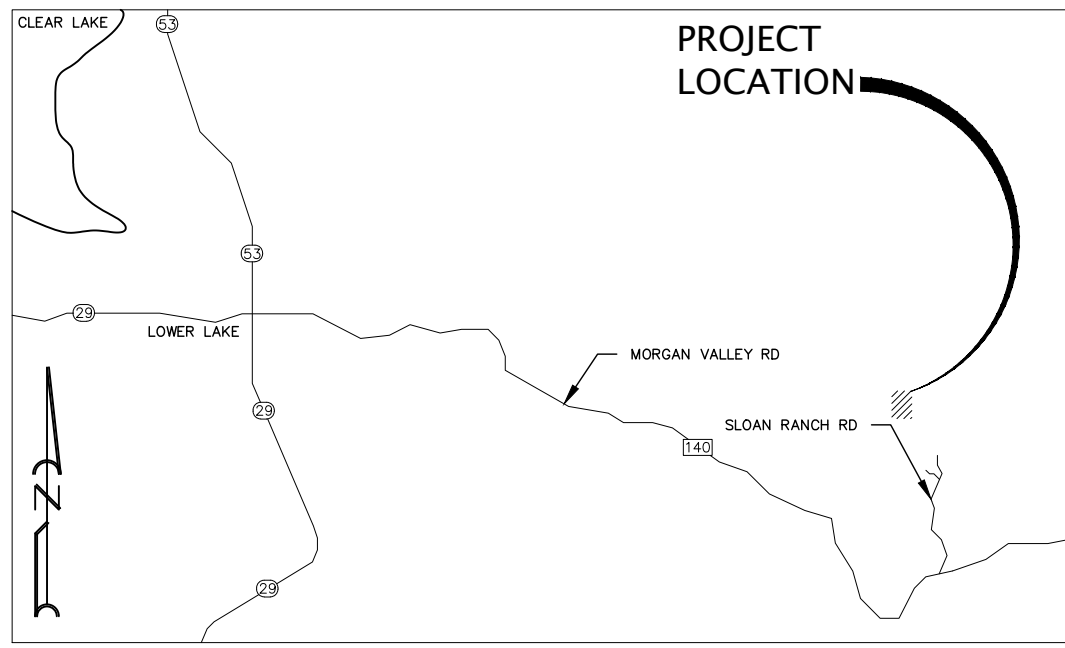
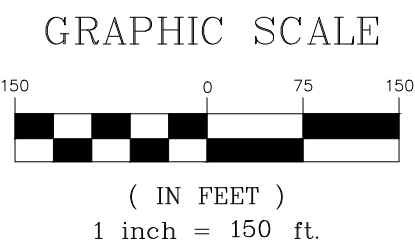
By: _____

ATTACHEMENT B

EXISTING AND PROPOSED CONDITIONS SITE PLANS



EXISTING CONDITIONS SITE PLAN



VICINITY MAP
NO SCALE

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:

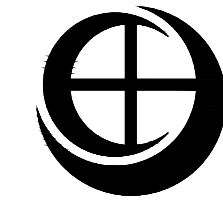
1. CONTOUR INTERVAL IS 10'

