

**2015**  
**ANNUAL MONITORING NETWORK PLAN**

**SACRAMENTO METROPOLITAN  
AIR QUALITY MANAGEMENT DISTRICT**

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## List of Abbreviations and Acronyms

AADT	Annual average daily traffic
AGL	Above ground level
AIR	Sacramento-Airport Road Air Monitoring Site
ANP	Annual network plan
ARM	Approved Regional Monitor
AQS	Air Quality System
BAM	Beta Attenuation Monitor
BC	Sacramento-Branch Center #2 Air Monitoring Site
BL	General/Background
BRU	Elk Grove-Bruceville Air Monitoring Site
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CSN	Chemical Speciation Network
CFR	Code of Federal Regulations
CO	Carbon Monoxide
DPM	Sacramento-Del Paso Manor Air Monitoring Site
DV	Design Value
ECW	Sacramento-El Camino/Watt Air Monitoring Site
EPA	U.S Environmental Protection Agency
ER	Emission ratio
ERG	Eastern Research Group, Inc.
FE AADT	Fleet equivalent annual average daily traffic
FEM	Federal Equivalent Method
FID	Flame Ionization Detector
FOL	Folsom-Natoma Air Monitoring Site
FRM	Federal Reference Method
GC	Gas Chromatography
GOL	Sacramento-Golden Land Court Air Monitoring Site
HC	Highest Concentration
IM	Source Impact
MET	Meteorological sensor
MI	Microscale
MS	Middle Scale
MSA	Metropolitan Statistical Area
NAAQS	National Ambient Air Quality Standard

NCORE	National Core, a multi-pollutant ambient monitoring network
NDIR	Non-dispersive Infrared Spectrometry
NEI	National Emission Inventory
NH	North Highlands-Blackfoot Air Monitoring Site
NMHC	Non-Methane Hydrocarbon
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>X</sub>	Oxides of Nitrogen
NO <sub>Y</sub>	Reactive Oxides of Nitrogen
NPAP	National Performance Audit Program (Criteria pollutant monitors)
NPEP	National Performance Evaluation Program (PM <sub>2.5</sub> FRM)
NS	Neighborhood Scale
O <sub>3</sub>	Ozone
PAMS	Photochemical Assessment Monitoring Sites
Pb	Lead
PEP	Performance Evaluation Program (PM <sub>2.5</sub> FRM)
PM	Particulate Matter
PM <sub>2.5</sub>	Particulate Matter 2.5 micron
PM <sub>10</sub>	Particulate Matter 10 micron
PM-Coarse	Particulate Matter > 2.5 micron and < 10 micron (PM <sub>10-2.5</sub> )
POC	Parameter occurrence code
PPB	Parts per Billion
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QMP	Quality Management Plan
RC	Representative Concentration
RH	Relative Humidity
RS	Rancho Seco monitoring site
RTI	Research Triangle Institute
SASS	PM <sub>2.5</sub> Speciation sampler
SCK	Sacramento Health Department-Stockton Blvd. Air Monitoring Site
SFNA	Sacramento Federal Nonattainment Area
SIP	State Implementation Program
SJV	San Joaquin Valley
SLAMS	State and Local Air Monitoring Sites
SLU	Sloughhouse Air Monitoring Site
SMAQMD	Sacramento Metropolitan Air Quality Management District
SO <sub>2</sub>	Sulfur Dioxide
SO <sub>4</sub>	Sulfate
SPM	Special Purpose Monitoring
SRD	Solar Radiation
SSI	Size Selective Inlet (PM <sub>10</sub> FRM sampler)

STN	Speciation Trends Network
TAPI	Teledyne Advanced Pollution Instrumentation
TCCR	Transportation Corridor Concept Report
TEI	Thermo Environmental Instruments
TEOM	Tapered Element Oscillating Microbalance
THC	Total Hydrocarbon
TNMHC	Total Non-methane hydrocarbon
TST	Sacramento-T Street Air Monitoring Site
US	Urban Scale
UV	Ultraviolet
VCAPCD	Ventura County Air Pollution Control District
VOC	Volatile Organic Compounds
VSCC	Very Sharp Cut Cyclone
WD	Wind Direction
WF	Welfare Based
WS	Wind Speed

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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, Part 58.10, to submit an Annual Monitoring Network Plan to the U.S. Environmental Protection Agency (EPA), no later than July 1st, each year. The report must contain specific monitoring network information and the report must be presented for a 30-day public review period prior to submittal to EPA. The public review period was open from July 15, 2015 thru August 15, 2015. No comment was received during this period. This report covers the period: January 1, 2014-December 31, 2014.

The primary purpose of this ambient air monitoring network report is to document the existing Sacramento County State and Local Air Monitoring sites (SLAMS), National Core (NCore) multi-pollutant monitoring stations, Chemical Speciation Network (CSN), Special Purpose Monitoring (SPM), and Photochemical Assessment Monitoring (PAMS) sites, operated by our District and California Air Resources Board (CARB), and to show that the ambient air monitoring network meets the requirements of 40 CFR 58, including Appendix A, C, D, and E, where applicable. The report will include the Federal Reference Method (FRM), Federal Equivalent Method (FEM), and Approved Regional Method (ARM) monitors. This report also discusses additional SPM monitoring instrumentation being operated, such as aethalometers and nephelometers, and surface/upper air meteorological sensors required for the PAMS program. The secondary purpose of this report is to discuss proposed changes (additions, relocations, and terminations of non-SPM monitors) in the ambient air monitoring network that may be proposed to occur within an 18 month period following submittal of this report.

This report is not an "in depth" analysis of the local air monitoring network design. An in-depth analysis of the monitoring network is required every 5 years to determine, at a minimum, if the network meets the monitoring objectives defined in 40 CFR Part 58 Appendix D, whether new sites are needed, whether existing sites are no longer needed, and whether new technologies are appropriate for incorporation in to the ambient air monitoring network.

This network plan focuses on the monitors that are operated within Sacramento County, which is a part of Sacramento-Arden Arcade-Roseville Metropolitan Statistical Area (MSA). Section 3, Minimum Monitoring Requirement, discusses any shared monitoring responsibility agreement between SMAQMD and neighboring monitoring organization. For details on monitors in neighboring counties within the MSA, please refer to the latest California Air Annual Monitoring Network Report for Small District in California < <http://www.arb.ca.gov/aqd/amnr/amnr2014draft.pdf> >.

## Section 2. Network Operations

Sacramento County is located in the middle of California’s Central Valley and at the southern end of the Sacramento Valley. Sacramento County is the most populous part of the Sacramento-Arden Arcade-Roseville, California, MSA (Sacramento MSA). The Sacramento MSA also includes Placer, El Dorado, and Yolo County. It has 2.2 million people, including 1.5 million in Sacramento County, and is the 27<sup>th</sup> most populous MSA in the U.S.<sup>1</sup>. Figure 2-1 shows a map of Sacramento MSA.

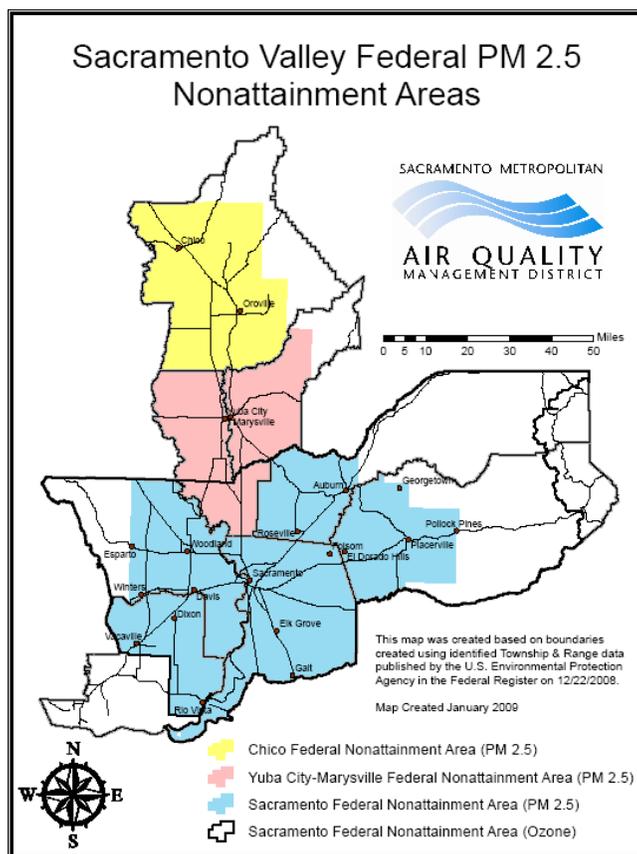
**Figure 2-1**  
**Counties within Sacramento-Arden Arcade-Roseville, California, MSA**



<sup>1</sup> Source: Population Estimates, U.S. Census, 2014

The Sacramento MSA is a non-attainment area for the Federal 8hr O<sub>3</sub> standard and is referred to as Sacramento Federal Nonattainment Area (SFNA)<sup>2</sup>. This area includes the western sections of Placer and El Dorado Counties, Yolo County, Sacramento County, and parts of Solano and Sutter Counties. It is shown in Figure 2-2. U.S. EPA re-designated Sacramento County as a PM<sub>10</sub> attainment area in September 2013<sup>3</sup>. The county has met PM<sub>10</sub> air quality standard since 2002. The metropolitan area met the PM<sub>2.5</sub> standard in 2012 and will continue to reduce PM<sub>2.5</sub> level through various programs and strategies. Sacramento County is in attainment for the Federal CO, NO<sub>2</sub>, and SO<sub>2</sub> standards. The California Air Resources Board recommended that EPA designate Sacramento County as unclassified for the 2008 Federal Pb standard.

