



DRAFT TECHNICAL MEMORANDUM

To: David Harde
Rodney Miller

Date: December 01, 2020

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Copies: Arron Mount (Planning)
Rania Serieh (AQMD)

Subject: Analysis of Odor at the Proposed Outdoor Cannabis Cultivation Located in
Somerset (El Dorado County), California

INTRODUCTION AND SUMMARY

Environmental Permitting Specialists (EPS) has completed its review of potential odors at your proposed outdoor cultivation premises in Somerset. The site is located at 6540 Perry Creek Road, in Somerset.

The maximum area for outdoor cultivation is approximately 1.5 acres (68,560 square feet). The distance between the cultivation areas and the property lines varies between 1,650 feet to 20 feet. A site map showing the cultivation areas and distances to the property lines is shown in Figure 1.

EPS used an air dispersion model, 1 year (2019) of hourly wind and temperature data at Somerset and on-site measurements of odor intensity at other locations to conduct this analysis. Data from 4 other outdoor cannabis and hemp cultivation facilities and one Tedlar bag sample were reviewed as part of the current analysis. Odor measurements taken at 0.75 acre outdoor cultivation site in Yolo County were used as baseline odors to predict odors at the property lines.

The results of our analysis indicate that maximum odor intensity along the property lines would range from 2.73 to 21.08 DT. Since there is a potential for odor intensity exceeding El Dorado

County's limit of 7 DT, EPS recommends the installation of an odor control system along a portion of the Southwestern property line to mitigate the odors. See Figure 8.

This Technical Memorandum presents the methodology, data and assumptions used in this analysis. These are described in detail below.

SCOPE AND METHODOLOGY OF ODOR ANALYSIS

The overall methodology used in this analysis is to use an atmospheric dispersion model to predict the dilution of odors as they migrate away from the outdoor cultivation area. By calculating the relative concentration of odors adjacent to the cultivation area and at the property line(s), we can determine the dilution ratio defined as odor concentration at the cultivation area divided by concentration at the property line(s).

For example, if the maximum concentration at the cultivation area is 5,000 micrograms per cubic meter (ug/m³) and the relative concentration at the property line 2,000 ug/m³, the dilution ratio would equal:

$$\text{Dilution Ratio} = \frac{5,000 \text{ ug/m}^3}{2,000 \text{ ug/m}^3} = 2.5$$

In other words, the odors would be diluted by a factor of 2.5 as they migrate from the cultivation area towards the property line.

The dilution factor is used along with measurements at other outdoor cannabis cultivation sites to predict odor intensity at property lines. This methodology was reviewed by the staff at El Dorado County Air Quality Management District (AQMD) to confirm that this approach would be acceptable. The District agreed with this approach as noted in their August 28, 2020 letter to Aaron Mount at El Dorado County Planning.

Modeling Methodology

We used the EPA and AQMD recommended AERMOD dispersion model (Version 19191) along with one year (2019) of hourly wind data for Somerset. The data (known as MM5) is derived from weather satellites to calculate winds and other parameters for all locations in the continental US. The data used was prepared by Lakes Environmental (Waterloo, Canada)¹.

The cultivation site was modeled as a single ground based area source. Concentrations were calculated using a 20 meter grid using an emission rate of 1.00×10^{-4} grams/sec-square meter. See Figure 7.

¹ Lakes Environmental. Waterloo, Canada. Information on the development of local wind data based on the MM5 for Somerset can be found at: https://www.weblakes.com/services/met_data.html#aermetmm5

The model results are concentrations in terms of micrograms per cubic meter at each grid location averaged over 1-hour. These concentrations are meaningful only in a relative sense to help establish the dilution pattern. It is recognized that the averaging time for odors is a few minutes, not 1 hour. Typically, peak concentrations over a few minutes are many times greater than those over 1 hour. However, the ratio of concentrations and the dilution factor will remain the same whether averaged over a few minutes or 1 hour averaging time.

