2018
ANNUAL MONITORING NETWORK PLAN

SACRAMENTO METROPOLITAN
AIR QUALITY MANAGEMENT DISTRICT

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List of Abbreviations and Acronyms

$\mu g/m^3$	microgram per cubic meter
40 CFR	Title 40, Code of Federal Regulations
AAC Lab	Atmospheric Analysis and Consulting, Inc.
AADT	Annual average daily traffic
AGL	Above ground level
ANP	Annual network plan
ARM	Approved Regional Monitor
AQI	Air Quality Index
AQS	Air Quality System
BAM	Beta Attenuation Monitor
CAP III	California Alternative Plan III
CARB	California Air Resources Board
CBSA	Core-based Statistical Area
CSN	Chemical Speciation Network
CFR	Code of Federal Regulations
CO	Carbon Monoxide
District	Sacramento Metropolitan Air Quality Management District
DV	Design Value
ERG, Inc.	Eastern Research Group, Inc.
FEM	Federal Equivalent Method
FR	Federal Register
FRM	Federal Reference Method
m	Meter(s)
MSA	Metropolitan Statistical Area
NAAQS	National Ambient Air Quality Standards
NCore	National Core Multi-pollutant Monitoring Stations
NEI	National Emission Inventory
NMHC	Non-Methane Hydrocarbon
NO_2	Nitrogen Dioxide
NO_X	Oxides of Nitrogen
NO_Y	Reactive Oxides of Nitrogen
O_3	Ozone
PAMS	Photochemical Assessment Monitoring Station
Pb	Lead

PM	Particulate Matter
$PM_{2.5}$	Particulate Matter with size of 2.5 micrometers or smaller
PM_{10}	Particulate Matter with size of 10 micrometers or smaller
PM_{Coarse}	Particulate Matter with size between 10 and 2.5 micrometers
ppb	Parts per Billion
ppm	Parts per Million
PQAO	Primary quality assurance organization
PWEI	Population weighted emission index
QA	Quality Assurance
QC	Quality Control
RASS	Radio acoustic sounding system
RTI	Research Triangle Institute
RWP	Radar wind profiler
SACDOT	Sacramento County Department of Transportation
Sac Metro Air District	Sacramento Metropolitan Air Quality Management District
SASS	Speciated Air Sampling System
SCC	Sacramento City Code
SIP	State Implementation Plan
SLAMS	State and Local Air Monitoring Stations
SO_2	Sulfur Dioxide
SODAR	Sonic detection and ranging (instrument)
SPM	Special Purpose Monitoring
STN	Speciation Trends Network
TAPI	Teledyne Advanced Pollution Instrumentation
TEI	Thermo Environmental Instruments
TEOM	Tapered Element Oscillating Microbalance
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds
VSCC	Very Sharp Cut Cyclone

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Section 1 Introduction

State and local agencies that conduct ambient air monitoring for regulatory purposes are required by Title 40, Code of Federal Regulations (40 CFR), Part 58.10 to submit an Annual Network Plan (ANP) to the United States Environmental Protection Agency (U.S. EPA) no later than July 1st of each year. The report must contain specific monitoring network information and must be presented for a 30-day public review period prior to submittal to the U.S. EPA. This ANP was posted on Sacramento Metropolitan Air Quality Management District's ('Sac Metro Air District's' or 'District's') website for public review and comment from May 25, 2018 through June 25, 2018. No comment was received. This ANP covers the period from: January 1, 2017 – December 31, 2017. It focuses on the monitors that operate within Sacramento County, which is a part of Sacramento-Arden Arcade-Roseville Metropolitan Statistical Area (Sacramento MSA).

The primary purpose of this ANP is to document the existing Sacramento County air monitoring network and to discuss proposed changes in the ambient air monitoring network that may occur within 18 months following the submittal of this report. The plan includes information on monitors that are a part of State and Local Air Monitoring Stations (SLAMS) network, National Core Multi-pollutant Monitoring Stations (NCore), Chemical Speciation Network (CSN), Speciation Trends Network (STN), Special Purpose Monitor (SPM) sites, and Photochemical Assessment Monitoring Station (PAMS) network. The plan states whether each monitor in the ambient air monitoring network meets the requirements of 40 CFR Part 58, including Appendix A, C, D, and E, where applicable. 40 CFR 58, Appendix B, does not apply to the District's monitoring network because the District does not operate any air monitors regulated by Appendix B, which pertains only to Prevention of Significant Deterioration monitors. This report includes Federal Reference Method (FRM) and Federal Equivalent Method (FEM).

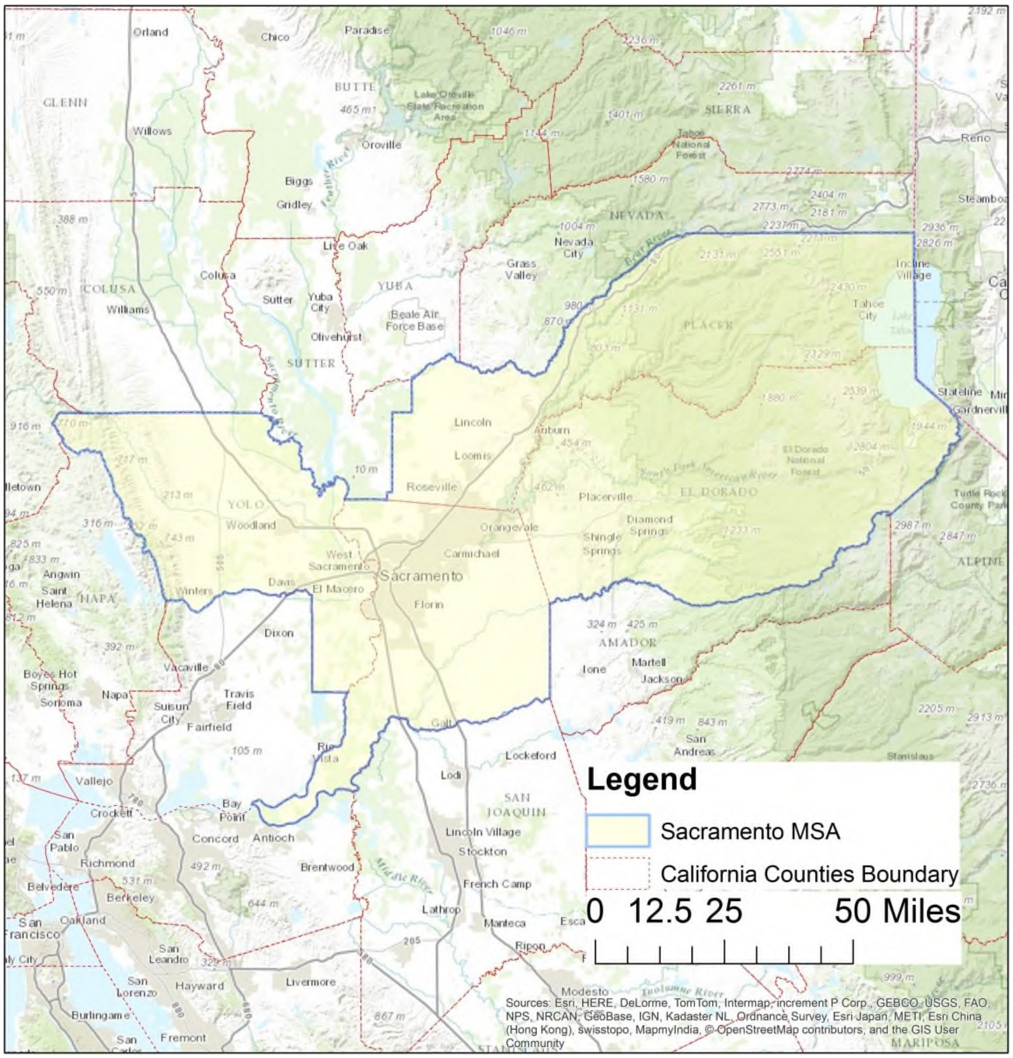
This report is not an extensive analysis of the design of the local air monitoring network. The extensive analysis of the air monitoring network is provided in a network assessment report, which is required every five years. The network assessment report analyzes and determines if the air monitoring network meets the monitoring objectives as defined in 40 CFR Part 58, Appendix D. It also provides recommendations to determine "whether new sites are needed, whether existing sites are no longer needed and can be terminated, and whether new technologies are appropriate for incorporation into the ambient air monitoring network" (40 CFR 58.10). The most recent network assessment report (2015 Air Monitoring Network Assessment) was completed and submitted to U.S. EPA Region 9 on April 22, 2016. The report is available on the District's website at http://www.airquality.org/Air-Quality-Health/Air-Monitoring.

Any shared monitoring responsibilities between the District and neighboring monitoring organizations in the Sacramento MSA are discussed in Section 3, Minimum Monitoring Requirement. For details on monitors in neighboring counties within the Sacramento MSA, please refer to the latest Annual Monitoring Network Plan published by California Air Resources Board (CARB).

Section 2 Network Operations

Sac Metro Air District is the local regulatory air quality agency that is responsible for routine air quality surveillance for Sacramento County. Sacramento County is located in the middle of California's Central Valley and is a part of the Sacramento-Arden Arcade-Roseville Metropolitan Statistical Area. Sacramento MSA also includes Placer, El Dorado and Yolo Counties. Sacramento MSA has an estimated population of 2.3 million, including 1.5 million in Sacramento County. It ranks 27th in population among other MSA in the United States[1]. Figure 2-1 shows a map of Sacramento MSA.

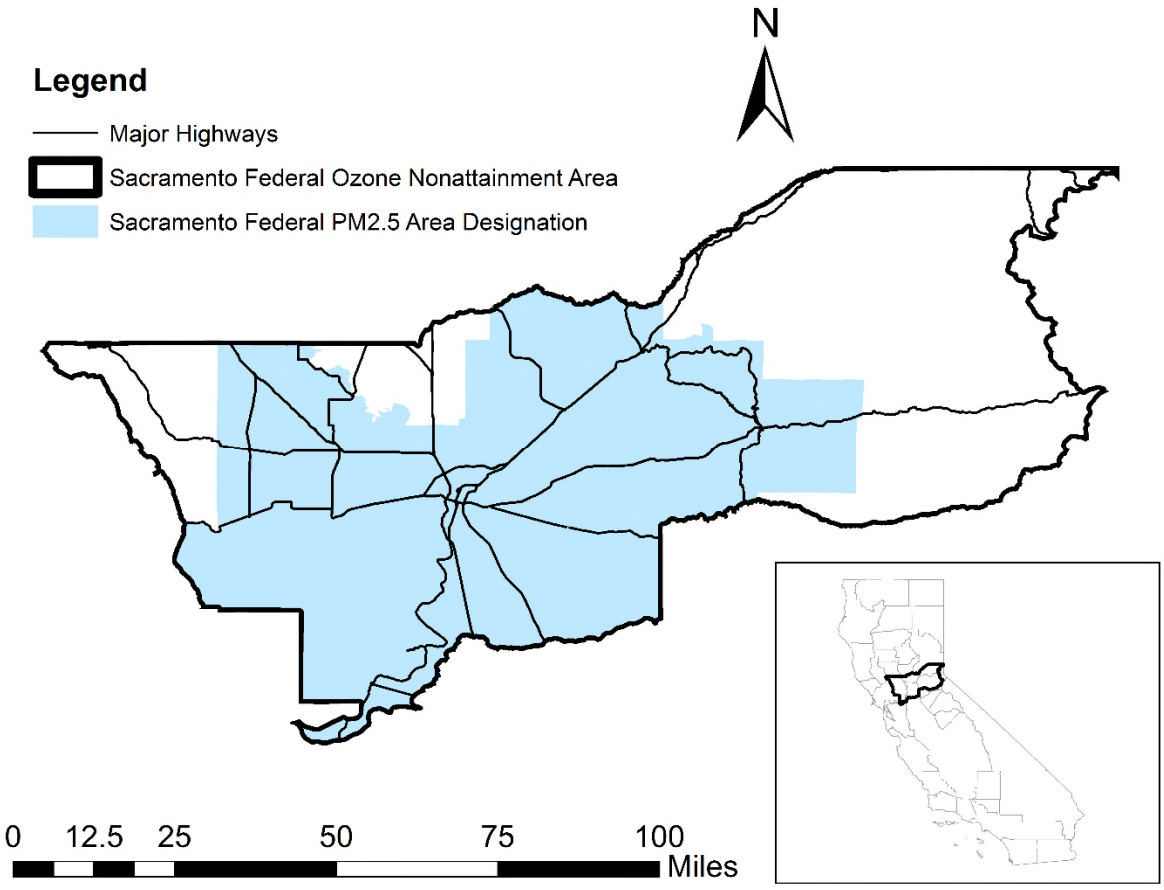
Figure 2-1 Counties within Sacramento-Arden Arcade-Roseville, California, MSA



[1] United States Census Bureau, Population Division, 2017 Population Estimates

A portion of the Sacramento MSA is a nonattainment area for the federal 2015 8-hr ozone (O_3) standard and is referred to as the Sacramento Federal Ozone Nonattainment Area[2]. This area includes all of Sacramento and Yolo Counties and portions of Placer, El Dorado, Solano, and Sutter Counties. The Sacramento region was also designated as nonattainment for the 2006 24-hour particulate matter with size of 2.5 microns or smaller ($PM_{2.5}$) standard (Figure 2-2). The region met the 2006 24-hour $PM_{2.5}$ standard in 2015 (82 FR 21711) and will continue to reduce $PM_{2.5}$ levels through various programs and strategies. Sacramento County has met the particulate matter with size of 10 microns or smaller (PM_{10}) air quality standard since 2002. Sacramento County is designated attainment for the most recent federal health standards for carbon monoxide (CO), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2). U.S. EPA has designated Sacramento County as unclassifiable/attainment for the 2008 federal lead (Pb) standard[3].

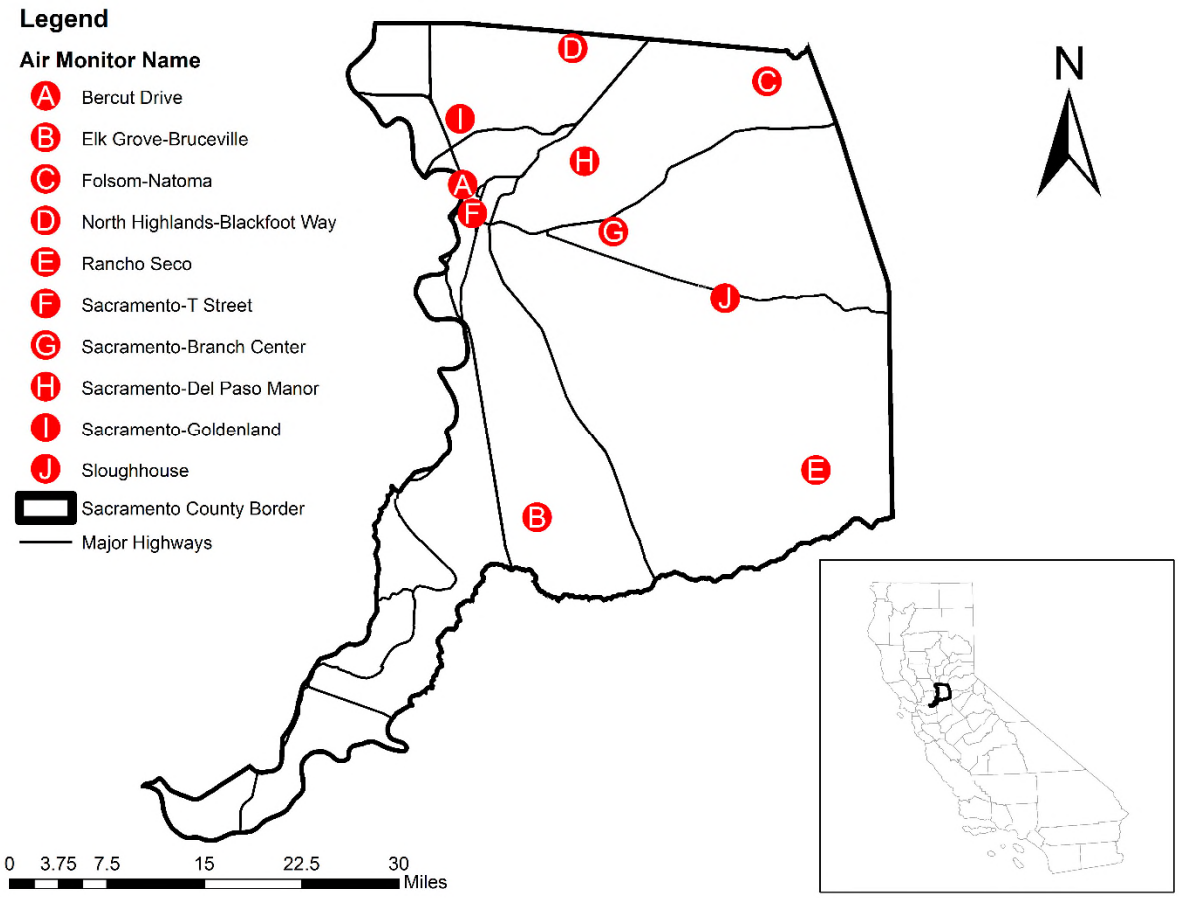
Figure 2-2 Sacramento Federal O_3 and $PM_{2.5}$ Nonattainment Area



[2] https://www.epa.gov/sites/production/files/2018-04/documents/placeholder.pdf
[3] https://www.epa.gov/lead-designations/lead-designations-final-nonattainment-designations-rounds-1-and-2; 70 FR 72097

Sac Metro Air District operates eight air monitoring sites within Sacramento County with CARB operating the ninth site at the Sacramento-T Street location. Sacramento-Goldenland Ct air monitoring station ('I' in Figure 2-3) was discontinued in May 2017. Figure 2-3 provides the location of air monitoring sites in Sacramento County.

Figure 2-3 Air Monitoring Sites in Sacramento County



Sac Metro Air District monitors all criteria air pollutants as designated by the U.S. EPA. The District also monitors for non-criteria air pollutants and meteorological parameters. Tables 2-1 through 2-3 list the criteria pollutants, non-criteria pollutants and meteorological parameters measured at each station located in Sacramento County. Each monitoring instruments is categorized by monitor types: SLAMS or SPM. The instruments can be further sub-divided into one or more network affiliations (e.g. PAMS, NCore, near-road, CSN STN). Tables 2-4 through 2-7 identify the monitor type and network affiliation at each air monitoring site.

Table 2-1 Criteria Pollutants Measured by Stations

	O_3	CO	NO_2	SO_2	Pb	PM_{10} Hourly	PM_{10} 24-Hr	$PM_{2.5}$ Hourly	$PM_{2.5}$ 24-Hr
Sacramento-Bercut Dr.		✓	✓						✓
Sacramento-Branch Center #2							✓		
Elk Grove-Bruceville Rd.	✓		✓					✓	
Sacramento-Del Paso Manor	✓	✓	✓	✓	✓		✓	✓	✓
Folsom-Natoma St.	✓		✓					✓	
Sacramento-Goldenland Ct.[4]	✓	✓	✓				✓		
North Highlands-Blackfoot Way	✓	✓	✓				✓		
Rancho Seco								✓	
Sloughhouse	✓							✓	
Sacramento-T Street	✓		✓			✓		✓	✓

Table 2-2 Non-Criteria Pollutants Measured by Stations

	Reactive Nitrogen Compound (NO_Y)	Non-methane hydrocarbon (NMHC)	Volatile Organic Compound (VOC)	Carbonyl	$PM_{10-2.5}$	Speciated $PM_{2.5}$	Black Carbon (BC)
Sacramento-Bercut Dr.							✓
Sacramento-Branch Center #2							
Elk Grove-Bruceville Rd.		✓	✓				
Sacramento-Del Paso Manor	✓	✓	✓	✓	✓	✓	✓
Folsom-Natoma St.	✓	✓	✓				
Sacramento-Goldenland Ct.[4]		✓					
North Highlands-Blackfoot Way							
Rancho Seco							
Sloughhouse							
Sacramento-T Street						✓	

Table 2-3 Meterology Measured by Stations

	Outdoor Temperature	Relative Humidity	Solar Radiation	Ultraviolet Radiation	Barometric Pressure	Precipita-tion	Wind Direction & Speed
Sacramento-Bercut Dr.	✓						✓
Sacramento-Branch Center #2							
Elk Grove-Bruceville Rd.	✓	✓	✓	✓	✓	✓	✓
Sacramento-Del Paso Manor	✓	✓	✓				✓
Folsom-Natoma St.	✓	✓	✓				✓
Sacramento-Goldenland Ct.[5]	✓	✓	✓				✓
North Highlands-Blackfoot Way							
Rancho Seco							
Sloughhouse							✓
Sacramento-T Street							✓

[4] This station was discontinued at the end of May 2017

Table 2-4 Monitor Type of Criteria Pollutants

	O_3	CO	NO_2	SO_2	Pb	PM_{10} Hourly	PM_{10} 24-Hr	$PM_{2.5}$ Hourly	$PM_{2.5}$ 24-Hr
Sacramento-Bercut Dr.		SLAMS	SLAMS						SLAMS
Sacramento-Branch Center #2							SLAMS		
Elk Grove-Bruceville Rd.	SLAMS		SLAMS					SLAMS	
Sacramento-Del Paso Manor	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS		SLAMS	SLAMS	SLAMS
Folsom-Natoma St.	SLAMS		SLAMS					SLAMS	
Sacramento-Goldenland Ct.[4]	SLAMS	SLAMS	SLAMS				SLAMS		
North Highlands-Blackfoot Way	SPM	SPM	SPM				SLAMS		
Rancho Seco								SPM	
Sloughhouse	SLAMS							SLAMS	
Sacramento-T Street	SLAMS		SLAMS			SLAMS		SLAMS	SLAMS

Legend:
SLAMS – State/Local Air Monitoring Stations
SPM – Special Purpose Monitor

Table 2-5 Monitor Type of Non-criteria Pollutants

	NO_Y	NMHC	VOC	Carbonyl	$PM_{10-2.5}$	Speciated $PM_{2.5}$	BC
Sacramento-Bercut Dr.							SLAMS
Sacramento-Branch Center #2							
Elk Grove-Bruceville Rd.		SLAMS	SLAMS				
Sacramento-Del Paso Manor	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS	SPM
Folsom-Natoma St.	SLAMS	SLAMS	SLAMS				
Sacramento-Goldenland Ct.[5]		SLAMS					
North Highlands-Blackfoot Way							
Rancho Seco							
Sloughhouse							
Sacramento-T Street						SLAMS	

Legend:
SLAMS – State/Local Air Monitoring Stations
SPM – Special Purpose Monitor

[5] This station was discontinued at the end of May 2017

Table 2-6 Network Affiliation of Criteria Pollutants

	O_3	CO	NO_2	SO_2	Pb	PM_{10} Hourly	PM_{10} 24-Hr	$PM_{2.5}$ Hourly	$PM_{2.5}$ 24-Hr
Sacramento-Bercut Dr.		NR	NR						NR
Sacramento-Branch Center #2							NA		
Elk Grove-Bruceville Rd.	PAMS		PAMS					NA	
Sacramento-Del Paso Manor	NCORE PAMS	NCORE PAMS	NCORE PAMS	NCORE	NCORE		NA	NCORE	NCORE
Folsom-Natoma St.	PAMS		PAMS					NA	
Sacramento-Goldenland Ct.[4]	NA	NA	NA			NA	NA		
North Highlands-Blackfoot Way	NA	NA	NA				NA		
Rancho Seco								NA	
Sloughhouse	NA							NA	
Sacramento-T Street	NA		NA			NA		NA	NA

Legend:
NA – No affiliation
NCore – National Core Multi-pollutant Network
NR – Near-road
PAMS – Photochemical Assessment Monitoring Station

Table 2-7 Network Affiliation of Non-criteria Pollutants

	Reactive Nitrogen Compound	Non-methane hydrocarbon	Volatile Organic Compound	Carbonyl	$PM_{10-2.5}$	Speciated $PM_{2.5}$	Black Carbon
Sacramento-Bercut Dr.							NR
Sacramento-Branch Center #2							
Elk Grove-Bruceville Rd.		PAMS	PAMS				
Sacramento-Del Paso Manor	NCORE	PAMS	PAMS	PAMS	NCORE	CSN NCORE	NA
Folsom-Natoma St.	PAMS	PAMS	PAMS				
Sacramento-Goldenland Ct.[6]		PAMS					
North Highlands-Blackfoot Way							
Rancho Seco							
Sloughhouse							
Sacramento-T Street						CSN	

Legend:
CSN – Chemical Speciation Network
NA – No affiliation
NCore – National Core Multi-pollutant Network
NR – Near-road
PAMS – Photochemical Assessment Monitoring Station

[6] This station was discontinued at the end of May 2017

The primary focus of the current ambient air monitoring network is the data collection of criteria pollutants. The data collected from the air monitoring stations supports State Implementation Plan (SIP) development, attainment/nonattainment decisions, public notification, and air quality modeling and research efforts. The network is designed to meet three basic monitoring objectives as required by 40 CFR Part 58, Appendix D: (1) provide air pollution data to the general public in a timely manner; (2) support compliance with ambient quality standards and emissions strategy development; and (3) support air pollution research studies. An overview of monitoring objectives is in Table 2-8.

Table 2-8 Monitoring Objective of Criteria Pollutants

	O_3	CO	NO_2	SO_2	Pb	PM_{10}	$PM_{2.5}$
Sacramento-Bercut Dr.		N, P, R	N, P, R				N, P, R
Sacramento-Branch Center #2						N, P	
Elk Grove-Bruceville Rd.	N, P		N, P				P
Sacramento-Del Paso Manor	N, P, R	N, P, R	N, P, R	N, P, R	N, P, R	N, P, R$^{(A)}$	N, P, R
Folsom-Natoma St.	N, P		N, P				N, P, R
Sacramento-Goldenland Ct.[7]	N, P	N, P	N, P			N, P	
North Highlands-Blackfoot Way	N, R	N, R	N, R			N, P	
Rancho Seco							P, R
Sloughhouse	N, P						N, P, R
Sacramento-T Street	N, P		N, P			N, P	N, P

$^{(A)}$There are three PM_{10} monitors at Sacramento-Del Paso Manor; the primary monitor for NAAQS comparison and its collocated (audit) monitor with parameter code 88102 have objectives of N, P; the last PM_{10} monitor with parameter code 85101, used in the calculation of Particulate Matter with size between 10 and 2.5 micrometers (PM_{Coarse}), has objectives of P, R.

Monitoring objective abbreviation:

N – National Ambient Air Quality Standards (NAAQS) Comparison

P – Public Info

R – Research

There are different types of monitoring sites to support these monitoring objectives. Examples of these are: sites that are located in highest pollutant concentration area, sites that are located in area of high population density to monitor for population exposure, sites that determines general background concentration levels, etc. A list of different types of monitoring sites is listed in 40 CFR Part 58, Appendix D. In addition, a spatial scale of representative is assigned to the air monitors to identify "the link between general monitoring objectives, sites types and the physical location of a particular monitor" (40 CFR Part 58, Appendix D). Tables 2-9 and 2-10 summarize the site type and spatial scale. Description and further explanation on site type and spatial scale can be found in 40 CFR Part 58, Appendix D.

For in-depth details on individual monitors, see Appendix A, Detailed Site Information. Appendix A documents the monitor type, affiliation, monitoring objectives, type of site, and spatial scale by each monitor. It also provides a statement of purpose and pollutant specific information, such as whether a PM2.5 monitor is suitable for comparison to the national ambient air quality standard, 1-point quality control (QC) check frequency and distance to other PM monitors.

[7] This station was discontinued at the end of May 2017

All monitors operated in the District's ambient air monitoring network meet the requirements of 40 CFR Part 58, including Appendices A, C, D, and E, except for the $PM_{2.5}$ monitor at Rancho Seco. This monitor is a special purpose monitor but is not a FRM, FEM, or Approved Regional Monitor (ARM) monitor; it is not subject to requirements in Appendix A to 40 CFR Part 58.