- (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

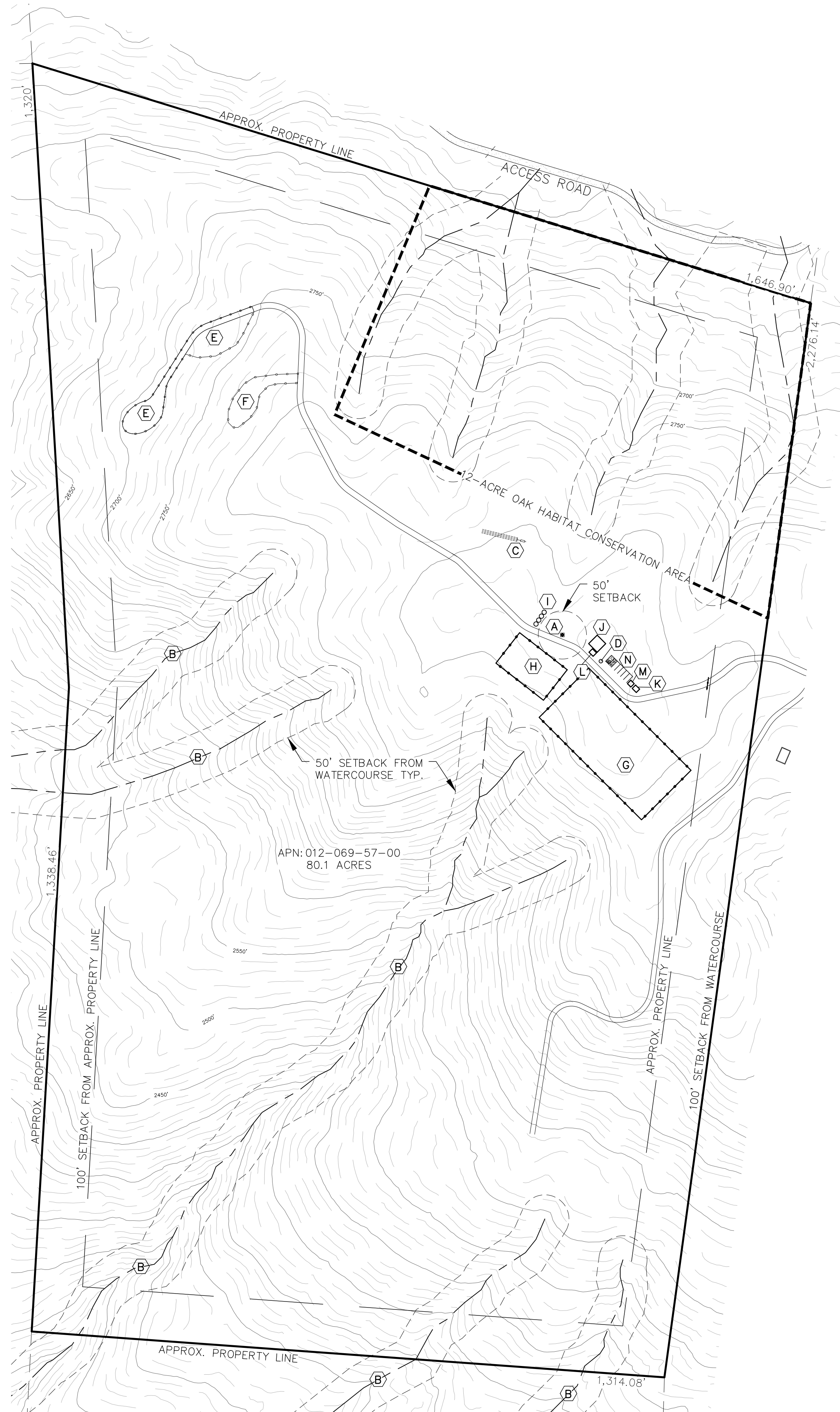
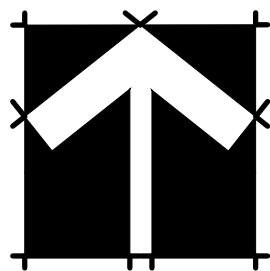
SCALE OF DRAWING:

SEE PLAN

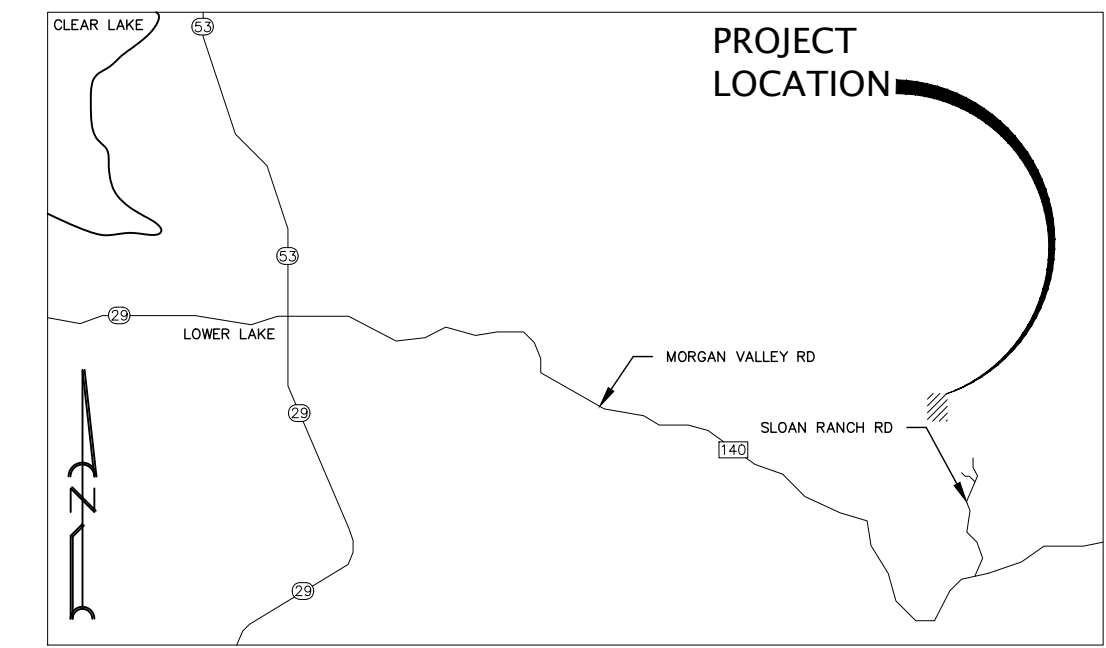
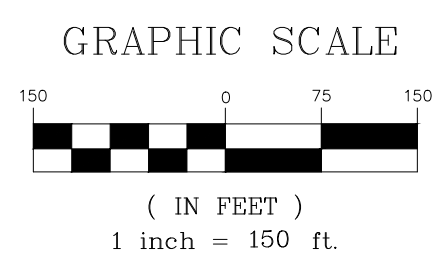
JOB NUMBER:

CADD FILE:

SHEET:



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
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- (E) POWER POLE
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- APPROX APPROXIMATELY
- DWY DRIVEWAY
- (E) EXISTING
- (P) PROPOSED
- RD ROAD
- SF SQUARE FEET

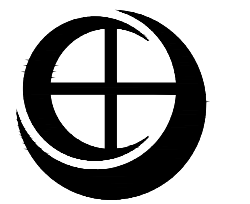
NOTES:

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:

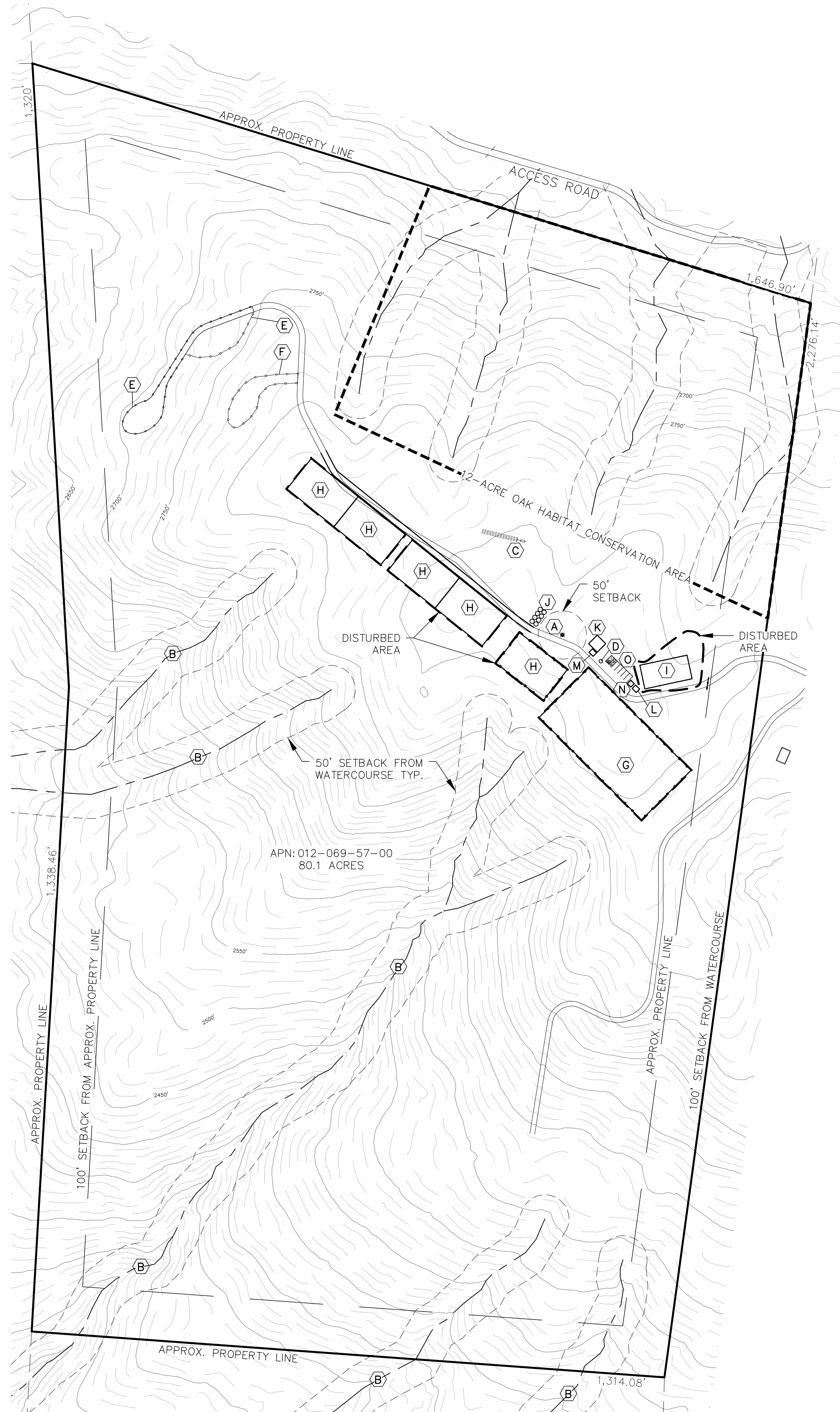
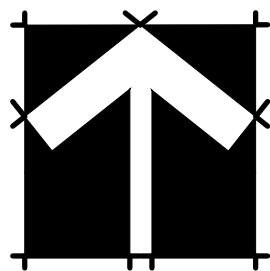
SEE PLAN