**Figure 2-2  
Sacramento Federal Non-attainment Area**



<sup>2</sup> U.S. Environmental Protection Agency, 2013

<sup>3</sup> 78 Federal Register 187

SMAQMD operates ten air monitoring sites within Sacramento County. While most sites operate a suite of instruments to monitor multiple pollutants and meteorological condition, only a few sites monitor a specific pollutant. Each site has monitors that belong to one or more national monitoring networks, such as SLAMS, PAMS, or is an SPM. In addition, SMAQMD operates one of the 80 NCore sites and one of the 54 PM<sub>2.5</sub> CSN trend sites nationwide. Table 2-1 lists the type of monitoring network each site belongs to and the pollutants monitored at each site. Figure 2-3 shows the location of Sacramento monitoring sites, which includes one site that is operated by ARB -- Sacramento-T Street.

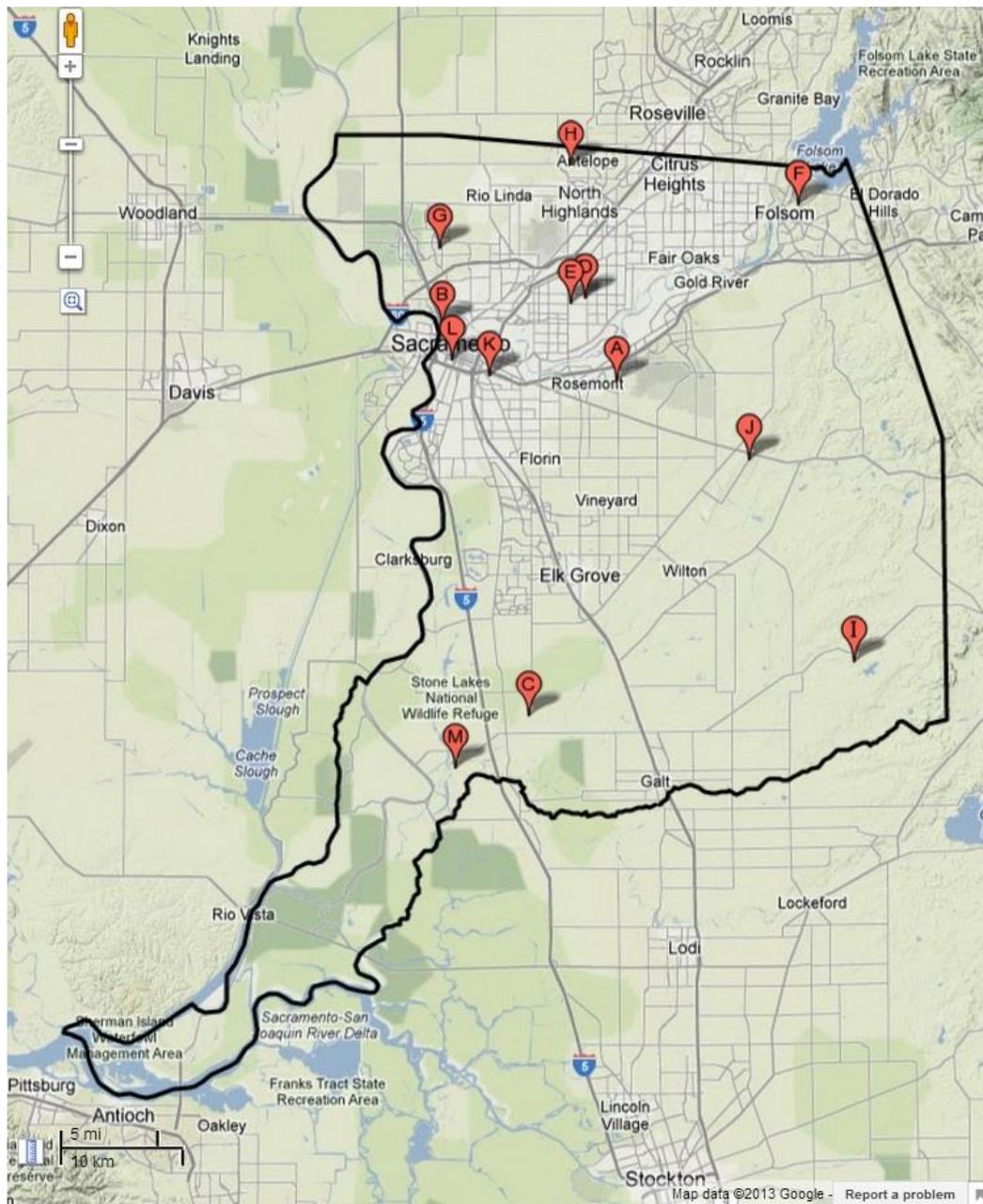
**Table 2-1  
Purpose and Overview of Pollutants Monitored**

		Sacramento-Branch Center Rd #2 (BC)	Sacramento-Bercut Dr. (BER) <sup>(A)</sup>	Elk Grove-Bruceville Rd. (BRU)	Sacramento-Del Paso Manor (DPM)	Sacramento-El Camino/Watt (ECW) <sup>(B)</sup>	Folsom-Natomia (FOL)	Sacramento-Golden Land Ct. (GOL)	North Highlands-Blackfoot Way (NH)	Rancho Seco (RS)	Sloughhouse (SLU)	Sacramento-Health Dept. (STK)	Sacramento- T St. (TST)
Purpose	SLAMS	x	x	x	x	x	x	x	x		x	x	x
	PAMS			x	x		x	x			x		
	CSN				x								x
	NCORE				x								
	SPM				x				x	x	x		
Pollutants	Ozone (O <sub>3</sub> )			x	x		x	x	x		x		x
	Carbon Monoxide (CO)		x		x	x		x	x				
	Nitrogen Dioxide (NO <sub>2</sub> )		x	x	x		x	x	x				x
	Total Reactive Nitrogen (NO <sub>y</sub> )				x		x						
	Sulfur Dioxide (SO <sub>2</sub> )				x								
	Non-methane Hydrocarbon (NMH)			x	x		x	x					
	Speciated VOC			x	x		x						
	Carbonyl				x								
	PM <sub>10</sub> (Hourly, continuous)							x				x	
	PM <sub>10</sub> (24-hr)	x			x			x	x			x	x
	PM <sub>2.5</sub> (Hourly, continuous)			x	x		x			x	x		x
	PM <sub>2.5</sub> (24-hr)				x							x	x
	Speciated PM <sub>2.5</sub>				x								x
	PM <sub>10-2.5</sub> (24-hr)				x								
	Lead (Pb)				x								
	Black Carbon (BC)		x		x								
Scattering Coefficient				x									
Meteorology	Outdoor Temperature		x	x	x		x	x			x		x
	Relative Humidity		x	x	x		x	x					x
	Wind Direction		x	x	x		x	x			x		x
	Wind Speed		x	x	x		x	x			x		x
	Solar Radiation			x	x		x	x					
	Ultraviolet Radiation			x									
	Barometric Pressure			x									x
	Precipitation			x									
	Upper Level Meteorology			x									

(A) EPA approved site under planning and construction, to be operational by December 31, 2015

