

## Irrigation

From the CalCannabis Cultivation Licensing Program's Final Programmatic Environmental Impact Report (PEIR):

"According to Hammon et al. (2015), water use requirements for outdoor cannabis production (25-35 inches per year) are generally in line with water use for other agricultural crops, such as corn (20-25 inches per year), alfalfa (30-40 inches per year), tomatoes (15-25 inches per year), peaches (30-40 inches per year), and hops (20-30 inches per year). In a study of cannabis cultivation in Humboldt County, approximate water use for an outdoor cultivation site was 27,470 gallons (0.08 acre-feet) per year on average and ranged from approximately 1,220 to 462,000 gallons per year (0.004 to 1.4 acre-feet), with the size of the operation being a major factor in this range. Annual water uses for a greenhouse operation averaged approximately 52,300 gallons (0.16 acre-feet) and ranged from approximately 610 to 586,000 gallons (0.002 to 1.8 acre-feet) annually (Butsic and Brenner 2016). During a field visit conducted by technical staff to an outdoor cultivation site, one cultivator reported using approximately 75,000 gallons (0.23 acre-feet) for 1 year's entire cannabis crop (approximately 66 plants), or approximately 1,140 gallons per plant per year."

The proposed cultivation operation's cultivation practices are most similar to commercial heirloom tomato production with an estimated water use requirement of 25 inches per year. The total proposed cannabis cultivation area is 29,880 ft<sup>2</sup> with an expected total annual water use requirement of less than 1.43 acre-feet or 465,966 gallons. The following table presents the expected water use of the proposed cultivation operation by month during the cultivation season in acre-feet and thousands of gallons.

Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
0.05	0.05	0.1	0.1	0.1	0.15	0.2	0.2	0.15	0.15	0.1	0.05
16.3	16.3	32.6	32.6	32.6	48.8	65.2	65.2	48.8	48.8	32.6	16.3

Irrigation water for the proposed cultivation operation, will be pumped from the pond/water storage reservoir to eight proposed 5,000-gallon water storage tanks located within the proposed cultivation area, via an HDPE water supply line. The water storage tanks will be equipped with float valves to shut off the flow of water from the well and prevent the overflow and runoff of irrigation water when full. An HDPE water supply line will be run from the water storage tanks to the irrigation systems of each greenhouse within the proposed cultivation area. The water supply lines will be equipped with redundant safety valves, capable of shutting off the flow of water so that waste of water and runoff is prevented/minimized when leaks occur and the system needs repair. The irrigation system of the proposed cultivation area(s) will be composed of PVC piping, black poly tubing, drip tapes/lines, and micro-spray emitters. Supplemental irrigation may be applied when needed by hand using garden hoses.

## Water Conservation

Per the Water Conservation and Use requirements outlined in the SWRCB's Cannabis General Order, Vivian and her staff will implement the following Best Management Practices (BMPs) / 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
- Install float valves on all water storage tanks to keep them from overflowing onto the ground
- Use water conserving irrigation systems/methods, such as drip/trickle and micro-spray irrigation and hand watering, and never overwater the plants
- Document and maintain daily records of all water used by the proposed cannabis cultivation operation
- Install and maintain screens compliant with Fish and Game Code sections 6020-6028 on water pump intakes to prevent the entrainment of aquatic species

## Water Efficient Landscape Worksheet

### Section A. Hydrozone Information Table

Hydrozone	Plant Water Use Type(s)	Plant Factor (PF)	Hydrozone Area (HA) (ft <sup>2</sup> )	PF x HA (ft <sup>2</sup> )
Cultivation Area(s)	<sup>1</sup> Moderate/Medium	0.4- 0.6	29,880	11,952 – 17,928
Companion Herbs/Plants <sup>2</sup>	<sup>2</sup> Low	0-0.3	10,000	0 – 3,000

<sup>1</sup> Hops (*Humulus lupulus*) was used as an analog for Cannabis (Cannabis, Corn, Tomatoes, and Alfalfa are not listed in Water Use Classification of Landscape Species for the Clearlake Region)

<sup>2</sup> Lavender (*Lavandula spp.*) was used to represent the fragrant flowering and herb plants to be grown throughout cultivation operation

$$\text{MAWA} = (\text{ETo}) (0.62) [(0.7 \times \text{LA}) + (0.3 \times \text{SLA})]$$

MAWA = Maximum Applied Water Allowance (gallons per year)

ETo = Reference Evapotranspiration (inches per year)

0.62 = Conversion Factor (to gallons)

0.7 = ET Adjustment Factor (ETAF)

LA = Landscape Area including SLA (square feet)

0.3 = Additional Water Allowance for SLA

SLA = Special Landscape Area (square feet)

$$ETWU = (ET_o) (0.62) [(PF \times HA)/IE + SLA]$$

ETWU = Estimated Total Water Use per year (gallons)

ET<sub>o</sub> = Reference Evapotranspiration (inches)

PF = Plant Factor from Water Use Classification of Landscape Species

HA = Hydrozone Area [high, medium, and low water use areas] (square feet)

SLA = Special Landscape Area (square feet)

0.62 = Conversion Factor

IE = Irrigation Efficiency (Micro-spray Irrigation System Design Efficiency = 82%, Drip Irrigation System Design Efficiency = 88%)

$$MAWA = (45.4) (0.62) [(0.7 \times 39,880) + (0.3 \times 0)] = 785,780 \text{ gallons}$$

$$ETWU = (45.4) (0.62) [(20,928)/0.82 + 0] = 718,392 \text{ gallons}$$

The proposed cannabis cultivation operation has a Maximum Applied Water Allowance greater than its Estimated Total Water Use, per the Water Efficient Landscape Worksheet.

The anticipated water usage of the proposed cultivation operation is 465,966 gallons (not 718,392 gallons as estimated in the Water Efficient Landscape Worksheet), which is less than two-thirds of the Maximum Applied Water Allowance for the proposed cultivation operation.

### Monitoring and Reporting

Inline water meters, compliant with California Code of Regulations, Title 23, Division 3, Chapter 2.7, will be installed on the main water supply line running between the pond/water storage reservoir and the water storage tanks of the proposed cultivation area. Vivian and/or her staff will maintain daily water meter readings records for a minimum of five years, and will make those records available to Water Boards, CDFW, and Lake County staff upon request.

Additionally, each year the landowner must file a Report of Licensee to the State Water Resources Control Board's Division of Water Rights for the Project Property's Appropriate Water Right. The general public can view the annual reports submitted since 2009 online via the State Water Resources Control Boards eWRIMS (Electronic Water Rights Information Management System) website.

The proposed groundwater well will serve as a back-up water source for the proposed cultivation operation, in the event that water cannot or should not be taken from the intermittent Class II watercourse or pond/water storage reservoir. If the proposed cultivation operation needs to use water from the groundwater well, an HDPE water supply line will be run between the groundwater well and the water storage tanks of the proposed cultivation area.

An inline water meter, compliant with California Code of Regulations, Title 23, Division 3, Chapter 2.7, will be installed on the water supply line, and Vivian and/or her staff will maintain daily water meter readings records for a minimum of five years, and will make those records available to Water Boards, CDFW, and Lake County staff upon request.