JOB NUMBER:

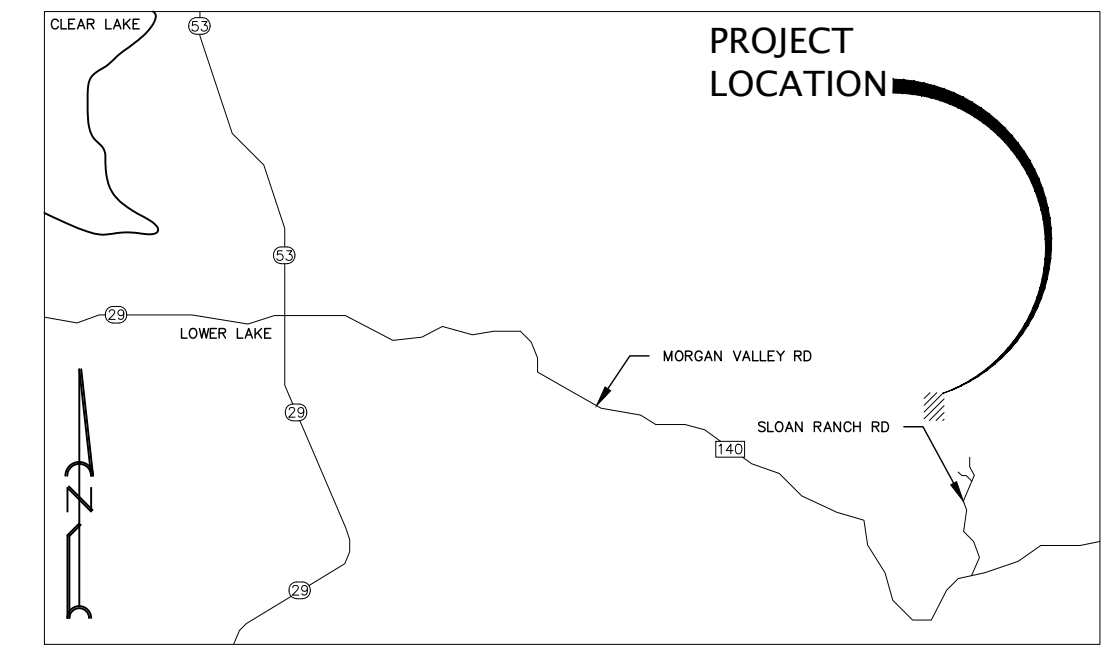
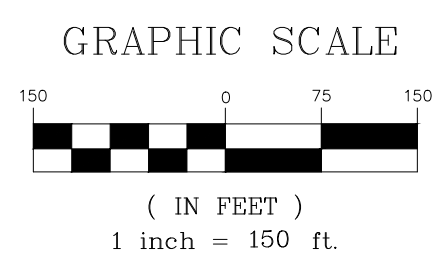
CADD FILE:

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

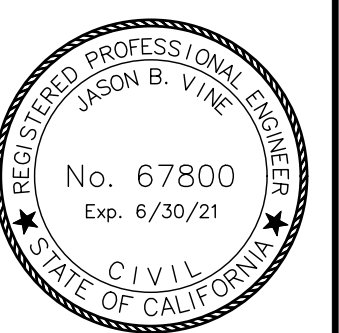
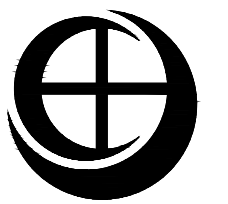
NOTES:

1. CONTOUR INTERVAL IS 10'

- (A) (E) GROUNDWATER WELL:
LAT: 38.910435°
LONG: -122.516293°
- (B) (E) EPHEMERAL CLASS III WATERCOURSE
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- (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:

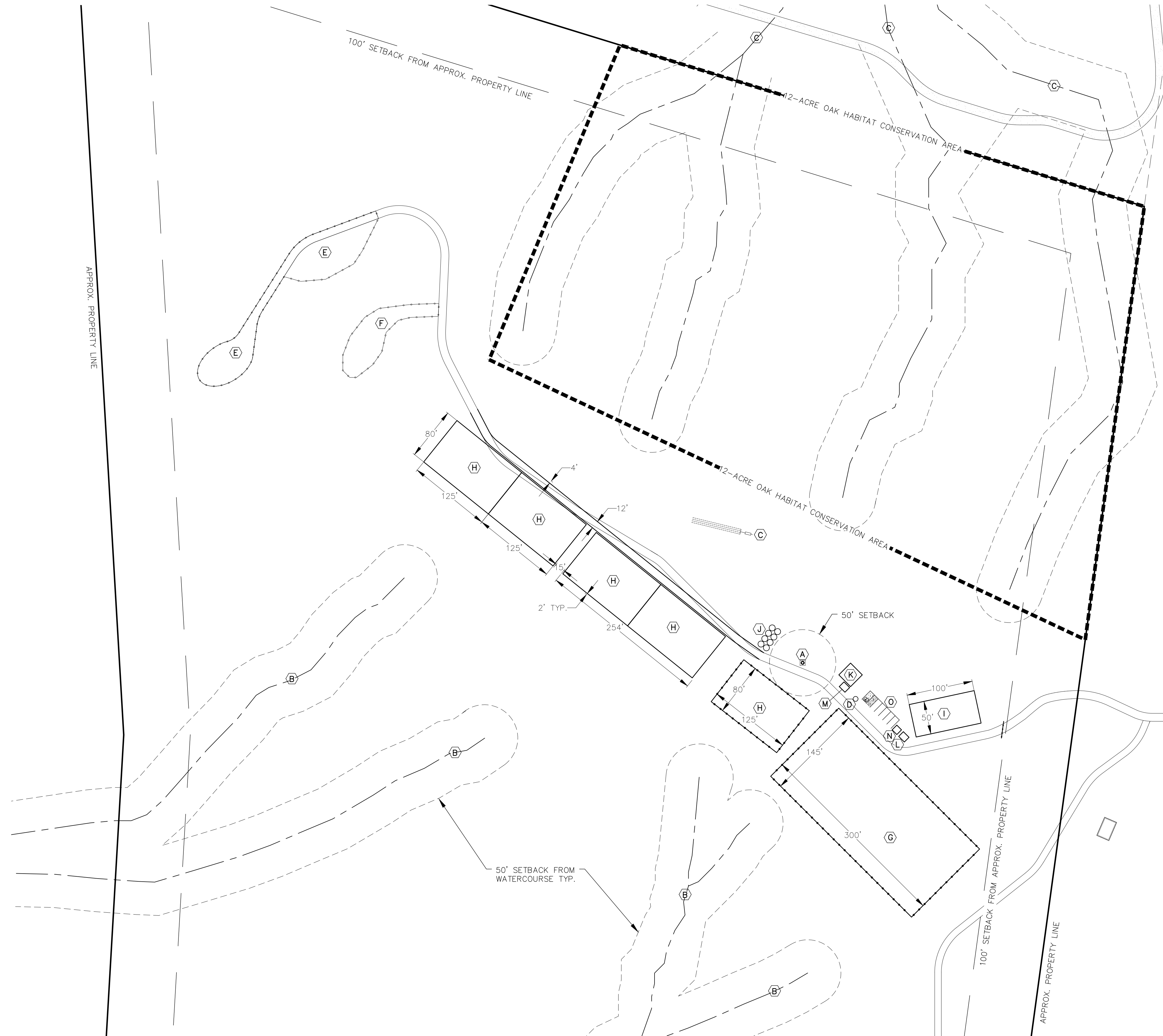
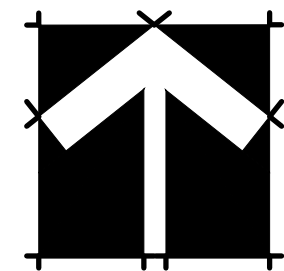
SEE PLAN

JOB NUMBER:

CADD FILE:

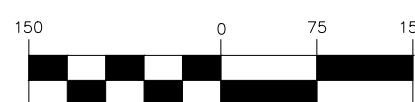
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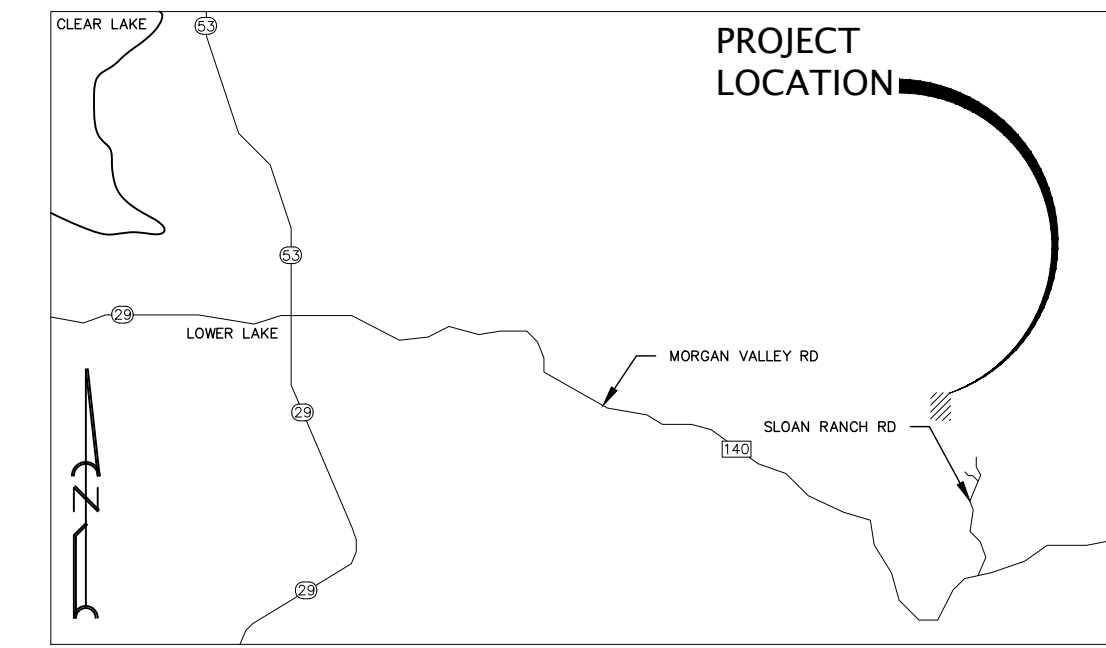