(B) Station permanently closed in December 2014, see Section 4

**Figure 2-3**  
**Air Monitoring Sites in Sacramento County**



Source: Google Map

- |   |  |
|---|--|
| A. Sacramento-Branch Center Rd #2                 | H. North Highlands-Blackfoot Way                             |
| B. <i>Proposed Monitoring Site</i> <sup>(A)</sup> | I. Rancho Seco   |
| C. Elk Grove-Bruceville Rd                        | J. Sloughhouse   |
| D. Sacramento-Del Paso Manor                      | K. Sacramento-Health Dept.                                   |
| E. Sacramento-El Camino Watt <sup>(B)</sup>       | L. Sacramento-T Street (operated by CARB)                    |
| F. Folsom-Natoma St                               | M. Walnut Grove Tower (Monitors ozone and meteorology aloft) |
| G. Sacramento-Golden Land Ct.                     |  |

(A) EPA approved site under planning and construction, to be operational by December 31, 2015

(B) Station permanently closed in December 2014, see Section 4

The primary focus of the current ambient air monitoring network is the collection of O<sub>3</sub> and photochemical pollutant precursors such as NO<sub>x</sub> and VOC, and PM<sub>2.5</sub> data to support SIP development, attainment/non-attainment decisions, public notification, and data for air quality modeling efforts. The network is designed to meet three basic monitoring objectives: (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. To support these monitoring objectives there are a variety of types of monitoring sites including sites located to determine the highest pollutant concentration, the representative concentrations in areas of high population density, the impact of major pollution emissions sources, the general background concentration levels, the extent of pollutant transport, and impacts on visibility, vegetation, and other welfare-based impacts. An overview of monitoring objective is in Table 2-2.

**Table 2-2  
Monitoring Objective**

	Sacramento-Branch Center Rd #2 (BC)	Sacramento-Bercut Dr. (BER) <sup>(A)</sup>	Elk Grove-Bruceville Rd. (BRU)	Sacramento-Del Paso Manor (DPM)	Sacramento-El Camino/Watt (ECW) <sup>(B)</sup>	Folsom-Natoma (FOL)	Sacramento-Golden Land Ct. (GOL)	North Highlands- Blackfoot Way (NH)	Rancho Seco (RS)	Sloughhouse (SLU)	Sacramento-Health Dept. (STK)	Sacramento-T St. (TST)
O <sub>3</sub>			N,P	N,P		N,P	N,P	N,R		N,P		N,P
CO		N,P		N,P	N,P		N,P	N,R				
NO <sub>2</sub>		N,P	N,P	N,P		N,P	N,P	N,R				N,P
NO <sub>y</sub>				P		P						
SO <sub>2</sub>				N,P								
NMH			P,R	P,R		P,R	P,R					
VOC			R	R		R						
PM <sub>10</sub> (Hourly)							P,R				P,R	
PM <sub>10</sub> (24-hr)	N,P			N,P			N,P	N,P			N,P	N,P
PM <sub>2.5</sub> (Hourly)			P	P		N,P			P,R	R		P
PM <sub>2.5</sub> (24-hr)				N,P							N,P	N,P
PM <sub>10-2.5</sub>				P								
Pb				N,P								

<sup>(A)</sup> EPA approved site under planning and construction, to be operational by December 31, 2015

<sup>(B)</sup> Station permanently closed in December 2014, see Section 4

N: NAAQS Comparison

P: Public Info

R: Research

The physical siting of an air monitoring station must achieve a spatial scale of representativeness that is consistent with the monitoring objective of the monitor. The spatial scale results from the physical location of the site with respect to the pollutant

sources. It estimates the size of the area surrounding the monitoring site that experiences uniform pollutant concentrations. Table 2-3 summarizes the site type and spatial scale. For in-depth details on individual monitors, including monitoring objective and statement of purpose, see Appendix A, Detailed Site Information. Site type and spatial scale description can be found in Appendix D to 40 CFR 58.

**Table 2-3  
Type of Site and Spatial Scale**

		Sacramento-Branch Center Rd #2 (BC)	Sacramento-Bercut Dr. (BER) <sup>(A)</sup>	Elk Grove-Bruceville Rd. (BRU)	Sacramento-Del Paso Manor (DPM)	Sacramento-El Camino/Watt <sup>(B)</sup> (ECW)	Folsom-Natoma (FOL)	Sacramento-Golden Land Ct. (GOL)	North Highlands-Blackfoot Way (NH)	Rancho Seco (RS)	Sloughhouse (SLU)	Sacramento-Health Dept. (STK)	Sacramento- T St. (TST)
Site Type	Ozone			UP	PE		MO PE	PE	PE		MO		PE
	Carbon Monoxide		SO		PE	HC		PE	PE				
	Nitrogen Dioxide		SO	UP	PE		HC	PE	PE				PE
	Sulfur Dioxide				PE								
	PM <sub>10</sub> (Cont. or Manual)	HC			PE			PE	PE			PE	PE
	PM <sub>2.5</sub> (Cont. or Manual)			BG	PE HC		PE			BG	UP	PE HC	PE HC
	PM <sub>10-2.5</sub>				PE								
	Lead				BG								
Spatial Scale	Ozone			US	PE		NS	US	US		NS		US
	Carbon Monoxide		MC		NS	MC		NS	NS				
	Nitrogen Dioxide		MC	NS	NS		NS	NS	NS				NS
	Sulfur Dioxide				NS								
	PM <sub>10</sub> (Cont. or Manual)	NS			NS			NS	NS			NS	NS
	PM <sub>2.5</sub> (Cont. or Manual)			NS	NS		NS			NS	NS	NS	NS
	PM <sub>10-2.5</sub>				NS								
	Lead				US								

<sup>(A)</sup> EPA approved site under planning and construction, to be operational by December 31, 2015

<sup>(B)</sup> Station permanently closed in December 2014, see Section 4

- ED: Extreme downwind
- GB: General/background
- HC: Highest concentration
- MO: Maximum O<sub>3</sub> concentration
- PE: Population exposure
- QA: Quality assurance
- MP: Maximum precursor emission
- OT: Other
- RT: Regional transport
- SO: Source oriented
- UP: Upwind/background
- WF: Welfare related impacts
- MC: Microscale
- MD: Middle scale
- NS: Neighborhood scale
- US: Urban scale
- RS: Regional scale
- NG: National/global scale

### Section 3. Minimum Monitoring Requirements

Depending on the specific pollutant, the minimum number of monitors required for each pollutant is based on the one or more applicable factors as described in 40 CFR 58 Appendix D: MSA population, pollutant design value, pollutant maximum concentration, attainment status, annual average daily traffic (AADT), state implantation plan (SIP), maintenance plan, population weighted emission index (PWEI), and EPA's national emission inventory (NEI) data.

Sacramento MSA meets or exceeds minimum monitoring requirement for all criteria pollutants – O<sub>3</sub>, PM<sub>2.5</sub> (manual and continuous methods), PM<sub>10</sub>, NO<sub>2</sub>, SO<sub>2</sub>, CO, and Pb. Details of the minimum monitoring requirements of all criteria pollutants are provided in tables 3-1 and 3-2. Monitors in these tables represent Sacramento MSA (or CBSA, ID#40900). As mentioned in Section 2, Sacramento MSA has 2.2 million residents (U.S. Census, 2010) and is composed of El Dorado, Placer, Sacramento, and Yolo Counties.

SMAQMD does not currently have any shared monitoring responsibility agreement with other monitoring organization in the MSA. Other monitoring organizations that operate air monitoring stations in the MSA are: CARB, Placer County APCD, and Yolo-Solano AQMD. With the exception of PM<sub>2.5</sub> FRM or FEM monitors, SMAQMD operates more monitors than are required in the Sacramento MSA. Detailed assessment is available in Appendix B. SMAQMD is currently working with CARB on an agreement to share responsibility for PM<sub>2.5</sub> FRM or FEM monitoring. A copy of this agreement will be attached to Appendix B in the final copy of this network plan.

