REALM
Engineering
1767 Market Street, Suite C, Redding, CA 96001

HYDROLOGY REPORT

11795 NORTH DRIVE, CLEARLAKE PARK, CA

AUGUST 2, 2021

Contents

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

Akwaaba, LLC (Akwaaba) is seeking a Major Use Permit from the County of Lake, for a proposed commercial cannabis cultivation operation at 11795 North Drive near Clearlake Park, California on Lake County APN 010-019-15 (Project Parcel). Akwaaba's proposed cultivation operation will be composed of two A-Type 3 "Medium Outdoor" cultivation areas and an A-Type 2B "Small Mixed-Light" cultivation area (with a total combined cultivation/canopy area of 83,280 ft^2), a 1,800 ft^2 Drying & Harvest Storage Facility (existing metal barn), and a 160 ft^2 Pesticide & Agricultural Chemicals Storage Area (proposed metal shipping/storage container). The proposed cultivation areas will be enclosed with 6-foot tall galvanized woven wire fences, covered with privacy screen/mesh where necessary to screen the cultivation/canopy areas from public view. The growing medium of the proposed outdoor cultivation/canopy areas will be an imported organic soilless growing medium (composed mostly of composted forest material) in aboveground fabric pots. Akwaaba will use drip and micro-spray irrigation systems to deliver irrigation water to the aboveground fabric pots, and to conserve water resources. All water for the proposed cultivation operation will come from the existing onsite groundwater well located at Latitude: 38.99555° and Longitude: -122.68973°.

The Project Parcel is located along the spine of Sulphur Bank Ridge, near the base of a large peninsula that extends out into Clear Lake. The western extent of the large peninsula is known as Sulphur Bank Point. There are no watercourses or other surface water bodies (including wetlands and vernal pools) on the Project Parcel. Stormwater runoff from the Project Parcel flows north, south, and east, into ephemeral drainages that discharge into Clear Lake (north and south) or Borax Lake (east). Soils of the Project Parcel in the area of the proposed cultivation operation are identified as the Maymen-Millsholm-Bressa complex by the NRCS Web Soil Survey (attached), and characterized as well-drained gravelly and clay loams derived from residuum weathered from sedimentary rock. The United States Geological Survey Map of the Santa Rosa Quadrangle (1982) defines the area in the vicinity of the Project Property as the Franciscan Complex, composed mostly of sandstone, shale, conglomerate, chert, greenstone, and metagraywacke. The Project Property is not located within any of the 13 groundwater basins/source areas identified in the 2006 Lake County Groundwater Management Plan.

Figure 1 – Site Location Map

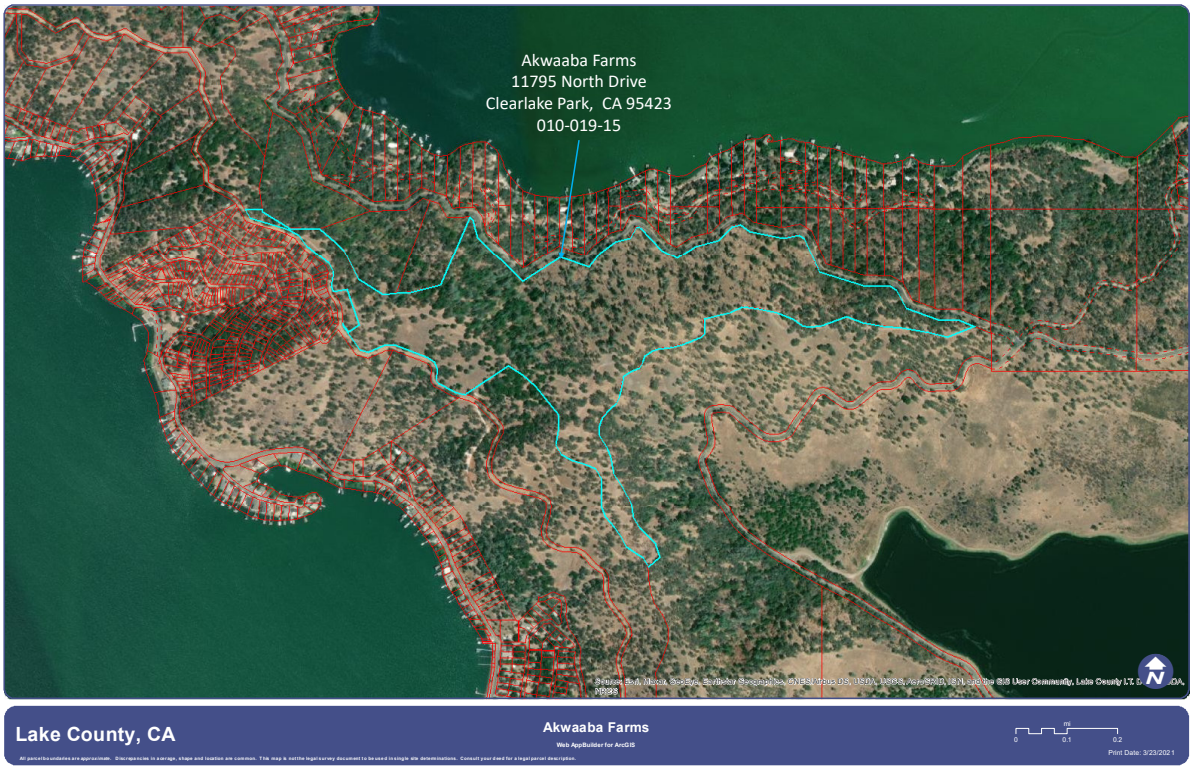


Figure 2 – Surrounding Area Aerial Image

WATER USAGE

Cannabis has often been characterized as a high-water-use plant. Bauer et al. (2015)[1] and Carah et al (2015)[2] 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. 2015[3]). According to a recent study published in the Journal of Environmental Management (Dillis et al. 2020[4]), 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.

According to Akwaaba's Water Use Management Plan, they expect a total annual water use requirement of 1,296,900 gallons for irrigation purposes, with the greatest daily water usage coming in the month of August (approximately 9,776 gallons). The following table (from Akwaaba's Water Use Management Plan) presents the expected water use of the proposed cultivation operation by month during the cultivation season in gallons and acre-feet, during the cultivation season (April through November).