CULTIVATION SITE
PLAN WITH CANOPY

GRAPHIC SCALE



(IN FEET)
1 inch = 150 ft.



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
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- (N) (P) DESIGNATED REFUSE AREA
- (O) (P) EMPLOYEE PARKING / A.D.A.

Revisions:

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

ORIENTATION () ☒ VERTICAL ☐ HORIZONTAL ☐ ANGLE (SPECIFY)

DRILLING METHOD Rotary FLUID Air

| DEPTH FROM SURFACE | DESCRIPTION |
|--------------------|--|
| Ft. to Ft. | Describe material, grain size, color, etc. |
| 0 3 | Brown Soil |
| 3 16 | Brown Clay |
| 16 34 | Brown Shale |
| 34 165 | Gray and Black Sandstone and Shale |
| 165 220 | Gray Sandstone |

TOTAL DEPTH OF BORING 220' (Feet)

TOTAL DEPTH OF COMPLETED WELL 220' (Feet)

WELL LOCATION

Address 21258 Morgan Valley Al.

City Lower Lake

County Lake

APN Book 012 Page 069 Parcel 570

Township 12N Range 06W Section 10

Lat. ____ N Long. ____ W

DEG. MIN. SEC. DEG. MIN. SEC.

LOCATION SKETCH

WEST EAST

well 0 to 400'

Property line

ROADWAY

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

ACTIVITY () ☒ NEW WELL

MODIFICATION/REPAIR

Deepen

Other (Specify)

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

USES ()

WATER SUPPLY

☒ Domestic ☐ Public

☐ Irrigation ☐ Industrial

MONITORING

TEST WELL

CATHODIC PROTECTION

HEAT EXCHANGE

DIRECT PUSH

INJECTION

VAPOR EXTRACTION

SPARGING

REMEDIATION

OTHER (SPECIFY)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 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) | | | | | | DEPTH FROM SURFACE | ANNULAR MATERIAL | | | | |
|--------------------|-----|-----|----------------------------|------------|-------------|-----------|----------|------------------|----------------------------|--------------------|-------------------------|---------------------------|------|--|--------------|
| | | | | TYPE (≤) | | | | MATERIAL / GRADE | INTERNAL DIAMETER (Inches) | | GAUGE OR WALL THICKNESS | SLOT SIZE IF ANY (Inches) | TYPE | | |
| Ft. | to | Ft. | BLANK | SCREEN | CON- DUCTOR | FILL PIPE | | | | | | | | | CE- MENT (≤) |
| 0 | 40 | 9 | X | | | | PVC F480 | 4 1/2 | SDR26 | | 0 | 1 | X | | |
| 40 | 180 | 7 | X | | | | PVC F480 | 4 1/2 | SDR26 | | 1 | 22 | X | | |
| 180 | 220 | 7 | | X | | | PVC F480 | 4 1/2 | SDR 26 | .032 | 22 | 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 CITY Lower Lake STATE CA ZIP 95473