Finally, we note that the maximum predicted concentration varies with both the distance and the direction from the cultivation site. Generally, the concentration decreases with distance from the cultivation site, however, since the canopy is modeled with a release height of 2 meters, the peak concentration occurs some distance from the canopy. Figures 4 and 5 illustrate the spatial distribution of 1-hour relative concentration. These figures show an East-West alignment of maximum odors.

Baseline Odor Used in the Analysis

We used odor measurements taken at a Yolo County outdoor cannabis site. This outdoor site covers 0.75 acres and is located at 22945 County Road 23, Esparto. At the time the measurements were taken, the plants were 2 weeks away from harvesting. Odor measurements were taken September 22, 2020 that indicated odor intensity of 15 DT. However, we noted that there were brief periods when odor intensity was above 15 but were not fully captured by the Nasal Ranger. We estimated the odor intensity to be closer to 20 DT and this is the value used in the current analysis. A complete documentation of the September 22nd odor survey is attached.

CALCULATION OF ODOR INTENSITY AND RESULTS

The calculation of odor intensity at the property lines is as follows:

$$\text{Odor Intensity at Property Line} = \frac{\text{Baseline Odor Intensity (DT)}}{\text{Dilution Factor}}$$

For example, the odor intensity at the Eastern property line (Figure 6) would equal:

$$\frac{20 \text{ DT}}{1.08} = 18.59$$

The results for the closest property lines is summarized on the next page.

Location	Distance to Property Line		Maximum Conc.	Conc. At Property Line	Lowest Dilution Ratio	Fenceline DT
Eastern Property Line	(ft) 20	(m) 6.1	1,764	1,640	1.08	18.59
North Property Line	550	167.7	17,617	3,619	4.87	4.11
Western Property Line	1250	381.1	17,617	3,926	4.49	4.46
Southern Property Line	250	76.2	17,617	2,407	7.32	2.73
Baseline DT	20					

The odor intensity at the Eastern property line would exceed the County's threshold of 7. As a result, odor mitigation along this property line is recommended. Concentration of odors at nearby homes are not expected to exceed 7 DT.

Once a permit has been issued and cannabis cultivation proceeds, EPS staff will be available to conduct odor monitoring at your property to confirm that odors do not exceed the County limit of 7 DT.

As a way of comparison of odors that are associated with other industries, the following table lists typical odor intensities within 500 feet from each industry. EPS has been involved in several studies related to odor measurements at different industries.

Industry	Type of Odor	Odor Intensity (DT)
Meat Rendering	Rotting Animal Smell	Above 180
Pulp and Paper	Sulfur Compounds	Above 180
Wastewater Treatment Plants	Hydrogen Sulfide	60 to 120
Dairies	Rotten Egg	120+
Landfills	Rotten Egg	60+
Composting Facilities	Ammonia/sulfur	60+

FIGURES

Figure 1: Site Map

Figure 2: Modeling Grid

Figure 3: Contours of Relative Concentrations

Figure 4: Contours of Relative Concentration (close-up)