Table 2-9 Type of Site

	O_3	CO	NO_2	SO_2	Pb	PM_{10}	$PM_{2.5}$	BC
Sacramento-Bercut Dr.		SO	SO				SO	SO
Sacramento-Branch Center #2						HC		
Elk Grove-Bruceville Rd.	UB		UB				GB	
Sacramento-Del Paso Manor	PE	PE	PE	PE	PE	PE	PE, HC	PE
Folsom-Natoma St.	MO		HC				PE	
Sacramento-Goldenland Ct.[8]	PE	PE	PE			PE		
North Highlands-Blackfoot Way	PE	PE	PE			PE		
Rancho Seco							UB	
Sloughhouse	MO						UB	
Sacramento-T Street	GB		PE			PE	HC, PE	

Site Type abbreviation

ED – Extreme downwind
GB – General/background
HC – Highest concentration
MO – Maximum O_3 concentration
PE – Population exposure
QA – Quality assurance
MP – Maximum precursor emission
OT – Other
RT – Regional transport
SO – Source oriented
UB – Upwind/background
WF – Welfare related impacts

Table 2-10 Spatial Scale

	O_3	CO	NO_2	SO_2	Pb	PM_{10}	$PM_{2.5}$
Sacramento-Bercut Dr.		MC	MC				MC
Sacramento-Branch Center #2						NB	
Elk Grove-Bruceville Rd.	UB		UB				UB
Sacramento-Del Paso Manor	NB	NB	NB	UB	UB	NB	NB
Folsom-Natoma St.	NB		NB				NB
Sacramento-Goldenland Ct.[8]	UB	NS	NS			NS	
North Highlands-Blackfoot Way	UB	NB	NB			NB	
Rancho Seco							RG
Sloughhouse	NB						UB
Sacramento-T Street	UB		NB			NB	NB

Spatial Scale abbreviation

MC – Microscale
MD – Middle scale
NB – Neighborhood scale
UB – Urban scale
RG – Regional scale
NG – National/global scale

[8] This station was discontinued at the end of May 2017

Section 3 Minimum Monitoring Requirements

The minimum number of monitoring sites required for each pollutant is based on one or more applicable factors, as described in 40 CFR Part 58, Appendix D. Examples of these factors include: MSA population, core-based statistical area (CBSA) population, pollutant design value, pollutant maximum concentration, attainment status, annual average daily traffic (AADT), SIP, maintenance plan, population weighted emission index (PWEI), and U.S. EPA's national emission inventory (NEI) data.

Sacramento MSA meets or exceeds minimum monitoring requirement for all criteria pollutants – O_3, $PM_{2.5}$ (manual and continuous methods), PM_{10}, NO_2, SO_2, CO, and Pb. Details of the monitors representing Sacramento MSA (or CBSA, ID#40900) are provided in Tables 3-1 and 3-2. As mentioned in Section 2, Sacramento MSA has 2.3 million residents and covers all of El Dorado, Placer, Sacramento, and Yolo Counties.

Sac Metro Air District has an agreement with CARB to share specific portions of the monitoring responsibility in the Sacramento MSA. A copy of this agreement is provided in Appendix B. Placer County Air Pollution Control District, the air quality agency for Placer County, and Yolo-Solano Air Quality Management District, the air quality agency for Yolo County, also operate air monitoring stations within the Sacramento MSA.

Table 3-1 2017 Sacramento MSA Design Value and Monitoring Site Requirement, Part 1

Pollutant	Type (if applicable)	Number of SLAMS sites required	Active SLAMS sites in Sacramento MSA[A]	Active SLAMS sites in Sacramento County[A]	Additional SLAMS sites needed	2017 design value [B] and location
O_3		2	16	6	0	0.083 parts per million (ppm) Placerville (06-017-0010)
$PM_{2.5}$	FRM/FEM	3	8	5	0	24-hr: 34 micrograms per cubic meters ($\mu g/m^3$) Sacramento-Del Paso Manor (06-067-0006) Annual: 9.6 $\mu g/m^3$ Sacramento-Del Paso Manor (06-067-0006)
	Continuous	2	7	4	0	
PM_{10}		2-4	9	5	0	3-year average expected number of exceedance: 0.0 Max 24-hr concentration (FRM): 128 $\mu g/m^3$ [C] Sacramento-Branch Center #2 (06-067-0284) Max 24-hr concentration (FEM): 149 $\mu g/m^3$ [C] Sacramento-T Street (06-067-0010)
$PM_{10-2.5}$		1	1	1	0	Not applicable

[A] U.S. EPA Air Quality System (AQS) Raw Data Report (AMP 350) and Monitor Description Report (AMP 390), accessed on 9 May 2018

[B] Design values from U.S. EPA Air Quality System Design Value Report (AMP 480), accessed 25 Apr. 2018, and Raw Data Report (AMP350), accessed on 2 May 2018

[C] These 24-hr concentrations are marked with IT (wildfire) information qualifier code, which signifies air quality impact by wildfire(s)

Table 3-2 2017 Sacramento MSA Design Value and Monitoring Site Requirement, Part 2

Pollutant	Type (if applicable)	Number of SLAMS sites required	Active SLAMS sites in Sacramento MSA	Active SLAMS sites in Sacramento County	Additional SLAMS sites Needed	Notes
NO_2	Near-road	1	1	1	0	Highest AADT: 260,000 (U.S. Highway 50 east of 15/16th Street) [A][B] NO_2 monitor at Sacramento-Del Paso Manor (06-067-0006) serves as both PAMS and area-wide monitor
	Area-wide	1	7	5	0	
SO_2		1	1	1	0	Total SO_2: 4,213 tons[C] Population Weighted Emission Index: 9,795 million persons-tons per year[D] Monitor at Sacramento-Del Paso Manor satisfy NCore requirement
CO	Near-road	1	1	1	0	Monitor at Sacramento-Bercut Dr. satisfy the near-road monitoring requirement
	Non-near-road	1	2	2	0	Trace monitor at Sacramento-Del Paso satisfy the NCore requirement, which also satisfy the monitor requirement in the CO Maintenance Plan
Pb	NCore	0[E]	1	1	0	Located at Sacramento-Del Paso Manor
	Source oriented	0	0	0	0	Number of non-airport source > 0.5 tons per year: 0[C] Number of airport source >= 1.0 tons per year: 0[C]

[A] California Department of Transportation, 2016 Traffic Volumes, accessed 23 Apr. 2018 (2017 data is not yet available)

[B] Sacramento MSA has surpassed the 250,000 threshold for a second near-road monitoring site per 40 CFR Part 58 Appendix D, 4.3.2(a); the District is working with U.S. EPA and CARB to determine the appropriate timing and location for a second near-road monitoring site

[C] Source: 2014 National Emission Inventory, accessed 24 Apr. 2018

[D] Per 40 CFR Part 58, Appendix D, $PWEI = \frac{Total\ SO_2 \times MSA\ population}{1{,}000{,}000}$

[E] Revisions to Ambient Monitoring Quality Assurance and Other Requirements promulgated on April 27, 2016, revokes the lead monitoring requirement at NCore sites

The District also meets minimum PAMS monitoring requirements. PAMS monitoring is required for the Sacramento MSA because the region is designated as a nonattainment area for the federal ozone standard. The PAMS network is operated in accordance with the California Alternative Plan III (CAP III), which is provided in Appendix D.

Currently, the District operates four PAMS sites: one Type I, one Type II, one secondary Type II, and Type III sites. The site requirements and definitions can be found in 40 CFR 58, Appendix D. Tables 3-3 and 3-4 list the instruments operating at each PAMS site and the current number of monitors required. New PAMS requirements were promulgated in the Federal Register (FR) with the 2015 revision of the National Ambient Air Quality Standards for Ozone (80 FR 65292). As required with the promulgation, the District will submit an enhanced ozone monitoring plan to U.S. EPA by October 1, 2019.

Table 3-3 PAMS Minimum Monitoring Requirement, Table 1

	PAMS Site Type	O_3	CO	NO_2	NO_Y	VOC	Carbonyl	Surface Meteorology	Upper Air Meteorology
Elk Grove-Bruceville Rd.	I	✓		✓				✓	✓
Sacramento-Del Paso Manor	II	✓	✓	✓	✓[A]	✓	✓	✓	
Sacramento-Goldenland Ct.	II, Secondary	✓	✓	✓				✓	
Folsom-Natoma St.	III	✓		✓	✓	✓		✓	
Number of monitors required		4[B]	1	2	1	2	1	4[B]	1
Number of monitors active		4	2	4	1	2	1	4	1

[A] Per 40 CFR Part 58, Appendix D, this monitor does not count toward PAMS requirement but is required for NCore; reactive oxides of nitrogen (NO_Y) for PAMS must be at Type I or III site. This requirement is fulfilled by the Folsom-Natoma St. site

[B] This requirement is dependent on the number of PAMS sites; see 40 CFR 58, Appendix D

All instruments operated by the District meet the operating schedule requirements as specified in 40 CFR Part 58.12. All continuous monitors report hourly data and monitor air pollutant year-round, unless otherwise specified in Appendix A. Non-continuous monitors are operated by following the sampling schedule in Table 3-5 and are operated year-round, except:

- Speciated volatile organic compound (VOC) and carbonyl samplers related to PAMS that are operated from July through September; and
- The special purpose $PM_{2.5}$ monitor at Rancho Seco that is operated from November through February if there are sufficient resources. However, monitoring at Rancho Seco was discontinued in November 2017. See Section 4, Recent and Proposed Modification to the Network.

Design values are included in the Table 3-5, as necessary, to determine an appropriate schedule for non-continuous monitors (in accordance to 40 CFR 58.12).

Table 3-4 Sampling Schedule and 2016 Design Value (DV) for PM, Pb, and VOC Monitors in Sacramento County
All units in µg/m^3

Site	PM10[A]	PM2.5[B] [C]	$PM_{10-2.5}$[D]	Lead	PAMS monitors
Sacramento-Branch Center #2	Max. 24-hr concentration: 79 Ratio to standard: 0.53				
Sacramento-Bercut Dr.		1 in 3 days[E]			
Elk Grove-Bruceville		(Continuous Monitor)			Speciated VOC: During summer O_3 episode only
Sacramento-Del Paso Manor	Max. 24-hr concentration: 57 Ratio to standard: 0.38	24-hr DV: 34 Annual DV: 9.6	1 in 3 days	Design Value: 0.0031	Speciated VOC and carbonyl: 1 in 3 days (Jul-Sep)
Folsom-Natoma St.		(Continuous Monitor)			Speciated VOC: 1 in 3 days (Jul-Sep)
Sacramento-Goldenland Ct.	(Monitoring discontinued in May 2017)				
North Highlands-Blackfoot Way	Max. 24-hr concentration: 66 Ratio to standard: 0.44				
Rancho Seco		(Continuous Monitor)			
Sloughhouse		(Continuous Monitor)			
Sacramento-T St	(Continuous Monitor)	24-hr DV: 30 Annual DV: 8.9			

Source: Design values from U.S. EPA Air Quality System Design Value Report (AMP 480), accessed on 2 May 2018, and Raw Data Report (AMP350) on Pb (85129), accessed on 25 Apr. 2018

Legend:

Blue denotes daily sampling	Yellow denotes 1 in 3 day sampling	Green denotes 1 in 6 day sampling

[A] Per 40 CFR Part 58.12(e), PM_{10} (non-continuous) operates on a minimum of 1in 6 days sampling schedule. More frequent sampling may be required if ratio to the 24-hr PM_{10} NAAQS (standard) exceeds 0.8

[B] Per 40 CFR Part 58.12(d)(1)(iii), "required SLAMS stations whose measurements determine the 24-hour design value for their area and whose data are within ±5 percent of the level of the 24-hour PM2.5 NAAQS must have an FRM or FEM operate on a daily schedule if that area's design value for the annual NAAQS is less than the level of the annual PM2.5 standard."

[C] Per 40 CFR Part 58.12 (d)(1)(i), "manual PM2.5 samplers at required SLAMS stations without a collocated continuously operating PM2.5 monitor must operate on at least a 1-in-3 day schedule unless a waiver for an alternative schedule has been approved per paragraph (d)(1)(ii) of this section.

[D] Per 40 CFR Part 58.12(f)(1), "manual PM10-2.5 samplers at NCore stations must operate on at least a 1-in-3 day schedule at sites without a collocated continuously operating federal equivalent PM10-2.5 method."

[E] There is no design value because monitoring began on 12/2/16 and there is insufficient data because 40 CFR Part 50, Part N, requires three years of data for the calculation of annual and 24-hr design values

Section 4 Recent and Proposed Modifications to the Network

This section discusses recent and proposed modifications to the Sacramento County air monitoring network. It includes modifications that occurred within calendar year 2017 and may occur within the next 18 months following this annual network plan submittal. Unless specifically noted below with approval received from CARB and U.S. EPA, Sac Metro Air District is not formally requesting approval for modification through this network plan. Prior to a network modification, the District will work with the CARB to submit to U.S. EPA the required documentation for official review and approval of proposed system modifications. Sac Metro Air District is a part of the CARB's primary quality assurance organization and works with CARB to ensure air monitoring requirements are met.

Sacramento-Bercut Dr.
No change anticipated.

Sacramento-Branch Center #2
No change anticipated.

Elk Grove-Bruceville Rd.
The District is considering discontinuing the speciated VOC episodic measurements at this site. Speciated VOC measurements at this site are not specifically required by 40 CFR Part 58, Appendix D, but are included as a measurement in Sacramento's portion of the California Alternative Plan[9]. Speciated VOC concentrations collected at this site are low, indicative of robust representations of background concentrations.

In the District's 2017 ANP, it requested a waiver to install one of the PAMS-required instrument, a ceilometer, at Elk Grove-Bruceville because there was insufficient space at Sacramento-Del Paso Manor. U.S. EPA approved the waiver request, and the District installed the ceilometer in January 2018. The ceilometer is used to determine the mixing height and inversion layer, and it replaced the radar wind profiler that malfunctioned and has been out of service since October 2016. The District anticipates to install a sonic detection and ranging (SODAR) instrument to determine upper air wind speed when resources become available.

Elk Grove-Bruceville $PM_{2.5}$ beta attenuation monitor (BAM) monitor is being considered for an equipment upgrade. This monitor currently reports data to AirNow with parameter code 88501 even though the data can also be used for air quality index (AQI) forecasting. The District will continue to report this data under 88501 to maintain continuity of historical data records. After the equipment upgrade (summer/fall 2018), the District will change the parameter code to 88502 to promote consistency on data reporting practices for data that can be used for AQI forecasting.

[9] A copy is provided in Appendix D

Sacramento-Del Paso Manor

In Revisions to Ambient Monitoring Quality Assurance and Other Requirements promulgated on March 28, 2016 (81 FR 17248), U.S. EPA removed the lead monitoring requirement at urban NCore sites, provided that the sampler has collected sufficient data to calculate a design value. Sacramento-Del Paso is an NCore site, and the lead sampler at this site has met the condition to be discontinued. The District is considering whether to discontinue this lead sampler to utilize its resources more efficiently.

Sacramento-Del Paso Manor was established with a small number of monitoring equipment in 1970s. The number of equipment has steadily increased due to PAMS and NCore requirements, and the station cannot accommodate any more equipment. Renovation and site expansion are scheduled for spring 2019. The expansion will allow the station to accommodate additional equipment required by the 2015 review of National Ambient Air Quality Standards for Ozone (80 FR 65291). The District will strive to meet the July 1, 2019 PAMS re-engineering deadline and will work the U.S. EPA Region 9 if there is any delay in the station expansion project. The District will also work with CARB and U.S. EPA Region 9 to minimize data loss during construction.

After the station expansion project is completed, the District will replace the existing PAMS VOC canister sampling with a continuous auto gas chromatography (Auto-GC) instrument as required by the 2015 National Ambient Air Quality Standards for Ozone. In addition to the Auto-GC, ultraviolet radiation sensor, precipitation gauge, and barometric pressure sensor will also be installed to the new requirements.

Folsom-Natoma St

The District started work to replace the air monitoring shelter and has worked with CARB and U.S. EPA to minimize the loss of ozone data during construction. On May 10, 2018, the District received an email[10] from U.S. EPA Region 9 approving the proposal to place a temporary trailer at a nearby location and conduct monitoring. The District is working to secure electricity to operate the temporary trailer. If the District is unable to secure electricity for the temporary trailer, the District will work with CARB and U.S. EPA to consider alternative options for the temporary monitoring station. The temporary trailer will have ozone and nitrogen dioxide analyzers to monitor these parameters during the high ozone season. Non-methane hydrocarbon, reactive oxides of nitrogen, $PM_{2.5}$, speciated volatile organic compound, outdoor temperature, relative humidity, solar radiation, wind direction, and wind speed will not be monitored while the shelter is being replaced. The construction for shelter replacement is expected to be completed by the end of 2018. As of May 2018, demolition of the existing shelter has not commenced.

Sacramento-Goldenland Ct

U.S. EPA approved a discontinuation request for this site on May 2, 2017. The last day of operation was May 31, 2017. A copy of U.S. EPA's approval letter is provided in Appendix E.

North Highlands-Blackfoot Way

The District has been negotiating a lease with the new property manager at North Highlands-Blackfoot Way. If an agreement is not reached, the District will evaluate its options to relocate or discontinue the monitoring station.

[10] Per email correspondence with Michael Flagg, U.S. EPA Region 9, on May 10, 2018

Sloughhouse-Sloughhouse Rd.

In summer 2017, the District replaced the $PM_{2.5}$ BAM monitor with one that is suitable for NAAQS comparison and AQI forecasting. The parameter code was changed from 88501 to 88101.

Rancho Seco

This is a special purpose monitoring site that operates seasonally. The District operated this site in past winter season when staff resource was available. The District discontinued this special purpose site in November 2017.

Near-road site #2

40 CFR Part 58 requires state or local air monitoring organization to operate a second near-road monitoring site if any traffic count in the metropolitan area surpasses 250,000 in annual average daily traffic. Sacramento MSA has surpassed the threshold and triggered the requirement. The location of the exceedance is on U.S. Highway 50 east of $15^{th}/16^{th}$ Street. The District is working with U.S. EPA and CARB to determine the appropriate timing, location, and funding for a second near-road monitoring site.

Section 5 Quality Assurance Requirement and Other Monitoring Requirement for the PQAO

40 CFR Part 58, Appendix A, requires monitoring activities to satisfy quality assurance criteria. Most of these activities are required and met on a primary quality assurance organization (PQAO) level. Sac Metro Air District is a part of the CARB's PQAO and works with the PQAO to meet the quality assurance requirements. Currently, there are collocated $PM_{2.5}$ FRM and PM_{10} FRM monitors at Sacramento-Del Paso Manor. There is a collocated $PM_{2.5}$ FEM monitor at Folsom-Natoma St. For the aforementioned collocated monitors, the primary monitor and audit monitor use the same U.S. EPA FRM/FEM method designation.

The District operates a Pb-PM_{10} at its Sacramento-Del Paso Manor NCore site. However, it does not have any Pb-PM_{10} collocated monitor as required by 40 CFR Part 58. As mentioned in Section 4, Recent and Proposed Modification to the Network, the District does not currently have any space at Sacramento-Del Paso Manor to operate a collocation monitor. In addition, the District is evaluating whether it will continue to operate the Pb monitor. If the District continues to operate this monitor, the District will consider installing a collocation monitor after the station has been renovated to a larger footprint and ensure that the monitor meets Pb-PM_{10} collocation requirements. For complete details on PM and Pb collocation, please refer to the latest edition of Annual Monitoring Network Report published by CARB[11].

40 CFR Part 58, Appendix D, 4.7.3, requires "each State shall install and operate at least one $PM_{2.5}$ site to monitor for regional background and at least one $PM_{2.5}$ site to monitor regional transport." In CARB's 2017 Annual Monitoring Network Report[13], it identified Point Reyes National Seashore and San Rafael Wilderness sites as the state's regional background sites and Vallejo as the regional transport site for $PM_{2.5}$. Please refer to the CARB's 2017 Annual Monitoring Network Report for updates or more information.

[11] https://www.arb.ca.gov/aqd/amnr/amnr.htm

Section 6 Process to Review Changes to $PM_{2.5}$ Monitoring Network

40 CFR 58.10(c) requires this annual network plan to "provide for the review of changes to a $PM_{2.5}$ monitoring network that impact the location of a violating $PM_{2.5}$ monitor." Although Sac Metro Air District has not formally requested a re-designation the attainment status for $PM_{2.5}$, monitors operated by the District have not recorded any annual or 24-hr $PM_{2.5}$ violations since 2014. There is also no current plan to relocate or discontinue any $PM_{2.5}$ monitor suitable for NAAQS comparison. Any changes to the $PM_{2.5}$ monitoring network with impact to the location of a violating $PM_{2.5}$ monitor will be documented in this section of future annual network plans. The District made the plan available for public comment for 30 days. This ANP was posted on the District's website for public review and comment from May 25, 2018 through June 25, 2018. No comment was received.

Section 7 Data Submission Requirements

CARB submits precision, accuracy, and raw data for all District operated monitors in 2017. CARB is also the lead agency on annual data certification. The following submission dates are provided by CARB. A copy of the annual data certification is provided in Appendix C.

- 2017 Annual data certification submitted: June 2, 2017
- 2017 1-pt QC data submitted to AQS: Quarterly
- 2017 flow rate verification data submitted to AQS: Quarterly

Starting with January 2018, Sac Metro Air District is responsible for its quarterly data submissions and annual data certification. The quarterly data submission includes raw data for all monitors operated by the District and the 1-point quality control or flow rate verification data.

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Appendix A Detailed Site and Monitor information

Detailed site information covered in this appendix reflects air monitoring operation from January 1, 2017-December 31, 2017.

A.1 Sacramento-Bercut Dr.

This is an approved near-road monitoring site. Located one mile from Downtown Sacramento, this site is expected to measure the highest NO_2 concentration due to the emissions from mobile sources on Interstate 5, which is about 20 meters (m) from the site. The site started operation on October 13, 2015.

Table A-1 Sacramento-Bercut Dr. Metadata

Site Name	Sacramento-Bercut
AQS Site No.	06-067-0015
Geographic Coordinates	38.593328°N, 121.503728°W
Location	On the downwind side of Interstate 5, one mile north-northwest of downtown Sacramento.
Address	100 Bercut Dr., Sacramento, CA
County	Sacramento
Distance from roadway	Interstate 5: 20 m Bercut Dr.: 5 m
Annual Average Daily Traffic (Vehicles/Day)	Interstate 5: 188,700 (California Department of Transportation, 2015) Bercut Dr. south of Richards Blvd.: 2,709 (City of Sacramento, 2012)
Ground Cover	Pavement, with vegetation
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

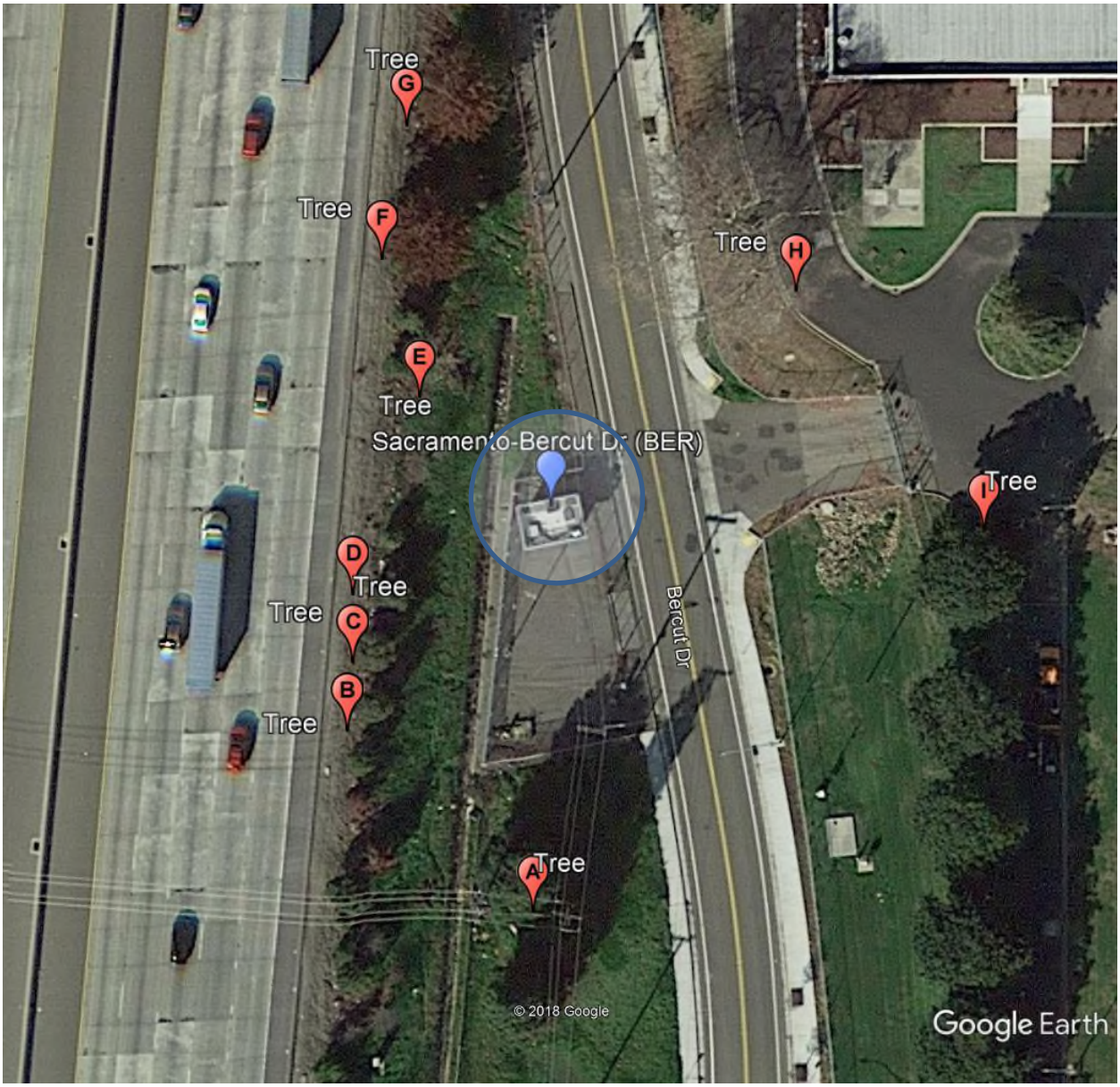
Figure A-1 Panoramic view toward north from air monitoring station roof

Figure A-2 Panoramic view toward east from air monitoring station roof

Figure A-3 Panoramic view toward south from air monitoring station roof

Figure A-4 Panoramic view toward west from air monitoring station roof

Figure A-5 Google Earth satellite image of Sacramento-Bercut Dr.



The circle in figure A-5 indicates there are no trees within a 10 m radius, which satisfy a siting criteria that requires drip lines of trees to be at least 10 m away from probes and inlets (40 CFR Part 58, Appendix E). Also, heights of potential flow obstacles were calculated on-site with trigonometry on 5/8/18 and are provided in Tables A-2 thru A-4. With the exception of tree "H," each inlet and sampler has 360° of unrestricted airflow. Tree H is an old growth heritage tree, as defined by Chapter 12.64 of Sacramento City Code (SCC). It is protected by SCC from removal or significant pruning. Since the tree is directly downwind of emission source, it has limited scavenging effect and does not interfere with the emission source being monitored. Before the air monitoring site was established, U.S. EPA staff had approved for this tree to remain in place[12].