**Table 3-1**  
**2014 Sacramento MSA Design Value and Monitoring Requirement, Part 1**

Pollutant	Type (if applicable)	Monitors required	Active Monitors in MSA	Active Monitors in Sacramento County	Additional Monitors Needed	2014 Design Value <sup>(A)</sup>	Design Value Site/Location (AIRS ID#)
O <sub>3</sub>		2	15 <sup>(B)</sup>	7	0	0.085 ppm <sup>(B)</sup>	Folsom-Natoma St (06-067-0012)
PM <sub>2.5</sub>	FRM	3	5	3	0	24-hr: 32 µg/m <sup>3</sup> Annual: 9.8 µg/m <sup>3</sup>	Sacramento-Del Paso Manor (06-067-0006)
	FEM		1 <sup>(C)</sup>	0 <sup>(C)</sup>			Sacramento-Del Paso Manor (06-067-0006)
	Continuous	2	12	5	0		
PM <sub>10</sub>		2-4	14	7	0	105 µg/m <sup>3</sup> (70% of NAAQS)	Sacramento-T Street (06-067-0010)
PM <sub>10-2.5</sub>		1	1	1	0	N/A	Located at Sacramento-Del Paso Manor (06-067-0006)

<sup>(A)</sup> Design values from U.S. EPA Air Quality System Design Value Report (AMP 480) and Raw Data Report (AMP350) on PM<sub>10</sub> (81102), accessed on 10-Apr-2015

<sup>(B)</sup> Per 40 CFR Part 58, Appendix D, Section 4.1(a), only SLAMS O<sub>3</sub> monitors counts toward minimum monitoring requirement

<sup>(C)</sup> FEM monitors categorized as SPM are not counted toward meeting monitoring requirements

**Table 3-2**

## 2014 Sacramento MSA Design Value and Monitoring Requirement, Part 2

Pollutant	Type (if applicable)	Monitors required	Active Monitors in MSA	Active Monitors in Sacramento County	Additional Monitors Needed	Notes
NO <sub>2</sub>	Near-road	1	0	0	1 <sup>(A)</sup>	Max annual average daily traffic count: 246,000 <sup>(B)</sup> Near-road monitoring requirement will be satisfied by the Proposed Monitoring Site
	Area-wide	1	8	6	0	NO <sub>2</sub> monitor at Sacramento-Del Paso Manor (06-067-0006) serves as both PAMS and area-wide monitor
SO <sub>2</sub>						Total SO <sub>2</sub> : 1,085 tons <sup>(C)</sup>  Population Weighted Emission Index: 2,435 million persons-tons per year <sup>(D)</sup>
		1	1	1	0	Monitor at Sacramento-Del Paso Manor satisfy NCore and SO <sub>2</sub> monitoring requirements
CO		2	4	4	1 <sup>(E)</sup>	Trace monitor at Sacramento-Del Paso satisfy the NCore requirement, which also satisfy the 1 monitor requirement in the Maintenance Plan
Pb	NCore	1	1	1	0	Located at Sacramento-Del Paso Manor
	Non-source oriented	0	0	0	0	No industrial source > 0.5 tpy <sup>(C)</sup> ,
	Source oriented	0	0	0	0	Airport source < 1.0 tpy <sup>(C)</sup>

<sup>(A)</sup> Located at new near-road monitoring site, to be operational by December 31, 2015

<sup>(B)</sup> Source: California Department of Transportation, 2013; 2014 figures were not yet available at the time of plan drafting

<sup>(C)</sup> Source: 2011 National Emission Inventory version 2, 2015

<sup>(D)</sup> Per 40 CFR Part 58 Appendix D,  $PWEI = \frac{Total\ SO_2 \times MSA\ population}{1,000,000}$

<sup>(E)</sup> Located at new near-road monitoring site; anticipated to be in operation by December 31, 2015, ahead of the 2017 deadline as per 40 CFR Part 58.13(e) because it is replacing the closed El-Camino Watt station, which was the prior peak design value site in the CO maintenance area

In addition to the criteria pollutants, Sacramento MSA also meets minimum monitoring requirement for PAMS, which is required due to the severity of ozone non-attainment classification in Sacramento MSA. Currently, there is one of each PAMS type I, II, and III sites. There is also a secondary type II site. Table 3-3 lists the instruments operating at each PAMS.

**Table 3-3  
PAMS Minimum Monitoring Requirement**

	# Required	# Active	Elk Grove- Bruceville Rd. (Type I)	Sacramento-Del Paso Manor (Type II)	Sacramento- Golden Land Ct. (Type II, secondary)	Folsom-Natoma St. (Type III)
O <sub>3</sub>	4 <sup>(A)</sup>	4	✗	✗	✗	✗
CO	1	2		✗	✗	
NO <sub>x</sub>	2	4	✗	✗	✗	✗
NO <sub>y</sub>	1	1		✗ <sup>(B)</sup>		✗
Speciated VOC	2	2		✗		✗
Carbonyl Sampling	1	1		✗		
Surface Met	4 <sup>(A)</sup>	4	✗	✗	✗	✗
Upper Air Meteorology	1	1	✗			

<sup>(A)</sup> This requirement is dependent on the number of PAMS site; see 40 CFR 58 Appendix D

<sup>(B)</sup> Per 40 CFR 58 Appendix D, this monitor does not count toward PAMS requirement but is required for NCORE; NO<sub>y</sub> for PAMS must be at Type I or III site

Furthermore, all instruments operated by SMAQMD meets operating schedule requirement as specified in 40 CFR Part 58.12. All continuous monitors, including O<sub>3</sub>, CO, NO<sub>2</sub> and SO<sub>2</sub>, report hourly data and monitor pollutant year-round, unless otherwise specified in Appendix A, Detailed Site Information. Sampling schedule for non-continuous monitors is summarized in Table 3-4. Design value is included in the table if it is needed to maintain a specific schedule for non-continuous monitors in accordance to Appendix D, Network Design, to 40 CFR Part 58. All monitors are operated year-round except the speciated VOC and carbonyl samplers at PAMS, which operate from July thru September, and special purpose PM<sub>2.5</sub> monitors at Rancho Seco, which operates from November thru February. For details on sampling season and operating schedule, please refer to Appendix A.

**Table 3-4  
Sampling Schedule and 2014 Design Value for PM, Pb, VOC Monitors  
in Sacramento County**

Unit in $\mu\text{g}/\text{m}^3$	PM <sub>10</sub> <sup>(A)</sup>	PM <sub>2.5</sub> <sup>(A)</sup>	PM <sub>10-2.5</sub>	Pb	VOC
Sacramento-Branch Center #2	Max Conc: 45				
Sacramento-Bercut Dr.					
Elk Grove-Bruceville		(Non FRM/FEM monitor)			During O <sub>3</sub> episode only
Sacramento-Del Paso Manor	Max Conc: 40	24-hr DV: 32 Annual DV: 9.8	1 in 3 days	1 in 6 days Max rolling 3-month average: 0.0035 $\mu\text{g}/\text{m}^3$	1 in 3 days (Jul-Sep)
Folsom-Natoma St.		(B)			1 in 3 days (Jul-Sep)
Sacramento-Golden Land Ct.	Max Conc: 33				
North Highlands-Blackfoot Way	Max Conc: 29				
Sacramento-Health Department	Max Conc: 39	24-hr DV: 27 Annual DV: 8.7			
Sacramento-T St	Max Conc: 105 <sup>(C)</sup>	24-hr DV: 25 Annual DV: 9.0.			
Sacramento-El Camino Watt	No FRM/FEM PM monitor				
Sloughhouse	No FRM/FEM PM monitor				
Rancho Seco	No FRM/FEM PM monitor				

Legend:

Blue denotes daily sampling	Yellow denotes 1 in 3 day sampling	Green denotes 1 in 6 day sampling
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<sup>(A)</sup> Design values from U.S. EPA Air Quality System Design Value Report (AMP 480) and Raw Data Report (AMP350) on PM<sub>10</sub> (81102), accessed on 10-Apr-2015

<sup>(B)</sup> FRM/FEM monitor at Folsom-Natoma St. was categorized as an SPM; per 40 CFR §58.20, this SPM monitor is not eligible for comparison to NAAQS within a two-year period of operation, which ended April 1, 2015

<sup>(C)</sup> Incomplete data (4<sup>th</sup> quarter completeness was 67%)

## **Section 4. Recent and Proposed Modification to the Network**

This section discusses recent and proposed modification to the monitoring network. As required by 40 CFR Part 58.10, modifications within the next 18 months are included. The District is not formally requesting approval for modification through this network plan. Prior to a network modification, the District will work with the CARB<sup>4</sup> to submit required documentation for official review and approval of proposed system modifications.

### **Sacramento-Branch Center #2**

No change anticipated.

### **Sacramento-Bercut Dr. (Approved Site under planning/construction)**

U.S. EPA approved Bercut Dr. as the near-road monitoring site for Sacramento CBSA. A copy of the approval letter is provided in Appendix E. This site is required to monitor NO<sub>2</sub> by January 1, 2014, and CO and PM<sub>2.5</sub> by January 1, 2017 (40 CFR §58.13(c), (e), and (f)). Black carbon and meteorological parameters –wind direction, wind speed, temperature, and relative humidity – are optional. Appendix A lists the details such as site type and objective for planned instruments at this site. Working with CARB, the District may also install a particle counter at this site.

