



5/15/24

Re: Moriarty Holdings LLC; 6980 Cat Canyon Road, Property Crop Water Requirement Analysis.

Project Scope:

Determination of crop water requirement for South 5.19 acres proposed Moriarty Holdings LLC Cannabis production facility located at 6980 Cat Canyon Road, Los Alamos, CA 93440. APN: 101-070-069

Executive Summary:

Moriarty Holdings LLC crop water requirement usage for the above listed location will require a total annual water usage of 1.70-acre feet of water to produce 2 crop cycles, one (90-day) crop Cycle from March 1 through May 25th and a second cycle (120-day) from June 1 – September 15 per year. The usage rates are calculated using geographic location ETo data from a CIMIS weather Station near the above-mentioned property, calculated Crop Coefficient (Kc factor), and the time of year each crop cycle will be produced. The data is calculated based on the agriculture industry standards of ETc calculations using software developed by California State University Fresno's Center for Irrigation Technology (CIT).

I Eryn Gray, a licensed Certified Crop Advisor (CCA) through the American Society of Agronomy, has evaluated the data relative to this production site. I have implemented industry developed agronomic data to support the calculations of water needed to produce cannabis at the above-mentioned property. It is my professional opinion that based on the data used and my experience of 20 years developing irrigation requirements for crops, that the calculations for water requirements for this project are reasonable and supported by industry data and standards. Usage may vary due to climatic conditions year to year.



Growing Zone:

1. APN-101-070-069: The total land area amounts to 5.19 acres, with 4.15 acres dedicated to cultivation after accounting for roads and walkways. Considering the dimensions of the pots and the layout of plants within the hoops, the net area occupied by pots, where plants will be grown, is 0.83 acres.

Geographical Evapotranspiration (ET) Requirements

Evapotranspiration requirements used to understand the amount of ETo is in a geographical area. ETo is used to calculate the Evapotranspiration Crop requirement or (ETc), based on plant date and harvest dates.

CIMIS – Sisquoc – Central Coast Valley Station 165 was used to calculate the total area evapotranspiration (ETo-in) requirement.

The total ETo-in at station-165 is 47.12 inch per year in 2023.

California Irrigation Management Information System (CIMIS)

CIMIS Monthly Report

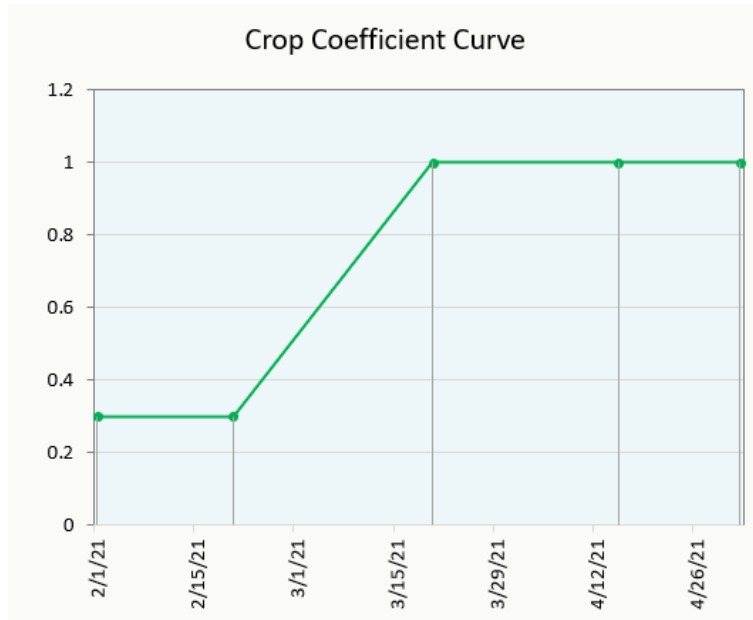
Rendered in ENGLISH Units.
 January 2023 - December 2023
 Printed on Wednesday, May 15, 2024