[12] Per email correspondence with Elfego Felix, U.S. EPA Region 9, on August 6, 2013

Table A-2 Distance between Object and Inlet or Probe at Sacramento-Bercut Dr. All units in meter

	Gaseous Probe	$PM_{2.5}$ Inlet
Object A (Tree)	36.58	32.00
Object B (Tree)	24.69	25.60
Object C (Tree)	21.95	22.86
Object D (Tree)	18.29	20.12
Object E (Tree)	15.54	20.12
Object F (Tree)	18.29	22.86
Object G (Tree)	25.60	30.18
Object H (Tree)	34.75	34.75
Object I (Tree)	41.15	39.32

Table A-3 Object Protrusion above Inlet or Probe at Sacramento-Bercut Dr. All units in meter

	Gaseous Probe	$PM_{2.5}$ Inlet
Object A (Tree)	8.14	8.14
Object B (Tree)	1.41	1.41
Object C (Tree)	0.95	0.95
Object D (Tree)	-0.43	-0.43
Object E (Tree)	-0.36	-0.36
Object F (Tree)	3.84	3.84
Object G (Tree)	6.07	6.07
Object H (Tree)	23.25	23.25
Object I (Tree)	7.29	7.29

Note: negative value indicates inlet or probe is taller than the object; thus, airflow is not obstructed no matter the distance

Table A-4 Distance vs. Protrusion Ratio at Sacramento-Bercut Dr. (must be ≥ 2)[13]

	Gaseous Probe	$PM_{2.5}$ Inlet
Object A (Tree)	4.5	4.5
Object B (Tree)	17.5	18.8
Object C (Tree)	23.0	24.0
Object D (Tree)	N/A	N/A
Object E (Tree)	N/A	N/A
Object F (Tree)	4.8	5.2
Object G (Tree)	4.2	4.7
Object H (Tree)	1.5[(A)]	1.5[(A)]
Object I (Tree)	5.6	5.6

[(A)] See discussion on page 23

Note: N/A indicates inlet or probe is taller than the object and airflow is not obstructed; refer to the note in the previous table

[13] Per Appendix E to 40 CFR Part 58, "the distance from the obstacle to the probe, inlet, or monitoring path must be at least twice the height that the obstacle protrudes above the probe, inlet, or monitoring path."

Site	Sacramento-Bercut Dr	Sacramento-Bercut Dr
Start Date	10/13/2015	10/13/2015
Collecting Agency	Sac Metro Air District	Sac Metro Air District
Analytical Lab	N/A	N/A
Reporting Agency	CARB	CARB
Pollutant	NO2	CO
Parameter Code	42602	42101
Parameter Occurrence Code	1	1
Manufacturer and model	TAPI200UP	TAPI 300U
Sampling Method	Instrumental	Instrumental
Method Code	200	593
Analysis Method	Photolytic-Chemiluminescence	Gas Filter Correlation
FRM/FEM/ARM/Other	FEM	FRM
Monitoring objective	NAAQS comparison, public info, research	NAAQS comparison, public info, research
Statement of Purpose	Monitors near road emission at region's highest fleet equivalent AADT roadway	Monitors near road emission at region's highest fleet equivalent AADT roadway
Monitor type	SLAMS	SLAMS
Affiliation	Near Road	Near Road
Site type	Source Oriented	Source Oriented
Spatial scale	Microscale	Microscale
Sampling Frequency	Continuous	Continuous
Sampling season	Year Round	Year Round
Distance from supporting structure or rooftop (m)	1.8	1.8
Distance from flow obstructions on roof (m)	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	34.8	34.8
Distance from nearest tree drip line (m)	11.9	11.9
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable
Distance with nearest PM monitor (m)	4.6 m (lo vol)	4.6 m (lo vol)
Unrestricted airflow (deg)	336	336
Probe height (m, agl)	4.6	4.6
Probe material	Teflon	Teflon
Residence time (seconds)	17.9	18.6
Changes in next 18 months?	No	No
Frequency of one-point quality control check	Every other day	Every other day
Last Performance Evaluation	5/5/17	4/11/17

Site	Sacramento-Bercut Dr	
Start Date	10/30/2015	12/2/2016
Collecting Agency	Sac Metro Air District	Sac Metro Air District
Analytical Lab	N/A	CARB
Reporting Agency	CARB	CARB
Pollutant	Black Carbon	PM2.5
Parameter Code	84313	88101
Parameter Occurrence Code	1	1
Manufacturer and model	Magee Scientific M633	R & P 2025
Sampling Method	Aethalometer	Low volume with VSCC
Method Code	894	118
Analysis Method	Optical Absorption	Gravimetric
FRM/FEM/ARM/Other	Other	FRM
Monitoring objective	Public info, research	NAAQS comparison, public info, research
Statement of Purpose	Determines component of PM emission at region's highest fleet equivalent AADT roadway	Monitors near road emission at region's highest fleet equivalent AADT roadway
Monitor type	SLAMS	SLAMS
Affiliation	Near Road	Near Road
Site type	Source Oriented	Source Oriented
Spatial scale	Not applicable	Micro
Sampling Frequency	Continuous	1 in 3 days
Sampling season	Year Round	Year Round
Distance from supporting structure or rooftop (m)	1.8	2.2
Distance from flow obstructions on roof (m)	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	34.8	34.8
Distance from nearest tree drip line (m)	12.8	17.4
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable
Distance with nearest PM monitor (m)	Not applicable	No other PM monitors
Unrestricted airflow (deg)	336	336
Probe height (m, agl)	4.6	5.0
Probe material	Aluminum	Aluminum
Residence time (seconds)	Not applicable	Not applicable
Changes in next 18 months?	No	No
Frequency of one-point quality control check	Monthly	Monthly
Last Performance Evaluation	Not applicable	4/11/17, 10/5/17

Site	Sacramento-Bercut Dr		
Start Date	10/30/2015	10/30/2015	10/30/2015
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	N/A	N/A	N/A
Reporting Agency	CARB	CARB	CARB
Pollutant	Outdoor Temperature	Wind Direction	Wind Speed
Parameter Code	62101	61104	61103
Parameter Occurrence Code	1	1	1
Manufacturer and model	Climatronics 100093	Climatronics F-460	Climatronics F-460
Sampling Method	Instrumental	Instrumental	Instrumental
Method Code	042	020	020
Analysis Method	Machine Average	Vector Summation	Vector Summation
FRM/FEM/ARM/Other	Other	Other	Other
Monitoring objective	Public info, research	Public info, research	Public info, research
Statement of Purpose	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology
Monitor type	Other	Other	Other
Affiliation	Near Road	Near Road	Near Road
Site type	Not applicable	Not applicable	Not applicable
Spatial scale	Not applicable	Not applicable	Not applicable
Sampling Frequency	Continuous	Continuous	Continuous
Sampling season	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	No supporting structure	No supporting structure	No supporting structure
Distance from flow obstructions on roof (m)	Not applicable	Not applicable	Not applicable
Distance from flow obstructions not on roof (m)	Not applicable	Not applicable	Not applicable
Distance from nearest tree drip line (m)	Not applicable	Not applicable	Not applicable
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	Not applicable	Not applicable	Not applicable
Unrestricted airflow (deg)	336	336	336
Probe height (m, agl)	10.0	10.0	10.0
Probe material	Not applicable	Not applicable	Not applicable
Residence time (seconds)	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	No	No
Frequency of one-point quality control check	Not applicable	Not applicable	Not applicable
Last Performance Evaluation	4/11/17	4/11/17	4/11/17

A.2 Sacramento-Branch Center #2

Sacramento-Branch Center #2 is a PM_{10} monitoring site. This site was established in 2006 to replace the former Sacramento-Branch Center site, which was approximately one-quarter mile to the north. The site was moved because nearby trees at the previous location obstructed the airflow, and the former monitoring site did not meet siting requirements.

The objective of this site is to measure the representative PM_{10} concentration, as documented in the original site initiation reports filed in the late 1980s.

Table A-5 Sacramento-Branch Center #2 Metadata

Site Name	Sacramento-Branch Center #2
AQS Site No.	06-067-0284
Geographic Coordinates	38.551290°N, 121.336590°W
Location	Rooftop of building in the middle of County Maintenance Yard, located 10 miles east-southeast of downtown Sacramento.
Address	3847 Branch Center Road, Sacramento, CA 95827
County	Sacramento
Distance from roadway	62 m
Annual Average Daily Traffic (Vehicles/Day)	Bradshaw Rd South of Old Placerville Rd.: 37,938 (SACDOT, 3/26/2014)
Ground Cover	Paved
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

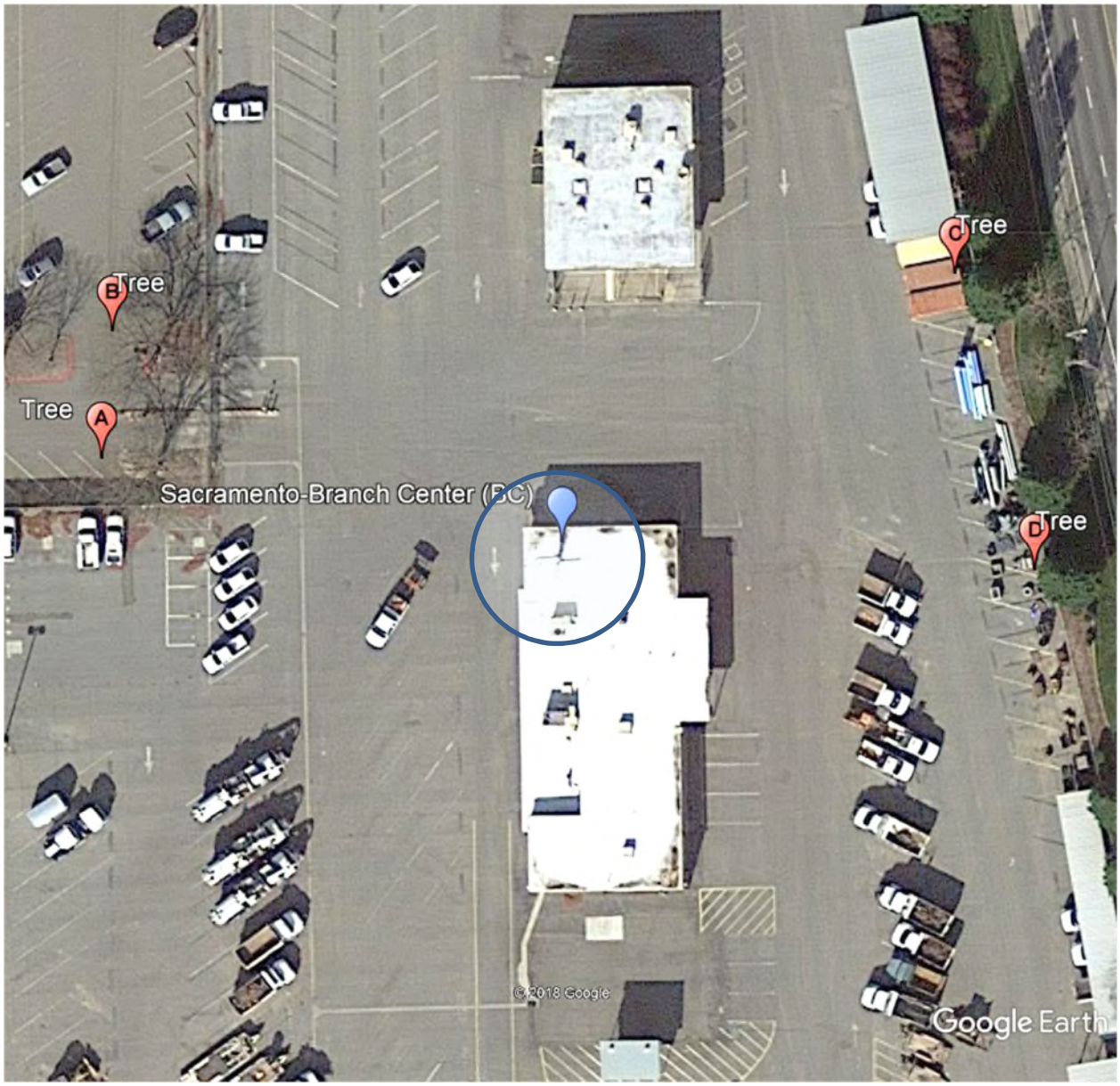
Figure A-6 Panoramic view toward north from air monitoring station roof

Figure A-7 Panoramic view toward east from air monitoring station roof

Figure A-8 Panoramic view toward south from air monitoring station roof

Figure A-9 Panoramic view toward west from air monitoring station roof

Figure A-10 Google Earth satellite image of Sacramento-Branch Center #2



The circle in Figure A-10 indicates no trees exist within a 10 m radius, which satisfy a siting criteria that requires drip lines of trees to be at least 10 m away from probes and inlets (40 CFR Part 58, Appendix E). Also, heights of the trees were calculated on-site with trigonometry on 5/4/18. Object C and D marks the tallest tree northeast and southeast of the station, respectively. Analyses in Tables A-6 thru A-8 show the objects identified above do not restrict air flow to the roof top inlets and samplers. Therefore, each inlet and sampler has 360° of unrestricted airflow.

Table A-6 Distance between Object and Inlet or Probe at Sacramento-Branch Center #2
All units in meter

	PM_{10} Inlet
Object A (Tree)	37.49
Object B (Tree)	41.15
Object C (Tree)	50.29
Object D (Tree)	50.29

Table A-7 Object Protrusion above Inlet or Probe at Sacramento-Branch Center #2
All units in meter

	PM_{10} Inlet
Object A (Tree)	6.11
Object B (Tree)	4.97
Object C (Tree)	6.71
Object D (Tree)	11.87

Table A-8 Distance vs. Protrusion Ratio at Sacramento-Branch Center #2
(must be ≥ 2)[14]

	PM_{10} Inlet
Object A (Tree)	6.1
Object B (Tree)	8.3
Object C (Tree)	7.5
Object D (Tree)	4.2

[14] Per Appendix E to 40 CFR Part 58, "the distance from the obstacle to the probe, inlet, or monitoring path must be at least twice the height that the obstacle protrudes above the probe, inlet, or monitoring path."

Site	Sacramento-Branch Center
Start Date	4/1/2006
Collecting Agency	Sac Metro Air District
Analytical Lab	Sac Metro Air District
Reporting Agency	CARB
Pollutant	PM10
Parameter Code	81102
Parameter Occurrence Code	1
Manufacturer and model	Sierra Anderson 1200
Sampling Method	Hi Volume
Method Code	063
Analysis Method	Gravimetric
FRM/FEM/ARM/Other	FRM
Monitoring objective	NAAQS comparison, public info
Statement of Purpose	Measures PM10 concentration
Monitor type	SLAMS
Affiliation	None
Site type	Highest concentration
Spatial scale	Neighborhood
Sampling Frequency	1 in 6 days
Sampling season	Year Round
Distance from supporting structure or rooftop (m)	2.0
Distance from flow obstructions on roof (m)	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions
Distance from nearest tree drip line (m)	36.6
Distance to furnace or incinerator flue (m)	No furnace/flue
Distance between collocated PM monitors (m)	Not collocated
Distance with nearest PM monitor (m)	No other PM monitors
Unrestricted airflow (deg)	360
Probe height (m, agl)	6.5
Probe material	Not applicable
Residence time (seconds)	Not applicable
Changes in next 18 months?	No
Frequency of flow rate verification	Monthly
Last Performance Evaluation	4/5/17, 10/2/17

A.3 Elk Grove-Bruceville

Bruceville air monitoring site is located in a rural area 4 miles south of Elk Grove, CA, and 20 miles south of Downtown Sacramento. It was initiated in 1992 to replace the former Sacramento-Meadowview Road O_3 monitoring site.

This site is the upwind O_3 and ozone precursor monitoring site for the Sac Metro Air District's network, also known as a PAMS Type I site. Adjacent to the air monitoring site is the Franklin Field radar wind profiler (RWP) and radio acoustic sounding system (RASS). The instruments measure wind and temperature in the upper levels and are operated year-round. Collection of upper air meteorology data is a requirement for the PAMS program. Because the RWP and RASS instruments malfunctioned since October 2016, the District installed the ceilometer at Elk Grove-Bruceville in January 2018 after receiving an approval from U.S. EPA.

Table A-9 Elk Grove-Bruceville Metadata

Site Name	Elk Grove-Bruceville
AQS Site No.	06-067-0011
Geographic Coordinates	38.302560°N, 121.420830°W
Location	Rural area located 4 miles south of Elk Grove, CA.
Address	12490 Bruceville Rd, Elk Grove, CA 95758
County	Sacramento
Distance from roadway	76 m
Annual Average Daily Traffic (Vehicles/Day)	Bruceville Rd south of Lambert Rd.: 1,717 (SACDOT, 7/16/2014)
Ground Cover	Vegetated
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

Figure A-11 Panoramic view toward north from air monitoring station roof

Figure A-12 Panoramic view toward east from air monitoring station roof

Figure A-13 Panoramic view toward south from air monitoring station roof

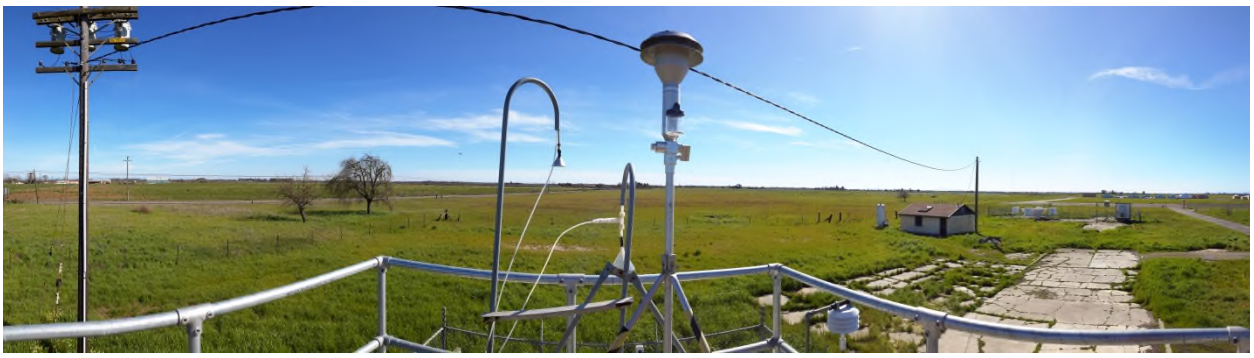
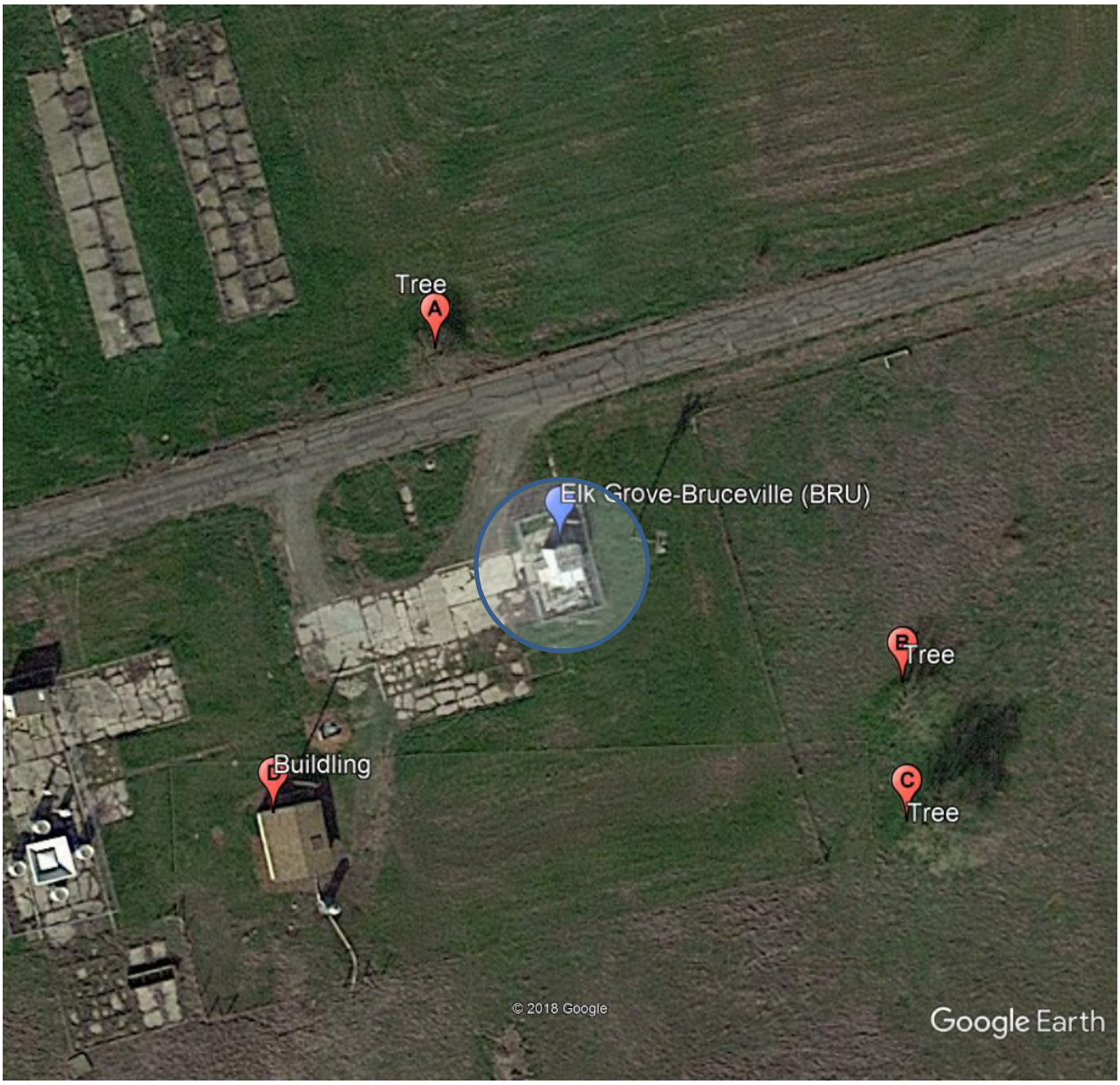


Figure A-14 Panoramic view toward west from air monitoring station roof

Figure A-15 Google Earth satellite image of Elk Grove-Bruceville



The circle in Figure A-15 indicates no trees exist within a 10 m radius, which satisfy a siting criteria that requires drip lines of trees to be at least 10 m away from probes and inlets (40 CFR Part 58, Appendix E). Also, heights of the trees were calculated on-site with trigonometry on 5/4/18. Analyses in Tables A-10 thru A-12 show the objects identified above do not restrict air flow to the roof top inlets and samplers. Therefore, each inlet and sampler has 360° of unrestricted airflow.

Table A-10 Distance between Object and Inlet or Probe at Elk Grove-Bruceville
All units in meter

	Gaseous Probe	VOC Probe	$PM_{2.5}$ Inlet
Object A (Tree)	23.77	23.77	22.86
Object B (Tree)	36.58	36.58	37.49
Object C (Tree)	45.72	45.72	45.72
Object D (Building)	35.66	35.66	35.66

Table A-11 Object Protrusion above Inlet or Probe at Elk Grove-Bruceville
All units in meter

	Gaseous Probe	VOC Probe	$PM_{2.5}$ Inlet
Object A (Tree)	1.01	0.54	0.09
Object B (Tree)	2.26	1.79	1.34
Object C (Tree)	4.56	4.09	3.64
Object D (Building)	-1.45	-1.92	-2.37

Note: negative value indicates inlet or probe is taller than the object; thus, airflow is not obstructed no matter the distance

Table A-12 Distance vs. Protrusion Ratio at Elk Grove-Bruceville
(must be ≥ 2)[15]

	Gaseous Probe	VOC Probe	$PM_{2.5}$ Inlet
Object A (Tree)	23.6	44.3	263.3
Object B (Tree)	16.2	20.5	28.0
Object C (Tree)	10.0	11.2	12.6
Object D (Building)	N/A	N/A	N/A

Note: N/A indicates inlet or probe is taller than the object and airflow is not obstructed; refer to the note in the previous table

[15] Per Appendix E to 40 CFR 58, "the distance from the obstacle to the probe, inlet, or monitoring path must be at least twice the height that the obstacle protrudes above the probe, inlet, or monitoring path."