April	May	June	July	August	September	October	November
32,585	65,170	162,925	260,680	293,270	260,680	195,510	32,585
0.1	0.2	0.5	0.8	0.9	0.8	0.6	0.1

Akwaaba's water usage estimates are based on an estimated water use requirement of 25 inches per year, which is greater than the water use estimates outlined in the recent study published in the Journal of Environmental Management (Dillis et al. 2020[4]).

WATER AVAILABILITY

All water for the proposed cultivation operation will come from the existing onsite groundwater well located at Latitude: 38.99555° and Longitude: -122.68973°. This groundwater well was drilled in November of 2020, through shale, chert, and sand stone, to a depth of 660 feet below ground surface (bgs). This well had an estimated yield of 80 gallons per minute at the time it was drilled **(Attachment B: Onsite Well Completion Report)**. On May 29th, 2021 an NSF/ANSI 61 compliant positive displacement mechanical brass totalizing meter and a Well Watch 670 sonic water level meter equipped with data logging capabilities, were installed on the groundwater well. Immediately following installation of this equipment, an 8-hour pump test was performed to thoroughly evaluate the production capacity of the well using a small electrical pump that had previously been installed in the well. The small electrical pump could only produce 12 gallons per minute (gpm) at a depth of 600 feet below ground surface. During the pump test, the water level in the well only dropped four feet and remained static for the duration of the 8-hour pump test (**Attachment C - Will Peterson Well Drilling Well Yield/Pump Test**). A total of approximately 5,760 gallons were pumped from the well during the pump test. Within 5 minutes after pumping of the well ceased, the water level in the well rebounded to 600 feet below ground

surface (100% recovery). A Specific Capacity of 3 gpm/foot of drawdown (i.e., 12 gpm / 4 feet) was calculated from the pump test data.

The well yield test data suggests that the onsite groundwater well can produce approximately 3 gpm for every foot of drawdown in the well during eight hours of pumping. The well recovery observations demonstrated that the well may be able to produce this water without causing overdraft conditions. With the site aquifer extending to approximately 660 bgs, that calculates to approximately 60 feet of available well drawdown (660 feet - 600 feet (static water level)). Based on the well yield test and the Well Completion Report information, it does appear that the well can produce much more than 12 gpm with a more powerful pump (as much as 80 gpm as indicated on the Well Completion Report). The peak anticipated daily demand for water of the proposed cultivation operation is ~9,776 gallons per day, which equates to a need for the water supply well to produce at least 13.6 gpm over a 12-hour pumping period (or 6.8 gpm over a 24-hour period). Additionally, Akwaaba proposes to establish at least 20,000 gallons of water storage capacity on the property.

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). The Project Parcel is located near the base of a large peninsula that extends out into Clear Lake. The aquifer from which Akwaaba's existing onsite groundwater well is recharged, is composed of sandstone, and is approximately 520 feet to at least 660 feet bgs (**Attachment B – Onsite Well Completion Report**).

To estimate the groundwater recharge at the site, we first must assume that the recharge to the aquifer is primarily through rainfall across the 97-acre Project Property (Lake County APNs 010-019-10 and 15). Therefore, the annual precipitation available for recharge onsite can initially be estimated using the following data and equation.

97 acres x 2.75 feet (Average Annual Precipitation for Clearlake, CA) = 266.75 acre-feet
Estimated Annual Precipitation Onsite = 266.75 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 somewhat excessively drained gravelly loam soils and vegetation, we estimate that the long-term average precipitation that recharges groundwater within the entire site is at least 3% (a conservative estimate). With this data and the precipitation data presented above, we can estimate the groundwater recharge of the Project Property by using the following equation.

266.75 acre-feet/year (annual precipitation onsite) x 0.03 (long term average recharge) =
Estimated Groundwater Recharge = 8.0 acre-feet/year

Based on the estimated average annual recharge to the aquifer under the Project Property (~8 acre-feet/year) and the estimated annual water usage of the proposed cultivation operation (~4 acre-feet/year), it appears that Akwaaba will have enough water to meet their demands without causing overdraft conditions.

POTENTIAL IMPACTS TO STREAMS & NEIGHBORING WELLS

We must first identify onsite and nearby surface water bodies and groundwater wells to evaluate potential impacts from the project's well pumping/water usage. There are no surface water bodies on the Project Property, and the nearest intermittent or perennial watercourse to the onsite groundwater well is Clear Lake. Clear Lake is a large perennial surface water body with over a million acre-feet of storage. The onsite groundwater well is located over 1,000 feet from Clear Lake, and is recharged by a confined sandstone aquifer with an estimated hydraulic conductivity between 0.28 and 0.0003 feet per day (Freeze and Cherry, 1979, p.29[5]). Given the relatively low hydraulic conductivity of the aquifer, and the relatively long distance between the onsite groundwater well and Clear Lake, it does not appear that pumping for cultivation will have any impact on nearby surface water bodies (i.e. Clear Lake).

The California Department of Water Resources' Well Completion Report Map Application indicates that there are four groundwater wells in the same Section as the Project Property (Township 13N, Range 08W, Section 12). However, upon further review, it is apparent that two of the wells shown on the Well Completion Report Map Application as being located within Section 12, are actually located within Sections that over two miles northwest of the Project Property (not within Section 12). Additionally, a well shown on the Well Completion Report Map Application as being located within Section 11, was determined to be located within Section 12 (same Section as the Project Property). All three of the wells that were identified as being located within Section 12, are located more than 2,000 feet from Akwaaba's onsite groundwater well, and were drilled in 1999 to a maximum depth of 30 feet (Figure 3 – Nearest Known Wells Location Map). The Well Completion Reports for these wells do not indicate that any of the three wells were drilled into the confined sandstone aquifer that recharges the onsite groundwater well **(Attachment D: Well Completion Reports for Nearest Known Wells)**. Given the long distance between the onsite groundwater well and the nearest known wells to the Project Property, and the fact that the known wells were not drilled into the same aquifer as the onsite groundwater well, it does not appear that pumping for cultivation will have any impact on neighboring wells.