Figure 5: Display of Numerical Concentration

Figure 6: Calculation of Dilution Factor

Figure 7: Summary of Results and Recommended Mitigation

Figure 1

PROPERTY DIAGRAM SITE PLAN

6540 Perry Creek Rd
Somerset CA 95667
Parcel 1 ID: 093-032-071-000
Lot 1 area: 57.29 Acres
Plot Size: 24"x36"

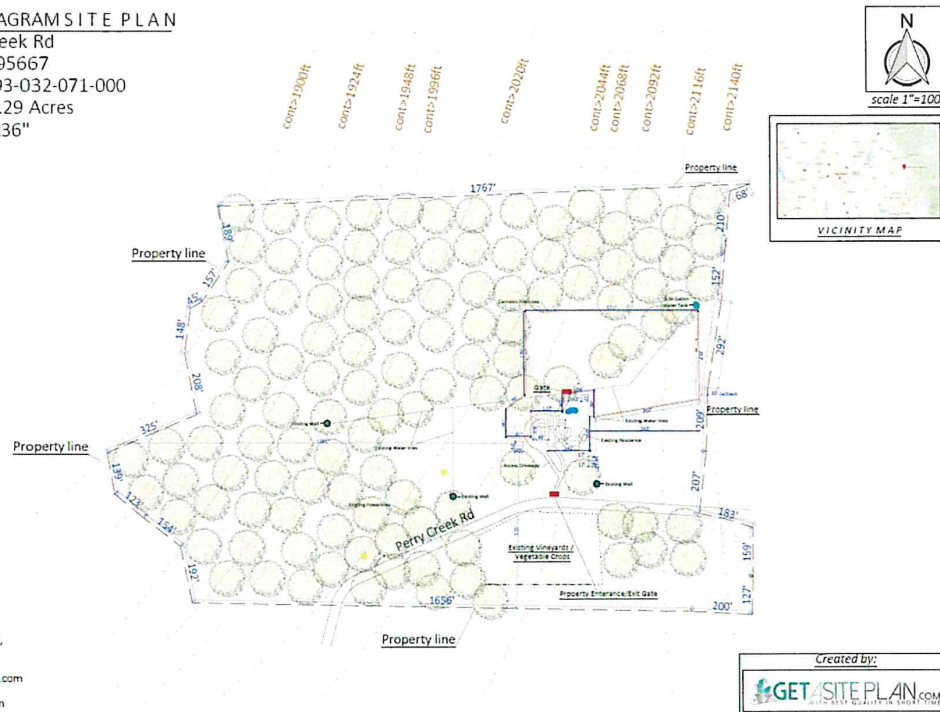


Figure 2
Modeling Grid

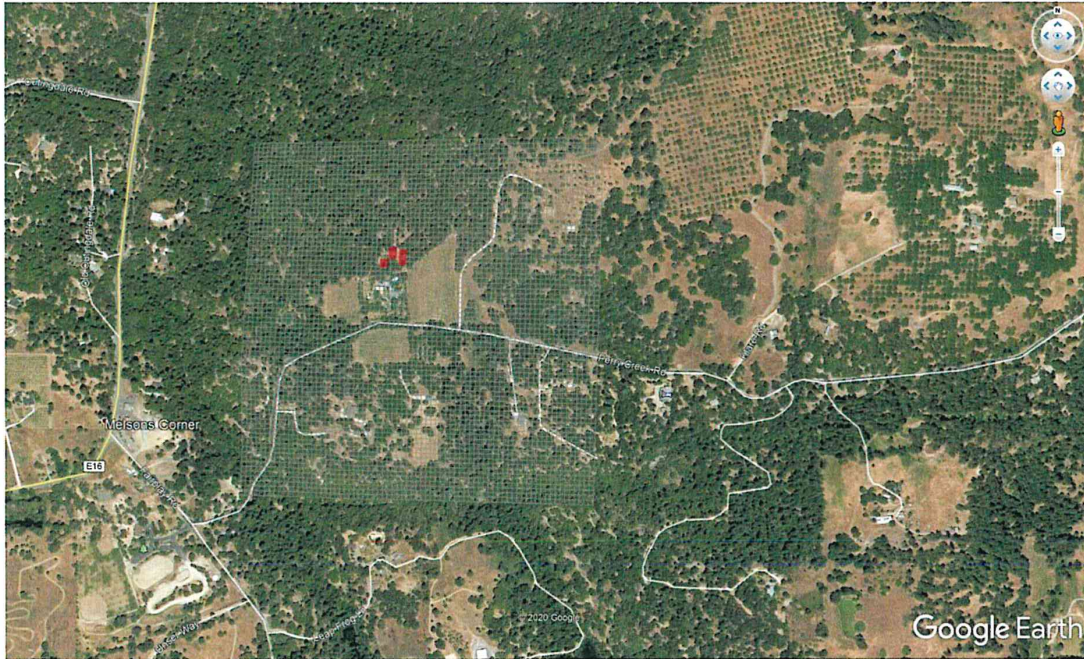


Figure 3

Contours of Relative 1-Hour Concentrations

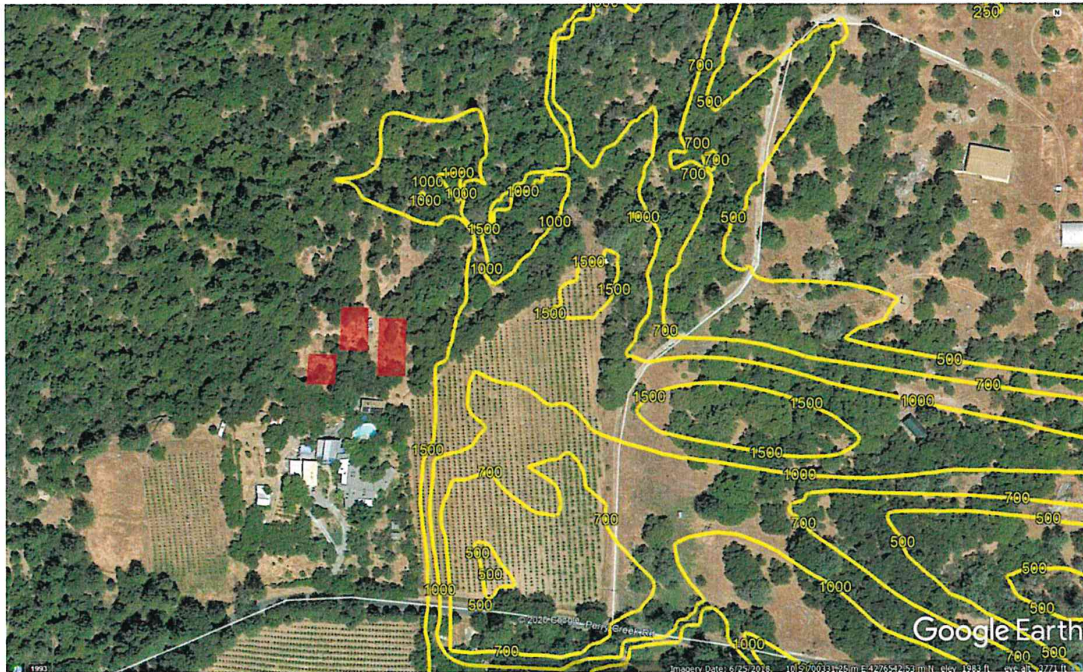


Figure 4

Contours of Relative Concentration (close-up)