Site	Elk Grove-Bruceville			
Start Date	7/1/1992	7/1/1992	7/1/1996	7/1/1996
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	Not applicable	Not applicable	Not applicable	AAC Lab
Reporting Agency	CARB	CARB	CARB	CARB
Pollutant	O3	NO2	Total NMHC	Speciated VOC
Parameter Code	44201	42602	43102	43102
Parameter Occurrence Code	1	1	1	2
Manufacturer and model	TAPI 400E	TAPI200UP	TEI 55C	Xontech 910A/912
Sampling Method	Instrumental	Instrumental	Instrumental	6L Pressurized Canister
Method Code	087	200	164	123
Analysis Method	Ultraviolet Absorption	Photolytic-Chemiluminescence	Flame Ionization Detector	Dual Flame Ionization Detector
FRM/FEM/ARM/Other	FEM	FEM	Other	Other
Monitoring objective	NAAQS comparison, public info	NAAQS comparison, public info	Public info, research	Research
Statement of Purpose	Measures background O3 concentration at upwind site	Measures background ozone precursor concentration	Measures background ozone precursor concentration	Measures background ozone precursor concentration
Monitor type	SLAMS	SLAMS	SLAMS	SLAMS
Affiliation	PAMS (Type I)	PAMS (Type I)	PAMS (Type I)	PAMS (Type I)
Site type	Upwind/Background	Upwind/Background	Upwind/Background	Upwind/Background
Spatial scale	Urban	Urban	Not applicable	Not applicable
Sampling Frequency	Continuous	Continuous	Continuous	Episodic Sampling
Sampling season	Year Round	Year Round	Year Round	July thru Sep
Distance from supporting structure or rooftop (m)	1.2	1.2	1.2	1.2
Distance from flow obstructions on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions
Distance from nearest tree drip line (m)	21.9	21.9	21.9	21.9
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	1.1 m (lo vol)	1.1 m (lo vol)	1.1 m (lo vol)	1.1 m (lo vol)
Unrestricted airflow (deg)	360	360	360	360
Probe height (m, agl)	4.5	4.5	4.5	4.9
Probe material	FEP Teflon	FEP Teflon	FEP Teflon	Stainless Steel
Residence time (seconds)	18.1	16.9	16.9	2.0
Changes in next 18 months?	No	No	No	Yes
Frequency of one-point quality control check	Every other day	Every other day	Every other day	Pre- and post-seasonally check
Last Performance Evaluation	4/7/17	4/7/17	Temporary shutdown[A]	Not applicable

[A] U.S. EPA Region 9 approved the temporary shut down on 12/1/17

Site	Elk Grove-Bruceville
Start Date	12/1/2000
Collecting Agency	Sac Metro Air District
Analytical Lab	N/A
Reporting Agency	CARB
Pollutant	PM2.5
Parameter Code	88501
Parameter Occurrence Code	3
Manufacturer and model	Met One 1020 BAM
Sampling Method	Very sharp cut cyclone
Method Code	731
Analysis Method	Beta Attenuation
FRM/FEM/ARM/Other	Other
Monitoring objective	Public info [(A)]
Statement of Purpose	Measures background concentration and transport of PM2.5 from San Joaquin Valley for PM2.5 forecasting
Monitor type	SPM
Affiliation	None
Site type	General/Background
Spatial scale	Urban
Sampling Frequency	Continuous
Sampling season	Year Round
Distance from supporting structure or rooftop (m)	2.1
Distance from flow obstructions on roof (m)	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions
Distance from nearest tree drip line (m)	21.0
Distance to furnace or incinerator flue (m)	No furnace/flue
Distance between collocated PM monitors (m)	Not collocated
Distance with nearest PM monitor (m)	Not applicable
Unrestricted airflow (deg)	360
Probe height (m, agl)	5.4
Probe material	Not applicable
Residence time (seconds)	Not applicable
Changes in next 18 months?	No
Frequency of flow rate verification	Bi-monthly
Last Performance Evaluation	4/7/17

[(A)] This PM2.5 monitor is not comparable to NAAQS because it does not meet reference method or equivalent method designation requirements

Site	Elk Grove-Bruceville			
Start Date	8/1/1996	8/1/1996	7/1/1997	8/1/1997
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	N/A	N/A	N/A	N/A
Reporting Agency	CARB	CARB	CARB	CARB
Pollutant	Outdoor Temperature	Relative Humidity	Barometric Pressure	Precipitation
Parameter Code	62101	62201	64101	65102
Parameter Occurrence Code	1	1	1	1
Manufacturer and model	Climatronics 100093	Climatronics 101669	Climatronics 101448	Climatronics 100508
Sampling Method	Instrumental	Instrumental	Instrumental	Bucket
Method Code	042	012	011	011
Analysis Method	Machine Average	Hygroscopic Plastic Film	Aneroid	Continuous Or Incremental
FRM/FEM/ARM/Other	Other	Other	Other	Other
Monitoring objective	Public info	Public info	Public info	Public info
Statement of Purpose	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology
Monitor type	Other	Other	Other	Other
Affiliation	PAMS (Type I)	PAMS (Type I)	PAMS (Type I)	PAMS (Type I)
Site type	Not applicable	Not applicable	Not applicable	Not applicable
Spatial scale	Not applicable	Not applicable	Not applicable	Not applicable
Sampling Frequency	Continuous	Continuous	Continuous	Continuous
Sampling season	Year Round	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	No supporting structure	No supporting structure	No supporting structure	No supporting structure
Distance from flow obstructions on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions
Distance from nearest tree drip line (m)	Not applicable	Not applicable	Not applicable	Not applicable
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	Not applicable	Not applicable	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360	360	360
Probe height (m, agl)	10.0	10.0	10.0	1.6
Probe material	Not applicable	Not applicable	Not applicable	Not applicable
Residence time (seconds)	Not applicable	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	No	No	No
Frequency of one-point quality control check	N/A	N/A	N/A	N/A
Last Performance Evaluation	Temporary shutdown[(A)]	Not applicable	Temporary shutdown[(A)]	Not applicable

[(A)] U.S. EPA Region 9 approved the temporary shut down on 4/15/16

Site	Elk Grove-Bruceville			
Start Date	8/1/1996	8/1/1997	8/1/1996	8/1/1996
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	N/A	N/A	N/A	N/A
Reporting Agency	CARB	CARB	CARB	CARB
Pollutant	Solar Radiation	UV Radiation	Wind Direction	Wind Speed
Parameter Code	63301	63302	61104	61103
Parameter Occurrence Code	1	1	1	1
Manufacturer and model	Climatronics 100848	Climatronics 100TUVR	Climatronics F-460	Climatronics F-460
Sampling Method	Instrumental	Instrumental	Instrumental	Instrumental
Method Code	011	011	020	020
Analysis Method	Pyranometer	UV Radiometer (Photometer)	Vector Summation	Vector Summation
FRM/FEM/ARM/Other	Other	Other	Other	Other
Monitoring objective	Public info	Public info	Public info, research	Public info, research
Statement of Purpose	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology
Monitor type	Other	Other	Other	Other
Affiliation	PAMS (Type I)	PAMS (Type I)	PAMS (Type I)	PAMS (Type I)
Site type	Not applicable	Not applicable	Not applicable	Not applicable
Spatial scale	Not applicable	Not applicable	Not applicable	Not applicable
Sampling Frequency	Continuous	Continuous	Continuous	Continuous
Sampling season	Year Round	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	No supporting structure	No supporting structure	No supporting structure	No supporting structure
Distance from flow obstructions on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions
Distance from nearest tree drip line (m)	Not applicable	Not applicable	Not applicable	Not applicable
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	Not applicable	Not applicable	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360	360	360
Probe height (m, agl)	10.0	10.0	10.0	10.0
Probe material	Not applicable	Not applicable	Not applicable	Not applicable
Residence time (seconds)	Not applicable	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	No	No	No
Frequency of one-point quality control check	N/A	N/A	N/A	N/A
Last Performance Evaluation	Not applicable	Not applicable	Temporary shutdown[(A)]	Temporary shutdown[(A)]

[(A)] U.S. EPA Region 9 approved the temporary shut down on 4/15/16

Site	Elk Grove-Bruceville
Start Date	6/1/1996
Collecting Agency	Sac Metro Air District
Analytical Lab	N/A
Reporting Agency	N/A
Pollutant	Upper Level Wind and Virtual Temperature
Parameter Code	Not applicable
Parameter Occurrence Code	Not applicable
Manufacturer and model	Radian LAP-3000 with RASS option
Sampling Method	Not applicable
Method Code	Not applicable
Analysis Method	915 MHz Radar Wind Profiler, with RASS
FRM/FEM/ARM/Other	Other
Monitoring objective	Public info, research
Statement of Purpose	Measures representative upper level meteorology
Monitor type	Other
Affiliation	PAMS (Type I)
Site type	Not applicable
Spatial scale	Not applicable
Sampling Frequency	Continuous
Sampling season	Year Round
Distance from supporting structure or rooftop (m)	No supporting structure
Distance from flow obstructions on roof (m)	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions
Distance from nearest tree drip line (m)	> 20 m
Distance to furnace or incinerator flue (m)	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable
Distance with nearest PM monitor (m)	Not applicable
Unrestricted airflow (deg)	360
Probe height (m, agl)	Not applicable
Probe material	Not applicable
Residence time (seconds)	Not applicable
Changes in next 18 months?	No
Frequency of one-point quality control check	N/A
Last Performance Evaluation	Malfunctioned[(A)]

[(A)] According to the PAMS Network Operations report submitted to U.S. EPA on 9/15/17 and internal District QC document, the radar wind profiler malfunctioned starting 10/25/16

A.4 Sacramento-Del Paso Manor

This air monitoring site was initiated in 1979 and eventually became the largest air monitoring site in the Sacramento Valley Air Basin. This site is also one of the largest in Northern California, in terms of number of parameters measured. In October 2009, U.S. EPA Region 9 approved Sacramento-Del Paso Manor as an NCore site. This is one of six NCore sites operating in California. Also, Sacramento-Del Paso Manor is a design value site for $PM_{2.5}$, which means that this site has the highest $PM_{2.5}$ design value in the $PM_{2.5}$ non-attainment area.

Located just downwind of Downtown Sacramento, Sacramento-Del Paso Manor is a PAMS Type II primary site. It monitors for NMHC year-round and speciated VOC and carbonyl during the summer.

Speciation monitors at this site are part of the Chemical Speciation Network and Speciated Trends Network. A URG3000N sampler was installed in April 2009. The Met One Spiral Aerosol Speciation Sampler has been in service for many years.

Table A-13 Sacramento-Del Paso Manor Metadata

Site Name	Sacramento-Del Paso Manor
AQS Site No.	06-067-0006
Geographic Coordinates	38.613740°N, 121.368040°W
Location	Neighborhood park located 7 miles east-northeast of downtown Sacramento.
Address	2701 Avalon Drive, Sacramento, CA 95821
County	Sacramento
Distance from roadway	56 m
Annual Average Daily Traffic (Vehicles/Day)	Avalon Dr. south of Annette St.: 1,000 (estimated, two-lanes suburban local residential road)
Ground Cover	Vegetated
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

Figure A-16 Panoramic view toward north from air monitoring station roof

Figure A-17 Panoramic view toward east from air monitoring station roof

Figure A-18 Panoramic view toward south from air monitoring station roof

Figure A-19 Panoramic view toward west from air monitoring station roof

Figure A-20 Google Earth satellite image of Sacramento-Del Paso Manor

The circle in Figure A-20 indicates no trees exist within a 10 m radius, which satisfy a siting criteria that requires drip lines of trees to be at least 10 m away from probes and inlets (40 CFR Part 58, Appendix E). Also, heights of the trees and building were calculated on-site with trigonometry on 5/3/18. Analyses in Tables A-14 thru A-16 show the objects identified above do not restrict air flow to the roof top inlets and samplers. Therefore, each inlet and sampler has 360° of unrestricted airflow.

Table A-14 Distance between Object and Inlet or Probe at Sacramento-Del Paso Manor
All units in meter

	Gaseous Probe	NO_Y Probe	PM_{10} Inlet (Primary)	PM_{10} Inlet (Collocated)	Black Carbon Inlet	VOC Inlet
Object A (Tree)	23.77	23.77	24.69	22.86	23.77	21.95
Object B (Tree)	32.92	31.09	31.09	30.18	32.00	34.75
Object C (Tree)	27.43	22.86	22.86	21.95	23.77	27.43
Object D (Tree)	42.06	35.66	35.66	36.58	39.32	41.15
Object E (Tree)	55.78	53.04	53.04	53.95	54.86	56.69
Object F (Tree)	31.09	29.26	29.26	30.18	30.18	32.00
Object G (Tree)	46.63	44.81	44.81	45.72	46.63	47.55
Object H (Building)	17.40	16.50	19.20	16.50	16.50	17.40
Object I (Tree)	40.23	42.06	41.15	43.89	41.15	41.15
Object J (Tree)	42.06	44.81	44.81	45.72	43.89	44.81
Object K (Tree)	44.81	47.55	46.63	48.46	46.63	45.72
	$PM_{2.5}$ Inlet	$PM_{2.5}$ Inlet	$PM_{10\text{-}2.5}$ Inlet	$PM_{2.5}$ Inlet	$PM_{2.5}$ Inlet	Carbon
Object A (Tree)	22.86	23.77	23.77	21.95	21.03	21.95
Object B (Tree)	36.58	36.58	36.58	32.92	32.92	36.58
Object C (Tree)	28.35	28.35	27.43	28.35	28.35	28.35
Object D (Tree)	42.06	42.06	41.15	42.06	41.15	42.06
Object E (Tree)	55.78	55.78	54.86	55.78	55.78	57.61
Object F (Tree)	30.18	30.18	30.18	32.00	31.09	31.09
Object G (Tree)	47.55	47.55	47.55	48.46	49.38	49.38
Object H (Building)	16.50	15.50	15.50	17.40	20.10	18.30
Object I (Tree)	39.32	38.40	39.32	41.15	43.89	41.15
Object J (Tree)	42.06	41.15	41.15	43.89	45.72	42.98
Object K (Tree)	43.89	42.06	44.81	45.72	45.72	43.89

Table A-15 Object Protrusion above Inlet or Probe at Sacramento-Del Paso Manor

	Gaseous Probe	NO_Y Probe	PM_{10} Inlet (Primary)	PM_{10} Inlet (Collocated)	Black Carbon Inlet	VOC Inlet
Object A (Tree)	6.46	-1.54	6.5	6.46	6.56	6.26
Object B (Tree)	6.67	-1.33	6.7	6.67	6.77	6.47
Object C (Tree)	2.57	-5.43	2.6	2.57	2.67	2.37
Object D (Tree)	5.98	-2.02	6.0	5.98	6.08	5.78
Object E (Tree)	6.80	-1.20	6.80	6.80	6.90	6.60
Object F (Tree)	8.11	0.11	8.11	8.11	8.21	7.91
Object G (Tree)	7.36	-0.64	7.36	7.36	7.46	7.16
Object H (Building)	-0.78	-8.78	-0.78	-0.78	-0.68	-0.98
Object I (Tree)	9.57	1.57	9.57	9.57	9.67	9.37
Object J (Tree)	6.49	-1.51	6.49	6.49	6.59	6.29
Object K (Tree)	10.18	2.18	10.18	10.18	10.28	9.98
	$PM_{2.5}$ Inlet	$PM_{2.5}$ Inlet	$PM_{10\text{-}2.5}$ Inlet	$PM_{2.5}$ Inlet	$PM_{2.5}$ Inlet	Carbon
Object A (Tree)	6.36	6.36	6.36	6.46	6.46	6.36
Object B (Tree)	6.57	6.57	6.57	6.67	6.67	6.57
Object C (Tree)	2.47	2.47	2.47	2.57	2.57	2.47
Object D (Tree)	5.88	5.88	5.88	5.98	5.98	5.88
Object E (Tree)	6.70	6.70	6.70	6.80	6.80	6.70
Object F (Tree)	8.01	8.01	8.01	8.11	8.11	8.01
Object G (Tree)	7.26	7.26	7.26	7.36	7.36	7.26
Object H (Building)	-0.88	-0.88	-0.88	-0.78	-0.78	-0.88
Object I (Tree)	9.47	9.47	9.47	9.57	9.57	9.47
Object J (Tree)	6.39	6.39	6.39	6.49	6.49	6.39
Object K (Tree)	10.08	10.08	10.08	10.18	10.18	10.08

Note: negative value indicates inlet or probe is taller than the object; thus, airflow is not obstructed no matter the distance

Table A-16 Distance vs. Protrusion Ratio at Sacramento-Del Paso Manor (must be ≥ 2)[16]

	Gaseous Probe	NO_Y Probe	PM_{10} Inlet (Primary)	PM_{10} Inlet (Collocated)	Black Carbon Inlet	VOC Inlet
Object A (Tree)	3.7	N/A	3.8	3.5	3.6	3.5
Object B (Tree)	4.9	N/A	4.7	4.5	4.7	5.4
Object C (Tree)	10.7	N/A	8.9	8.5	8.9	11.6
Object D (Tree)	7.0	N/A	6.0	6.1	6.5	7.1
Object E (Tree)	8.2	N/A	7.8	7.9	7.9	8.6
Object F (Tree)	3.8	258.7	3.6	3.7	3.7	4.0
Object G (Tree)	6.3	N/A	6.1	6.2	6.3	6.6
Object H (Building)	N/A	N/A	N/A	N/A	N/A	N/A
Object I (Tree)	4.2	26.9	4.3	4.6	4.3	4.4
Object J (Tree)	6.5	N/A	6.9	7.0	6.7	7.1
Object K (Tree)	4.4	21.8	4.6	4.8	4.5	4.6
	Gaseous Probe	NO_Y Probe	PM_{10} Inlet (Primary)	PM_{10} Inlet (Collocated)	Black Carbon Inlet	VOC Inlet
Object A (Tree)	3.6	3.7	3.7	3.4	3.3	3.4
Object B (Tree)	5.6	5.6	5.6	4.9	4.9	5.6
Object C (Tree)	11.5	11.5	11.1	11.0	11.0	11.5
Object D (Tree)	7.2	7.2	7.0	7.0	6.9	7.2
Object E (Tree)	8.3	8.3	8.2	8.2	8.2	8.6
Object F (Tree)	3.8	3.8	3.8	3.9	3.8	3.9
Object G (Tree)	6.6	6.6	6.6	6.6	6.7	6.8
Object H (Building)	N/A	N/A	N/A	N/A	N/A	N/A
Object I (Tree)	4.2	4.1	4.2	4.3	4.6	4.3
Object J (Tree)	6.6	6.4	6.4	6.8	7.0	6.7
Object K (Tree)	4.4	4.2	4.4	4.5	4.5	4.4

Note: N/A indicates inlet or probe is taller than the object and airflow is not obstructed; refer to the note in the previous table

[16] Per Appendix E to 40 CFR 58, "the distance from the obstacle to the probe, inlet, or monitoring path must be at least twice the height that the obstacle protrudes above the probe, inlet, or monitoring path."

Site	Sacramento-Del Paso Manor			
Start Date	12/1/1979	7/1/2011	5/1/2013	7/1/2011
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	N/A	N/A	N/A	N/A
Reporting Agency	CARB	CARB	CARB	CARB
Pollutant	O3	CO	NO2	NOY
Parameter Code	44201	42101	42602	42600
Parameter Occurrence Code	1	1	1	1
Manufacturer and model	TAPI 400E	TAPI 300EU	TAPI200UP	TEI 42I-Y
Sampling Method	Instrumental	Instrumental	Instrumental	Instrumental
Method Code	087	593	200	574
Analysis Method	Ultraviolet Absorption	Gas Filter Correlation	Photolytic-Chemiluminescence	Chemiluminescence
FRM/FEM/ARM/Other	FEM	FRM	FEM	Other
Monitoring objective	NAAQS comparison, public info, research	NAAQS comparison, public info, research	NAAQS comparison, public info, research	Public info, research
Statement of Purpose	Measures elevated summer O3 levels near the downwind edge of the central business district	Measures representative wintertime CO concentration in populated area	Measures O3 precursor emission near downwind edge of central business district	Measures representative concentration in populated area
Monitor type	SLAMS	SLAMS	SLAMS	SLAMS
Affiliation	NCORE, PAMS (Type II)	NCORE, PAMS (Type II)	NCORE, PAMS (Type II)	NCORE
Site type	Population Exposure	Population Exposure	Population Exposure	Population Exposure
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Not applicable
Sampling Frequency	Continuous	Continuous	Continuous	Continuous
Sampling season	Year Round	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	2.0	2.0	2.0	Not applicable
Distance from flow obstructions on roof	No obstructions	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions
Distance from nearest tree drip line (m)	21.9	21.9	21.9	22.9
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	1.1 m (lo vol)	1.1 m (lo vol)	1.1 m (lo vol)	Not applicable
Unrestricted airflow (deg)	360	360	360	360
Probe height (m, agl)	5.3	5.3	5.3	10.0
Probe material	FEP Teflon	FEP Teflon	FEP Teflon	FEP Teflon
Residence time (seconds)	15.2	13.4	15.0	4.0
Changes in next 18 months?	No	No	No	No
Frequency of one-point quality control check	Every fourth day	Every fourth day	Every fourth day	Every fourth day
Last Performance Evaluation	11/17/17	11/21/17	11/17/17	Not applicable

Site	Sacramento-Del Paso Manor			
Start Date	7/1/2011	8/1/1994	8/1/1994	8/1/1996
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	N/A	N/A	AAC Lab	ERG, Inc.
Reporting Agency	CARB	CARB	CARB	CARB
Pollutant	SO2	Total NMHC	Speciated VOC	Carbonyl
Parameter Code	42401	43102	43102	Multiple
Parameter Occurrence Code	1	2	1	1
Manufacturer and model	TAPI 100EU	TEI 55C	Xontech 910A/912	Xontech 925
Sampling Method	Instrumental	Instrumental	6L Pressurized Canister	DNPH Silica gel
Method Code	600	164	123	202
Analysis Method	Ultraviolet Fluorescence	Flame Ionization Detector	Dual Flame Ionization Detector	(multiple)
FRM/FEM/ARM/Other	FEM	Other	Other	Other
Monitoring objective	NAAQS comparison, public info, research	Public info, research	Research	Research
Statement of Purpose	Measures representative concentration in populated area	Measures O3 precursor emission near downwind edge of central business district	Measures O3 precursor emission near downwind edge of central business district	Measures O3 precursor emission near downwind edge of central business district
Monitor type	SLAMS	SLAMS	SLAMS	SLAMS
Affiliation	NCORE	PAMS (Type II)	PAMS (Type II)	PAMS (Type II)
Site type	Population Exposure	Highest concentration, population exposure	Highest concentration, population exposure	Highest concentration, population exposure
Spatial scale	Urban	Not applicable	Not applicable	Not applicable
Sampling Frequency	Continuous	Continuous	1 in 3 days	1 in 3 days
Sampling season	Year Round	Year Round	July thru Sep	July thru Sep
Distance from supporting structure or rooftop (m)	2.0	2.0	2.2	2.2
Distance from flow obstructions on roof	No obstructions	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions
Distance from nearest tree drip line (m)	21,9	21.9	21.0	21.0
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	1.1 m (lo vol)	1.1 m (lo vol)	1.0 m (lo vol)	1.0 m (lo vol)
Unrestricted airflow (deg)	360	360	360	360
Probe height (m, agl)	5.3	5.3	5.5	5.5
Probe material	FEP Teflon	FEP Teflon	Stainless Steel	Stainless Steel
Residence time (seconds)	14.7	17.0	3.0	3.0
Changes in next 18 months?	No	No	No	No
Frequency of one-point quality control check	Every fourth day	Every fourth day	Pre- and post-seasonally check	Pre- and post-seasonally check
Last Performance Evaluation	11/21/17	Temporary shutdown[(A)]	Not applicable	Not applicable

[(A)] U.S. EPA Region 9 approved the temporary shut down on 12/1/17

Site	Sacramento-Del Paso Manor		
Start Date	12/1/2001	1/1/1986	1/1/1986
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	N/A	Sac Metro Air District	Sac Metro Air District
Reporting Agency	CARB	CARB	CARB
Pollutant	Black Carbon	PM10 (Primary monitor)	PM10 (Audit monitor)
Parameter Code	84313	81102	81102
Parameter Occurrence Code	1	1	2
Manufacturer and model	Magee Scientific M633	Sierra Anderson 1200	Sierra Anderson 1200
Sampling Method	Aethalometer	Hi Volume	Hi Volume
Method Code	894	063	063
Analysis Method	Optical Absorption	Gravimetric	Gravimetric
FRM/FEM/ARM/Other	Other	FRM	FRM
Monitoring objective	Research	NAAQS comparison, public info	NAAQS comparison, public info
Statement of Purpose	Installed for CRPAQS[(A)] study in 1999	Measures wintertime elevated PM level from motor vehicles and residential wood combustion	Collocated for QA purpose and provides substitute data if necessary
Monitor type	SPM	SLAMS	SLAMS
Affiliation	None	None	None
Site type	Population Exposure	Population Exposure	Population Exposure
Spatial scale	Not applicable	Neighborhood	Neighborhood
Sampling Frequency	Continuous	1 in 6 days	1 in 6 days
Sampling season	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	1.9	2.0	2.0
Distance from flow obstructions on roof	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions	No obstructions
Distance from nearest tree drip line (m)	21.9	20.1	21.9
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	2.2 m	2.2 m
Distance with nearest PM monitor (m)	1.8 m (lo vol)	2.1 m (lo vol)	2.2 m (hi vol)
Unrestricted airflow (deg)	360	360	360
Probe height (m, agl)	5.2	5.3	5.3
Probe material	Aluminum	Not applicable	Not applicable
Residence time (seconds)	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	No	No
Frequency of flow rate verification	Monthly	Monthly	Monthly
Last Performance Evaluation	Not applicable	4/24/17, 11/17/17	4/24/17, 11/17/17

[(A)] California Regional Particulate Air Quality Study

Site	Sacramento-Del Paso Manor			
Start Date	1/1/1999	2/1/1999	5/1/2000	2/1/2000
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	CARB	CARB	N/A	RTI
Reporting Agency	CARB	CARB	CARB	RTI
Pollutant	PM2.5 (Primary monitor)	PM2.5 (Audit monitor)	PM2.5	PM2.5 Mass Speciated
Parameter Code	88101	88101	88502	88502
Parameter Occurrence Code	1	2	3	5
Manufacturer and model	R & P 2025	R & P 2025	Met One 1020 BAM	Met One SASS
Sampling Method	Low volume with VSCC	Low volume with VSCC	Very sharp cut cyclone	Sharp cut cyclone
Method Code	118	118	731	810
Analysis Method	Gravimetric	Gravimetric	Beta Attenuation	Gravimetric
FRM/FEM/ARM/Other	FRM	FRM	Other	Other
Monitoring objective	NAAQS Comparison, research, public info	NAAQS Comparison, research	Public info, research[(A)]	Research
Statement of Purpose	Measures wintertime elevated PM level from motor vehicles and residential wood combustion	Collocated for QA purpose and provides substitute data if necessary	Provides real time PM Measurement from motor vehicles and residential wood combustion	Provides speciation data on urban PM emission
Monitor type	SLAMS	SLAMS	SLAMS	SLAMS
Affiliation	NCORE	None	NCORE	CSN STN, NCORE
Site type	Highest concentration, population exposure	Highest concentration, population exposure	Highest concentration, population exposure	Highest concentration, population exposure
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling Frequency	1 in 3 days	1 in 12 days	Continuous	1 in 3 days
Sampling season	Year Round	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	2.1	2.1	2.0	2.0
Distance from flow obstructions on roof	No obstructions	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions
Distance from nearest tree drip line (m)	21.9	23.8	23.8	21.0
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	1.6 m	1.6 m	Not applicable	Not applicable
Distance with nearest PM monitor (m)	1.5 m (lo vol)	1.6 m (lo vol)	1.4 (lo vol)	2.2 m (hi vol)
Unrestricted airflow (deg)	360	360	360	360
Probe height (m, agl)	5.4	5.4	5.3	5.3
Probe material	Not applicable	Not applicable	Not applicable	Not applicable
Residence time (seconds)	Not applicable	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	No	No	No
Frequency of flow rate verification	Monthly	Monthly	Bi-monthly	Monthly
Last Performance Evaluation	4/24/17, 11/17/17	4/24/17, 11/17/17	4/24/17, 11/17/17	3/30/17

[(A)] This PM2.5 monitor is not comparable to NAAQS because it does not meet reference method or equivalent method designation requirements

Site	Sacramento-Del Paso Manor		
Start Date	4/1/2009	4/1/2012	4/1/2012
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	RTI	CARB	AAC Lab
Reporting Agency	RTI	CARB	CARB
Pollutant	OC & EC	PM10	Pb
Parameter Code	(multiple)[A]	85101	85129
Parameter Occurrence Code	5	7	4
Manufacturer and model	URG 3000N	R & P 2025	R & P 2025
Sampling Method	Quartz filter and cyclone inlet	Low volume with VSCC	Low volume with VSCC
Method Code	842, 826	127	811
Analysis Method	(multiple)	Gravimetric	X-Ray Fluorescence (EDXRF)
FRM/FEM/ARM/Other	Other	FRM	FRM
Monitoring objective	Research	Public info, research	NAAQS comparison, public info, research
Statement of Purpose	Provides speciation data on urban PM emission	Measures PM mass to provide PM10-2.5 data	Measures representative Pb concentration
Monitor type	SLAMS	SLAMS	SLAMS
Affiliation	CSN STN, NCORE	NCORE	NCORE (Non-source)
Site type	Highest concentration	Population Exposure	Population Exposure
Spatial scale	Neighborhood	Neighborhood	Urban
Sampling Frequency	1 in 3 days	1 in 3 days	1 in 6 days
Sampling season	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	2.1	2.1	2.1
Distance from flow obstructions on roof	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions	No obstructions
Distance from nearest tree drip line (m)	20.1	23.8	23.8
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	1.7 m (lo vol)	1.9 m (lo vol)	1.8 (lo vol)
Unrestricted airflow (deg)	360	360	360
Probe height (m, agl)	5.4	5.4	5.4
Probe material	Not applicable	Not applicable	Not applicable
Residence time (seconds)	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	No	No
Frequency of flow rate verification	Monthly	Monthly	Monthly
Last Performance Evaluation	3/30/17	4/24/17, 11/17/17	4/24/17, 11/17/17

[A] 88355, 88357, 88370, 88374, 88375, 88376, 88377, 88378, 88380, 88383, 88384, 88385, 88388

Site	Sacramento-Del Paso Manor				
Start Date	8/1/1994	8/1/1994	9/1/1994	8/1/1994	8/1/1994
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	N/A	N/A	N/A	N/A	N/A
Reporting Agency	CARB	CARB	CARB	CARB	CARB
Pollutant	Outdoor Temperature	Relative Humidity	Solar Radiation	Wind Direction	Wind Speed
Parameter Code	62101	62201	63301	61104	61103
Parameter Occurrence Code	1	1	1	1	1
Manufacturer and model	Climatronics 100093	Climatronics 101669	Climatronics 100848	Climatronics F-460	Climatronics F-460
Sampling Method	Instrumental	Instrumental	Instrumental	Instrumental	Instrumental
Method Code	042	012	011	020	020
Analysis Method	Machine Average	Hygroscopic Plastic Film	Pyranometer	Vector Summation	Vector Summation
FRM/FEM/ARM/Other	Other	Other	Other	Other	Other
Monitoring objective	Public info, research	Public info, research	Public info	Public info, research	Public info, research
Statement of Purpose	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology
Monitor type	Other	Other	Other	Other	Other
Affiliation	NCORE, PAMS (Type II)	NCORE, PAMS (Type II)	NCORE, PAMS (Type II)	NCORE, PAMS (Type II)	NCORE, PAMS (Type II)
Site type	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Spatial scale	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Sampling Frequency	Continuous	Continuous	Continuous	Continuous	Continuous
Sampling season	Year Round	Year Round	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	No supporting structure	No supporting structure	No supporting structure	No supporting structure	No supporting structure
Distance from flow obstructions on roof	No obstructions	No obstructions	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions	No obstructions
Distance from nearest tree drip line (m)	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360	360	360	360
Probe height (m, agl)	10.0	10.0	10.0	10.0	10.0
Probe material	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Residence time (seconds)	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	No	No	No	No
Frequency of one-point quality control check	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Last Performance Evaluation	11/17/17	Not applicable	Not applicable	11/17/17	11/17/17

A.5 Folsom-Natoma St

This site has been in operation since 1996. This site replaced the former Folsom-Leidesdorff Street site. Approximately 20 miles northeast of Downtown Sacramento, Folsom-Natoma site is the maximum summertime O_3 monitoring site within Sacramento County, for days with the prevailing afternoon southwesterly winds. This is a PAMS Type III site.