While every effort was made to operate this site by January 1, 2014, unforeseen circumstances are expected to delay starting operation until 2015. In 2013, due to concerns over installing an air monitoring trailer because the aesthetics could be inconsistent with the large scale redevelopment of the Sacramento Railyard project, District staff began pursuing a lease for a neighboring building belonging to California Department of Transportation (“Caltrans”). On May 6, 2013, an architectural firm was contracted to design modifications to the building to meet our air monitoring needs. District staff met with Sacramento City staff and neighborhood groups regarding site design. In May 2014, the District signed a lease from Caltrans permitting the use and modification of the building for air monitoring use. As a condition of the lease, Caltrans required pre-construction soil sampling, which was completed in December 2014. A general contractor was selected in April 2015, and construction is expected to be completed and the site operational by December 31, 2015.

### **Elk Grove-Bruceville Rd.**

The District is considering discontinuing the speciated VOC measurement. 40 CFR Part 58 Appendix D requires only two speciated VOC measurement sites per PAMS network area, and Sacramento-Del Paso Manor (type II PAMS) and Folsom-Natoma St. (type III PAMS) satisfy this requirement. Speciated VOC concentrations collected at this site are low, representing background concentration.

### **Sacramento-Del Paso Manor**

The District is shutting down the Nephelometer. The monitor was originally installed in 1999 for the California Regional Particulate Air Quality Study (CRPAQS). After the

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<sup>4</sup> CARB is the primary quality assurance organization of the SMAQMD

study ended in 2001, the monitor was not removed and became a special purpose monitor. Since the monitor is designated as a special purpose monitor, “Prior approval from EPA is not required for discontinuance” (40 CFR §58.20).

#### **Sacramento-El Camino/Watt**

In September 2011, EPA approved the District’s site termination request due to a street/sidewalk improvement project in 2012 that requires termination or relocation of this air monitoring station. The project was initially postponed but received sufficient funding to resume in April 2015. The District terminated monitoring activities on December 17, 2014, to prepare for demolition. A copy of the approval letter is attached in Appendix F.

#### **Folsom-Natoma St**

In April 2013, a continuous PM<sub>2.5</sub> FEM monitor was relocated to this site as an SPM. The District is converting this monitor to SLAMS. Also, the District is partnering with CARB to install a collocation monitor to help the PQAO meet its quality assurance collocation requirements (per 40 CFR Part 58 Appendix A). The collocation monitor will be operational by June 30, 2015.

#### **Sacramento-Goldenland Ct**

The District is evaluating to terminate this site. Sacramento-Golden Land Ct. is a redundant secondary type II PAMS, as nearby Sacramento-Del Paso Manor is a primary type II PAMS that measures a full suite of VOC. Furthermore, preliminary analysis shows this site does not measure the highest concentration of criteria pollutants. If this site is terminated, there are still enough monitors within this CBSA to satisfy the monitoring requirement in 40 CFR Part 58 Appendix D.

#### **North Highlands-Blackfoot Way**

The District is evaluating termination of the PM<sub>10</sub> SSI sampler. If the evaluation concludes termination of the monitor is appropriate, then the District will work with the CARB and EPA to request approval to terminate this monitor. Staff resource for this monitor would be reassigned to operate the new near roadway monitoring site.

In its comments on the District’s 2013 Annual Network Plan, U.S. EPA “recommend for the District to evaluate in particular the purpose of continuing to operate SPM parameters for extended periods of time.” The District worked with CARB to submit paperwork to U.S. EPA to re-classify all SPM (O<sub>3</sub>, CO, and NO<sub>2</sub>) to SLAMS.

#### **Sloughhouse-Sloughhouse Rd**

No change anticipated.

#### **Sacramento Health Dept.-Stockton Blvd.**

The District is evaluating termination of the PM<sub>10</sub> TEOM and PM<sub>10</sub> SSI monitors. If the evaluation concludes that termination is appropriate, then the District will work with the CARB and EPA to request approval to terminate these monitors. The TEOM monitor is not required, and its data is not used for forecasting or analysis due to its negative bias during the winter time when there is an abundance of wood combustion. The SSI

monitor also is not required because there is a sufficient number of SSI monitors in Sacramento MSA to meet the minimum monitoring requirement.

Also, the District is considering moving the PM<sub>2.5</sub> FRM monitor to the new Near Road monitoring site. This monitor is redundant as it collects the same PM<sub>2.5</sub> data as the nearby Sacramento-T Street.

**Rancho Seco**

No change anticipated.

## Section 5. PM and Lead Collocation Requirement

Quality Assurance Requirements for SLAMS found in 40 CFR Part 58 Appendix A requires collocation for PM<sub>10</sub>, PM<sub>2.5</sub> FRM and FEM, PM<sub>10-2.5</sub>, and Pb monitors. Section 3 in the appendix states that each method within a “primary quality assurance organization (PQAO) must have 15 percent of the monitors collocated.”

SMAQMD is not a PQAO. Collocated monitors operated by SMAQMD are part of the CARB PQAO. Currently, PM<sub>2.5</sub> FRM and PM<sub>10</sub> FRM monitors at Sacramento-Del Paso Manor are collocated. As mentioned in Section 4, PM<sub>2.5</sub> FEM monitor at Folsom-Natoma St will be collocated with a monitor with the same method designation as the FEM starting July 2015.

The CARB PQAO requires no source or non-source Pb monitoring. However, the CARB PQAO does have two NCore sites which are located at Fresno-Garland and Sacramento-Del Paso Manor. PQAO with only NCore and no source-oriented Pb monitoring do not have to collocate for Pb<sup>9</sup>. The CARB PQAO, including the Del Paso Manor site, does not require any collocation for Pb. Similarly, SMAQMD is not required to collocate its PM<sub>10-2.5</sub> monitors because it is determined on a national scale<sup>10</sup>.

For complete details on PM and Pb collocation, please refer to Federal Collocation Requirement for the ARB PQAO in the latest edition of Annual Monitoring Network Report published by CARB<sup>11</sup> <<http://www.arb.ca.gov/aqd/amnr/amnr2014draft.pdf>>.

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<sup>9</sup> 40 CFR Part 58, Appendix A, 3.3.4.3

<sup>10</sup> 40 CFR Part 58, Appendix A, 3.3.6

<sup>11</sup> California Environmental Protection Agency. "Annual Monitoring Network Report for Twenty-three Districts in California." 17 July 2013. California Environmental Protection Agency. Portable Document Format. 26 April 2014.

## **Section 6. Process to Review Changes to PM<sub>2.5</sub> Monitoring Network**

40 CFR Part 58 requires that this Annual Monitoring Plan to “document how State and Local Agencies provide for the review of changes to a PM<sub>2.5</sub> monitoring network that impact the location of a violating PM<sub>2.5</sub> monitor or the creation/change to a community monitoring zone, including a description of the proposed use of spatial averaging for purposes of making comparisons to the annual PM<sub>2.5</sub> NAAQS as set forth in 40 CFR 58 Appendix N. The affected State or local agency must document the process for obtaining public comment and include any comments received through the public notification process within their submitted plan.” Note that spatial averaging does not apply in California because the state and local air monitoring districts collectively elected not to establish community monitoring zone in the 1990s.

An informational comparison, not required by air monitoring regulation, on the number of PM<sub>2.5</sub> monitors by area and population has been included. The analysis can be found in Appendix D.

The general process for any proposed change to the monitoring network is that the proposed change is discussed in this Annual Monitoring Plan. Then, during spring, each year, this Annual Monitoring Plan will be sent by SMAQMD to CARB/TSD for review and comment. Prior to June 1, each year, this report will be posted to our District Website for no less than 30 days, for public review and comment. During late June, each year, the finalized Annual Monitoring Plan and comments on the Plan will be forwarded to EPA-Region IX, prior to the July 1 deadline.

**Section 7. Data Submission Requirements**

CARB submits precision, accuracy, and raw data for all District operated monitors in 2014. 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

- 2014 Precision/Accuracy reports submitted to AQS: Quarterly
- 2014 Annual data certification submitted: May 8, 2015

**Section 8. Review of Existing SMAQMD Air Monitoring Sites**

For each monitor at each monitoring site, the tables in Appendix A to this network plan provides details to determine if each monitor meets 40 CFR 58 requirements, including Appendix A (QA Requirements), C (FRM/FEM/ARM Requirements), D (Network Design Criteria), and E (Probe Sitting Criteria), when applicable. The SMAQMD ambient air monitoring network meets the requirements of 40 CFR 58 including Appendix A, C, D, and E.