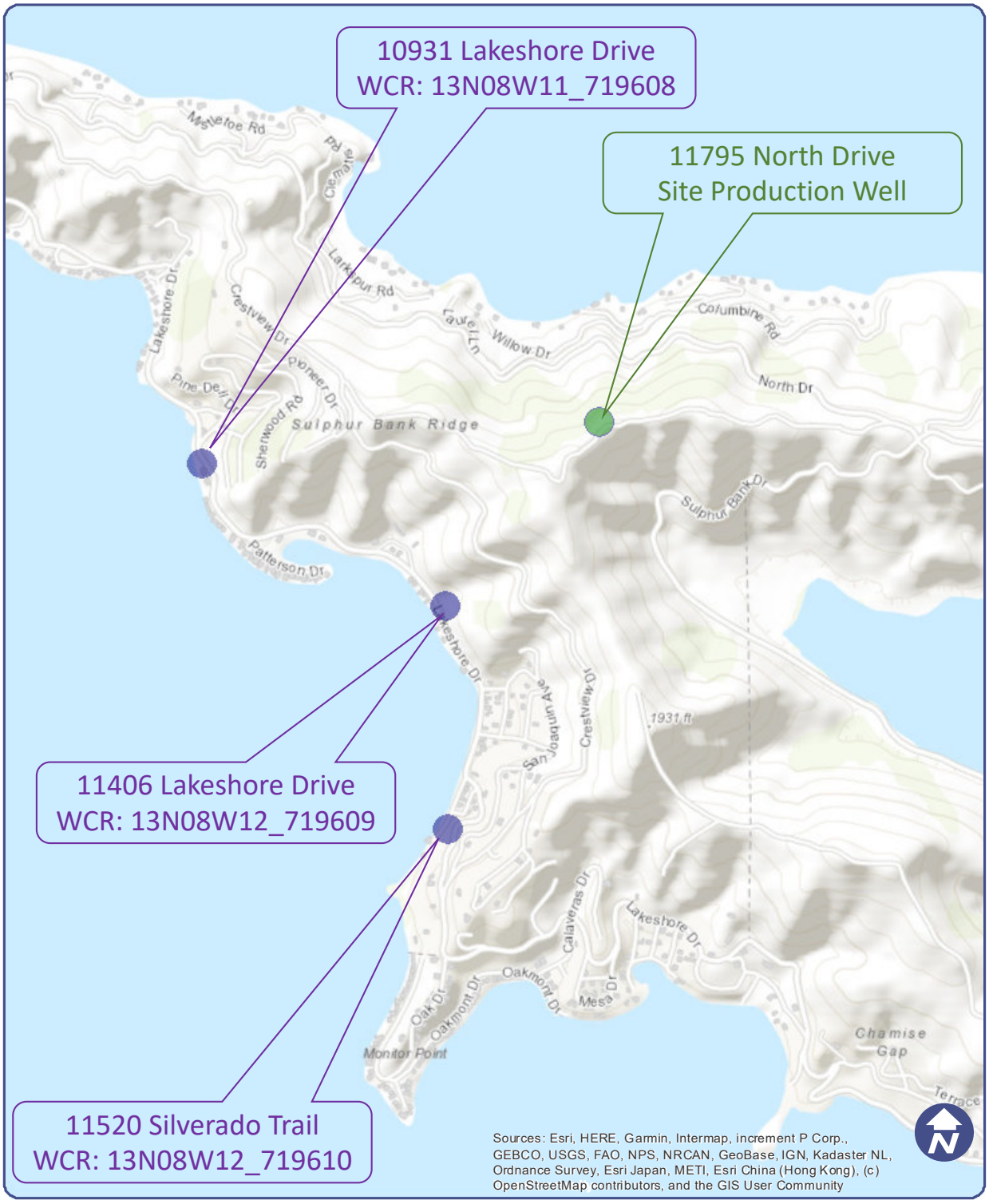


Figure 3 – Nearest Known Wells Location Map

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. Akwaaba's proposed cannabis cultivation operation will have up to 73,560 ft^2 of outdoor canopy area and 9,720 ft^2 of mixed-light canopy area, with a total combined estimated annual water use requirement of 1,296,900 gallons. Akwaaba intends to plant the mixed-light canopy areas on or around May 1st of each year (depending on climatic conditions), and the outdoor canopy areas on or around June 1st of each year. Akwaaba anticipates that they will be able to obtain the first of two harvests from the mixed-light canopy areas in July of each year, with the second harvest from the mixed-light canopy areas in November. Akwaaba anticipates that they will be able to harvest the outdoor canopy areas in October of each year.

To ensure both success and decreased impacts to the surrounding areas, Akwaaba plans to reduce their water usage during the second half of the cultivation season by more than 11%, by not replanting the mixed-light canopy areas after the first harvest when a drought emergency has been declared for their region. This reduction will occur during the hottest and driest months, when water usage for the proposed cultivation operation is at its highest (July, August, and September). The peak anticipated daily demand for water of the proposed cultivation operation is ~9,776 gallons per day (when not under a declared drought emergency). By not replanting the mixed-light canopy areas during a drought emergency, Akwaaba will reduce the peak anticipated daily demand for water of the proposed cultivation operation by approximately 1,141 gallons per day. The table below summarizes the anticipated reduction in water usage for the proposed cultivation operation during a drought emergency.

	July	August	September	October	November
Estimated Water Use During Normal Operations (gallons)	260,680	293,270	260,680	195,510	32,585
Estimated Water Use During Drought Emergency (gallons)	230,255	259,040	230,255	172,690	2,000

By implementing the Drought Management Plan outlined above, Akwaaba will reduce their estimated annual water demand by 148,485 gallons during the second half of the cultivation season when available water resources are at their most scarce.