Table A-17 Folsom-Natoma St. Metadata

Site Name	Folsom-Natoma Street
AQS Site No.	06-067-0012
Geographic Coordinates	38.683304°N, 121.164457°W
Location	Folsom City Hall (parking lot), located 20 miles east-northeast of downtown Sacramento.
Address	50 Natoma Street, Folsom, CA 95630
County	Sacramento
Distance from roadway	206 m
Annual Average Daily Traffic (Vehicles/Day)	Natoma St. southwest of Randall Dr.: 11,059 (City of Folsom, 2010)
Ground Cover	Vegetated
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

Figure A-21 Panoramic view toward north from air monitoring station roof

Figure A-22 Panoramic view toward east from air monitoring station roof

Figure A-23 Panoramic view toward south from air monitoring station roof

Figure A-24 Panoramic view toward west from air monitoring station roof

Figure A-25 Google Earth satellite image of Folsom-Natoma St.

The circle over Folsom-Natoma in Figure A-25 indicates no trees exist within a 10 m radius, which satisfy a siting criteria that requires drip lines of trees to be at least 10 m away from probes and inlets (40 CFR Part 58, Appendix E). Also, height of the tree and building were calculated on-site with trigonometry on 5/2/18. Analyses in Tables A-18 thru A-20 show the objects identified above do not restrict air flow to the roof top inlets and samplers. Therefore, each inlet and sampler has 360° of unrestricted airflow.

Sac Metro Air District is proposing to place a temporary monitoring trailer near the Folsom air monitoring station while the station shelter is being replaced. The District will work with CARB and U.S. EPA prior to operating the temporary monitors and ensure that the location for the temporary trailer will meet siting requirements as specified in 40 CFR Part 58, Appendix E.

Table A-18 Distance between Object and Inlet or Probe at Folsom-Natoma St. All units in meter

	Gaseous Probe	NO_Y Probe	VOC	PM2.5 (Primary)	PM2.5 (Collocation)
Object A (TV Tower)	7.32	5.49	7.32	9.14	6.40
Object B (Building)	10.97	10.97	10.97	13.72	12.80
Object C (Building)	15.54	13.72	15.54	17.37	17.37
Object D (Building)	6.40	5.49	6.40	9.14	10.06
Object E (Building)	12.80	14.63	12.80	11.89	10.97
Object F (Building)	7.32	9.14	7.32	7.32	5.49
Object G (Tree)	16.46	18.29	16.46	15.54	14.63

Table A-19 Object Protrusion above Inlet or Probe at Folsom-Natoma St. All units in meter

	Gaseous Probe	NO_Y Probe	VOC	PM2.5 (Primary)	PM2.5 (Collocation)
Object A (TV Tower)	19.75	19.75	19.8	19.50	19.50
Object B (Building)	-3.05	-3.05	-3.1	-3.30	-3.30
Object C (Building)	-3.05	-3.05	-3.1	-3.30	-3.30
Object D (Building)	-3.05	-3.05	-3.1	-3.30	-3.30
Object E (Building)	-2.95	-2.95	-2.95	-3.20	-3.20
Object F (Building)	-2.45	-2.45	-2.45	-2.70	-2.70
Object G (Tree)	3.14	3.14	3.14	2.89	2.89

Note: negative value indicates inlet or probe is taller than the object; thus, airflow is not obstructed no matter the distance

Table A-20 Distance vs. Protrusion Ratio at Folsom-Natoma St. (must be ≥ 2)[17]

	Gaseous Probe	NO_Y Probe	VOC	PM2.5 (Primary)	PM2.5 (Collocation)
Object A (TV Tower)	0.4[(A)]	0.3[(A)]	0.4[(A)]	0.5[(A)]	0.3[(A)]
Object B (Building)	N/A	N/A	N/A	N/A	N/A
Object C (Building)	N/A	N/A	N/A	N/A	N/A
Object D (Building)	N/A	N/A	N/A	N/A	N/A
Object E (Building)	N/A	N/A	N/A	N/A	N/A
Object F (Building)	N/A	N/A	N/A	N/A	N/A
Object G (Tree)	5.2	5.8	5.2	5.4	5.1

[(A)] Object A is a broadcast tower with open frame structure. Even though it does not meet the ratio require, it does not block air flow to any probe or inlet

Note: N/A indicates inlet or probe is taller than the object and airflow is not obstructed; refer to the note in the previous table

[17] Per Appendix E to 40 CFR 58, "the distance from the obstacle to the probe, inlet, or monitoring path must be at least twice the height that the obstacle protrudes above the probe, inlet, or monitoring path."

Site	Folsom-Natoma St.				
Start Date	7/1/1996	7/1/1996	7/1/2011	7/1/1996	7/1/1996
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	N/A	N/A	N/A	N/A	N/A
Reporting Agency	CARB	CARB	CARB	CARB	CARB
Pollutant	O3	NO2	NOY	Total NMHC	Speciated VOC
Parameter Code	44201	42602	42600	43102	43102
Parameter Occurrence Code	1	1	1	1	2
Manufacturer and model	TAPI 400E	TAPI200UP	TEI 42I-Y	TEI 55C	Xontech 910A/912
Sampling Method	Instrumental	Instrumental	Instrumental	Instrumental	6L Pressurized Canister
Method Code	087	200	574	164	123
Analysis Method	Ultraviolet Absorption	Photolytic-Chemiluminescence	Chemiluminescence	Flame Ionization Detector	Dual Flame Ionization Detector
FRM/FEM/ARM/Other	FEM	FEM	Other	Other	Other
Monitoring objective	NAAQS comparison, public info	NAAQS comparison, public info	Public info, research	Public info, research	Research
Statement of Purpose	Measure highest summer O3 level downwind of urban area	Measures concentration downwind of urban area	Measures representative concentration	Measures concentration downwind of urban area	Measures concentration downwind of urban area
Monitor type	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS
Affiliation	PAMS (Type III)	PAMS (Type III)	PAMS (Type III)	PAMS (Type III)	PAMS (Type III)
Site type	Max O3 Concentration, Population Exposure	Highest concentration	Population Exposure	Highest concentration	Highest concentration
Spatial scale	Neighborhood	Neighborhood	Not applicable	Not applicable	Not applicable
Sampling Frequency	Continuous	Continuous	Continuous	Continuous	1 in 3 days
Sampling season	Year Round	Year Round	Year Round	Year Round	July thru Sep
Distance from supporting structure or rooftop (m)	1.9	1.9	Not applicable	1.9	1.9
Distance from flow obstructions on roof (m)	No obstruction	No obstruction	No obstruction	No obstruction	No obstruction
Distance from flow obstructions not on roof (m)	No obstruction	No obstruction	No obstruction	No obstruction	No obstruction
Distance from nearest tree drip line (m)	15.5	15.5	14.6	15.5	13.7
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	2.2 (lo vol)	2.2 (lo vol)	2.2 (lo vol)	2.2 (lo vol)	2.2 (lo vol)
Unrestricted airflow (deg)	360	360	360	360	360
Probe height (m, agl)	5.5	5.5	10.0	5.5	5.5
Probe material	FEP Teflon	FEP Teflon	FEP Teflon	FEP Teflon	Stainless Steel
Residence time (seconds)	13.9	12.7	9.0	13.7	3.0
Changes in next 18 months?	No	No	No	No	No
Frequency of one-point quality control check	Every other day	Every other day	Every other day	Every other day	Pre- and post-seasonally check
Last Performance Evaluation	5/4/17	5/4/17	Not applicable	Temporary shutdown[(A)]	Not applicable

[(A)] U.S. EPA Region 9 approved the temporary shut down on 12/1/17

Site	Folsom-Natoma St.	
Start Date	4/1/2013	7/1/2015
Collecting Agency	Sac Metro Air District	Sac Metro Air District
Analytical Lab	N/A	N/A
Reporting Agency	CARB	CARB
Pollutant	PM2.5 (Primary monitor)	PM2.5 (Audit monitor)
Parameter Code	88101	88101
Parameter Occurrence Code	3	4
Manufacturer and model	Met One 1020 BAM	Met One 1020 BAM
Sampling Method	Very sharp cut cyclone	Very sharp cut cyclone
Method Code	170	170
Analysis Method	Beta Attenuation	Beta Attenuation
FRM/FEM/ARM/Other	FEM	FEM
Monitoring objective	NAAQS comparison, public info, research	NAAQS comparison, public info, research
Statement of Purpose	Measures representative concentration	Collocated for QA purpose and provides substitute data if necessary
Monitor type	SLAMS	SLAMS
Affiliation	None	None
Site type	Population Exposure	Population Exposure
Spatial scale	Neighborhood	Neighborhood
Sampling Frequency	Continuous	Continuous
Sampling season	Year Round	Year Round
Distance from supporting structure or rooftop (m)	2.1	2.1
Distance from flow obstructions on roof (m)	No obstruction	No obstruction
Distance from flow obstructions not on roof (m)	No obstruction	No obstruction
Distance from nearest tree drip line (m)	12.8	11.9
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	2.0	2.0
Distance with nearest PM monitor (m)	2.0 m (lo vol)	2.0 m (lo vol)
Unrestricted airflow (deg)	360	360
Probe height (m, agl)	5.7	5.7
Probe material	Aluminum	Aluminum
Residence time (seconds)	Not applicable	Not applicable
Changes in next 18 months?	No	No
Frequency of flow rate verification	Bi-monthly	Bi-monthly
Last Performance Evaluation	5/4/17, 10/6/17	5/4/17, 10/6/17

Site	Folsom-Natoma St.				
Start Date	7/1/1996	7/1/1996	7/1/1996	7/1/1996	7/1/1996
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	N/A	N/A	N/A	N/A	N/A
Reporting Agency	CARB	CARB	CARB	CARB	CARB
Pollutant	Outdoor Temperature	Relative Humidity	Solar Radiation	Wind Direction	Wind Speed
Parameter Code	62101	62201	63301	61104	61103
Parameter Occurrence Code	1	1	1	1	1
Manufacturer and model	Climatronics 100093	Climatronics 101669	Climatronics 100848	Climatronics F-460	Climatronics F-460
Sampling Method	Instrumental	Instrumental	Instrumental	Instrumental	Instrumental
Method Code	042	012	011	020	020
Analysis Method	Machine Average	Hygroscopic Plastic Film	Pyranometer	Vector Summation	Vector Summation
FRM/FEM/ARM/Other	Other	Other	Other	Other	Other
Monitoring objective	Public info	Public info	Public info	Public info, research	Public info, research
Statement of Purpose	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology
Monitor type	Other	Other	Other	Other	Other
Affiliation	PAMS (Type III)	PAMS (Type III)	PAMS (Type III)	PAMS (Type III)	PAMS (Type III)
Site type	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Spatial scale	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Sampling Frequency	Continuous	Continuous	Continuous	Continuous	Continuous
Sampling season	Year Round	Year Round	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	No supporting structure	No supporting structure	No supporting structure	No supporting structure	No supporting structure
Distance from flow obstructions on roof (m)	No obstruction	No obstruction	No obstruction	No obstruction	No obstruction
Distance from flow obstructions not on roof (m)	No obstruction	No obstruction	No obstruction	No obstruction	No obstruction
Distance from nearest tree drip line (m)	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360	360	360	360
Probe height (m, agl)	10.0	10.0	10.0	10.0	10.0
Probe material	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Residence time (seconds)	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	No	No	No	No
Frequency of one-point quality control check	N/A	N/A	N/A	N/A	N/A
Last Performance Evaluation	5/4/17	Not applicable	Not applicable	5/4/17	5/4/17

A.6 Sacramento-Goldenland Ct.

This site was established in late 2008 to replace the former Airport Rd. monitoring site, which was one mile away. The 2015 Air Monitoring Network Assessment found this station to be redundant because it measures the same pollution and meteorological parameters as nearby Sacramento-Del Paso Manor (12.8 km, 7.9 mi, ESE) and Sacramento-T Street (9.2 km, 5.7 mi, SSE). U.S. EPA approved Sac Metro Air District's request to discontinue monitoring (see Appendix E), and Sacramento-Goldenland Ct. was removed on June 1, 2017.

Table A-21 Sacramento-Goldenland Ct. Metadata

Site Name	Goldenland Court
AQS Site No.	06-067-0014
Geographic Coordinates	38.650716°N, 121.506650°W
Location	Site located 5 miles north of downtown Sacramento, in a residential/commercial area.
Address	68 Goldenland Court, Sacramento, CA 95834
County	Sacramento
Distance from roadway	120 m
Annual Average Daily Traffic (Vehicles/Day)	Goldenland Ct. west of Gateway Park Dr.: 750 (Estimated)
Ground Cover	Vegetated
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

A.7 North Highlands-Blackfoot

North Highlands-Blackfoot has been in operation since 1979. The original site objective was to collect data in support of a proposed power plant project at McClellan Air Force Base, which was located 3 miles southwest of the site. The proposed power plant project was canceled during the early 1980's; and the air force base was closed in 2001. This entire site was designated as SPM upon its establishment. During an annual review of network design in the mid-1990s, Sac Metro Air District needed additional SLAMS (which was known as National Air Monitoring Stations) sites for SO_2 and PM_{10} to meet minimum monitoring requirements. Thus, the designation of those monitors were changed to SLAMS. The SO_2 monitor was terminated in late 2010.

Table A-22 North Highlands-Blackfoot Metadata

Site Name	North Highlands-Blackfoot
AQS Site No.	06-067-0002
Geographic Coordinates	38.71209°N, 121.38109°W
Location	Residential area located 11 miles north-northeast of downtown Sacramento.
Address	7823 Blackfoot Way, Antelope, CA 95843
County	Sacramento
Distance from roadway	100 m
Annual Average Daily Traffic (Vehicles/Day)	Navaho Dr. east of Aztec Way: <100 (estimated, two-lanes suburban circular local residential road)
Ground Cover	Paved (to north), vegetated (to south)
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

Figure A-26 Panoramic view toward north from air monitoring station roof

Figure A-27 Panoramic view toward east from air monitoring station roof

Figure A-28 Panoramic view toward south from air monitoring station roof

Figure A-29 Panoramic view toward east from air monitoring station roof

Figure A-30 Google Earth satellite image of North Highlands-Blackfoot Way

The circle in Figure A-34 indicates no trees exist within a 10 m radius, which satisfy a siting criteria that requires drip lines of trees to be at least 10 m away from probes and inlets (40 CFR Part 58, Appendix E). Each of the markers identifies the tallest tree in its local cluster of vegetation. Also, height of the tree was calculated on-site with trigonometry on 5/10/18. Analyses in Tables A-26 thru A-28 show objects identified above do not restrict air flow to the roof top inlets and samplers.

Table A-23 Distance between Object and Inlet or Probe at North Highlands-Blackfoot Way
All units in meter

	Gaseous Probe	PM_{10} Inlet
Object A (Tree)	55.78	54.86
Object B (Tree)	40.23	39.32
Object C (Tree)	22.86	22.86
Object D (Tree)	21.03(A)	21.03(A)
Object E (Tree)	49.38	50.29
Object F (Tree)	44.81	45.72

(A) There is a substantial adjustment because the 2016 measurement was incorrect. The 13 m figure was the distance from the probe/inlet to the closest tree branch, which was close to the ground level

Table A-24 Object Protrusion above Inlet or Probe at North Highlands-Blackfoot Way
All units in meter

	Gaseous Probe	PM_{10} Inlet
Object A (Tree)	5.90	5.52
Object B (Tree)	8.15	7.77
Object C (Tree)	1.23	0.85
Object D (Tree)	6.15	5.77
Object E (Tree)	9.77	9.39
Object F (Tree)	3.91	3.53

Table A-25 Distance vs. Protrusion Ratio at North Highlands
(must be ≥ 2)[18]

	Gaseous Probe	PM_{10} Inlet
Object A (Tree)	9.4	9.9
Object B (Tree)	4.9	5.1
Object C (Tree)	18.6	26.9
Object D (Tree)	3.4	3.6
Object E (Tree)	5.1	5.4
Object F (Tree)	11.4	12.9

[18] Per Appendix E to 40 CFR 58, "the distance from the obstacle to the probe, inlet, or monitoring path must be at least twice the height that the obstacle protrudes above the probe, inlet, or monitoring path."

Site	North Highlands-Blackfoot Way		
Start Date	12/1/1979	12/1/1979	12/1/1979
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	N/A	N/A	N/A
Reporting Agency	CARB	CARB	CARB
Pollutant	O3	CO	NO2
Parameter Code	44201	42101	42602
Parameter Occurrence Code	1	1	1
Manufacturer and model	TAPI 400E	TEI 48C	TEI 42I
Sampling Method	Instrumental	Instrumental	Instrumental
Method Code	087	054	074
Analysis Method	Ultraviolet Absorption	Nondispersive Infrared	Chemiluminescence
FRM/FEM/ARM/Other	FEM	FRM	FRM
Monitoring objective	NAAQS comparison, research	NAAQS comparison, research	NAAQS comparison, research
Statement of Purpose	Measures representative concentrations	Measures representative concentrations	Measures representative concentrations
Monitor type	SPM	SPM	SPM
Affiliation	None	None	None
Site type	Population Exposure	Population Exposure	Population Exposure
Spatial scale	Urban	Neighborhood	Neighborhood
Sampling Frequency	Continuous	Continuous	Continuous
Sampling season	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	1.6	1.6	1.6
Distance from flow obstructions on roof (m)	No obstruction	No obstruction	No obstruction
Distance from flow obstructions not on roof (m)	No obstruction	No obstruction	No obstruction
Distance from nearest tree drip line (m)	12.8	12.8	12.8
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	1.1 (hi vol)	1.1 (hi vol)	1.1 (hi vol)
Unrestricted airflow (deg)	360	360	360
Probe height (m, agl)	5.0	5.0	5.0
Probe material	FEP Teflon	FEP Teflon	FEP Teflon
Residence time (seconds)	14.1	13.1	16.4
Changes in next 18 months?	Yes	Yes	Yes
Frequency of one-point quality control check	Every Other Day	Every Other Day	Every Other Day
Last Performance Evaluation	5/3/17	5/3/17	4/28/2016(A)

(A) Analyzer malfunction since 1/10/17

Site	North Highlands-Blackfoot Way
Start Date	1/1/1989
Collecting Agency	Sac Metro Air District
Analytical Lab	Sac Metro Air District
Reporting Agency	CARB
Pollutant	PM10
Parameter Code	81102
Parameter Occurrence Code	1
Manufacturer and model	Sierra Anderson 1200
Sampling Method	Hi Volume
Method Code	063
Analysis Method	Gravimetric
FRM/FEM/ARM/Other	FRM
Monitoring objective	NAAQS comparison, public info
Statement of Purpose	Measures representative concentrations
Monitor type	SLAMS
Affiliation	None
Site type	Population Exposure
Spatial scale	Neighborhood
Sampling Frequency	1 in 6 days
Sampling season	Year Round
Distance from supporting structure or rooftop (m)	2.0
Distance from flow obstructions on roof (m)	No obstruction
Distance from flow obstructions not on roof (m)	No obstruction
Distance from nearest tree drip line (m)	12.8
Distance to furnace or incinerator flue (m)	No furnace/flue
Distance between collocated PM monitors (m)	Not collocated
Distance with nearest PM monitor (m)	Not applicable
Unrestricted airflow (deg)	360
Probe height (m, agl)	5.4
Probe material	Not applicable
Residence time (seconds)	Not applicable
Changes in next 18 months?	Yes
Frequency of flow rate verification	Monthly
Last Performance Evaluation	5/3/17, 10/6/17

A.8 Rancho Seco

This outlying site is the furthest away from the urban area. It was established in 2008 as a seasonal $PM_{2.5}$ special purpose monitoring site. The $PM_{2.5}$ data collected during the months of November through February was used for the South Sacramento County winter $PM_{2.5}$ monitoring project. This study was extended due to poor data capture rate at the beginning of the study period. The $PM_{2.5}$ monitor continued to have poor data capture rate, and consequently, the collected data could not be used. Therefore, Sac Metro Air District decided to discontinue this monitoring site. Rancho Seco was closed as a SPM as of November 2017.

The District has not submitted the data collected with the e-BAM due to poor data quality and is not an FEM, FRM or ARM monitor. 40 CFR Part 58.20(b) only requires data submittal of FEM, FRM or ARM monitor.

Table A-26 Rancho Seco Metadata

Site Name	Rancho Seco
AQS Site No.	NA
Geographic Coordinates	38.343812°N, -121.109977°W
Location	Located at former Rancho Seco Nuclear Power Plant in rural area located 27 miles southeast of downtown Sacramento.
Address	No street address, Herald, CA 95638
County	Sacramento
Distance from roadway	13 m
Annual Average Daily Traffic (Vehicles/Day)	Rancho Seco Park (access road): <500 (estimated, two-lane rural access road to a nearby regional park)
Ground Cover	Vegetated
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

Site	Rancho Seco
Start Date	11/1/2008
Collecting Agency	Sac Metro Air District
Analytical Lab	N/A
Reporting Agency	N/A
Pollutant	PM2.5
Parameter Code	88501
Parameter Occurrence Code	3
Manufacturer and model	Met One E-BAM
Sampling Method	Very sharp cut cyclone
Method Code	731
Analysis Method	Beta Attenuation
FRM/FEM/ARM/Other	Other
Monitoring objective	Public info, research
Statement of Purpose	Measures rural, background PM2.5 concentration
Monitor type	SPM [(A)]
Affiliation	None
Site type	Upwind/ Background
Spatial scale	Regional
Sampling Frequency	Continuous
Sampling season	November-February
Distance from supporting structure or rooftop (m)	Not applicable
Distance from flow obstructions on roof (m)	No obstruction
Distance from flow obstructions not on roof (m)	No obstruction
Distance from nearest tree drip line (m)	15.0
Distance to furnace or incinerator flue (m)	No furnace/flue
Distance between collocated PM monitors (m)	Not collocated
Distance with nearest PM monitor (m)	Not applicable
Unrestricted airflow (deg)	360
Probe height (m, agl)	2.0
Probe material	Not applicable
Residence time (seconds)	Not applicable
Changes in next 18 months?	No
Frequency of flow rate verification	Monthly
Last Performance Evaluation	Not applicable

[(A)] This SPM does not meet requirement in 40 CFR Part 58, Appendix A, but meet requirement in 40 CFR Part 58, Appendix E

A.9 Sloughhouse

Located in a rural area 16.5 miles southeast of Downtown Sacramento, Sloughhouse was established in 1997 as a seasonal (April-October) O_3 special purpose monitoring site to measure elevated afternoon O_3 concentrations, under northwesterly winds, in support of Sac Metro Air District's summer Spare the Air (O_3 episodic control measure) program. It was sited to cover "data gaps" in the O_3 monitoring network, which is used for forecasting summer AQI levels.

A tree 10 m southeast of the O_3 inlet was removed in May 2011 in order to comply with 40 CFR Part 58, Appendix E (Probe and Monitoring Path Siting Criteria). After the tree removal, the O_3 monitor was re-classified from SPM to SLAMS and began continuous monitoring year round.

From November 2008 thru February 2013, seasonal (November–February) $PM_{2.5}$ data was collected with a special purpose monitor (Met One Instruments e-BAM). In November 2013, a non-FEM $PM_{2.5}$ sampler was relocated to this location to improve data quality. Sampling season was also increased to year-round. The monitor non-FEM sampler met quality assurance criteria and siting criteria in 40 CFR Part 58, Appendices A and E. In June 2017, a FEM $PM_{2.5}$ sampler replaced the non-FEM sampler. Subsequently, the parameter code associated with the $PM_{2.5}$ sampler was changed from 88501 ($PM_{2.5}$ raw data) to 88101 ($PM_{2.5}$ at local condition).

Table A-27 Sloughhouse Metadata

Site Name	Sloughhouse
AQS Site No.	06-067-5003
Geographic Coordinates	38.494475°N, W121.211131°
Location	Fire Station in rural area located 16.5 miles east-southeast of downtown Sacramento.
Address	7250 Sloughhouse Road, Sloughhouse, CA 95683
County	Sacramento
Distance from roadway	27 m
Annual Average Daily Traffic (Vehicles/Day)	Sloughhouse Rd south of Jackson Rd: 400 (Estimated)
Ground Cover	Vegetated
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

Figure A-31 Panoramic view toward north from air monitoring station roof

Figure A-32 Panoramic view toward east from air monitoring station roof

Figure A-33 Panoramic view toward south from air monitoring station roof

Figure A-34 Panoramic view toward west from air monitoring station roof

Figure A-35 Google Earth satellite image of Sloughhouse

The circle in Figure A-40 indicates no trees exist within a 10 m radius, which satisfy a siting criteria that requires drip lines of trees to be at least 10 m away from probes and inlets (40 CFR Part 58, Appendix E). Also, height of the tree and building was calculated on-site with trigonometry on 5/4/18. Analyses in Tables A-31 thru A-33 show the objects identified above do not restrict air flow to the roof top inlets and samplers. Therefore, each inlet and sampler has 360° of unrestricted airflow.

Table A-28 Distance between Object and Inlet or Probe at Sloughhouse
All units in meter

	Gaseous Probe	$PM_{2.5}$ Inlet
Object A (Tree)	53.9	54.9
Object B (Tree)	20.1	21.0
Object C (Building)	15.5	15.5
Object D (Tree)	21.0	22.9

Table A-29 Object Protrusion above Inlet or Probe at Sloughhouse
All units in meter

	Gaseous Probe	$PM_{2.5}$ Inlet
Object A (Tree)	13.03	12.55
Object B (Tree)	7.55	7.07
Object C (Building)	-3.46	-3.94
Object D (Tree)	3.00	2.52

Note: negative value indicates inlet or probe is taller than the object; thus, airflow is not obstructed no matter the distance

Table A-30 Distance vs. Protrusion Ratio at Sloughhouse
(must be ≥ 2)[19]

	Gaseous Probe	$PM_{2.5}$ Inlet
Object A (Tree)	4.1	4.4
Object B (Tree)	2.7	3.0
Object C (Building)	N/A	N/A
Object D (Tree)	7.0	9.1

Note: N/A indicates inlet or probe is taller than the object and airflow is not obstructed; refer to the note in the previous table

[19] Per Appendix E to 40 CFR 58, "the distance from the obstacle to the probe, inlet, or monitoring path must be at least twice the height that the obstacle protrudes above the probe, inlet, or monitoring path."