## Section 9. Reference

“Approval and Promulgation of Implementation Plans; Designation of Areas for Air Quality Planning Purposes; State of California; PM10; Redesignation of Sacramento To Attainment; Approval of PM10 Redesignation Request and Maintenance Plan for Sacramento” 78 Federal Register 187 (26 September, 2013), pp. 59261 – 59263

California Department of Transportation. "2013 Annual Average Daily Truck Traffic on the California State Highway System." 2013. Traffic Census. [http://traffic-counts.dot.ca.gov/docs/2013\\_aadt\\_truck.pdf](http://traffic-counts.dot.ca.gov/docs/2013_aadt_truck.pdf). 3 April 2015

Kurpius, Meredith. Letter to Larry Greene. 11 Dec. 2013. MS. San Francisco, CA. A copy of the manuscript letter is attached in Appendix E

U.S. Census. "Metropolitan and Micropolitan Statistical Area Totals Dataset: Population and Estimated Components of Change: April 1, 2010 to July 1, 2014." December 2014. <<http://www.census.gov/popest/data/metro/totals/2014/>>. 10 April 2015

U.S. Environmental Protection Agency. "8-Hour Ozone (2008) Nonattainment Area/State/County Report ." 5 December 2013. *Green Book*. <http://www.epa.gov/airquality/greenbook/hnca.html#6921>. 21 March 2014.

U.S. Environmental Protection Agency. "The 2011 National Emissions Inventory. Version 2" 4 March, 2015. Technology Transfer Network Clearinghouse for Inventories & Emissions Factors. <http://www.epa.gov/ttnchie1/net/2011inventory.html>. 3 April 2015.

## Appendix A Detailed Site and Monitor information

Detailed site information covered in this appendix reflects air monitoring operation from January 1, 2014-December 31, 2014.

### A.1 Sacramento-Branch Center #2

Sacramento-Branch Center #2 is a PM<sub>10</sub> SSI site. This site was established, in early 2006, to replace the former Sacramento-Branch Center site, which was approximately one-quarter mile to the north.

The objective of this site is to measure the representative concentration, as documented in the original site initiation reports filed in the late 1980s. The old site was relocated since nearby trees were a flow obstacle.

Site Name	Sacramento-Branch Center #2
AQS Site No.	06-067-0284
Geographic Coordinates	38.553611°, -121.336111° (NAD27)
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-1**  
**Panoramic view toward north from roof (May 2014)**



**Figure A-2**  
**Panoramic view toward east from roof (May 2014)**



**Figure A-3**  
**Panoramic view toward south from roof (May 2014)**



**Figure A-4**  
**Panoramic view toward west from roof (May 2014)**



**Figure A-5**  
**Sacramento-Branch Center #2 Google Earth Virtual View**



This virtual 3-D Google Earth image from 7/2/14<sup>13</sup> shows a number of potential flow obstacles around Sacramento-Branch Center #2 air monitoring station. Heights of the trees and building were calculated on-site on 5/12/15 with an inclinometer. The distances between probe and obstacle were measured with a laser distance measurer whenever possible. Otherwise, the distance is determined with the latest satellite imagery and ruler tool from Google Earth. Object B and C marks the tallest tree northeast and southeast of the station, respectively.

Table A-1 shows that the distance from each tree/building to each probe/inlet is at least twice the height that the tree/building protrudes above the probe/inlet as set forth in 40 CFR Part 58, Appendix E, Section 4(a).

<sup>13</sup> No observed or notable changes from the Google Earth image per 5/12/15 site inspection by District Staff

Table A-2 shows the distance between each probe/inlet to the closest tree dripline. All of the trees meet the 10 m dripline criteria as set forth in 40 CFR Part 58, Appendix E, Section 5(a).

As shown in Table A-1 and A-2, criteria for flow obstruction and distance from the dripline are met per 40 CFR Part 58, Appendix E, Section 4(a) and 5(a). Therefore all active monitors at the Sacramento-Branch Center #2 air monitoring site demonstrate a 360 degree unrestricted air flow.

**Table A-1**  
**Sacramento-Branch Center #2 Flow obstruction**

Flow Obstruction (Object height, above ground level (m))	Height of PM <sub>10</sub> Sampler = 5.4 m	
	Distance	Protrusion height
A: Tree (10.2 m)	41.9	4.8
B: Tree (14.8 m)	55.0	9.4
C: Tree (13.4 m)	63.7	8.0
Is the distance less than two times the protrusion height? <sup>14</sup>	No	

**Table A-2**  
**Sacramento-Branch Center #2 Distance from dripline**

Distance to dripline, all units in meter	PM <sub>10</sub> Sampler
A: Tree	34
B: Tree	58
C: Tree	59
Are tree driplines at least 10 m from probe and inlet? <sup>15</sup>	Yes

<sup>14</sup> 40 CFR Part 58, Appendix E, Section 4(a).

<sup>15</sup> 40 CFR Part 58, Appendix E, Section 5(a)

Site	Sacramento-Branch Center
Start Date	4/1/2006
Collecting Agency	SMAQMD
Analytical Lab	SMAQMD
Reporting Agency	CARB
Pollutant	PM10
Parameter code	81102
POC	1
Instrument manufacturer and model	Sierra Anderson 1200
Sampling Method	Hi Volume
Method Code	063
Analysis Method	Gravimetric
FRM/FEM/ARM/Other	FRM
Comparable to annual PM2.5 NAAQS?	Not applicable
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/roof top	Rooftop sampler, no supporting structure
Distance from flow obstructions on roof	No obstructions
Distance from flow obstructions not on roof	No obstructions
Distance from tree drip line	34 m
Distance to furnace or incinerator flue	No furnace/flue
Distance between collocated PM monitors	Not collocated
Unrestricted airflow (deg)	360
Probe height (agl)	6.2 m
Probe material	Not applicable
Residence time	Not applicable
Changes in next 18 months?	Yes
Frequency of flow rate verification	Monthly
Last Annual Performance Evaluation	5/6/14, 10/30/14

## A.2 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<sub>2</sub> concentration due to the emission from car and truck on Interstate 5, which is about 20 m from the site.

Site Name	Sacramento-Bercut
AQS Site No.	Unknown <sup>16</sup>
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: 186,000 (Caltrans, 2013) 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

<sup>16</sup> AQS site number is typically assigned when a site begins operation; this site is anticipated to begin operation by 12/31/2015

**Figure A-6**  
**Panoramic view toward north from roof (May 2014)**



**Figure A-7**  
**Panoramic view toward east from roof (May 2014)**



**Figure A-8**  
**Panoramic view toward south from roof (May 2014)**



**Figure A-9**  
**Panoramic view toward west from roof (May 2014)**



*Note: this site does not yet meet siting criteria; some vegetation shown in these photos will be removed to meet requirement in 40 CFR 58 Appendix E*

Site	Sacramento-Bercut Dr	
Start Date	12/31/2015	12/31/2015
Collecting Agency	SMAQMD	SMAQMD
Analytical Lab	Not applicable	Not applicable
Reporting Agency	CARB	CARB
Pollutant	Nitrogen Dioxide	Carbon Monoxide
Parameter code	42602	42101
POC	1	1
Instrument 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
Comparable to annual PM2.5 NAAQS?	Not applicable	Not applicable
Monitoring objective	NAAQS comparison, public info, research	NAAQS comparison, public info, research
Statement of Purpose	Monitors near road emission at region's highest FE-AADT roadw ay	Monitors near road emission at region's highest FE-AADT roadw ay
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/roof top	Not yet in operation	Not yet in operation
Distance from flow obstructions on roof	No obstructions	No obstructions
Distance from flow obstructions not on roof	No obstructions	No obstructions
Distance from tree drip line	17 m (dow nw ind) 31 m (upw ind)	17 m (dow nw ind) 31 m (upw ind)
Distance to furnace or incinerator flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360
Probe height (agl)	5.3 m (estimated)	5.3 m (estimated)
Probe material	Teflon	Teflon
Residence time	Not yet in operation	Not yet in operation
Changes in next 18 months?	No	No
Frequency of one-point QC check	Not yet in operation	Not yet in operation
Last Annual Performance Evaluation	Not yet in operation	Not yet in operation