CONCLUSIONS

All water for the proposed cultivation operation will come from the existing onsite groundwater well located at Latitude: 38.99555° and Longitude: -122.68973°. This groundwater well was drilled in November of 2020, through shale, chert, and sand stone, to a depth of 660 feet below ground surface. The confined aquifer from which the onsite groundwater well is recharged, is composed of sandstone and is approximately 520 feet to at least 660 feet below ground surface. The onsite groundwater well had an estimated yield of 80 gallons per minute at the time it was drilled. An 8-hour pump test was performed to evaluate the production capacity of the well in May of 2021. From the pump test data we can calculate a Specific Capacity of 3 gpm/foot for the onsite groundwater well. Based on well yield test data collected at the site, it appears that the aquifer storage and recharge area are sufficient to provide for sustainable annual water use at the site and on the Project Property.

The Project Property is not located within any of the 13 groundwater basins/source areas identified in the 2006 Lake County Groundwater Management Plan and there are no known neighboring wells that receive water from the confined sandstone aquifer that recharges the onsite groundwater well. Additionally, there are no surface water bodies on the Project Property, and the nearest perennial surface water body (Clear Lake) is located over 1,000 feet from the onsite groundwater well. Therefore, we do not anticipate any impacts from the proposed cannabis cultivation operation's water usage to neighboring wells or surrounding areas.

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 Akwaaba, 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

Realm Engineering
1767 Market Street, Suite C
Redding, CA 96001
530-526-7493
info@realm-engineering.com

REFERENCES

[1]Bauer, 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

[2]Carah, 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

[3]Hammon, 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

[4]Dillis, 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

[5]Freeze, 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 27th day of July, 2021.

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

NOES: None

ABSENT OR NOT VOTING: None

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

ONSITE WELL COMPLETION REPORT

*The free Adobe Reader may be used to view and complete this form. However, software must be purchased to complete, save, and reuse a saved form.

File Original with DWR

Page 1 of 1

Owner's Well Number: 1

Date Work Began 11-19-20 Date Work Ended 11-24-20

Local Permit Agency LAKE County Environmental Health

Permit Number WE5481 Permit Date 11-18-20

State of California

Well Completion Report

Refer to Instruction Pamphlet

No. XXXXXXX

DWR Use Only – Do Not Fill In

State Well Number/Site Number

Latitude N Longitude W

APN/TRS/Other

Geologic Log

Orientation ● Vertical ○ Horizontal ○ Angle Specify

Drilling Method Air Rotary Drilling Fluid —

Depth from Surface Feet	to Feet	Description Describe material, grain size, color, etc
0	200	Brown Shale
200	250	Red/Green Chert
250	420	Brown/Black Shale with Sandstone Stringers
420	480	Chert
480	520	Greenstone/Black Shale
520	660	Sandstone

Total Depth of Boring 665 Feet

Total Depth of Completed Well 660 Feet

Well Owner

Name Quincy Jackson

Mailing Address P.O. Box 777

City Clearlake Park State CA Zip 95424

Well Location

Address 11295 North Drive

City Clearlake Park County LAKE

Latitude ___ Deg. ___ Min. ___ Sec. N Longitude ___ Deg. ___ Min. ___ Sec. W

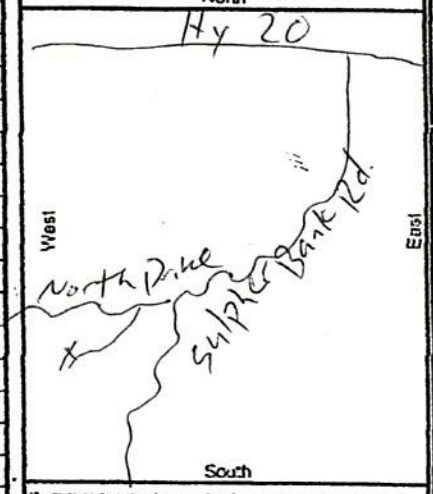
Datum ___ Dec. Lat. ___ Dec. Long. ___

APN Book 010 Page 019 Parcel 15

Township ___ Range ___ Section ___

Location Sketch

(Sketch must be drawn by hand after form is printed.)



Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. Please be accurate and complete.

Activity

● New Well
○ Modification/Repair
○ Deepen
○ Other ___
○ Destroy
Describe procedures and materials under "DESTRUCTION"

Planned Uses

● Water Supply
☒ Domestic ☐ Public
☒ Irrigation ☐ Industrial
○ Cathodic Protection
○ Dewatering
○ Heat Exchange
○ Injection
○ Monitoring
○ Remediation
○ Sparging
○ Test Well
○ Vapor Extraction
○ Other ___

Water Level and Yield of Completed Well

Depth to first water 580' (Feet below surface)

Depth to Static Water Level ___ (Feet) Date Measured 11-23-20

Estimated Yield * 80 (GPM) Test Type Air Lift

Test Length 2 HRS (Hours) Total Drawdown ___ (Feet)

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

Casings

Depth from Surface Feet	to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)
0	40	9"	F480	PVC	sch 40	5"	Blank	—
40	580	7 3/4"	F480	PVC	sch 40	5"	Blank	—
580	660	7 3/4	F480	PVC	sch 40	5"	Perf.	.032"

Annular Material

Depth from Surface Feet	to Feet	Fill	Description
0	1	Concrete	SEAL
1	22	Bentonite	
22	660	5/16 Pea	Gravel Pack

Attachments

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

Attach additional information, if exists

Certification Statement

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

Name Will Peterson Well Drilling

Person, Firm or Corporation

P.O. Box 695 Kelseyville CA 95451

Address City State Zip

Signed [signature] 11-24-20 100905

C-57 Licensed Water Well Contractor Date Signed C-57 License Number

DWR 188 REV 1/2006

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

ATTACHEMENT C

WILL PETERSON WELL DRILLING WELL YIELD/PUMP TEST

WILL PETERSON WELL DRILLING

Quincy Jackson
11795 North Drive
Clearlake Park. CA 95424

6/1/2021

To whom this may concern,

The static water level was 600’ below surface before test began. The static level dropped to 604’ for a drawn down of 4’ after 30 minutes @ 12 GPM.

We pumped 12 GPM for 8 hours. During the test the static never went past 604’ below the surface. Once the pump was stopped the well recharged the static to 600’ below surface in 5 minutes.

The static was rechecked 24 hours from the end of the test and static level was at 600’ below surface.

Feel free to call us with any questions at (707) 277-0103 or (707) 272-1121.