Sisquoc - Central Coast Valleys - Station 165

Month Year	Total ETo (in)	Total Precip (in)	Avg Sol Rad (Ly/day)	Avg Vap Pres (mBars)	Avg Max Air Temp (°F)	Avg Min Air Temp (°F)	Avg Air Temp (°F)	Avg Max Rel Hum (%)	Avg Min Rel Hum (%)	Avg Rel Hum (%)	Avg Dew Point (°F)	Avg Wind Speed (mph)	Avg Soil Temp (°F)
Jan 2023	1.64 K	0.00 K	232 K	9.4 K	60.6	39.9 K	49.6 K	93 K	56 K	77 K	42.4 K	3.6 K	53.4 K
Feb 2023	2.36 K	0.00	337 K	7.5 K	61.6 K	37.0	48.3 K	89	44	66 K	36.7 K	3.3 K	51.2
Mar 2023	3.02 K	0.00	398 K	10.0 K	60.2	41.1 K	50.2	95	59	79 K	43.8 K	3.5 K	53.6
Apr 2023	5.01 K	0.00	605 K	10.7	67.8	41.0	53.1	96	56	77	45.9	3.2 K	59.1
May 2023	4.83 K	0.00	549 K	12.4	68.6	47.6	56.4	95	59	79	50.1	2.7 K	65.3
Jun 2023	4.82 K	0.00	545 K	13.8	70.6	52.0 K	59.1	95	62	80	53.1	3.2 K	67.1
Jul 2023	6.87 K	0.01	687 K	15.3	79.5 K	52.4	64.1 K	96	52	75 K	55.9 K	3.1	71.8
Aug 2023	5.93 K	0.00	595 K	16.7	79.4 K	54.3	65.0 K	97 K	57 K	79	58.3	3.2 K	72.2 K
Sep 2023	3.95 K	0.00	428	15.6	76.0	52.2 K	62.2	97	60	82	56.5	3.2	70.2 K
Oct 2023	4.07 K	0.35 K	401	12.1 K	78.4 K	47.6 K	60.8 K	91	42	69 L	48.8 L	3.2	65.5
Nov 2023	2.81 K	1.87 K	302	8.6 K	73.7	43.6 K	56.8	83	31	55 K	39.3 K	3.2 K	62.0
Dec 2023	1.81 K	0.00	219	9.6 K	68.1 K	42.5 K	53.4 K	89	46	69 K	42.5 K	2.6 K	57.8 K
Tots/Avg	47.12	2.2	442	11.8	70.4	45.9	56.6	93	52	74	47.8	3.2	62.4

Crop Coefficient (Kc Values)

Most crop Kc values been established by the University of California Davis for all California crop types. The industry has not developed a Kc factor for Cannabis. This requires us to implement a Kc value based on crops that have a similar growing cycle and plant canopy architecture. Cotton is a crop that mimics the canopy crop architecture structure and has a similar crop cycle. The Kc Factor of Cotton at peak water requirement is 0.85. Due to unknowns, we have implemented a peak Kc factor of 1.0 to provide a conservative adjustment based on industry data.



Crop Evaporation Transpiration (ETc) Requirement:

Crop Evapotranspiration requirement (ETc) is calculated by using a Crop Coefficient Factor (Kc) and ETo. The Ministry of Agriculture and food, British Columbia recommends a ETc of 12–15-acre inches or 1 – 1.25-acre ft of water per crop cycle for Cannabis Sativa. The factor used when assessing the agronomic water requirement at any site for cannabis production. Ministry of Agriculture and Food, British Columbia. (September 1999) Specialty Crop Factsheet – Cannabis sativa. L

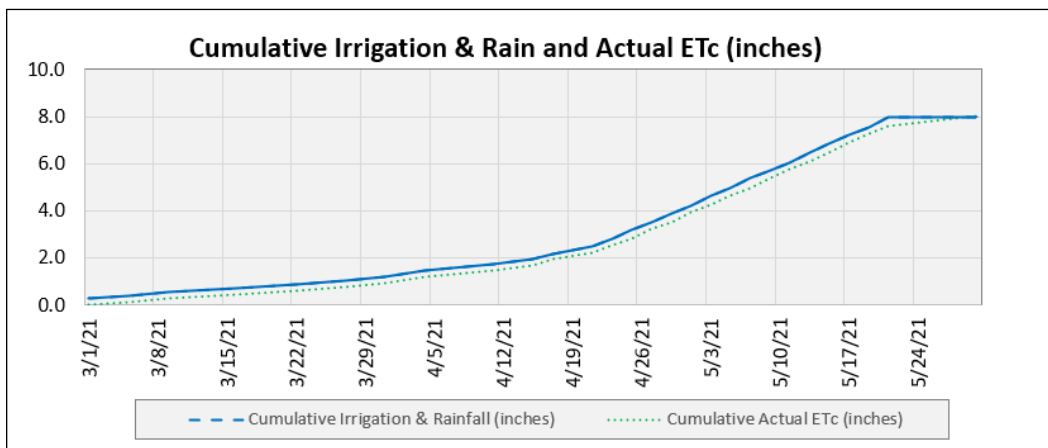
Daily ETo data from CIMIS station 165 and crop ETc is used to determine the total inches of water to be needed to produce a crop during a specific production window. Plant date, soil type, soil water holding capacity, and rooting depth are all factors used to develop total ETc requirements per crop cycle.

Water Usage:

Production Period 1st Crop Cycle March 1 – May 25 (90) Day Cycle:

1st Crop Cycle Growth Period: Estimated Plant Date 3/1, Estimated Harvest Date 5/25.