Site	Sacramento-Bercut Dr	
Start Date	1/1/2017*	1/1/2017*
Collecting Agency	SMAQMD	SMAQMD
Analytical Lab	N/A	CARB
Reporting Agency	CARB	CARB
Pollutant	Black Carbon	PM2.5
Parameter code	84313	88101
POC	1	1
Instrument 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
Comparable to annual PM2.5 NAAQS?	Not applicable	Yes
Monitoring objective	Public info, research	NAAQS comparison, public info, research
Statement of Purpose	Determines component of PM emission at region's highest FE-AADT roadway	Monitors near road emission at region's highest FE-AADT roadway
Monitor type	SLAMS	SLAMS
Affiliation	Near Road	Near Road
Site type	Source Oriented	Source Oriented
Spatial scale	Neighborhood	Neighborhood
Sampling Frequency	Continuous	1 in 3 days
Sampling season	Year Round	Year Round
Distance from supporting structure/roof top	Not yet in operation	Not yet in operation
Distance from flow obstructions on roof	No obstructions	No obstructions
Distance from flow obstructions not on roof	No obstructions	No obstructions
Distance from tree drip line	17 m (dow nw ind) 31 m (upw ind)	17 m (dow nw ind) 31 m (upw ind)
Distance to furnace or incinerator flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors	Not yet in operation	Not yet in operation
Unrestricted airflow (deg)	360	360
Probe height (agl)	5.0 m (estimated)	5.0 m (estimated)
Probe material	Aluminum	Unknown
Residence time	Not yet in operation	Not yet in operation
Changes in next 18 months?	No	No
Frequency of flow rate verification	Not yet in operation	Not yet in operation
Last Annual Performance Evaluation	Not yet in operation	Not yet in operation

\*Anticipated start date

Site	Sacramento-Bercut Dr			
Start Date	12/31/2015	12/31/2015	12/31/2015	12/31/2015
Collecting Agency	SMAQMD	SMAQMD	SMAQMD	SMAQMD
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
POC	1	1	1	1
Instrument manufacturer and model	Climatronics 100093	Climatronics 101669	Climatronics F-460	Climatronics F-460
Sampling Method	Instrumental	Instrumental	Instrumental	Instrumental
Method Code	042	012	020	020
Analysis Method	Machine Average	Hygroscopic Plastic Film	Vector Summation	Vector Summation
FRM/FEM/ARM/Other	Other	Other	Other	Other
Comparable to annual PM <sub>2.5</sub> NAAQS?	Not applicable	Not applicable	Not applicable	Not applicable
Monitoring objective	Public info, research	Public info, research	Public info, research	Public info, research
Statement of Purpose	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology	Measures representative meteorology
Monitor type	SLAMS	SLAMS	SLAMS	SLAMS
Affiliation	Near Road	Near Road	Near Road	Near Road
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/roof top	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
Distance from flow obstructions not on roof	No obstructions	No obstructions	No obstructions	No obstructions
Distance from tree drip line	17 m (dow nw ind) 31 m (upw ind)	17 m (dow nw ind) 31 m (upw ind)	17 m (dow nw ind) 31 m (upw ind)	17 m (dow nw ind) 31 m (upw ind)
Distance to furnace or incinerator flue	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors	Not applicable	Not applicable	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360	360	360
Probe height (agl)	10 m	10 m	10 m	10 m
Probe material	Not applicable	Not applicable	Not applicable	Not applicable
Residence time	Not applicable	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	No	No	No
Frequency of one-point QC check	Not applicable	Not applicable	Not applicable	Not applicable
Last Annual Performance Evaluation	Not yet in operation			

### A.3 Elk Grove-Bruceville

Bruceville air monitoring site is sited 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<sub>3</sub> monitoring site.

This site is the upwind O<sub>3</sub> and ozone precursor monitoring site for our network, also known as a PAMS Type I site. It measures O<sub>3</sub>, NO<sub>2</sub>, total NMHC, speciated VOC (episodic only), PM<sub>2.5</sub> BAM, WD, WS, TMP, RH, SRD, UV radiation, precipitation, and atmospheric pressure

Adjacent to the air monitoring site is the Franklin Field Radar Wind Profiler (RWP) for measurement of upper level winds and temperature. This RWP is operated year-round. Collection of upper air meteorology data is a requirement for the PAMS program.

Site Name	Elk Grove-Bruceville
AQS Site No.	06-067-0011
Geographic Coordinates	38.302630° -121.420850° (WGS84)
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-10**  
**Panoramic view toward north from roof (May 2015)**



**Figure A-11**  
**Panoramic view toward east from roof (May 2015)**



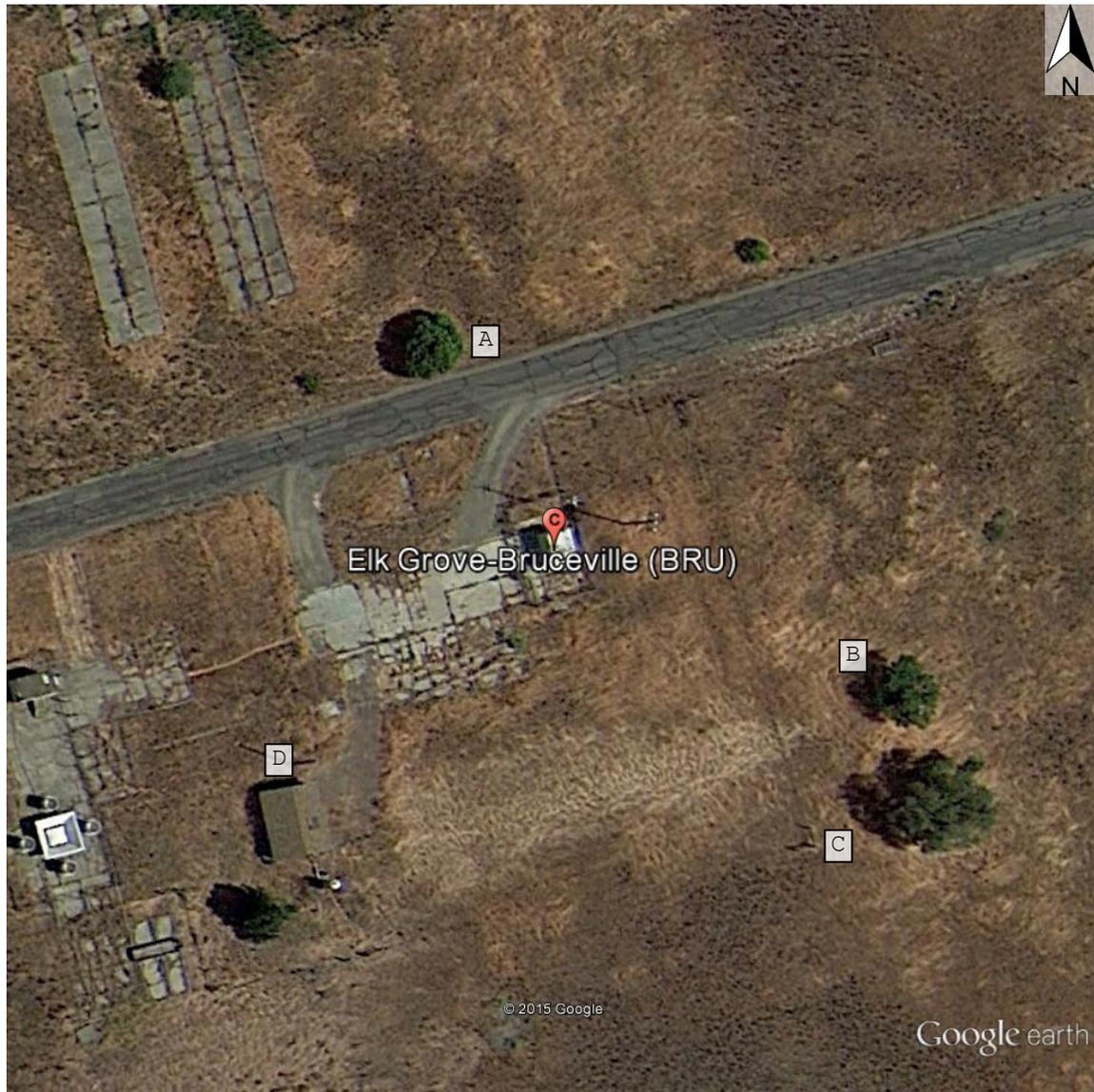
**Figure A-12**  
**Panoramic view toward south from roof (May 2015)**



**Figure A-13**  
**Panoramic view toward west from roof (May 2015)**



**Figure A-14**  
**Elk Grove-Bruceville Google Earth Virtual View**



This virtual 3-D Google Earth image from 7/2/14<sup>17</sup> shows a number of potential flow obstacles around Elk Grove-Bruceville air monitoring station. Heights of the trees and building were calculated on-site on 5/12/15 with an inclinometer. The distances between probe and obstacle were measured with a laser distance measurer whenever possible. Otherwise, the distance is determined with the latest satellite imagery and ruler tool from Google Earth. Height of building D as indicated in Figure A-14 is not evaluated because it is below the height of the probes and inlets.