Sincerely,

Will Peterson Well Drilling
Lic#1009053

PO Box 695
Kelseyville, CA
95451

PHONE (707) 277-0103
FAX (707) 277-0103
EMAIL William.peterson707@yahoo.com
WEBSITE www.willpetersonwelldrilling.com

ATTACHEMENT D

WELL COMPLETION REPORTS FOR NEAREST KNOWN WELLS

ORIGINAL
File with DWR

RECEIVED
AUG 02 1999

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. 719608

DWR USE ONLY — DO NOT FILL IN
13N/08W-11M
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

Page ___ of ___
Owner's Well No. P.S. #8
Date Work Began 6/17/99 Ended 6/17/99
Local Permit Agency LAKE COUNTY ENVIRONMENTAL HEALTH DEPT.
Permit No. WE 1731 Permit Date 6/14/99

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD HSA FLUID n/a

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	5	Angular multi-colored rock
5	15	Redish borwn sandy clay with gravels
15	25	Brown sandy clay with gravels
25	30	Brown clay becoming hard turns into fractured

TOTAL DEPTH OF BORING 30 (Feet)
TOTAL DEPTH OF COMPLETED WELL 30 (Feet)

CITY STATE ZIP

WELL LOCATION

Address 10931 Lakeshore Drive
City Clearlake Park
County LAKE - SE I/I Reduction Project
APN Book 036 Page 311 Parcel 04
Township 13N Range 08W Section 11
Latitude ___ DEG. ___ MIN. ___ SEC. NORTH Longitude ___ DEG. ___ MIN. ___ SEC. WEST

LOCATION SKETCH

NORTH / WEST / EAST / SOUTH

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

ACTIVITY (✓)

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

PLANNED USES (✓)

WATER SUPPLY
___ Domestic ___ Public
___ Irrigation ___ Industrial
MONITORING X
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 18' (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 9' (Ft.) & DATE MEASURED 7/2/99
ESTIMATED YIELD * HIGH (GPM) & TEST TYPE Pump
TEST LENGTH ½ (Hrs.) TOTAL DRAWDOWN ___ (Ft.)
** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	30	8½								
0	15		X				PVC	2"	SCH.40	
15	30			X			PVC	2"	SCH.40	.020

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	10	X			
10	12		X		
12	13			X	#30 Sand
13	30			X	#3 Sand
				AUG	3 1999

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 WEEKS DRILLING AND PUMP COMPANY by Ward Thompson
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

PO Box 176 Sebastopol CA 95473
ADDRESS CITY STATE ZIP

Signed Ward Thompson
WELL DRILLER/AUTHORIZED REPRESENTATIVE

7/16/99
DATE SIGNED

177681
C-57 LICENSE NUMBER

ORIGINAL
File with DWR

RECEIVED
AUG 02 1999

Page 1 of 1

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

Owner's Well No. P.S. #10 No. 719610

Date Work Began 6/21/99 Ended 6/21/99

Local Permit Agency LAKE COUNTY ENVIRONMENTAL HEALTH DEPT.

Permit No. WE 1733 Permit Date 6/14/99

DWR USE ONLY — DO NOT FILL IN
13N/08W-12M
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD HSA FLUID n/a

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	5	Loose brown clayee sand with gravel
5	10	Redish brown weathered and fractured rock
10	15	Multi-colored weathered bedrock
15	20	Redish brown gray rock
20	25	Hard multi-colored rock
25	30	Hard multi-colored weathered rock

TOTAL DEPTH OF BORING 30 (Feet)
TOTAL DEPTH OF COMPLETED WELL 30 (Feet)

CITY STATE ZIP

WELL LOCATION

Address 11520 Silverado Trail
City Clearlake Park
County LAKE - SE I/I Reduction Project
APN Book 037 Page 141 Parcel 25
Township 13N Range 08W Section 12
Latitude ___ DEG. ___ MIN. ___ SEC. NORTH Longitude ___ DEG. ___ MIN. ___ SEC. WEST

LOCATION SKETCH

NORTH / WEST / EAST / SOUTH

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

ACTIVITY (✓)

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

PLANNED USES (✓)

WATER SUPPLY
___ Domestic ___ Public
___ Irrigation ___ Industrial
MONITORING X
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 20' (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 6' (Ft.) & DATE MEASURED 7/2/99
ESTIMATED YIELD * LOW (GPM) & TEST TYPE Pump
TEST LENGTH ½ (Hrs.) TOTAL DRAWDOWN Bottom (Ft.)
** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	30	8½								
0	15		X				PVC	2"	SCH.40	
15	30			X			PVC	2"	SCH.40	.020

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	10	X			
10	12		X		
12	13			X	#30 Sand
13	30			X	#3 Sand

AUG 3 1999

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 WEEKS DRILLING AND PUMP COMPANY by Ward Thompson
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

P.O. Box 176 Sebastopol CA 95473
ADDRESS CITY STATE ZIP

Signed [signature] 7/16/99 177681
WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED C-57 LICENSE NUMBER

ORIGINAL
File with DWR

RECEIVED
AUG 02 1999

Page 1 of 1

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

DWR USE ONLY — DO NOT FILL IN
13N/08W-12M
STATE WELL NO./STATION NO.
LATITUDE / LONGITUDE
APN/TRS/OTHER

Owner's Well No. P.S. #9
No. 719609
Date Work Began 6/21/99, Ended 6/21/99
Local Permit Agency LAKE COUNTY ENVIRONMENTAL HEALTH DEPT.
Permit No. WE 1732 Permit Date 6/14/99

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD HSA FLUID n/a

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	10	Orange brown clayee sand with gravel
10	15	Hard light orange & brown rock
15	20	Hard light orange & brown rock with lenses of sand
20	25	Light orange and brown rock
25	30	Light orange and brown rock with some clay

TOTAL DEPTH OF BORING 30 (Feet)
TOTAL DEPTH OF COMPLETED WELL 30 (Feet)

WELL LOCATION

CITY STATE ZIP

Address 11406 Lakeshore Drive
City Clearlake Park
County LAKE - SE I/I Reduction Project
APN Book 039/036 Page 361 Parcel 25
Township ___ Range ___ Section 13N/08W-12
Latitude ___ DEG. ___ MIN. ___ SEC. NORTH
Longitude ___ DEG. ___ MIN. ___ SEC. WEST