Site	Sloughhouse-Sloughhouse Rd.		
Start Date	7/1/1997	7/1/1997	7/1/1997
Collecting Agency	Sac Metro Air District	Sac Metro Air District	Sac Metro Air District
Analytical Lab	N/A	N/A	N/A
Reporting Agency	CARB	CARB	CARB
Pollutant	O3	Wind Direction	Wind Speed
Parameter Code	44201	61104	61103
Parameter Occurrence Code	1	1	1
Manufacturer and model	TAPI 400E	Climatronics F-460	Climatronics F-460
Sampling Method	Instrumental	Instrumental	Instrumental
Method Code	087	020	020
Analysis Method	Ultraviolet Absorption	Vector Summation	Vector Summation
FRM/FEM/ARM/Other	FEM	Other	Other
Monitoring objective	NAAQS comparison, public info	Public info	Public info
Statement of Purpose	Measures elevated O3 concentration under northwesterly wind	Measures representative meteorology	Measures representative meteorology
Monitor type	SLAMS	Other	Other
Affiliation	None	None	None
Site type	Max O3 concentration	Not applicable	Not applicable
Spatial scale	Neighborhood	Not applicable	Not applicable
Sampling Frequency	Continuous	Continuous	Continuous
Sampling season	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	1.7	2.8	2.8
Distance from flow obstructions on roof (m)	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions	No obstructions
Distance from nearest tree drip line (m)	18.3	18.0	18.0
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	1.2 m (lo vol)	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360	360
Probe height (m, agl)	4.6	5.8	5.8
Probe material	FEP Teflon	Not applicable	Not applicable
Residence time (seconds)	3.9	Not applicable	Not applicable
Changes in next 18 months?	No	No	No
Frequency of one-point quality control check	Every other day	N/A	N/A
Last Performance Evaluation	4/5/17	4/5/17	4/5/17

Site	Sloughhouse-Sloughhouse Rd.
Start Date	11/5/2013 / 5/1/2017[A]
Collecting Agency	Sac Metro Air District
Analytical Lab	N/A
Reporting Agency	CARB
Pollutant	PM2.5
Parameter Code	88501/88101[A]
Parameter Occurrence Code	3
Manufacturer and model	Met One 1020 BAM
Sampling Method	Very sharp cut cyclone
Method Code	731/170[A]
Analysis Method	Beta Attenuation
FRM/FEM/ARM/Other	Other/FEM[A]
Monitoring objective	Public info, research/ NAAQS comparison, public info, research[A]
Statement of Purpose	Measures rural, background PM2.5 concentration
Monitor type	SPM/SLAMS[A]
Affiliation	None
Site type	Upwind/ Background
Spatial scale	Urban
Sampling Frequency	Continuous
Sampling season	Year Round
Distance from supporting structure or rooftop (m)	2.3
Distance from flow obstructions on roof (m)	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions
Distance from nearest tree drip line (m)	18.3
Distance to furnace or incinerator flue (m)	No furnace/flue
Distance between collocated PM monitors (m)	Not collocated
Distance with nearest PM monitor (m)	Not applicable
Unrestricted airflow (deg)	360
Probe height (m, agl)	5.2
Probe material	Not applicable
Residence time (seconds)	Not applicable
Changes in next 18 months?	Yes
Frequency of flow rate verification	Bi-monthly
Last Performance Evaluation	4/5/17, 10/4/17

[A] A new Met One 1020 was installed on 5/1/17, which led to the changes with parameter code, method code, etc.

A.10 Sacramento-1309 T Street

The Sacramento-1309 T Street site is operated by the California Air Resources Board/Monitoring and Laboratory Division/Special Purpose Monitoring Section. This site has been in existence since 1989. Monitor details provided in the remainder of Section A.10 are provided by CARB's Monitoring and Laboratory Division.

Table A-31 Sacramento-T Street Metadata

Site Name	Sacramento-1309 T Street
AQS Site No.	06-067-0010
Geographic Coordinates	38.568440°N, 121.4931190°W
Location	Residential area located in downtown Sacramento
Address	1309 T Street, Sacramento, CA 95814
County	Sacramento
Distance from roadway	30 m
Annual Average Daily Traffic (Vehicles/Day)	T St. east of 11th St.: 3,102 (City of Sacramento, 2009)
Ground Cover	Rooftop site (residential area is paved)
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

Site	Sacramento-1309 T St.	
Start Date	12/1/1998	5/15/2013
Collecting Agency	CARB	CARB
Analytical Lab	N/A	N/A
Reporting Agency	CARB	CARB
Pollutant	O3	NO2
Parameter Code	44201	42602
Parameter Occurrence Code	1	3
Manufacturer and model	TAPI 400E	TAPI 200 EU/501
Sampling Method	Instrumental	Instrumental
Method Code	087	599
Analysis Method	Ultraviolet Absorption	Chemiluminescence
FRM/FEM/ARM/Other	FEM	FEM
Monitoring objective	NAAQS comparison, public info	NAAQS comparison, public info
Statement of Purpose	Measures representative concentration in urban area	Measures representative concentration in urban area
Monitor type	SLAMS	SLAMS
Affiliation	None	None
Site type	General/Background	Population Exposure
Spatial scale	Urban	Neighborhood
Sampling Frequency	Continuous	Continuous
Sampling season	Year Round	Year Round
Distance from supporting structure or rooftop (m)	3.0	3.0
Distance from flow obstructions on roof (m)	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions
Distance from nearest tree drip line (m)	50.0	50.0
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable
Distance with nearest PM monitor (m)	1.0 - 2.0 m	1.0 - 2.0 m
Unrestricted airflow (deg)	360	360
Probe height (m, agl)	11.7	11.7
Probe material	FEP Teflon	FEP Teflon
Residence time (seconds)	5.4	6.0
Changes in next 18 months?	No	No
Frequency of one-point quality control check	Daily	Daily
Last Performance Evaluation	11/23/16	11/23/16

Source: Monitoring and Laboratory Division, CARB

Site	Sacramento-1309 T St.			
Start Date	5/1/2013	12/13/1998	5/1/2004	4/1/2007
Collecting Agency	CARB	CARB	CARB	CARB
Analytical Lab	CARB	CARB	N/A	CARB
Reporting Agency	CARB	CARB	CARB	CARB
Pollutant	PM10	PM2.5 (Primary monitor)	PM2.5	PM2.5 Mass Speciated
Parameter Code	81102	88101	88502	88502
Parameter Occurrence Code	4	1	3	5
Manufacturer and model	Met One 4 Models	Thermo 2025i	Met One 1020 BAM	Met One 5
Sampling Method	Instrumental	Low volume with VSCC	Sharp cut cyclone	Sharp cut cyclone
Method Code	122	145	731	810
Analysis Method	Beta Attenuation	Gravimetric	Beta Attenuation	Gravimetric
FRM/FEM/ARM/Other	FEM	FRM	Other	Other
Monitoring objective	NAAQS comparison, public info	NAAQS comparison, public info	Public info[(A)]	Research
Statement of Purpose	Measures representative concentration in urban area	Measures representative concentration in urban area	Measures representative concentration in urban area	Provide speciation data of urban emission
Monitor type	SLAMS	SLAMS	SLAMS	SLAMS
Affiliation	None	None	None	None
Site type	Population Exposure	Highest concentration, population exposure	Highest concentration, population exposure	Highest concentration, population exposure
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling Frequency	Continuous	1 in 3 days	Continuous	1 in 3 days
Sampling season	Year Round	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	2.0	2.0	2.0	2.0
Distance from flow obstructions on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions
Distance from nearest tree drip line (m)	50.0	50.0	50.0	50.0
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	1.0 - 2.0 m	1.0 - 2.0 m	1.0 - 2.0 m	1.0 - 2.0 m
Distance with nearest PM monitor (m)	1.0 - 2.0 m	1.0 - 2.0 m	1.0 - 2.0 m	1.0 - 2.0 m
Unrestricted airflow (deg)	360	360	360	360
Probe height (m, agl)	10.0	10.0	10.0	10.0
Probe material	Not applicable	Not applicable	Not applicable	Not applicable
Residence time (seconds)	Not applicable	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	Yes	Yes	No
Frequency of flow rate verification	Bi-Monthly	Monthly	Bi-monthly	Monthly
Last Performance Evaluation	4/27/17, 11/9/17	4/27/17, 11/9/17	4/27/17, 11/9/17	Not applicable

[(A)] This PM2.5 monitor is not comparable to NAAQS because it does not meet reference method or equivalent method designation requirements

Source: Monitoring and Laboratory Division, CARB

Site	Sacramento-1309 T St.			
Start Date	7/1/2015	7/1/2015	2/1/1992	2/1/1992
Collecting Agency	CARB	CARB	CARB	CARB
Analytical Lab	N/A	N/A	N/A	N/A
Reporting Agency	CARB	CARB	CARB	CARB
Pollutant	Outdoor Temperature	Relative Humidity	Wind Direction	Wind Speed
Parameter Code	62101	62201	61104	61103
Parameter Occurrence Code	2	2	1	1
Manufacturer and model	Vaisala OT/RH sensor	Vaisala OT/RH sensor	RM Young Model 81000	RM Young Model 81000
Sampling Method	Instrumental	Instrumental	Instrumental	Instrumental
Method Code	059	059	066	066
Analysis Method	Vaisala HMP155	Vaisala HMP155	Ultrasonic Anemometer	Ultrasonic Anemometer
FRM/FEM/ARM/Other	Other	Other	Other	Other
Monitoring objective	Public info	Public info	Public info	Public info
Statement of Purpose	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology
Monitor type	Other	Other	Other	Other
Affiliation	None	None	None	None
Site type	Not applicable	Not applicable	Not applicable	Not applicable
Spatial scale	Not applicable	Not applicable	Not applicable	Not applicable
Sampling Frequency	Continuous	Continuous	Continuous	Continuous
Sampling season	Year Round	Year Round	Year Round	Year Round
Distance from supporting structure or rooftop (m)	9.0	9.0	9.0	9.0
Distance from flow obstructions on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof (m)	No obstructions	No obstructions	No obstructions	No obstructions
Distance from nearest tree drip line (m)	50.0	50.0	50.0	50.0
Distance to furnace or incinerator flue (m)	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors (m)	Not applicable	Not applicable	Not applicable	Not applicable
Distance with nearest PM monitor (m)	Not applicable	Not applicable	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360	360	360
Probe height (m, agl)	15.0	15.0	15.0	15.0
Probe material	Not applicable	Not applicable	Not applicable	Not applicable
Residence time (seconds)	Not applicable	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	No	No	No
Frequency of flow rate verification	N/A	N/A	N/A	N/A
Last Performance Evaluation	Not applicable	Not applicable	Not applicable	Not applicable

Source: Monitoring and Laboratory Division, CARB

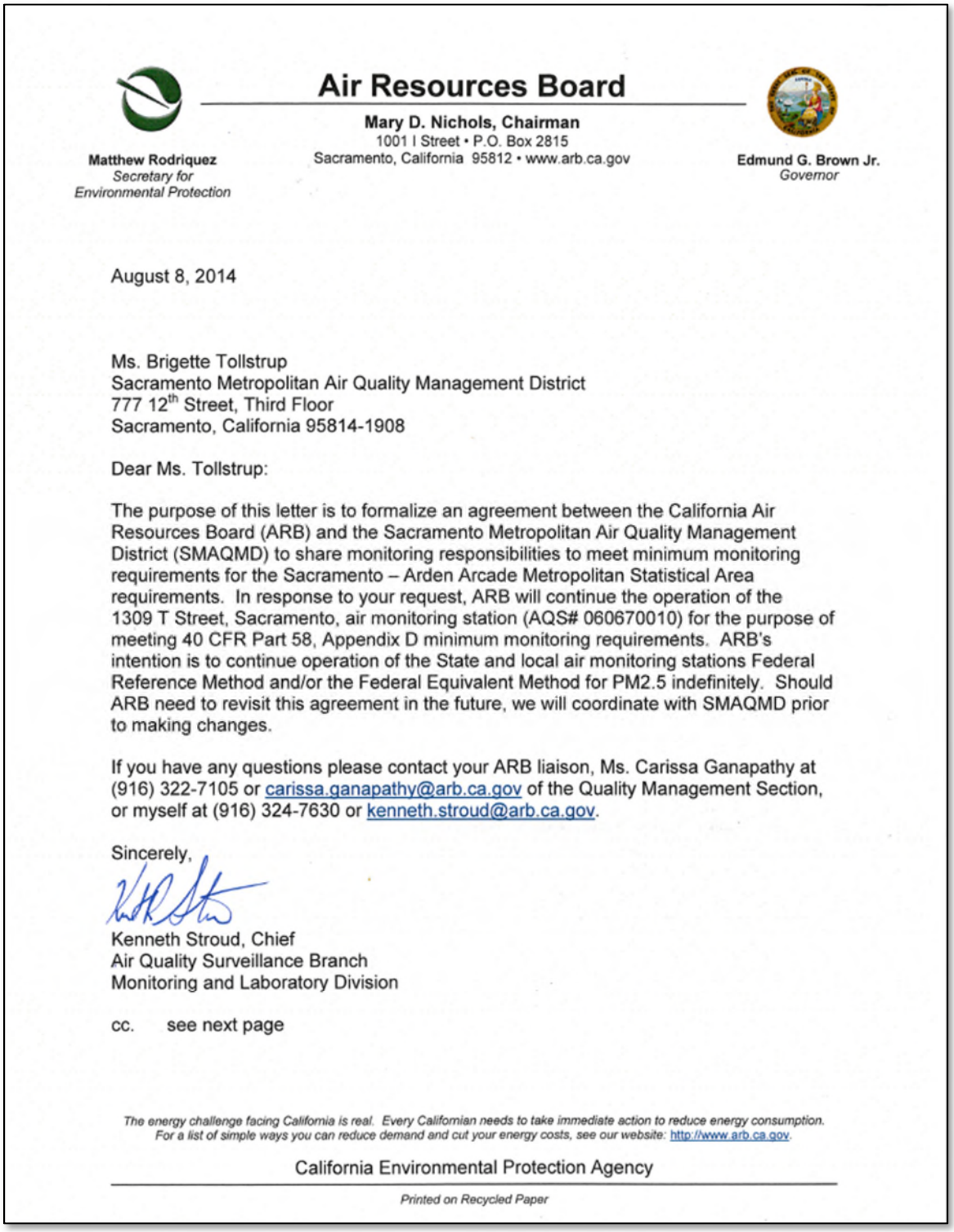
Appendix B Minimum Monitoring Requirement Assessment

Table B-1 Number of SLAMS Monitoring Site within Sacramento MSA

Pollutant		Required Monitors in Sacramento MSA	California Air Resources Board (CARB)	El Dorado County AQMD	Placer County APCD	Sacramento Metropolitan AQMD	Yolo-Solano AQMD	Total Monitors in Sacramento MSA
O_3		2	6	0	4	5	1	16
CO		2	0	0	0	3	0	3
NO_2	Area Wide	1	3	0	0	4	0	7
	Near-Road	1	0	0	0	1	0	1
SO_2		1	0	0	0	1	0	1
Pb	NCore	1	0	0	0	1	0	1
	Source Oriented	0	0	0	0	0	0	0
PM_{10}		2-4	3	0	1	4	2	10
$PM_{2.5}$	FEM/FRM	3	2	0	1	4	1	8
	Continuous	2	2	0	1	4	0	7
$PM_{10-2.5}$		1	0	0	0	1	0	1

Source: U.S. EPA Air Quality System Monitor Description Report (AMP 390), accessed on 9 May 2018

Figure B-1 MOU on Shared Monitoring Responsibility with CARB, Page 1



Air Resources Board

Mary D. Nichols, Chairman
1001 I Street • P.O. Box 2815
Sacramento, California 95812 • www.arb.ca.gov

Matthew Rodriquez
Secretary for
Environmental Protection

Edmund G. Brown Jr.
Governor

August 8, 2014

Ms. Brigette Tollstrup
Sacramento Metropolitan Air Quality Management District
777 12th Street, Third Floor
Sacramento, California 95814-1908

Dear Ms. Tollstrup:

The purpose of this letter is to formalize an agreement between the California Air Resources Board (ARB) and the Sacramento Metropolitan Air Quality Management District (SMAQMD) to share monitoring responsibilities to meet minimum monitoring requirements for the Sacramento – Arden Arcade Metropolitan Statistical Area requirements. In response to your request, ARB will continue the operation of the 1309 T Street, Sacramento, air monitoring station (AQS# 060670010) for the purpose of meeting 40 CFR Part 58, Appendix D minimum monitoring requirements. ARB's intention is to continue operation of the State and local air monitoring stations Federal Reference Method and/or the Federal Equivalent Method for PM2.5 indefinitely. Should ARB need to revisit this agreement in the future, we will coordinate with SMAQMD prior to making changes.

If you have any questions please contact your ARB liaison, Ms. Carissa Ganapathy at (916) 322-7105 or carissa.ganapathy@arb.ca.gov of the Quality Management Section, or myself at (916) 324-7630 or kenneth.stroud@arb.ca.gov.

Sincerely,

Kenneth Stroud, Chief
Air Quality Surveillance Branch
Monitoring and Laboratory Division

cc. see next page

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website: http://www.arb.ca.gov.

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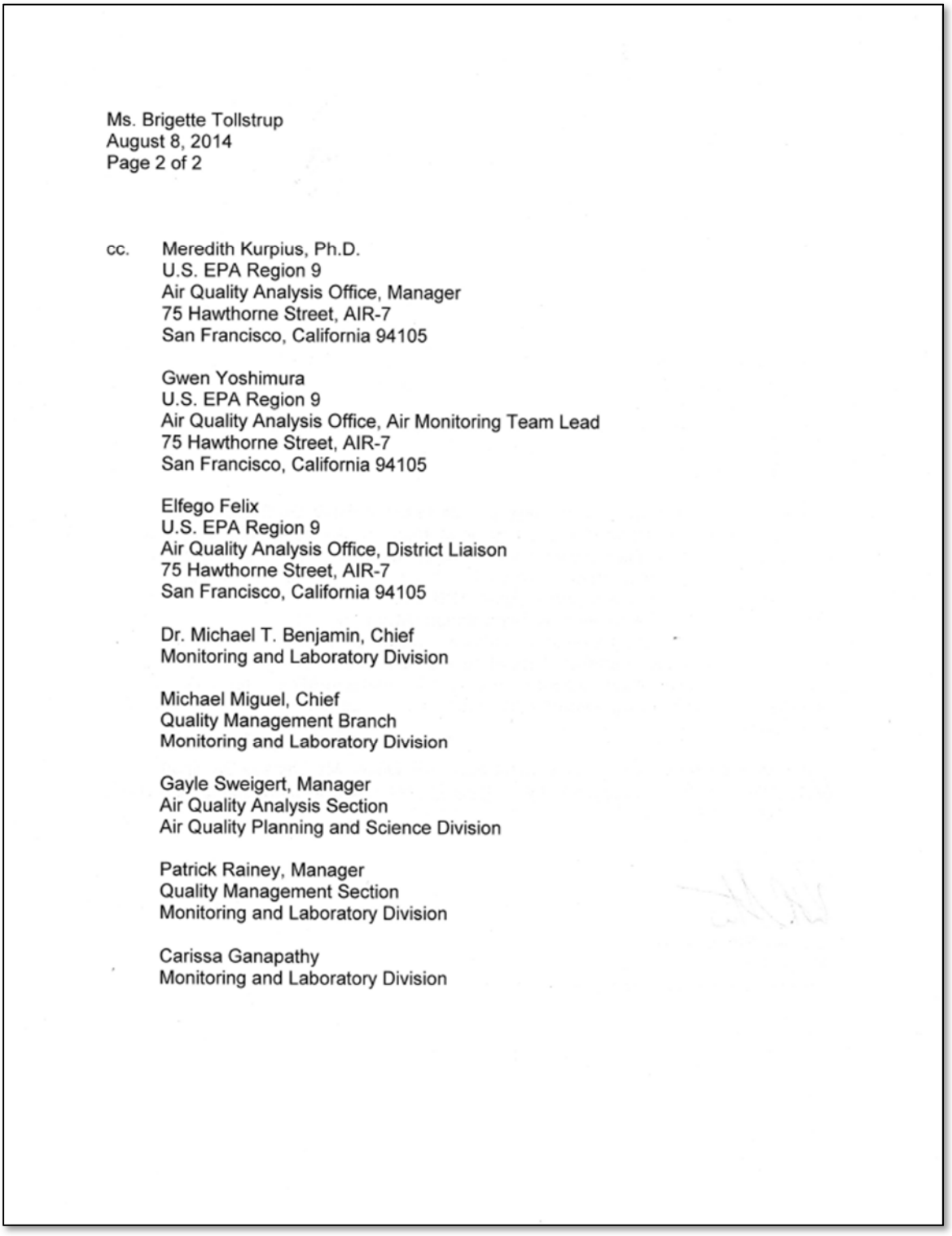
Figure B-2 MOU on Shared Monitoring Responsibility with CARB, Page 2



Ms. Brigette Tollstrup
August 8, 2014
Page 2 of 2

cc. Meredith Kurpius, Ph.D.
U.S. EPA Region 9
Air Quality Analysis Office, Manager
75 Hawthorne Street, AIR-7
San Francisco, California 94105

Gwen Yoshimura
U.S. EPA Region 9
Air Quality Analysis Office, Air Monitoring Team Lead
75 Hawthorne Street, AIR-7
San Francisco, California 94105

Elfego Felix
U.S. EPA Region 9
Air Quality Analysis Office, District Liaison
75 Hawthorne Street, AIR-7
San Francisco, California 94105

Dr. Michael T. Benjamin, Chief
Monitoring and Laboratory Division

Michael Miguel, Chief
Quality Management Branch
Monitoring and Laboratory Division

Gayle Sweigert, Manager
Air Quality Analysis Section
Air Quality Planning and Science Division

Patrick Rainey, Manager
Quality Management Section
Monitoring and Laboratory Division

Carissa Ganapathy
Monitoring and Laboratory Division

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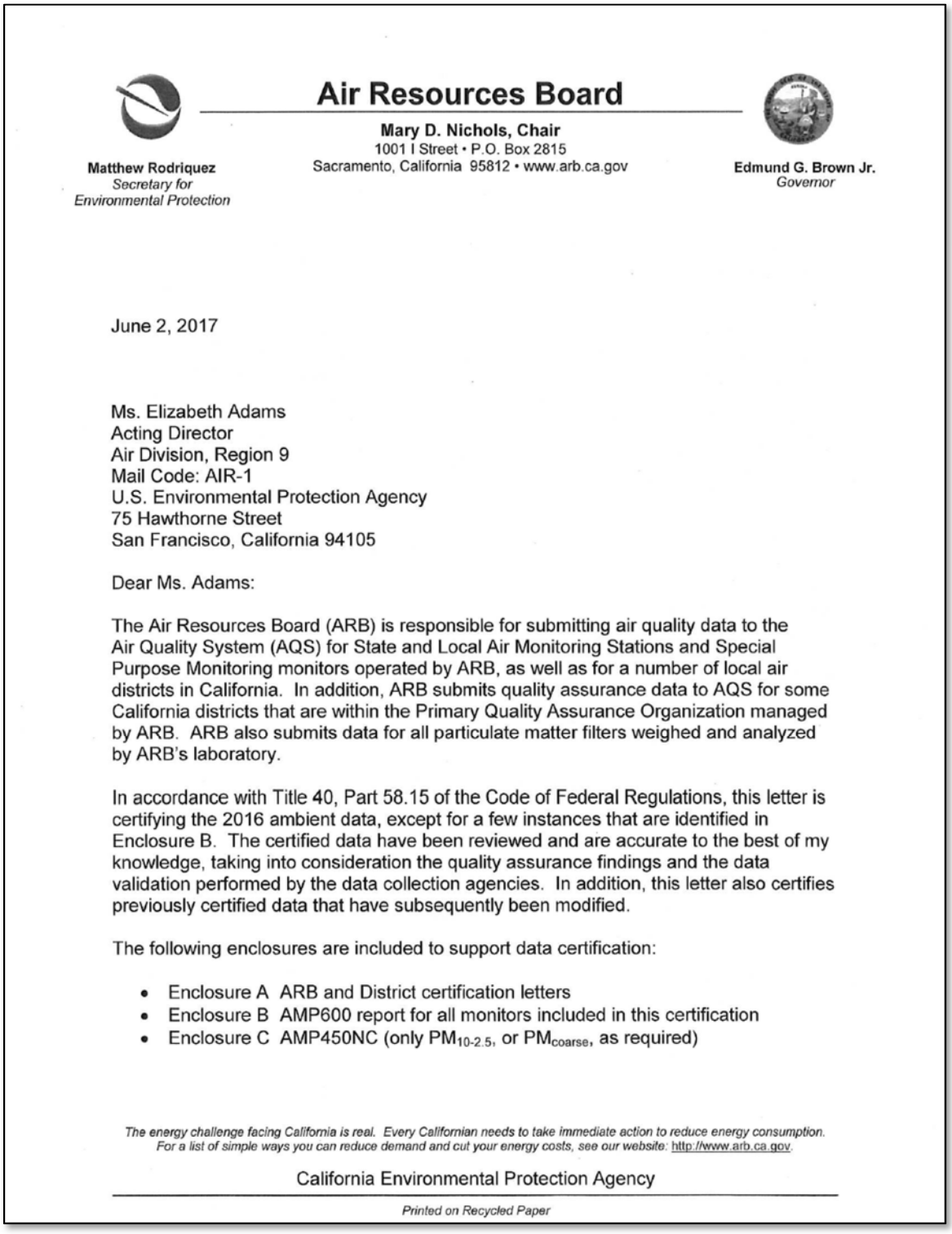
Appendix C Copy of Annual Data Certification Letter

Figure C-1 Copy of Sac Metro Air District data review letter, Page 1



Air Resources Board

Mary D. Nichols, Chair
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Sacramento, California 95812 • www.arb.ca.gov

Matthew Rodriquez
Secretary for
Environmental Protection

Edmund G. Brown Jr.
Governor

June 2, 2017

Ms. Elizabeth Adams
Acting Director
Air Division, Region 9
Mail Code: AIR-1
U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, California 94105

Dear Ms. Adams:

The Air Resources Board (ARB) is responsible for submitting air quality data to the Air Quality System (AQS) for State and Local Air Monitoring Stations and Special Purpose Monitoring monitors operated by ARB, as well as for a number of local air districts in California. In addition, ARB submits quality assurance data to AQS for some California districts that are within the Primary Quality Assurance Organization managed by ARB. ARB also submits data for all particulate matter filters weighed and analyzed by ARB's laboratory.

In accordance with Title 40, Part 58.15 of the Code of Federal Regulations, this letter is certifying the 2016 ambient data, except for a few instances that are identified in Enclosure B. The certified data have been reviewed and are accurate to the best of my knowledge, taking into consideration the quality assurance findings and the data validation performed by the data collection agencies. In addition, this letter also certifies previously certified data that have subsequently been modified.