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

C-57 LICENSED WATER WELL CONTRACTOR

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 | *Flow Rate Measured via Bucket or Meter |
|----------|-------|------------|---------------|---|
| 5 | 8:00 | 19.0 | 173.36 | Meter Start: <u>1193554</u> |
| 5 | 8:05 | 19.0 | 174.10 | Meter Stop: <u>1199804</u> |
| 5 | 8:10 | 19.0 | 174.89 | Total Gallons Produced: <u>6250</u> |
| 5 | 8:15 | 19.0 | 175.28 | Average GPM: <u>17.36</u> |
| 5 | 8:20 | 18.0 | 175.68 | 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. |
| 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 | Recharge Rate: <u>57.20%</u> |
| 10 | 9:15 | 17.5 | 178.84 | |
| 10 | 9:25 | 17.5 | 179.01 | |
| 30 | 9:55 | 17.5 | 180.36 | Field Quality Test Completed: pH: <u>7.9</u> |
| 30 | 10:25 | 17.5 | 181.43 | |
| 30 | 10:55 | 17.5 | 182.61 | |
| 30 | 11:25 | 17.5 | 183.63 | TDS: <u>138 ppm</u> |
| 30 | 11:55 | 17.0 | 183.98 | |
| 30 | 12:25 | 17.0 | 183.29 | Hardness: <u>42 grains per gallon</u> |
| 30 | 12:55 | 17.0 | 182.78 | |
| 30 | 13:25 | 17.0 | 182.44 | Iron: <u>1 ppm</u> |
| 30 | 13:55 | 17.0 | 182.61 | |
| STOP | | | | GPS: <u>38.882312°, -122.580289°</u> |
| 24Hrs | 13:12 | RECHARGE | 176.9 | |

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 | | |
| 5/3 - 5/9 | 362,700 | 19,300 | 96,300 | May |
| 5/10 - 5/16 | 385,800 | 23,100 | | |
| 5/17 - 5/23 | 412,400 | 26,600 | | |
| 5/24 - 5/30 | 439,700 | 27,300 | | |
| 5/31 - 6/6 | 472,600 | 32,900 | | |
| 6/7 - 6/13 | 505,800 | 33,200 | 135,300 | June |
| 6/14 - 6/20 | 547,700 | 41,900 | | |
| 6/21 - 6/27 | 575,000 | 27,300 | | |
| 6/28 - 7/4 | 608,300 | 33,300 | | |
| 7/5 - 7/11 | 647,700 | 39,400 | | |
| 7/12 - 7/18 | 677,600 | 29,900 | 170,200 | July |
| 7/19 - 7/25 | 712,500 | 34,900 | | |
| 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 | 188,600 | August |
| 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 | | |
| 9/20 - 9/26 | 1,070,700 | 24,200 | 173,700 | September |
| 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 | | |
| 10/18 - 10/24 | 1,191,000 | 22,600 | | |
| 10/25 - 10/31 | 1,191,000 | 0 | 83,500 | October |
| 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 | | |
| | | | 2,500 | November |

ATTACHEMENT E

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

JUN 17 2009

STATE OF CALIFORNIA
WELL COMPLETION REPORT

Refer to Instruction Pamphlet

Page ____ of ____

Owner's Well No. _____

No. 1089156

Date Work Began 4/29/08Ended 5/7/08Local Permit Agency Lake County Environmental HealthPermit No. WE 2606Permit Date 5/5/08

DWR USE ONLY — DO NOT FILL IN

12N/06W+11

STATE WELL NO./STATION NO.

LATITUDE

LONGITUDE

APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION ()

☒ VERTICAL

HORIZONTAL

ANGLE

(SPECIFY)

DRILLING
METHOD

Rotary

FLUID

Mud

DESCRIPTION

Describe material, grain size, color, etc.

DEPTH FROM
SURFACE

Ft. to Ft.

0 4

4 6

6 35

35 375

Brown, sandy soil

Yellow sandy clay

Brown, sandy soil

Gray, silty

Address 21242 Morgan Valley RdCity Chico LakeCounty LakeAPN Book 012Page 069Parcel 080Township 12NRange 6WSection 11

Lat. _____

DEG.

MIN.

SEC.

N

Long _____

DEG.

MIN.

SEC.

W

LOCATION SKETCH

NORTH

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 _____

REMEDICATION _____

OTHER (SPECIFY) _____

WEST
Property line
100' → well
EAST
SOUTH
Illustrate or Describe Distance of Well from Roads, Buildings,
Fences, Rivers, etc. and attach a map. Use additional paper if
necessary. PLEASE BE ACCURATE & COMPLETE.

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 120 (Ft.) BELOW SURFACE

DEPTH OF STATIC

WATER LEVEL 59 (Ft.) & DATE MEASURED 5/7/08ESTIMATED YIELD 40 (GPM) & TEST TYPE Air LiftTEST LENGTH 1 (Hrs.) TOTAL DRAWDOWN _____ (Ft.)

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

TOTAL DEPTH OF BORING 380 (Feet)TOTAL DEPTH OF COMPLETED WELL 375 (Feet)