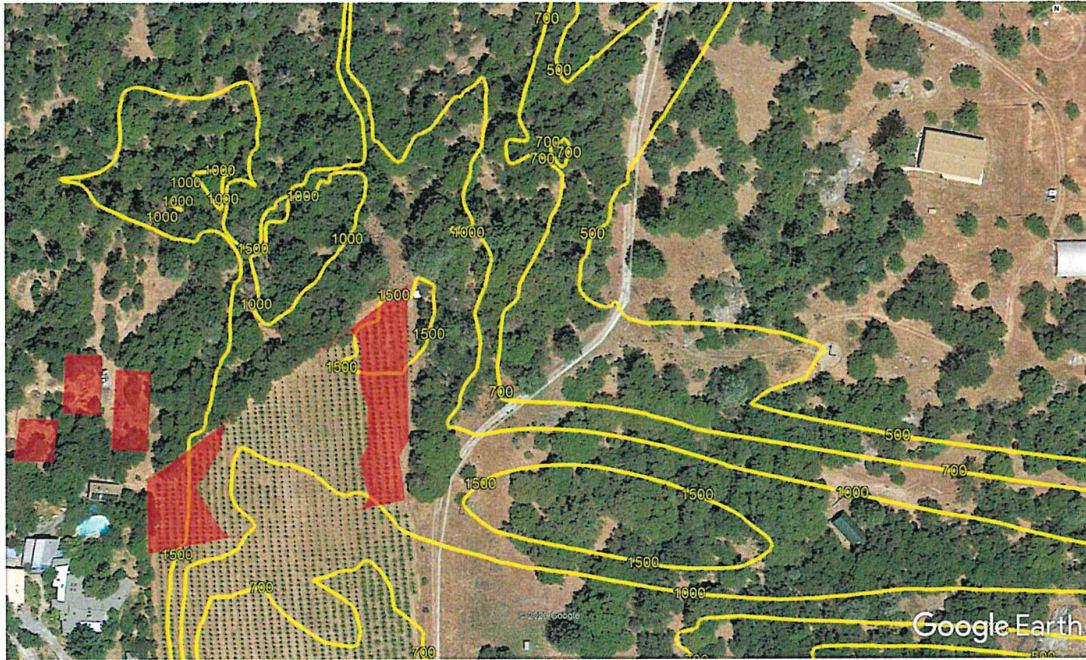


Figure 5

Numerical Values of Relative Concentration

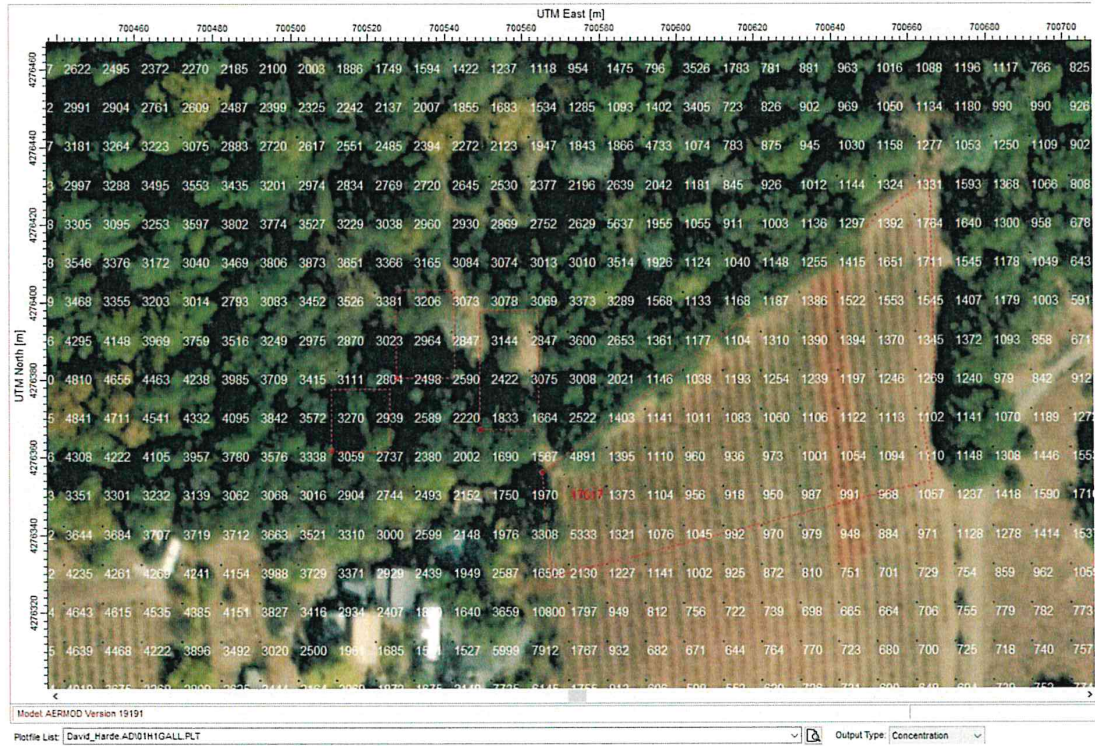


Figure 6

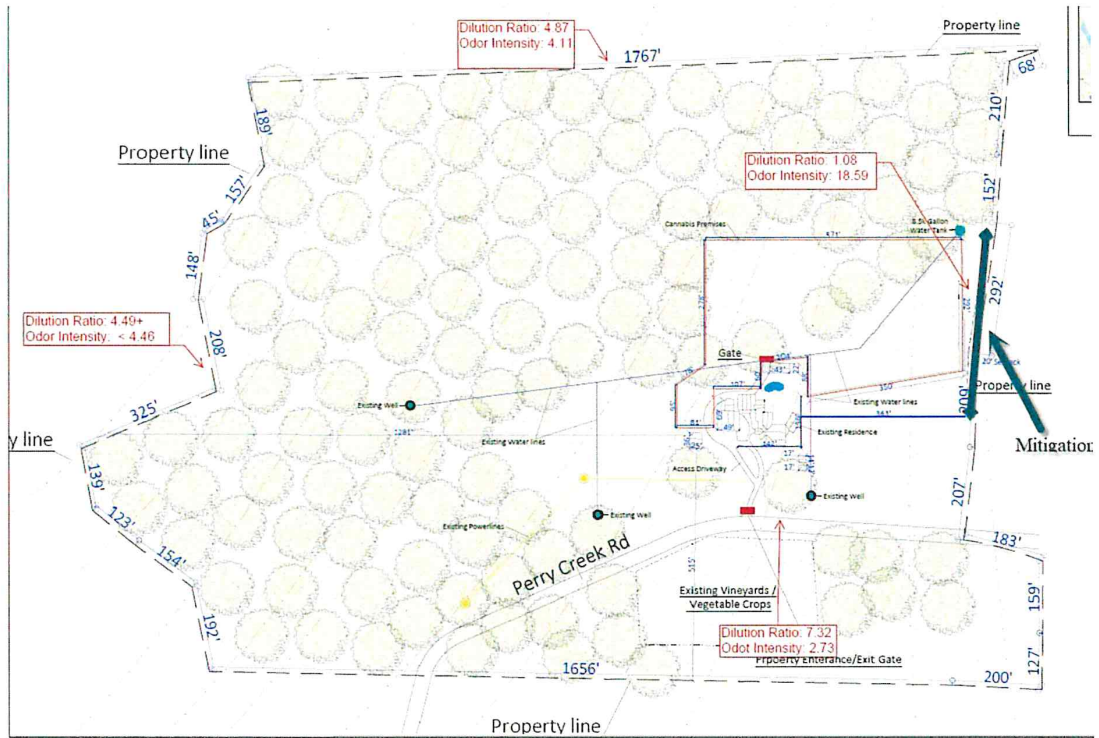
Sample Calculation of Dilution Factor at Eastern Property Line

Distance to Property Line 20 feet (6.1meters)



Figure 7

Summary of Results and Recommended Mitigation



ATTACHMENT

Yolo County Cannabis Site for Baseline Odor Measurements

September 22, 2020



COUNTY OF YOLO
CANNABIS TASK FORCE
120 W. Main Street, Suite C
Woodland, CA 95695
Telephone: (530) 406 4800

CULTIVATION LICENSE : PR0063595

LICENSE FOR CANNABIS CULTIVATION
NON-TRANSFERABLE

SUBJECT TO ALL CONDITIONS OF YOLO COUNTY CODE OF ORDINANCES TITLE 5, CHAPTER 20
THIS LICENSE MUST BE POSTED IN A CONSPICUOUS PLACE

CANNABIS CULTIVATION LICENSE

ISSUED TO:
CAPAY VALLEY INC

CONTACT:
CAPAY VALLEY INC
430 W CREEKSIDE CIR
DIXON, CA 95620

DATE OF ISSUE: 2/19/2020

DATE OF EXPIRATION: 12/31/2020

LOCATED AT:
22945 CR 23
ESPARTO, CA 95627

APN: 047-060-006

License Type: YEAR ROUND CULTIVATION LIC 1ST (1/4 ACRE)
Total Cultivation Area: 3/4 ACRE (32,670 sq ft)

General Conditions of approval of this Cannabis Cultivation License are listed below:

- Operations must comply with Yolo County's Ordinance on Marijuana Cultivation (Title 5, Chapter 20 of the Yolo County Code).
- This license supersedes Business License #12343 and is issued for cultivation only.
- Use of utilities and structures must be fully permitted under local authority.
- Licensee must maintain compliance with applicable requirements of the State Water Resources Control Board.
- Licensee must obtain and maintain in good standing a State license for cannabis cultivation.
- Licensees shall not commingle product with other cultivators or transfer marijuana to other cultivation sites, including a collocated site.
- This license constitutes a revocable privilege. Licensees have the burden of proving qualifications for a license at all times.
- Licensee shall permit Yolo County Staff the entry and inspection of all areas of the cultivation site.

Special Conditions:

Licensee must communicate to anyone coming on-site, including employees and contract labor, verbally and in writing through signage, that safe driving practices while traveling to and from the site must be followed.
Verified complaints on reckless driving may result in the issuance of a Notice of Violation.


Susan Strachan
Cannabis Policy and Enforcement Manager

Under federal and state law, compliance with disability access laws is a serious and significant responsibility that applies to all California building owners and tenants with buildings open to the public. You may obtain information about your legal obligations and how to comply with disability access laws at the following agencies: The Division of the State Architect at dvs.ca.gov/dsa/Home.aspx, The Department of Rehabilitation at rehab.caltwinst.org, and The California Commission on Disability Access at coda.ca.gov

Yolo County Dept. of Community Services Code Enforcement Unit 120 W. Main St. Ste. C Woodland, CA 95695 (530) 406-4800

6015.rpt





Odor Measurements

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Date	Time	Wind Speed	Wind Direction	Temp	Relative Humidity	Nasal Ranger Reading								
2	9/22/2020	9:45	(MPH)	(Dir From)	(F)	(%)	60	30	15	7	4	2	<2	ND	
3															
4	9/22/2020	9:55	INOP	INOP	79.1	55.6				X					
5	9/22/2020	9:58	INOP	INOP	79.5	54.6						X			
6	9/22/2020	10:00	INOP	INOP	81.3	52.4					X				
7	9/22/2020	10:10	INOP	INOP	80	47.6				X					
8	9/22/2020	10:12	INOP	INOP	78.8	48.7			X						
9	9/22/2020	10:15	INOP	INOP	81.3	45.9					X				
10	9/22/2020	10:16	INOP	INOP	81.3	44.8						X			
11	9/22/2020	10:17	INOP	INOP	81.4	43.5						X			
12	9/22/2020	10:18	INOP	INOP	81.4	42.9					X				
13															
14															
15															