Cumulative ETc_1st Cycle: ETc is calculated at 8 inches (0.66 -acre ft /acre per cycle.)



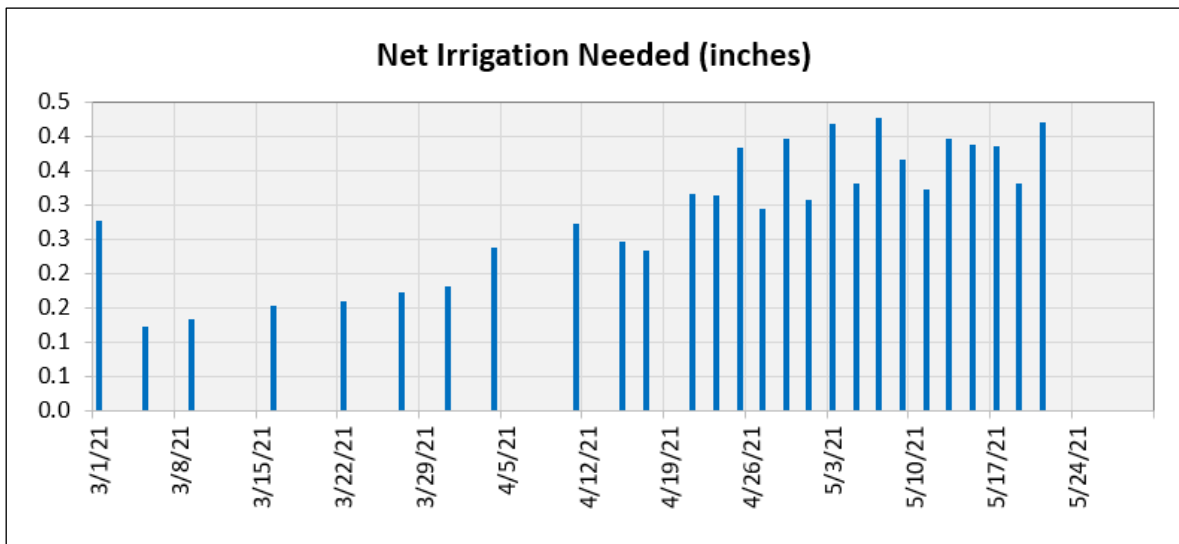


1st Crop Cycle - ETc Data Summary:

The total water requirements for the 1st Crop production cycle are as follows; 0.55-acre feet of water on 0.83 growing area acres. Which is 16% of total area.

1st Cycle March - May Production			
	<i>Physical Acres</i>	<i>Growing Acres</i>	
First Cycle	5.19	.83	
1 st Crop Cycle Water Requirement (ETc) Acre Ft			0.66
1st Crop Cycle Total Water Requirement 90 day growing period			0.55

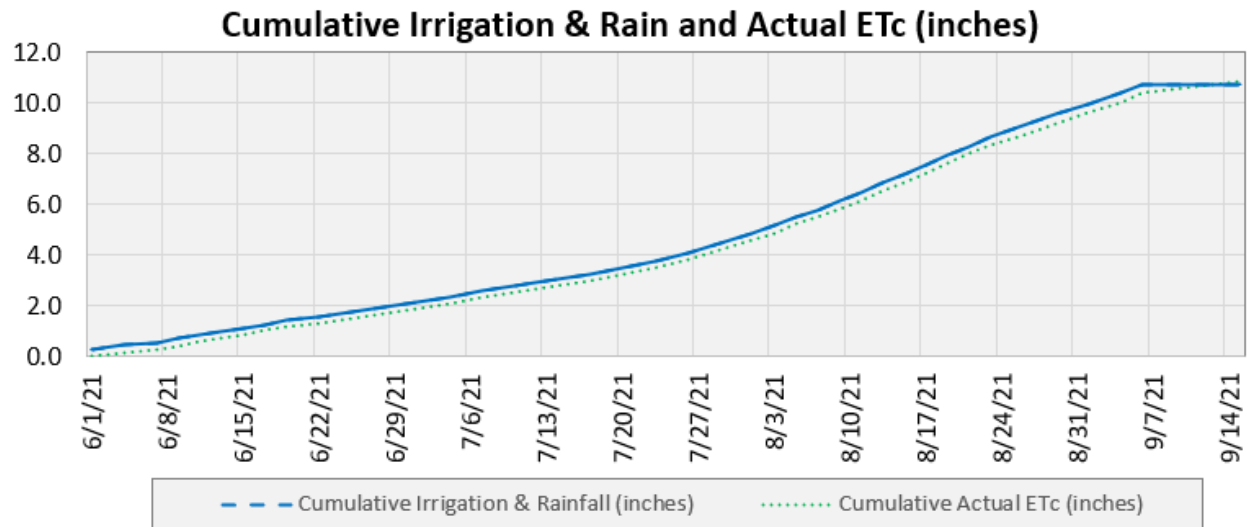
Net Irrigation Needed (Inches)



Production Period 2nd Crop Cycle Jun1 – Sep15 (120) days Cycle:

Summer Crop Growth Period: Estimated Plant Date 6/1, Estimated Harvest Date 9/15.