| DEPTH FROM SURFACE | | | BORE-HOLE DIA. (Inches) | CASING (S) | | | | | | | DEPTH FROM SURFACE | | | ANNULAR MATERIAL | | | |
|--------------------|-----|-----|-------------------------|-------------------|-------------|-----------|--|------------------|----------------------------|-------------------------|--------------------|----|-----|---------------------------|------|-----------------------|--------------------------|
| | | | | TYPE (\angle) | | | | MATERIAL / GRADE | INTERNAL DIAMETER (Inches) | GAUGE OR WALL THICKNESS | | | | SLOT SIZE IF ANY (Inches) | TYPE | | |
| Ft. | to | Ft. | BLANK | SCREEN | CON- DUCTOR | FILL PIPE | | | | | | | | | | CE- MENT (\angle) | BEN- TONITE (\angle) |
| 0 | 160 | | 8 1/2 | X | | | | PVC F400 | 4 1/2 | SDR26 | | 0 | 20 | K | | | |
| 160 | 375 | | 8 1/2 | X | | | | PVC F400 | 4 1/2 | SDR26 | .032 | 22 | 22 | | K | | |
| | | | | | | | | | | | | 22 | 375 | | | 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 CA CITY Chico Lake STATE CA ZIP 95423Signed Dan Mc Muller
C-57 LICENSED WATER WELL CONTRACTORDATE 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</u> <u>54</u> <u>19.8899</u> <u>N</u> | Longitude <u>-122</u> <u>30</u> <u>33.0228</u> <u>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> | |
| Vertical Datum _____ Horizontal Datum <u>WGS84</u> | | Baseline Meridian <u>Mount Diablo</u> | |
| Location Accuracy <u>Unknown</u> | | Ground Surface Elevation _____ | |
| Location Determination Method <u>GPS</u> | | Elevation Accuracy _____ | |
| | | Elevation Determination Method _____ | |

| Borehole Information | | Water Level and Yield of Completed Well | |
|--|---|---|--|
| Orientation <u>Vertical</u> Specify _____ | Depth to first water <u>77</u> (Feet below surface) | | |
| Drilling Method <u>Other - Air-rotary</u> Drilling Fluid <u>Foam</u> | Depth to Static _____ | | |
| Total Depth of Boring <u>508</u> Feet | Water Level <u>69</u> (Feet) Date Measured <u>09/23/2021</u> | | |
| Total Depth of Completed Well <u>472</u> Feet | 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 | <i>electronic signature received</i> | | 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 | | | | |
| | | | | | | | | | | |
| | | | | | N | | | | | W |
| Latitude Deg/Min/Sec | | | | | | Longitude Deg/Min/Sec | | | | |

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</u> <u>54</u> <u>31.1363</u> <u>N</u> | Longitude <u>-122</u> <u>30</u> <u>34.9956</u> <u>W</u> | Range <u>06 W</u> | |
| Deg. Min. Sec. | Deg. Min. Sec. | Section <u>10</u> | |
| Dec. Lat. <u>38.908649</u> | | Dec. Long. <u>-122.509721</u> | |
| Vertical Datum _____ Horizontal Datum <u>WGS84</u> | | Baseline Meridian <u>Mount Diablo</u> | |
| Location Accuracy <u>Unknown</u> | | Ground Surface Elevation _____ | |
| Location Determination Method <u>GPS</u> | | Elevation Accuracy _____ | |
| | | Elevation Determination Method _____ | |

| Borehole Information | | Water Level and Yield of Completed Well | |
|--|--|---|--|
| Orientation <u>Vertical</u> Specify _____ | Depth to first water <u>80</u> (Feet below surface) | | |
| Drilling Method <u>Other - Air-rotary</u> Drilling Fluid <u>Foam</u> | Depth to Static _____ | | |
| Total Depth of Boring <u>309</u> Feet | Water Level <u>99</u> (Feet) Date Measured <u>09/25/2021</u> | | |
| Total Depth of Completed Well <u>303</u> Feet | 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

W

Latitude Deg/Min/Sec

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</u> <u>54</u> <u>15.4443</u> <u>N</u> | Longitude <u>-122</u> <u>30</u> <u>28.0087</u> <u>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> | |
| Vertical Datum _____ Horizontal Datum <u>WGS84</u> | | Baseline Meridian <u>Mount Diablo</u> | |
| Location Accuracy <u>Unknown</u> | | Ground Surface Elevation _____ | |
| Location Determination Method <u>GPS</u> | | Elevation Accuracy _____ | |
| | | Elevation Determination Method _____ | |

| Borehole Information | | Water Level and Yield of Completed Well | |
|--|---|---|--|
| Orientation <u>Vertical</u> Specify _____ | Depth to first water <u>70</u> (Feet below surface) | | |
| Drilling Method <u>Other - Air-rotary</u> Drilling Fluid <u>Foam</u> | Depth to Static _____ | | |
| Total Depth of Boring <u>330</u> Feet | Water Level <u>151</u> (Feet) Date Measured <u>10/15/2021</u> | | |
| Total Depth of Completed Well <u>328</u> Feet | 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 |

Permit No. WE 1100

Refer to Insurance Portfolio

DWR USE ONLY - DO NOT FILL IN

12N/06W-10M

STATE WELL NO. 101

LATITUDE LONGITUDE

ADVISER'S SIGNATURE

000000

* May not be representative of a wider target group.

7/11/44 8-17-44 SSSK

9-17-44 533/52

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