Excerpts of Weather Data

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Location	22945 County Road 23, Esparto California														
2	Device Name	Kestrel 5500														
3	Device Model	KESTREL_5500L														
4	Serial Number	2486826														
5	FORMATTED DATE_TIN	Altitude	Dew Point	Density Altitude	Wind Chill	Direction - True	Headwind	Heat Stress Index	Crosswind	Wind Speed	Relative Humidity	Direction - Mag	Psychro	Wet Bulb	Temperature	Barometric Pressure
6	YY-MM-DD HH:MM:SS	ft	°F	ft	°F	°	mph	°F	mph	mph	%	°	°F	°F	°F	inHg
7	9/22/2020 10:15	291	65	2,057	82.8	***	***	84.9	***	0	55	***	70.5	29.69	82.8	29.69
8	9/22/2020 10:15	291	65.2	2,067	82.9	***	***	85.3	***	0	55.2	***	70.7	29.69	82.9	29.69
9	9/22/2020 10:15	291	65.4	2,080	82.9	***	***	85.3	***	0.9	55.2	***	70.7	29.69	83.1	29.69
10	9/22/2020 10:15	295	65.4	2,090	83.1	***	***	85.6	***	0	55	***	70.9	29.69	83.2	29.68
11	9/22/2020 10:15	291	65.6	2,095	83.3	***	***	86	***	0	55.4	***	71.1	29.69	83.3	29.68
12	9/22/2020 10:15	295	65.6	2,092	83.1	***	***	85.6	***	0	55.6	***	71.1	29.68	83.1	29.68
13	9/22/2020 10:16	295	64.5	2,040	82.4	***	***	84	***	0	54.6	***	70.2	29.69	82.5	29.68
14	9/22/2020 10:16	296	62.8	1,988	81.9	***	***	82.8	***	0	52.4	***	68.9	29.68	81.9	29.68
15	9/22/2020 10:16	296	61.3	1,963	81.7	***	***	82.2	***	0	50.1	***	68	29.68	81.7	29.68
16	9/22/2020 10:16	296	60.2	1,951	81.5	***	***	81.3	***	0	48.3	***	67.3	29.68	81.6	29.68
17	9/22/2020 10:16	296	59.4	1,928	81.3	***	***	81	***	0	47.4	***	66.9	29.68	81.4	29.68
18	9/22/2020 10:16	296	58.9	1,894	80.8	***	***	80.4	***	0	47.3	***	66.6	29.68	80.9	29.68
19	9/22/2020 10:16	295	58.4	1,837	79.9	***	***	79.3	***	0	47.6	***	65.8	29.68	80	29.68
20	9/22/2020 10:16	295	57.8	1,771	79	***	***	78.1	***	0	48.2	***	65.3	29.68	79.1	29.68
21	9/22/2020 10:16	296	57.8	1,753	78.6	***	***	77.9	***	0	48.7	***	65.1	29.68	78.8	29.68
22	9/22/2020 10:16	295	57.8	1,739	78.4	***	***	77.7	***	0	49	***	65.1	29.69	78.6	29.68
23	9/22/2020 10:16	291	58	1,746	78.6	***	***	77.9	***	0	49	***	65.1	29.69	78.7	29.68
24	9/22/2020 10:16	291	58.2	1,773	79	***	***	78.3	***	0	48.8	***	65.5	29.69	79.1	29.68
25	9/22/2020 10:16	291	58.4	1,798	79.5	***	***	79	***	0	48.5	***	65.7	29.69	79.5	29.69
26	9/22/2020 10:16	291	58.6	1,825	79.9	***	***	79.3	***	0	48.2	***	66	29.69	80	29.69
27	9/22/2020 10:16	288	58.8	1,852	80.2	***	***	79.7	***	0	47.9	***	66.2	29.69	80.3	29.69
28	9/22/2020 10:16	291	59	1,874	80.6	***	***	80.2	***	0	47.7	***	66.4	29.69	80.7	29.68
29	9/22/2020 10:16	295	59.2	1,891	80.8	***	***	80.4	***	0	47.7	***	66.6	29.69	80.9	29.68
30	9/22/2020 10:16	288	59.3	1,899	81	***	***	80.8	***	0	47.7	***	66.7	29.69	81.1	29.69
31	9/22/2020 10:16	253	59.5	1,867	81.1	***	***	81	***	0	47.8	***	66.9	29.73	81.2	29.73
32	9/22/2020 10:16	310	59.6	1,946	81.3	***	***	81.1	***	0	47.7	***	66.9	29.67	81.3	29.67
33	9/22/2020 12:15	321	59.6	1,963	81.3	***	***	81.1	***	0	47.6	***	66.9	29.66	81.4	29.65
34	9/22/2020 12:15	81	59.1	1,662	81.3	***	***	81	***	0	46.8	***	66.7	29.91	81.4	29.91
35	9/22/2020 12:15	56	58.4	1,625	81.3	***	***	80.6	***	0	45.7	***	66.4	29.94	81.4	29.94



Certificate of Completion

Richard Ensminger

Completed the "ODOR SCHOOL"® course

Nasal Ranger Inspector

Odor Assessment & Measurement for Ambient Odors

This course prepares the individual to make odor observations and investigations, to record pertinent information, and to report the data and findings to management or officials. (3.5TCH)



01/07/2020

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