The following enclosures are included to support data certification:

- Enclosure A ARB and District certification letters
- Enclosure B AMP600 report for all monitors included in this certification
- Enclosure C AMP450NC (only $PM_{10-2.5}$, or PM_{coarse}, as required)

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California Environmental Protection Agency

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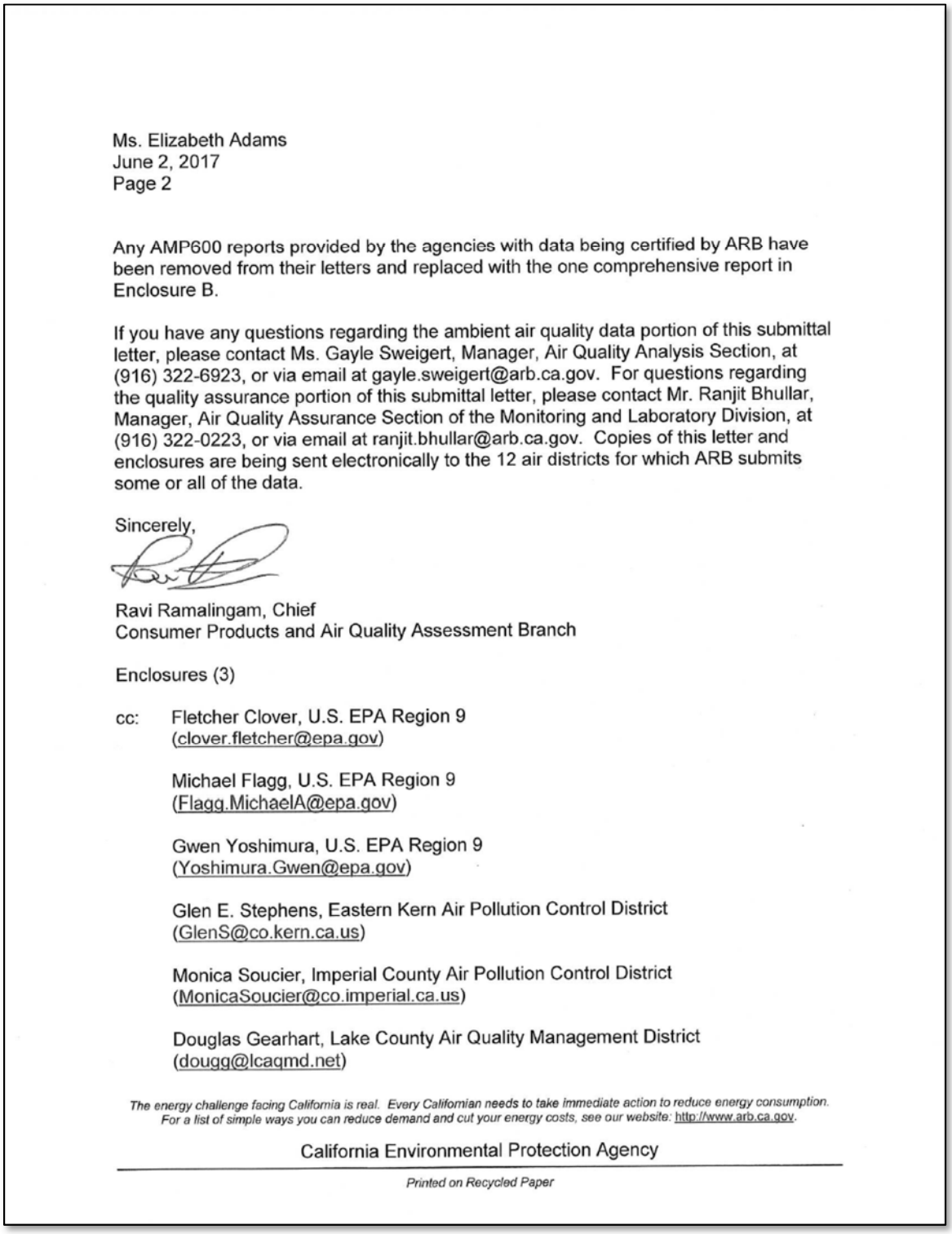
Figure C-2 Copy of Sac Metro Air District data review letter, Page 2



Ms. Elizabeth Adams
June 2, 2017
Page 2

Any AMP600 reports provided by the agencies with data being certified by ARB have been removed from their letters and replaced with the one comprehensive report in Enclosure B.

If you have any questions regarding the ambient air quality data portion of this submittal letter, please contact Ms. Gayle Sweigert, Manager, Air Quality Analysis Section, at (916) 322-6923, or via email at gayle.sweigert@arb.ca.gov. For questions regarding the quality assurance portion of this submittal letter, please contact Mr. Ranjit Bhullar, Manager, Air Quality Assurance Section of the Monitoring and Laboratory Division, at (916) 322-0223, or via email at ranjit.bhullar@arb.ca.gov. Copies of this letter and enclosures are being sent electronically to the 12 air districts for which ARB submits some or all of the data.

Sincerely,

Ravi Ramalingam, Chief
Consumer Products and Air Quality Assessment Branch

Enclosures (3)

cc: Fletcher Clover, U.S. EPA Region 9
(clover.fletcher@epa.gov)

Michael Flagg, U.S. EPA Region 9
(Flagg.MichaelA@epa.gov)

Gwen Yoshimura, U.S. EPA Region 9
(Yoshimura.Gwen@epa.gov)

Glen E. Stephens, Eastern Kern Air Pollution Control District
(GlenS@co.kern.ca.us)

Monica Soucier, Imperial County Air Pollution Control District
(MonicaSoucier@co.imperial.ca.us)

Douglas Gearhart, Lake County Air Quality Management District
(dougg@lcaqmd.net)

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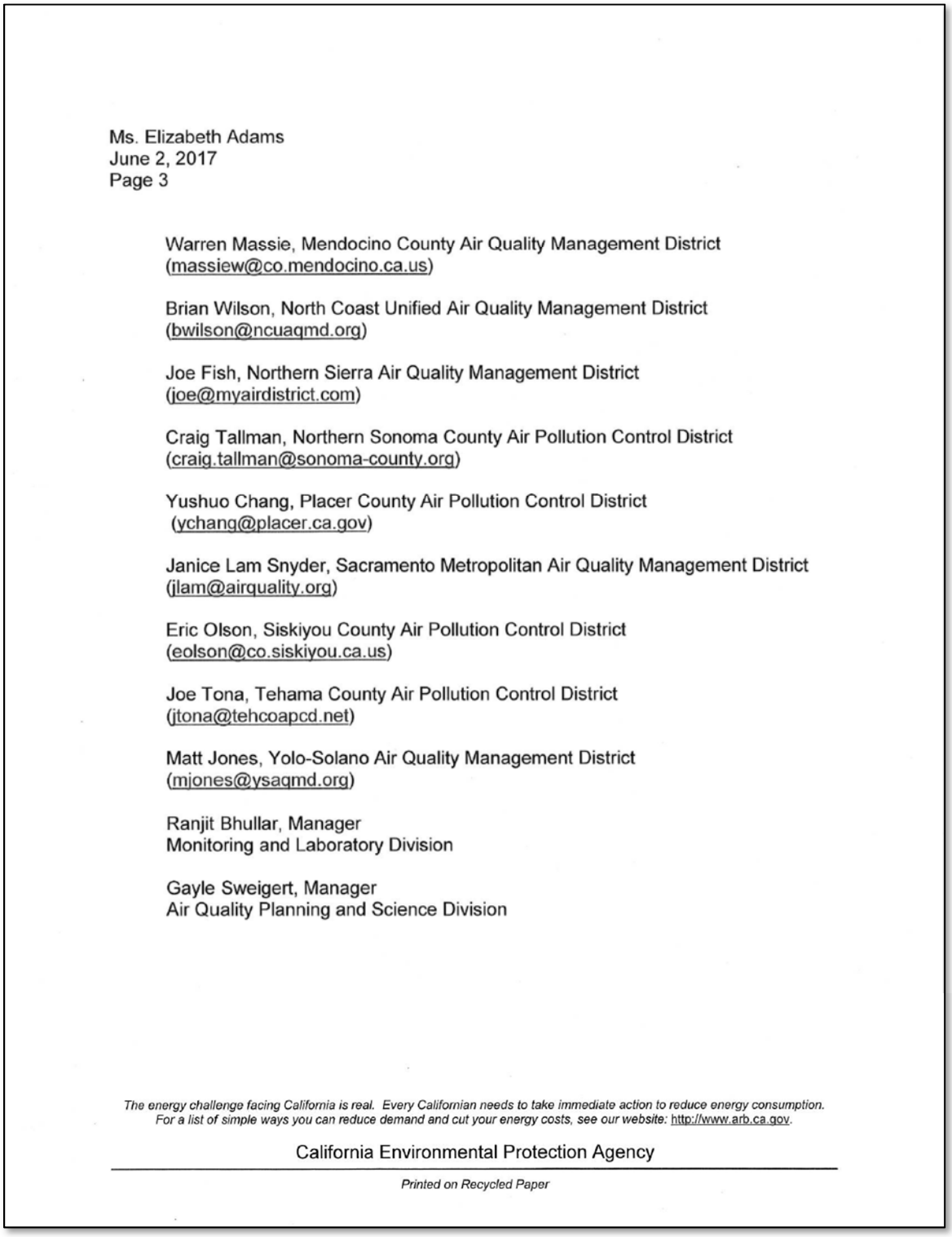
Figure C-3 Copy of Sac Metro Air District data review letter, Page 3



Ms. Elizabeth Adams
June 2, 2017
Page 3

Warren Massie, Mendocino County Air Quality Management District
(massiew@co.mendocino.ca.us)

Brian Wilson, North Coast Unified Air Quality Management District
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Joe Fish, Northern Sierra Air Quality Management District
(joe@myairdistrict.com)

Craig Tallman, Northern Sonoma County Air Pollution Control District
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Yushuo Chang, Placer County Air Pollution Control District
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Janice Lam Snyder, Sacramento Metropolitan Air Quality Management District
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Eric Olson, Siskiyou County Air Pollution Control District
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Joe Tona, Tehama County Air Pollution Control District
(jtona@tehcoapcd.net)

Matt Jones, Yolo-Solano Air Quality Management District
(mjones@ysaqmd.org)

Ranjit Bhullar, Manager
Monitoring and Laboratory Division

Gayle Sweigert, Manager
Air Quality Planning and Science Division

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The enclosure to this letter is not reproduced in this annual network plan. Please contact Sac Metro Air District for a copy of this letter in its entirety.

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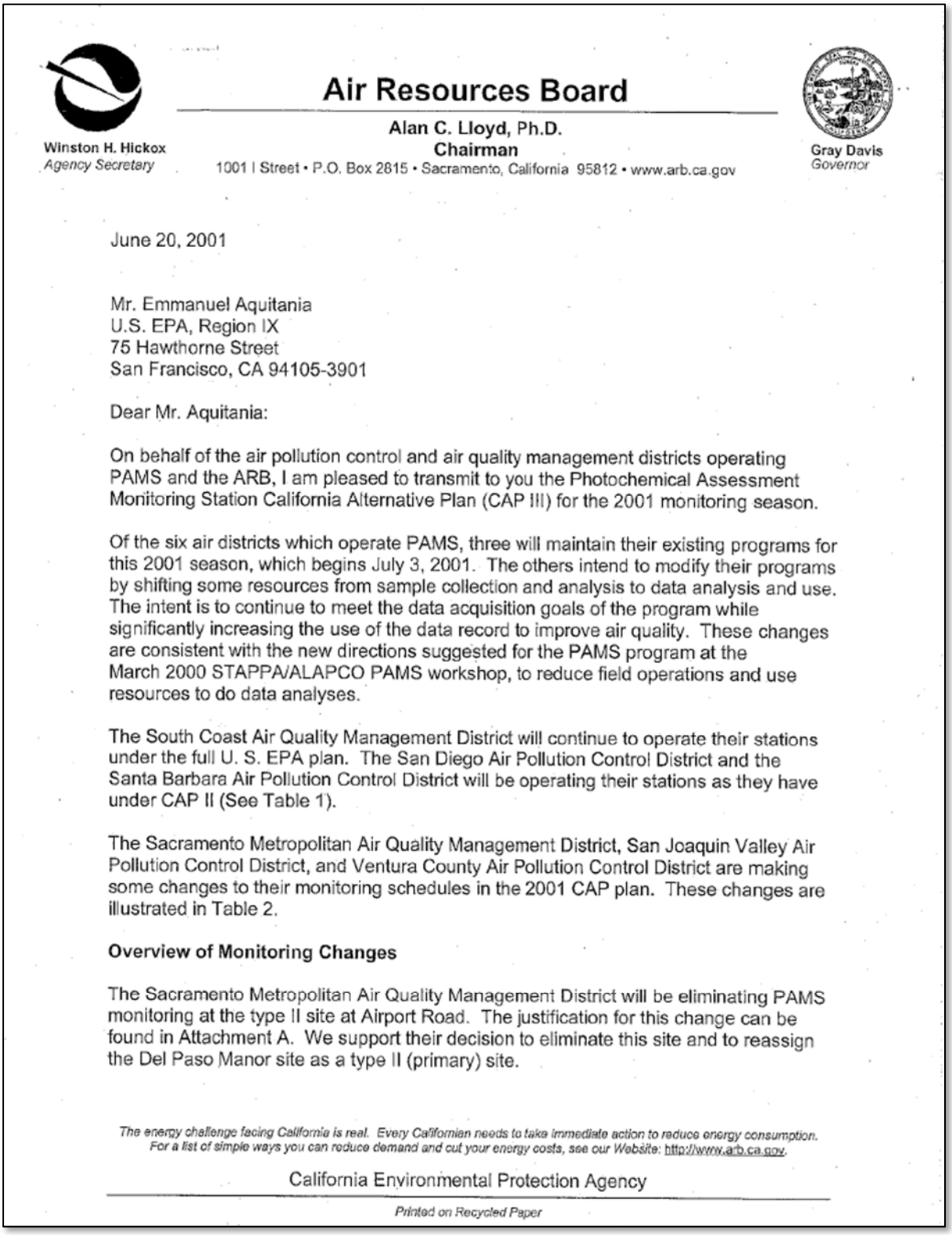
Appendix D California Alternative Plan (CAP III)

Figure D-1 California Alternative Plan, Page 1



Air Resources Board

Alan C. Lloyd, Ph.D.
Chairman
1001 I Street • P.O. Box 2815 • Sacramento, California 95812 • www.arb.ca.gov

Winston H. Hickox
Agency Secretary

Gray Davis
Governor

June 20, 2001

Mr. Emmanuel Aquitania
U.S. EPA, Region IX
75 Hawthorne Street
San Francisco, CA 94105-3901

Dear Mr. Aquitania:

On behalf of the air pollution control and air quality management districts operating PAMS and the ARB, I am pleased to transmit to you the Photochemical Assessment Monitoring Station California Alternative Plan (CAP III) for the 2001 monitoring season.

Of the six air districts which operate PAMS, three will maintain their existing programs for this 2001 season, which begins July 3, 2001. The others intend to modify their programs by shifting some resources from sample collection and analysis to data analysis and use. The intent is to continue to meet the data acquisition goals of the program while significantly increasing the use of the data record to improve air quality. These changes are consistent with the new directions suggested for the PAMS program at the March 2000 STAPPA/ALAPCO PAMS workshop, to reduce field operations and use resources to do data analyses.

The South Coast Air Quality Management District will continue to operate their stations under the full U. S. EPA plan. The San Diego Air Pollution Control District and the Santa Barbara Air Pollution Control District will be operating their stations as they have under CAP II (See Table 1).

The Sacramento Metropolitan Air Quality Management District, San Joaquin Valley Air Pollution Control District, and Ventura County Air Pollution Control District are making some changes to their monitoring schedules in the 2001 CAP plan. These changes are illustrated in Table 2.

Overview of Monitoring Changes

The Sacramento Metropolitan Air Quality Management District will be eliminating PAMS monitoring at the type II site at Airport Road. The justification for this change can be found in Attachment A. We support their decision to eliminate this site and to reassign the Del Paso Manor site as a type II (primary) site.

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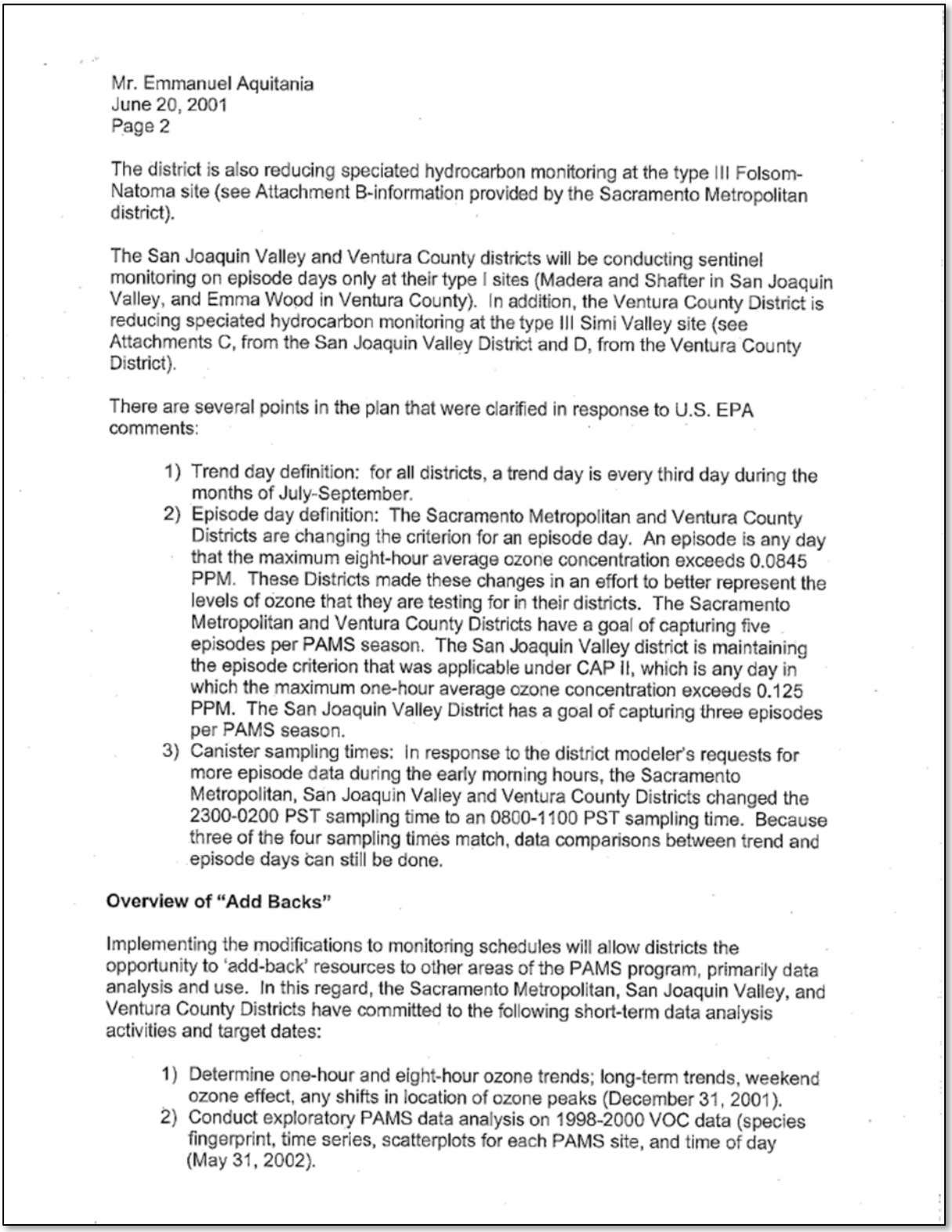
Figure D-2 California Alternative Plan, Page 2



Mr. Emmanuel Aquitania
June 20, 2001
Page 2

The district is also reducing speciated hydrocarbon monitoring at the type III Folsom-Natoma site (see Attachment B-information provided by the Sacramento Metropolitan district).

The San Joaquin Valley and Ventura County districts will be conducting sentinel monitoring on episode days only at their type I sites (Madera and Shafter in San Joaquin Valley, and Emma Wood in Ventura County). In addition, the Ventura County District is reducing speciated hydrocarbon monitoring at the type III Simi Valley site (see Attachments C, from the San Joaquin Valley District and D, from the Ventura County District).

There are several points in the plan that were clarified in response to U.S. EPA comments:

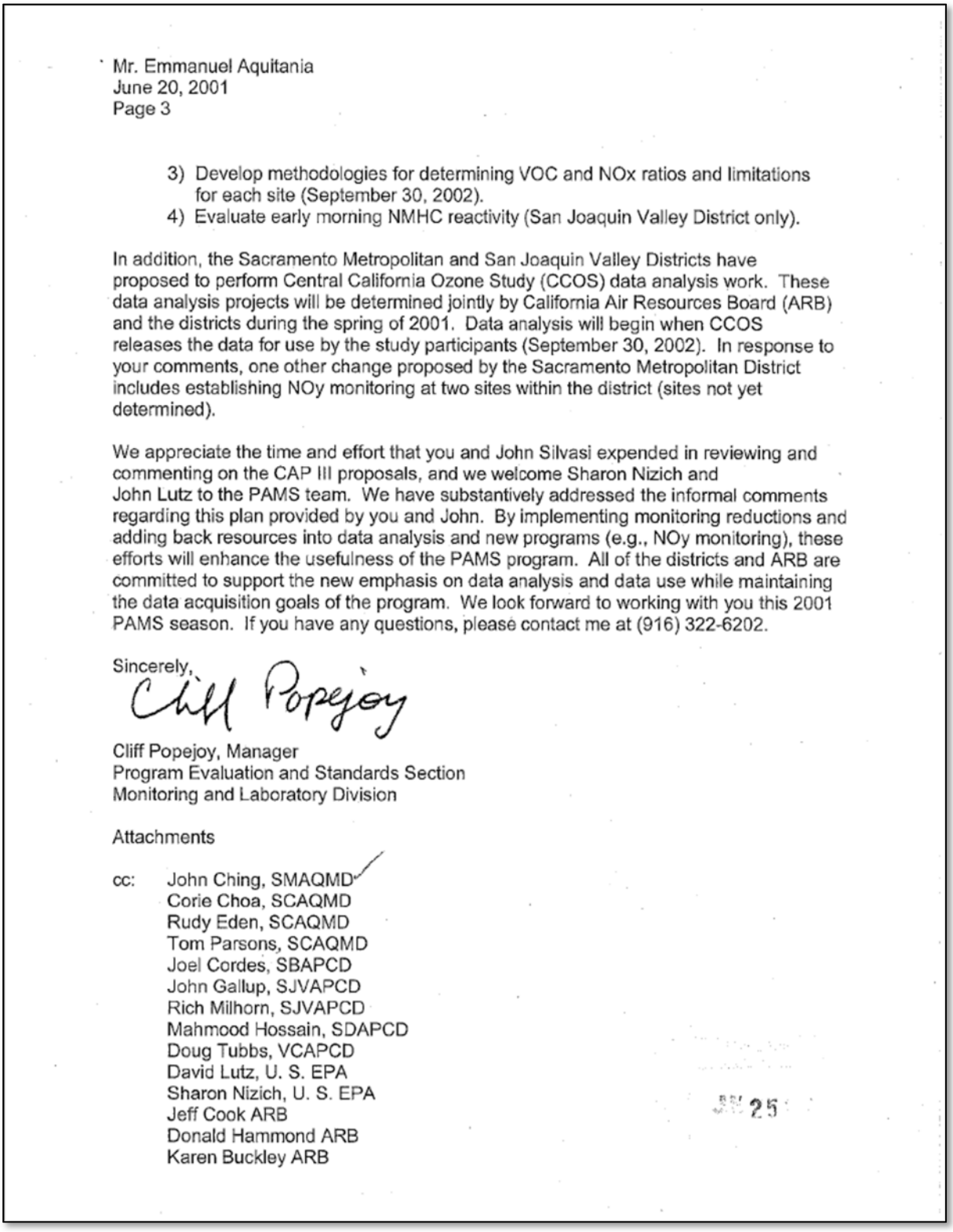
1) Trend day definition: for all districts, a trend day is every third day during the months of July-September.
2) Episode day definition: The Sacramento Metropolitan and Ventura County Districts are changing the criterion for an episode day. An episode is any day that the maximum eight-hour average ozone concentration exceeds 0.0845 PPM. These Districts made these changes in an effort to better represent the levels of ozone that they are testing for in their districts. The Sacramento Metropolitan and Ventura County Districts have a goal of capturing five episodes per PAMS season. The San Joaquin Valley district is maintaining the episode criterion that was applicable under CAP II, which is any day in which the maximum one-hour average ozone concentration exceeds 0.125 PPM. The San Joaquin Valley District has a goal of capturing three episodes per PAMS season.
3) Canister sampling times: In response to the district modeler's requests for more episode data during the early morning hours, the Sacramento Metropolitan, San Joaquin Valley and Ventura County Districts changed the 2300-0200 PST sampling time to an 0800-1100 PST sampling time. Because three of the four sampling times match, data comparisons between trend and episode days can still be done.

Overview of "Add Backs"

Implementing the modifications to monitoring schedules will allow districts the opportunity to 'add-back' resources to other areas of the PAMS program, primarily data analysis and use. In this regard, the Sacramento Metropolitan, San Joaquin Valley, and Ventura County Districts have committed to the following short-term data analysis activities and target dates:

1) Determine one-hour and eight-hour ozone trends; long-term trends, weekend ozone effect, any shifts in location of ozone peaks (December 31, 2001).
2) Conduct exploratory PAMS data analysis on 1998-2000 VOC data (species fingerprint, time series, scatterplots for each PAMS site, and time of day (May 31, 2002).

Figure D-3 California Alternative Plan, Page 3



Mr. Emmanuel Aquitania
June 20, 2001
Page 3

3) Develop methodologies for determining VOC and NOx ratios and limitations for each site (September 30, 2002).
4) Evaluate early morning NMHC reactivity (San Joaquin Valley District only).

In addition, the Sacramento Metropolitan and San Joaquin Valley Districts have proposed to perform Central California Ozone Study (CCOS) data analysis work. These data analysis projects will be determined jointly by California Air Resources Board (ARB) and the districts during the spring of 2001. Data analysis will begin when CCOS releases the data for use by the study participants (September 30, 2002). In response to your comments, one other change proposed by the Sacramento Metropolitan District includes establishing NOy monitoring at two sites within the district (sites not yet determined).

We appreciate the time and effort that you and John Silvasi expended in reviewing and commenting on the CAP III proposals, and we welcome Sharon Nizich and John Lutz to the PAMS team. We have substantively addressed the informal comments regarding this plan provided by you and John. By implementing monitoring reductions and adding back resources into data analysis and new programs (e.g., NOy monitoring), these efforts will enhance the usefulness of the PAMS program. All of the districts and ARB are committed to support the new emphasis on data analysis and data use while maintaining the data acquisition goals of the program. We look forward to working with you this 2001 PAMS season. If you have any questions, please contact me at (916) 322-6202.