Cumulative ETc_2nd Crop Cycle: ETc is calculated at 10.7 inches (0.89-acre ft /acre per cycle.)

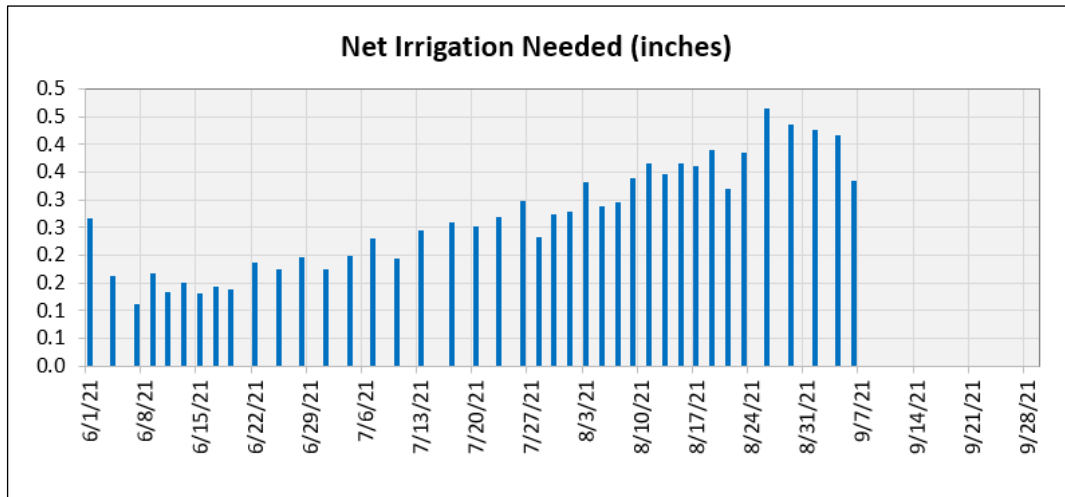


2nd Cycle ETc Data Summary:

The total water requirements for the 2nd production cycle are as follows; 0.73-acre feet of water on 0.83 growing area acres. Which is 16% of total area.

2nd Cycle June - Aug Production			
	<i>Physical Acres</i>	<i>Growing Area Acres</i>	
2 nd Cycle	5.19	0.83	
2 nd Cycle Water Requirements (ETc) Acre Ft			0.89
2 nd Cycle Total Water requirement 120-day Cycle			0.73

Net Irrigation Needed (Inches)



Total ETc Usage Requirements Summary:

Usage Requirement Summary	
1 st Crop Cycle Total ETc 90-day Cycle	0.55
2 nd Crop Cycle Total ETc 120-day Cycle	0.73
Landscape Water Use	0.42
Total Ac Feet	1.7
Total Acre Feet per total gross physical acre annually	0.33



Eryn Gray – Certified Crop Advisor (CCA#341161)
Agrosource Group
Principle Agronomist



Appendix A.

Landscape Irrigation.

136,239 gallons = 136,239/326,000 = 0.42-acre feet per year - AFPY

WATER EFFICIENT LANDSCAPE WORKSHEET

	SITE ADDRESS	6980 CAT CANYON ROAD					
	SITE TYPE	COMMERCIAL		ALLOWED ETAF:	0.45		
	ANNUAL ETO (INCHES/YEAR)	46.3					
HYDROZONE OR PLANTING DESCRIPTION	PLANT FACTOR (PF)	IRRIGATION METHOD	IRRIGATION EFFICIENCY (IE)	ETAF (PF/IE)	HYDROZONE (LANDSCAPED) AREA (SQFT)	ETAF X AREA	ESTIMATED TOTAL WATER USE - ETMU (GAL/YR.)
REGULAR LANDSCAPE AREAS							
7	0.2 (LOW)	DRIP	0.75	0.3	3,627	1,088	31,192
8	0.2 (LOW)	DRIP	0.75	0.3	7,299	2,190	62,771
9	0.2 (LOW)	DRIP	0.75	0.3	4,894	1,468	42,088
				SUBTOTALS	15,820	4,746	136,051
							136,051
							136,239
	ETAF CALCULATIONS						
	TOTAL ETAF X AREA	B =	4,746				
	TOTAL AREA	A =	15,820				
	AVERAGE ETAF		0.3				

**Landscape Irrigation uses data provided by design planning consultant for reference.