LOCATION SKETCH

NORTH / WEST / EAST / SOUTH

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

ACTIVITY (✓)

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

PLANNED USES (✓)

WATER SUPPLY
___ Domestic ___ Public
___ Irrigation ___ Industrial
MONITORING X
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 ? (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 7 1/2 (Ft.) & DATE MEASURED 7/2/99
ESTIMATED YIELD * LOW (GPM) & TEST TYPE Hand Bail
TEST LENGTH ½ (Hrs.) TOTAL DRAWDOWN Bottom (Ft.)
** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	30	8½								
0	15		X				PVC	2"	SCH.40	
15	30			X			PVC	2"	SCH.40	.020

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	9½	X			
9½	11		X		
11	12			X	#30 Sand
12	30			X	# 3 Sand

AUG 3 1999

ATTACHMENTS (✓)

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

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

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PO Box 176 Sebastopol CA 95473
ADDRESS CITY STATE ZIP

Signed Ward Thompson
WELL DRILLER/AUTHORIZED REPRESENTATIVE

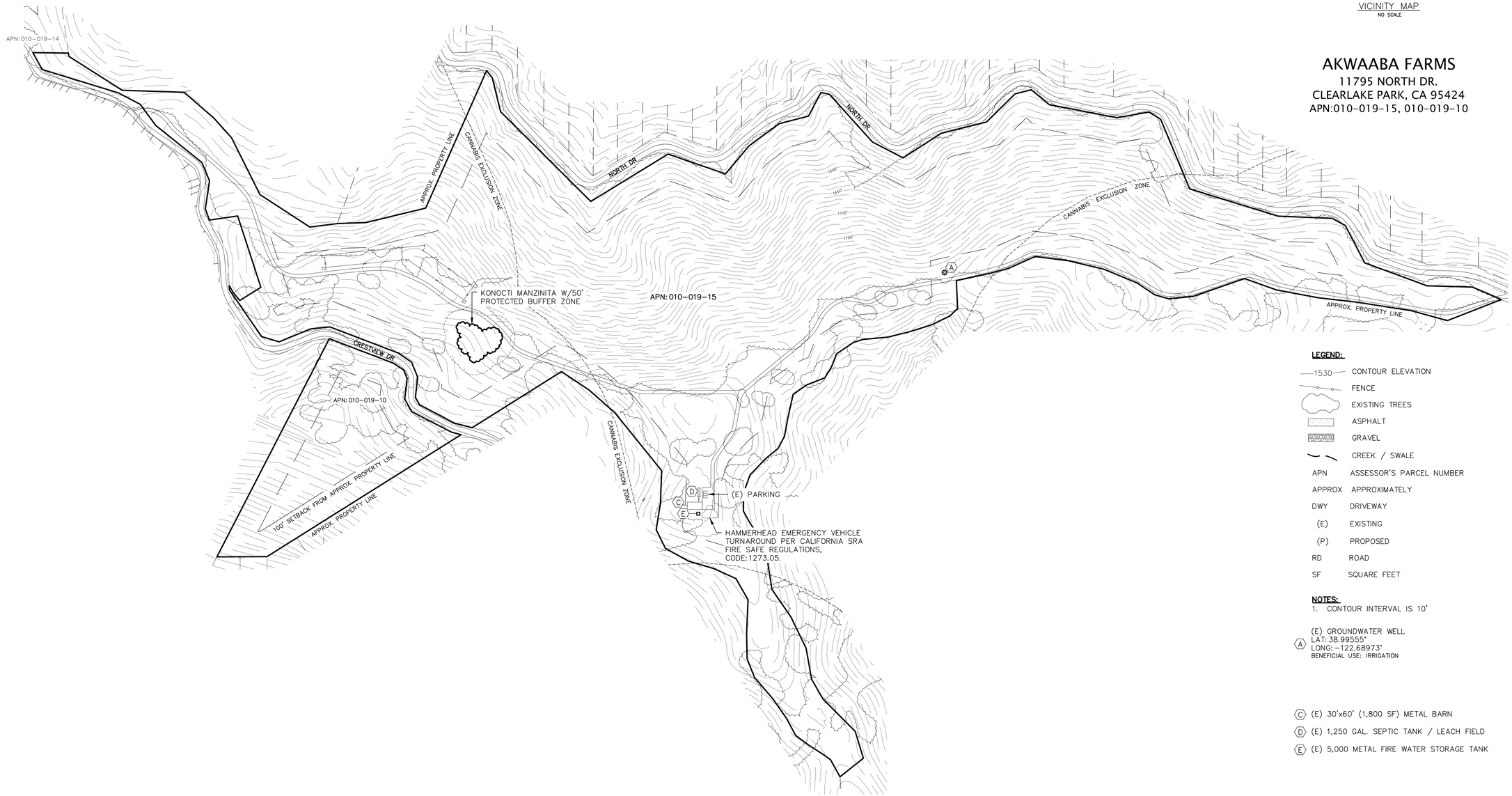
7/16/99
DATE SIGNED

177681
C-57 LICENSE NUMBER

DWR 188 REV. 11-97 IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

ATTACHMENT E

EXISTING AND PROPOSED CONDITIONS SITE PLANS



VICINITY MAP
NO SCALE

AKWAABA FARMS

11795 NORTH DR.
CLEARLAKE PARK, CA 95424
APN:010-019-15, 010-019-10

LEGEND:

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

NOTES:
1. CONTOUR INTERVAL IS 10'

(A) (E) GROUNDWATER WELL
LAT: 38.99555°
LONG: -122.68973°
BENEFICIAL USE: IRRIGATION

(C) (E) 30'x60' (1,800 SF) METAL BARN

(D) (E) 1,250 GAL. SEPTIC TANK / LEACH FIELD

(E) (E) 5,000 METAL FIRE WATER STORAGE TANK

EXISTING CONDITIONS SITE PLAN

GRAPHIC SCALE

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

Revisions:

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

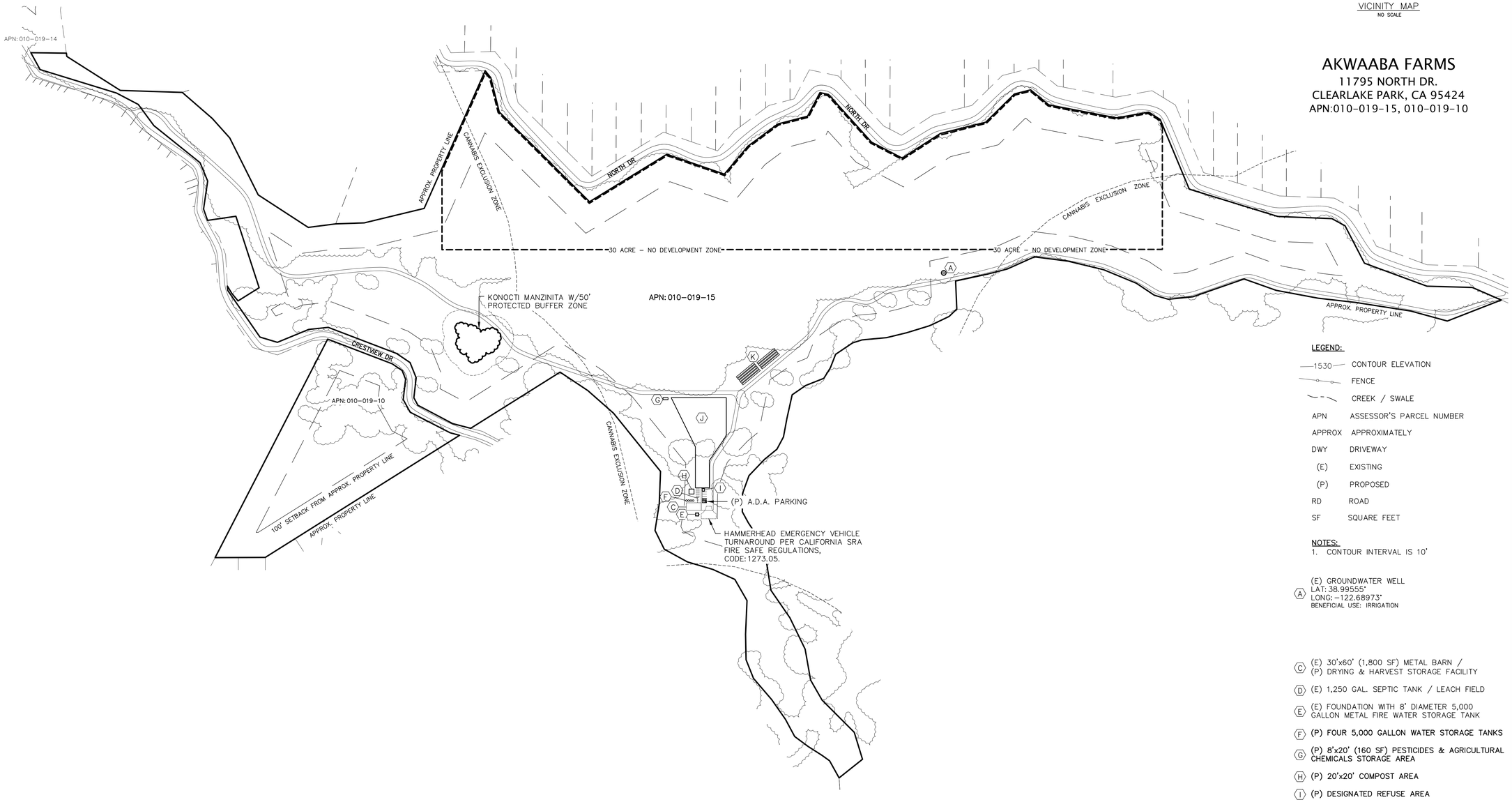
PLANS PREPARED UNDER THE SUPERVISION OF:

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

EXISTING CONDITIONS SITE PLAN

APN:010-019-15, 010-019-10 & 010-019-14
11795 NORTH DRIVE
CLEARLAKE, CA 95422
LAKE COUNTY

PLOTTED BY: ---
DATE PLOTTED: 6/01/21
SCALE OF DRAWING: SEE PLAN
JOB NUMBER:
CADD FILE:
SHEET: 1



VICINITY MAP
NO SCALE

AKWAABA FARMS

11795 NORTH DR.
CLEARLAKE PARK, CA 95424
APN:010-019-15, 010-019-10

LEGEND:

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

NOTES:
1. CONTOUR INTERVAL IS 10'

(A) (E) GROUNDWATER WELL
LAT: 38.99555°
LONG: -122.68973°
BENEFICIAL USE: IRRIGATION

(C) (E) 30'x60' (1,800 SF) METAL BARN / (P) DRYING & HARVEST STORAGE FACILITY

(D) (E) 1,250 GAL. SEPTIC TANK / LEACH FIELD

(E) (E) FOUNDATION WITH 8' DIAMETER 5,000 GALLON METAL FIRE WATER STORAGE TANK

(F) (P) FOUR 5,000 GALLON WATER STORAGE TANKS

(G) (P) 8'x20' (160 SF) PESTICIDES & AGRICULTURAL CHEMICALS STORAGE AREA

(H) (P) 20'x20' COMPOST AREA

(I) (P) DESIGNATED REFUSE AREA

(J) (P) 43,560 SF OUTDOOR CULTIVATION / CANOPY AREA

(K) (P) NINE 6'x90' (540 SF) MIXED-LIGHT CANOPY AREAS (LOW HOOPS)

PROPOSED CONDITIONS SITE PLAN- PHASE I

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

Revisions:

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

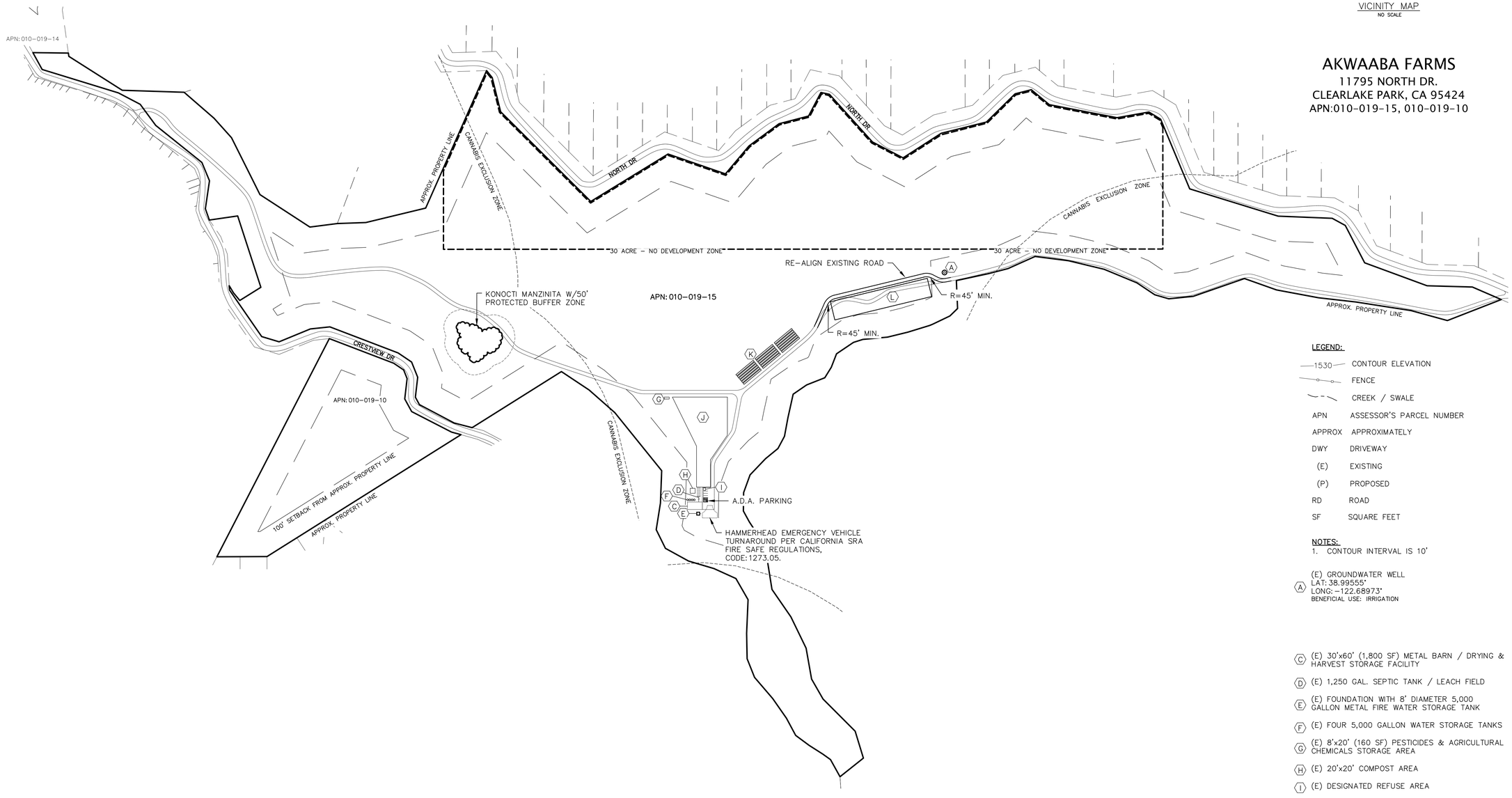
PLANS PREPARED UNDER THE SUPERVISION OF:

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

PROPOSED CONDITIONS SITE PLAN - PHASE I

APNs:010-019-15, 010-019-10 & 010-019-14
11795 NORTH DRIVE
CLEARLAKE, CA 95422
LAKE COUNTY

PLOTTED BY: ---
DATE PLOTTED: 6/01/21
SCALE OF DRAWING: SEE PLAN
JOB NUMBER:
CADD FILE:
SHEET: 1



VICINITY MAP
NO SCALE

AKWAABA FARMS

11795 NORTH DR.
CLEARLAKE PARK, CA 95424
APN:010-019-15, 010-019-10

LEGEND:

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

NOTES:
1. CONTOUR INTERVAL IS 10'

(A) (E) GROUNDWATER WELL
LAT: 38.99555°
LONG: -122.68973°
BENEFICIAL USE: IRRIGATION

(C) (E) 30'x60' (1,800 SF) METAL BARN / DRYING & HARVEST STORAGE FACILITY

(D) (E) 1,250 GAL. SEPTIC TANK / LEACH FIELD

(E) (E) FOUNDATION WITH 8' DIAMETER 5,000 GALLON METAL FIRE WATER STORAGE TANK

(F) (E) FOUR 5,000 GALLON WATER STORAGE TANKS

(G) (E) 8'x20' (160 SF) PESTICIDES & AGRICULTURAL CHEMICALS STORAGE AREA

(H) (E) 20'x20' COMPOST AREA

(I) (E) DESIGNATED REFUSE AREA

(J) (E) 43,560 SF OUTDOOR CULTIVATION / CANOPY AREA

(K) (P) EIGHTEEN 6'X90' (540 SF) MIXED-LIGHT CANOPY AREAS (LOW HOOPS)

(L) (P) 75'X400' (30,000 SF) OUTDOOR CULTIVATION / CANOPY AREA

PROPOSED CONDITIONS SITE PLAN- PHASE II

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

Revisions:

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

PLANS PREPARED UNDER THE SUPERVISION OF:
REGISTERED PROFESSIONAL ENGINEER
JASON B. VINE
No. 67800
EXP. 06/30/21
CIVIL
STATE OF CALIFORNIA

PROPOSED CONDITIONS SITE PLAN - PHASE II

APNs:010-019-15, 010-019-10 & 010-019-14
11795 NORTH DRIVE
CLEARLAKE, CA 95422
LAKE COUNTY

PLOTTED BY: ---
DATE PLOTTED: 6/01/21
SCALE OF DRAWING: SEE PLAN
JOB NUMBER:
CADD FILE:
SHEET: 1