Sincerely,

Cliff Popejoy

Cliff Popejoy, Manager
Program Evaluation and Standards Section
Monitoring and Laboratory Division

Attachments

cc: John Ching, SMAQMD
Corie Choa, SCAQMD
Rudy Eden, SCAQMD
Tom Parsons, SCAQMD
Joel Cordes, SBAPCD
John Gallup, SJVAPCD
Rich Milhorn, SJVAPCD
Mahmood Hossain, SDAPCD
Doug Tubbs, VCAPCD
David Lutz, U. S. EPA
Sharon Nizich, U. S. EPA
Jeff Cook ARB
Donald Hammond ARB
Karen Buckley ARB

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Figure D-4 California Alternative Plan, Page 4

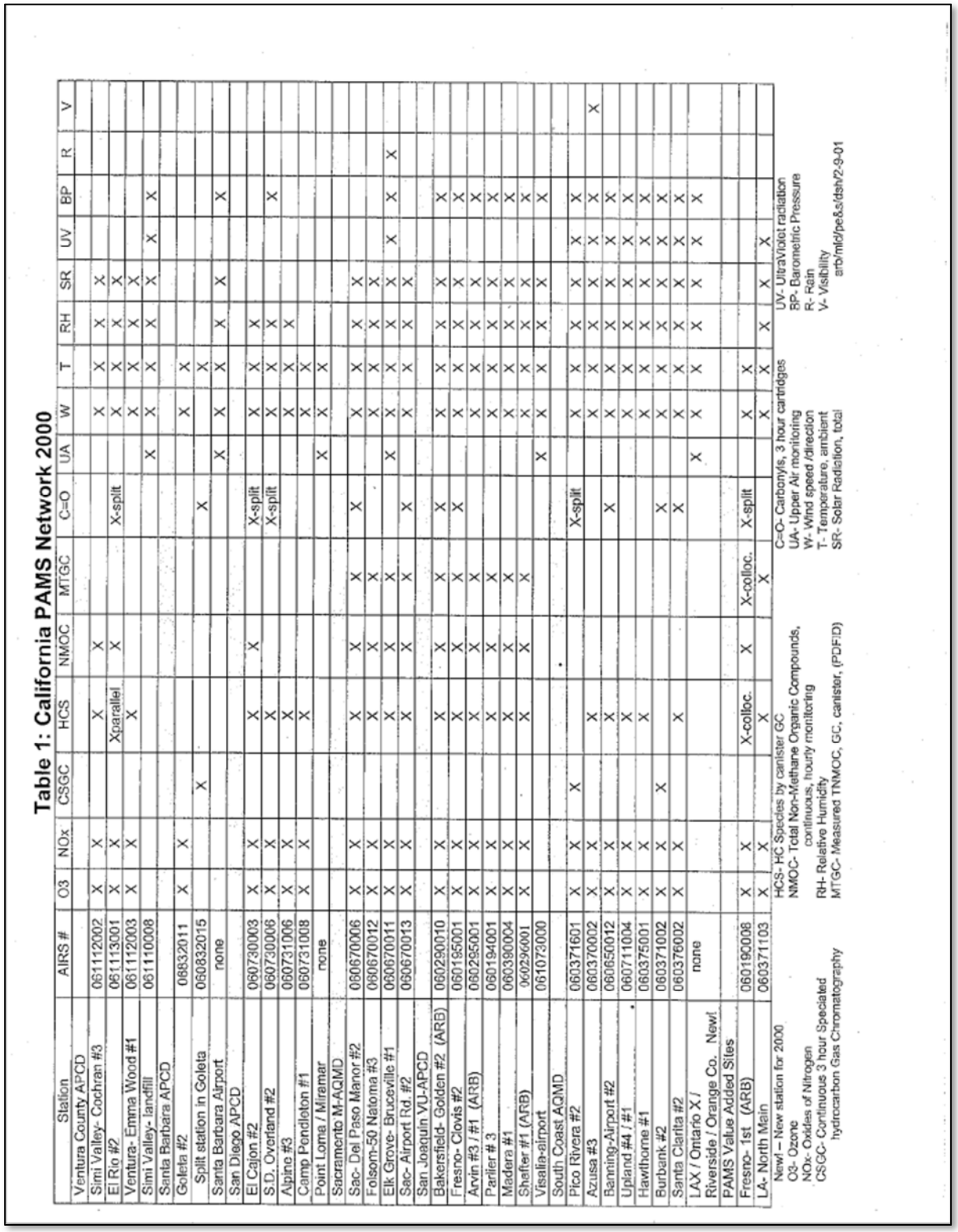

Table 1: California PAMS Network 2000

Station	AIRS #	O3	NOx	CSGC	HCS	NMOC	MTGC	C=O	UA	W	T	RH	SR	UV	BP	R	V
Ventura County APCD																	
Simi Valley- Cochran #3	061112002	X	X		X	X				X	X	X	X				
El Rio #2	061113001	X	X		Xparallel	X		X-split		X	X	X	X				
Ventura- Emma Wood #1	061112003	X	X		X					X	X	X	X				
Simi Valley- landfill	061110008								X	X	X	X	X	X	X		
Santa Barbara APCD																	
Goleta #2	08832011	X	X							X	X						
Split station in Goleta	060832015			X				X			X						
Santa Barbara Airport	none								X	X	X	X	X		X		
San Diego APCD																	
El Cajon #2	060730003	X	X		X	X		X-split		X	X	X					
S.D. Overland #2	060730006	X	X		X			X-split		X	X	X			X		
Alpine #3	060731006	X	X		X					X	X	X					
Camp Pendleton #1	060731008	X	X		X					X	X						
Point Loma / Miramar	none								X	X	X						
Sacramento M-AQMD																	
Sac- Del Paso Manor #2	060670006	X	X		X	X	X	X		X	X	X	X				
Folsom-50 Natoma #3	060670012	X	X		X	X	X			X	X	X	X				
Elk Grove- Bruceville #1	060670011	X	X		X	X	X		X	X	X	X	X	X	X	X	
Sac- Airport Rd. #2	060670013	X	X		X	X	X	X		X	X	X	X				
San Joaquin VU-APCD																	
Bakersfield- Golden #2 (ARB)	060290010	X	X		X	X	X	X		X	X	X	X		X		
Fresno- Clovis #2	060195001	X	X		X	X	X	X		X	X	X	X		X		
Arvin #3 / #1 (ARB)	060295001	X	X		X	X	X			X	X	X	X		X		
Parlier # 3	060194001	X	X		X	X	X			X	X	X	X		X		
Madera #1	060390004	X	X		X	X	X			X	X	X	X		X		
Shafter #1 (ARB)	060296001	X	X		X	X	X			X	X	X	X		X		
Visalia-airport	061073000								X	X	X	X	X		X		
South Coast AQMD																	
Pico Rivera #2	060371601	X	X	X				X-split		X	X	X	X	X	X		
Azusa #3	060370002	X	X		X					X	X	X	X	X	X		X
Banning-Airport #2	060650012	X	X		X			X		X	X	X	X	X	X		
Upland #4 / #1	060711004	X	X		X					X	X	X	X	X	X		
Hawthorne #1	060375001	X	X		X					X	X	X	X	X	X		
Burbank #2	060371002	X	X	X				X		X	X	X	X	X	X		
Santa Clarita #2	060376002	X	X		X			X		X	X	X	X	X	X		
LAX / Ontario X / Riverside / Orange Co. Newl	none								X	X	X	X	X	X	X		
PAMS Value Added Sites																	
Fresno- 1st (ARB)	060190008	X	X		X-colloc.	X	X-colloc.	X-split		X	X						
LA- North Main	060371103	X	X		X		X			X	X	X	X	X			

Newl – New station for 2000
O3- Ozone
NOx- Oxides of Nitrogen
CSGC- Continuous 3 hour Speciated hydrocarbon Gas Chromatography
HCS- HC Species by canister GC
NMOC- Total Non-Methane Organic Compounds, continuous, hourly monitoring
RH- Relative Humidity
MTGC- Measured TNMOC, GC, canister, (PDFID)
C=O- Carbonyls, 3 hour cartridges
UA- Upper Air monitoring
W- Wind speed /direction
T- Temperature, ambient
SR- Solar Radiation, total
UV- UltraViolet radiation
BP- Barometric Pressure
R- Rain
V- Visibility
arb/mld/pe&s/dsh/2-9-01

Figure D-5 California Alternative Plan, Page 5

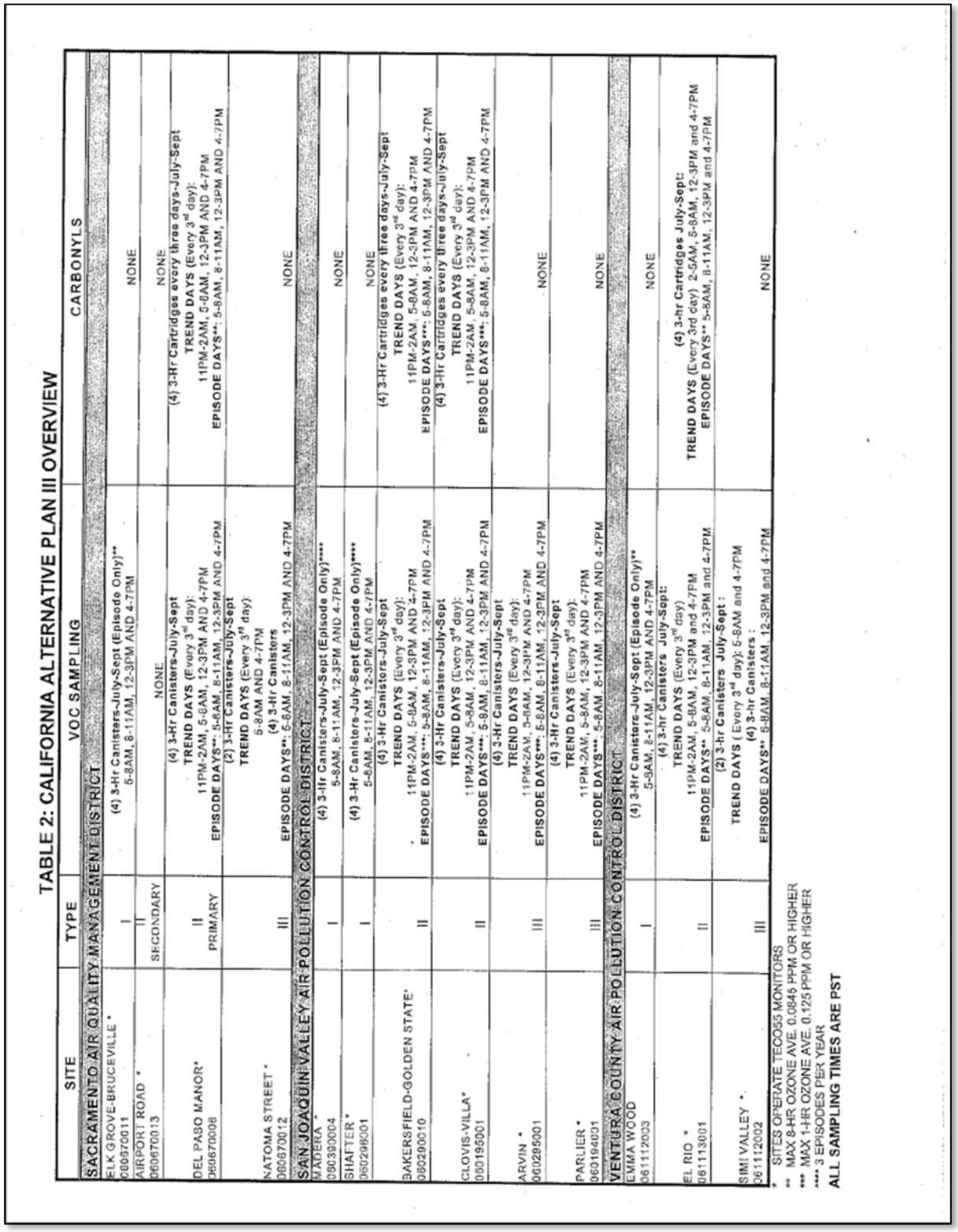

TABLE 2: CALIFORNIA ALTERNATIVE PLAN III OVERVIEW

SITE	TYPE	VOC SAMPLING	CARBONYLS
SACRAMENTO AIR QUALITY MANAGEMENT DISTRICT			
ELK GROVE-BRUCEVILLE * 060970011	I	(4) 3-Hr Canisters-July-Sept (Episode Only)** 6-8AM, 8-11AM, 12-3PM AND 4-7PM	NONE
AIRPORT ROAD * 060670013	II SECONDARY	NONE	NONE
DEL PASO MANOR* 060670006	II PRIMARY	(4) 3-Hr Canisters-July-Sept TREND DAYS (Every 3rd day): 11PM-2AM, 5-6AM, 12-3PM AND 4-7PM EPISODE DAYS**: 5-8AM, 8-11AM, 12-3PM AND 4-7PM	(4) 3-Hr Cartridges every three days-July-Sept TREND DAYS (Every 3rd day): 11PM-2AM, 5-6AM, 12-3PM AND 4-7PM EPISODE DAYS**: 5-8AM, 8-11AM, 12-3PM AND 4-7PM
NATOMA STREET * 060670012	III	(2) 3-Hr Canisters-July-Sept TREND DAYS (Every 3rd day): 5-8AM AND 4-7PM (4) 3-Hr Canisters EPISODE DAYS**: 5-8AM, 8-11AM, 12-3PM AND 4-7PM	NONE
SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT			
MADERA * 060390004	I	(4) 3-Hr Canisters-July-Sept (Episode Only)**** 5-8AM, 8-11AM, 12-3PM AND 4-7PM	NONE
SHAFTER* 060290501	I	(4) 3-Hr Canisters-July-Sept (Episode Only)**** 5-8AM, 8-11AM, 12-3PM AND 4-7PM	NONE
BAKERSFIELD-GOLDEN STATE* 060290010	II	(4) 3-Hr Canisters-July-Sept TREND DAYS (Every 3rd day): 11PM-2AM, 5-8AM, 12-3PM AND 4-7PM EPISODE DAYS***: 5-8AM, 8-11AM, 12-3PM AND 4-7PM	(4) 3-Hr Cartridges every three days-July-Sept TREND DAYS (Every 3rd day): 11PM-2AM, 5-8AM, 12-3PM AND 4-7PM EPISODE DAYS***: 5-8AM, 8-11AM, 12-3PM AND 4-7PM
CLOVIS-VILLA* 060195001	II	(4) 3-Hr Canisters-July-Sept TREND DAYS (Every 3rd day): 11PM-2AM, 5-8AM, 12-3PM AND 4-7PM EPISODE DAYS***: 5-8AM, 8-11AM, 12-3PM AND 4-7PM	(4) 3-Hr Cartridges every three days-July-Sept TREND DAYS (Every 3rd day): 11PM-2AM, 5-8AM, 12-3PM AND 4-7PM EPISODE DAYS***: 5-8AM, 8-11AM, 12-3PM AND 4-7PM
ARVIN * 060295001	III	(4) 3-Hr Canisters-July-Sept TREND DAYS (Every 3rd day): 11PM-2AM, 5-8AM, 12-3PM AND 4-7PM EPISODE DAYS***: 5-8AM, 8-11AM, 12-3PM AND 4-7PM	NONE
PARLIER * 060194001	III	(4) 3-Hr Canisters-July-Sept TREND DAYS (Every 3rd day): 11PM-2AM, 5-8AM, 12-3PM AND 4-7PM EPISODE DAYS***: 5-8AM, 8-11AM, 12-3PM AND 4-7PM	NONE
VENTURA COUNTY AIR POLLUTION CONTROL DISTRICT			
EMMA WOOD 061112003	I	(4) 3-Hr Canisters-July-Sept (Episode Only)** 5-8AM, 8-11AM, 12-3PM AND 4-7PM	NONE
EL RIO * 061113001	II	(4) 3-hr Canisters July-Sept: TREND DAYS (Every 3rd day) 11PM-2AM, 5-8AM, 12-3PM and 4-7PM EPISODE DAYS** 5-8AM, 8-11AM, 12-3PM and 4-7PM	(4) 3-hr Cartridges July-Sept: TREND DAYS (Every 3rd day) 2-5AM, 5-8AM, 12-3PM and 4-7PM EPISODE DAYS** 5-8AM, 8-11AM, 12-3PM and 4-7PM
SIMI VALLEY * 061112002	III	(2) 3-hr Canisters July-Sept : TREND DAYS (Every 3rd day): 5-8AM and 4-7PM (4) 3-hr Canisters : EPISODE DAYS** 5-8AM, 8-11AM, 12-3PM and 4-7PM	NONE

* SITES OPERATE TECO55 MONITORS
** MAX 8-HR OZONE AVE. 0.0845 PPM OR HIGHER
*** MAX 1-HR OZONE AVE. 0.125 PPM OR HIGHER
**** 3 EPISODES PER YEAR
ALL SAMPLING TIMES ARE PST

The enclosure to this letter is not reproduced in this annual network plan. Please contact Sac Metro Air District for a copy of this letter in its entirety.

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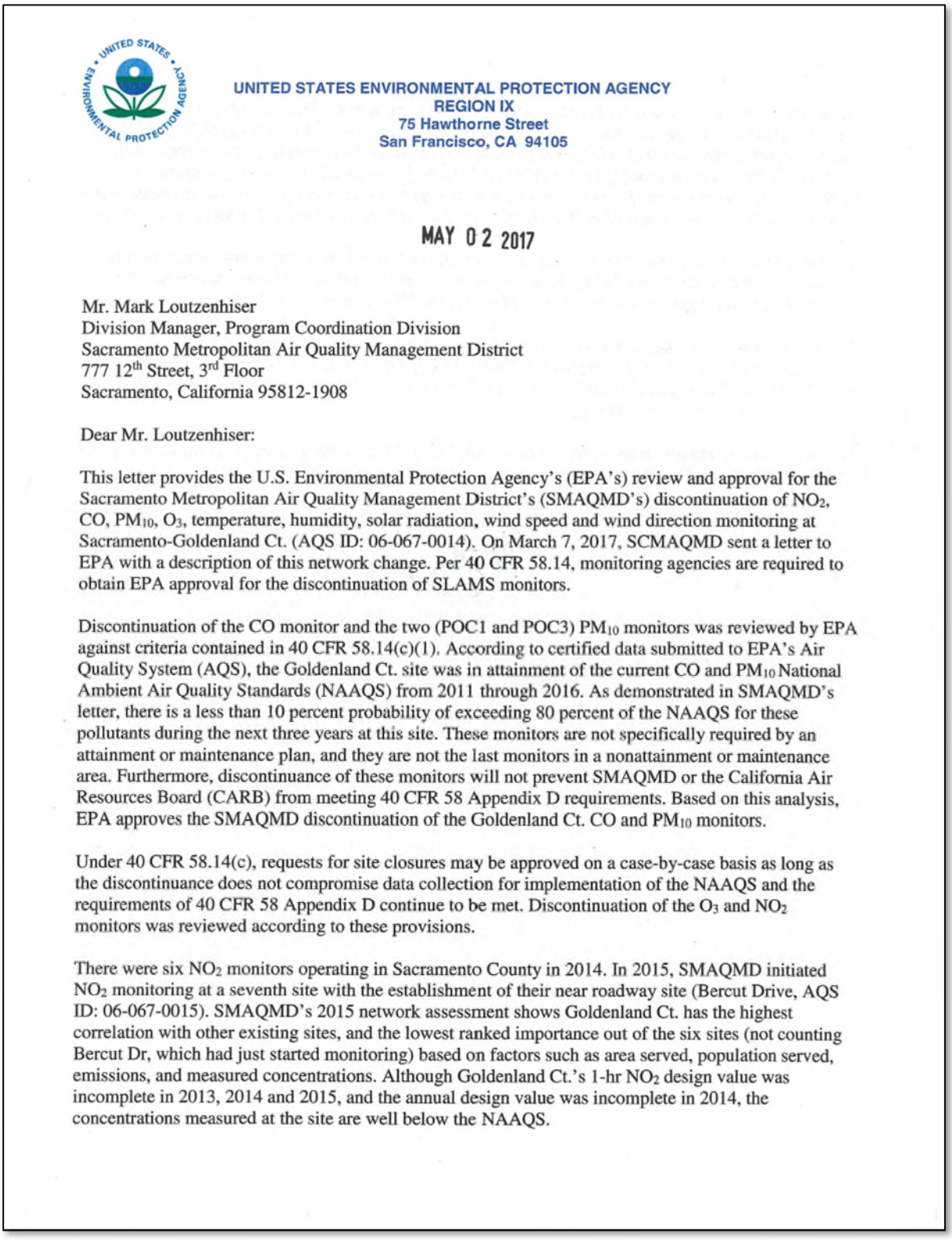
Appendix E Sacramento-Goldenland Ct. Closure Letter

Figure E-1 Sacramento-Goldenland Ct. Closure Approval Letter, Page 1



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

MAY 02 2017

Mr. Mark Loutzenhiser
Division Manager, Program Coordination Division
Sacramento Metropolitan Air Quality Management District
777 12th Street, 3rd Floor
Sacramento, California 95812-1908

Dear Mr. Loutzenhiser:

This letter provides the U.S. Environmental Protection Agency's (EPA's) review and approval for the Sacramento Metropolitan Air Quality Management District's (SMAQMD's) discontinuation of NO_2, CO, PM_{10}, O_3, temperature, humidity, solar radiation, wind speed and wind direction monitoring at Sacramento-Goldenland Ct. (AQS ID: 06-067-0014). On March 7, 2017, SCMAQMD sent a letter to EPA with a description of this network change. Per 40 CFR 58.14, monitoring agencies are required to obtain EPA approval for the discontinuation of SLAMS monitors.

Discontinuation of the CO monitor and the two (POC1 and POC3) PM_{10} monitors was reviewed by EPA against criteria contained in 40 CFR 58.14(c)(1). According to certified data submitted to EPA's Air Quality System (AQS), the Goldenland Ct. site was in attainment of the current CO and PM_{10} National Ambient Air Quality Standards (NAAQS) from 2011 through 2016. As demonstrated in SMAQMD's letter, there is a less than 10 percent probability of exceeding 80 percent of the NAAQS for these pollutants during the next three years at this site. These monitors are not specifically required by an attainment or maintenance plan, and they are not the last monitors in a nonattainment or maintenance area. Furthermore, discontinuance of these monitors will not prevent SMAQMD or the California Air Resources Board (CARB) from meeting 40 CFR 58 Appendix D requirements. Based on this analysis, EPA approves the SMAQMD discontinuation of the Goldenland Ct. CO and PM_{10} monitors.

Under 40 CFR 58.14(c), requests for site closures may be approved on a case-by-case basis as long as the discontinuance does not compromise data collection for implementation of the NAAQS and the requirements of 40 CFR 58 Appendix D continue to be met. Discontinuation of the O_3 and NO_2 monitors was reviewed according to these provisions.

There were six NO_2 monitors operating in Sacramento County in 2014. In 2015, SMAQMD initiated NO_2 monitoring at a seventh site with the establishment of their near roadway site (Bercut Drive, AQS ID: 06-067-0015). SMAQMD's 2015 network assessment shows Goldenland Ct. has the highest correlation with other existing sites, and the lowest ranked importance out of the six sites (not counting Bercut Dr, which had just started monitoring) based on factors such as area served, population served, emissions, and measured concentrations. Although Goldenland Ct.'s 1-hr NO_2 design value was incomplete in 2013, 2014 and 2015, and the annual design value was incomplete in 2014, the concentrations measured at the site are well below the NAAQS.

Figure E-2 Sacramento-Goldenland Ct. Closure Approval Letter, Page 1

There were seven O_3 monitors operating in Sacramento County in 2015. The network assessment shows that Goldenland Ct. highly correlates with three other sites in the county. As shown in SMAQMD's letter, concentrations measured at Goldenland Ct. are consistently lower than those measured at other sites within the county. Although it has a violating 2016 design value of 0.071 parts per million, Goldenland Ct. is not the design value site for O_3 within the county; it had the lowest design value in the county from 2011 to 2013, and from 2014-2016 it has had the fourth-highest design value in the county.

Discontinuance of the O_3 and NO_2 monitors at Goldenland Ct. would not compromise data collection needed for implementation of a NAAQS, and the requirements of Appendix D would continue to be met. EPA therefore approves discontinuation of the O_3 and NO_2 monitoring at Goldenland Ct.

While PAMS network changes must be approved by the Administrator, EPA Region 9 has recommended EPA Headquarters approve SMAQMD's request to close this PAMS site. A separate letter addressing the requested modification to the Photochemical Assessment Monitoring Stations (PAMS) network will be forthcoming.

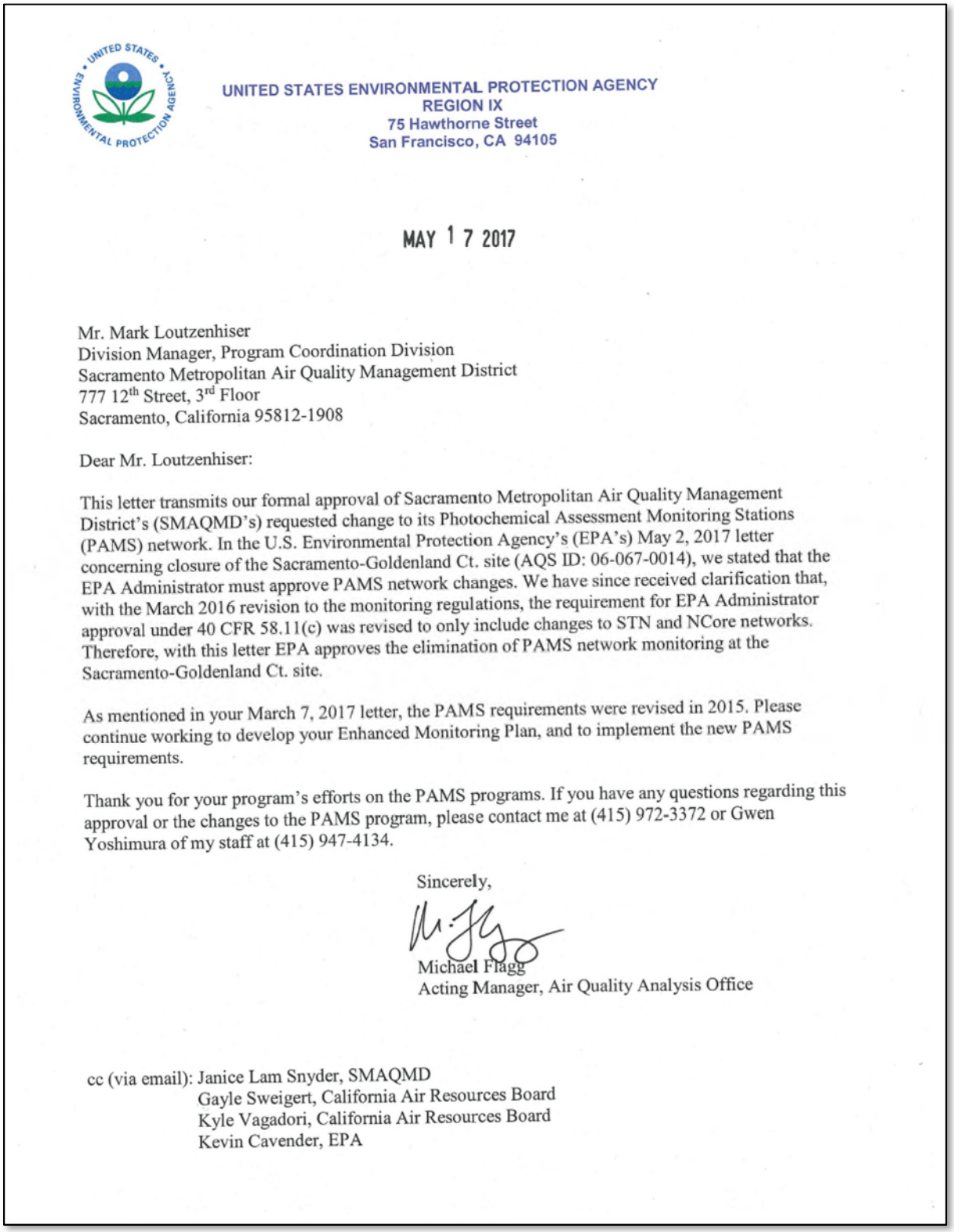
If you have any questions, please contact me at (415) 972-3372 or Gwen Yoshimura of my staff at (415) 947-4134. Thank you for your continued attention to detail and thorough data analyses.

Sincerely,

Michael Flagg
Acting Manager, Air Quality Analysis Office

cc (via email): Janice Lam Snyder, SMAQMD
Gayle Sweigert, CARB
Kyle Vagadori, CARB

Figure E-3 Sacramento-Goldenland Ct. PAMS Closure Approval Letter



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

MAY 17 2017

Mr. Mark Loutzenhiser
Division Manager, Program Coordination Division
Sacramento Metropolitan Air Quality Management District
777 12th Street, 3rd Floor
Sacramento, California 95812-1908

Dear Mr. Loutzenhiser:

This letter transmits our formal approval of Sacramento Metropolitan Air Quality Management District's (SMAQMD's) requested change to its Photochemical Assessment Monitoring Stations (PAMS) network. In the U.S. Environmental Protection Agency's (EPA's) May 2, 2017 letter concerning closure of the Sacramento-Goldenland Ct. site (AQS ID: 06-067-0014), we stated that the EPA Administrator must approve PAMS network changes. We have since received clarification that, with the March 2016 revision to the monitoring regulations, the requirement for EPA Administrator approval under 40 CFR 58.11(c) was revised to only include changes to STN and NCore networks. Therefore, with this letter EPA approves the elimination of PAMS network monitoring at the Sacramento-Goldenland Ct. site.

As mentioned in your March 7, 2017 letter, the PAMS requirements were revised in 2015. Please continue working to develop your Enhanced Monitoring Plan, and to implement the new PAMS requirements.

Thank you for your program's efforts on the PAMS programs. If you have any questions regarding this approval or the changes to the PAMS program, please contact me at (415) 972-3372 or Gwen Yoshimura of my staff at (415) 947-4134.

Sincerely,

Michael Flagg
Acting Manager, Air Quality Analysis Office

cc (via email): Janice Lam Snyder, SMAQMD
Gayle Sweigert, California Air Resources Board
Kyle Vagadori, California Air Resources Board
Kevin Cavender, EPA