Table A-3 shows that the distance from each tree/building to each probe/inlet is at least twice the height that the tree/building protrudes above the probe/inlet as set forth in 40 CFR Part 58, Appendix E, Section 4(a).

<sup>17</sup> No observed or notable changes from the Google Earth image per 5/12/15 site inspection by District Staff

Table A-4 shows the distance between each probe/inlet to the closest tree dripline. All of the trees meet the 10 m dripline criteria as set forth in 40 CFR Part 58, Appendix E, Section 5(a).

As shown in Table A-3 and A-4, criteria for flow obstruction and distance from the dripline are met per 40 CFR Part 58, Appendix E, Section 4(a) and 5(a). Therefore all active monitors at the Elk Grove-Bruceville air monitoring site demonstrate a 360 degree unrestricted air flow.

**Table A-3**  
**Elk-Grove Bruceville Flow obstruction**

Flow Obstruction (Object height, above ground level (m))	Height of Gaseous, VOC, Speciation Probe = 4.5 m		Height of PM <sub>10</sub> Sampler = 4.3 m	
	Distance	Protrusion height	Distance	Protrusion height
A: Tree (5.9 m)	25.7	1.4	24.9	4.6
B: Tree (6.1 m)	38.5	1.9	39.7	2.1
C: Tree (7.9 m)	46.9	3.4	47.7	3.6
Is the distance less than two times the protrusion height? <sup>18</sup>	No		No	

**Table A-4**  
**Elk Grove-Bruceville Distance from dripline**

Distance to dripline, all units in meter	Gaseous, VOC Speciation Probe	PM <sub>10</sub> Sampler
A: Tree	22	21
B: Tree	36	38
C: Tree	44	45
Are tree driplines at least 10 m from probe and inlet? <sup>19</sup>	Yes	Yes

<sup>18</sup> 40 CFR Part 58, Appendix E, Section 4(a).

<sup>19</sup> 40 CFR Part 58, Appendix E, Section 5(a)

Site	Elk Grove-Bruceville			
Start Date	7/1/1992	7/1/1992	7/1/1996	7/1/1996
Collecting Agency	SMAQMD	SMAQMD	SMAQMD	SMAQMD
Analytical Lab	N/A	N/A	N/A	ERG, Inc
Reporting Agency	CARB	CARB	CARB	CARB
Pollutant	Ozone	Nitrogen Dioxide	Total NMHC	Speciated VOC
Parameter code	44201	42602	43102	43102
POC	1	1	1	2
Instrument manufacturer and model	TAPI 400E	TEI 421	TEI 55C	Xontech 910A/912
Sampling Method	Instrumental	Instrumental	Instrumental	6L Pressurized Canister
Method Code	087	074	164	123
Analysis Method	Ultra Violet Absorption	Chemiluminescence	Flame ionization detector	Dual Fid - Pams
FRM/FEM/ARM/Other	FEM	FRM	Other	Other
Comparable to annual PM <sub>2.5</sub> NAAQS?	Not applicable	Not applicable	Not applicable	Not applicable
Monitoring objective	NAAQS comparison, public info	NAAQS comparison, public info	Public info, research	Research
Statement of Purpose	Measures background O <sub>3</sub> concentration at upw ind 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	Upw ind/Background	Upw ind/Background	Upw ind/Background	Upw ind/Background
Spatial scale	Urban	Neighborhood	Neighborhood	Neighborhood
Sampling Frequency	Continuous	Continuous	Continuous	Episodic Sampling
Sampling season	Year Round	Year Round	Year Round	July thru Sep
Distance from supporting structure/roof top	1.3 m from roof top	1.3 m from roof top	1.3 m from roof top	2.0 m from roof top
Distance from flow obstructions on roof	No obstructions	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof	No obstructions	No obstructions	No obstructions	No obstructions
Distance from tree drip line	22 m	22 m	22 m	22 m
Distance to furnace or incinerator flue	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors	Not applicable	Not applicable	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360	360	360
Probe height (agl)	4.5 m	4.5 m	4.5 m	5.2 m
Probe material	FEP Teflon	FEP Teflon	FEP Teflon	Stainless Steel
Residence time	18.0 s	17.8 s	16.9 s	2 s
Changes in next 18 months?	No	No	No	Yes
Frequency of one-point QC check	Every other day	Every other day	Every other day	Pre- and post-seasonally check
Last Annual Performance Evaluation	3/8/14	3/8/14	5/6/14	N/A

Site	Elk Grove-Bruceville
Start Date	12/1/2000
Collecting Agency	SMAQMD
Analytical Lab	N/A
Reporting Agency	CARB
Pollutant	PM2.5
Parameter code	88501
POC	3
Instrument 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
Comparable to annual PM2.5 NAAQS?	No
Monitoring objective	Public info
Statement of Purpose	Measures background concentration and transport of PM2.5 from San Joaquin Valley for PM2.5 forecasting
Monitor type	SLAMS
Affiliation	None
Site type	General/Background
Spatial scale	Neighborhood
Sampling Frequency	Continuous
Sampling season	Year Round
Distance from supporting structure/roof top	2.1 m from roof top
Distance from flow obstructions on roof	No obstructions
Distance from flow obstructions not on roof	No obstructions
Distance from tree drip line	21 m
Distance to furnace or incinerator flue	No furnace/flue
Distance between collocated PM monitors	Not Collocated
Unrestricted airflow (deg)	360
Probe height (agl)	4.3 m
Probe material	Not applicable
Residence time	Not applicable
Changes in next 18 months?	No
Frequency of flow rate verification	Bi-monthly
Last Annual Performance Evaluation	3/8/14, 9/5/14

Site	Elk Grove-Bruceville			
Start Date	8/1/1996	8/1/1996	7/1/1997	8/1/1997
Collecting Agency	SMAQMD	SMAQMD	SMAQMD	SMAQMD
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
POC	1	1	1	1
Instrument 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
Comparable to annual PM2.5 NAAQS?	Not applicable	Not applicable	Not applicable	Not applicable
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	SLAMS	SLAMS	SLAMS	SLAMS
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/roof top	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
Distance from flow obstructions not on roof	No obstructions	No obstructions	No obstructions	No obstructions
Distance from tree drip line	20 m	20 m	20 m	20 m
Distance to furnace or incinerator flue	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors	Not applicable	Not applicable	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360	360	360
Probe height (agl)	10 m	10 m	4.5 m	1.6 m
Probe material	Not applicable	Not applicable	Not applicable	Not applicable
Residence time	Not applicable	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	No	No	No
Frequency of one-point QC check	Not applicable	Not applicable	Not applicable	Not applicable
Last Annual Performance Evaluation	3/8/14	Not audited	3/8/14	Not audited

Site	Elk Grove-Bruceville			
Start Date	8/1/1996	8/1/1997	8/1/1996	8/1/1996
Collecting Agency	SMAQMD	SMAQMD	SMAQMD	SMAQMD
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
POC	1	1	1	1
Instrument 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
Comparable to annual PM <sub>2.5</sub> NAAQS?	Not applicable	Not applicable	Not applicable	Not applicable
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	SLAMS	SLAMS	SLAMS	SLAMS
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/roof top	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
Distance from flow obstructions not on roof	No obstructions	No obstructions	No obstructions	No obstructions
Distance from tree drip line	20 m	20 m	20 m	20 m
Distance to furnace or incinerator flue	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors	Not applicable	Not applicable	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360	360	360
Probe height (agl)	10 m	10 m	10 m	10 m
Probe material	Not applicable	Not applicable	Not applicable	Not applicable
Residence time	Not applicable	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	No	No	No
Frequency of one-point QC check	Not applicable	Not applicable	Not applicable	Not applicable
Last Annual Performance Evaluation	Not audited	Not audited	3/8/14	3/8/14

Site	Elk Grove-Bruceville
Start Date	6/1/1996
Collecting Agency	SMAQMD
Analytical Lab	N/A
Reporting Agency	N/A
Pollutant	Upper Level Wind Direction/Wind Speed and Virtual Temp
Parameter code	N/A
POC	N/A
Instrument manufacturer and model	Radian LAP-3000 w ith RASS option
Sampling Method	#N/A
Method Code	
Analysis Method	915 MHz Radar Wind Profiler, w ith RASS
FRM/FEM/ARM/Other	Other
Comparable to annual PM2.5 NAAQS?	Not applicable
Monitoring objective	Public info, research
Statement of Purpose	Measures representative upper level meteorology
Monitor type	SLAMS
Affiliation	PAMS (Type I)
Site type	Not applicable
Spatial scale	Not applicable
Sampling Frequency	Continuous
Sampling season	Year Round
Distance from supporting structure/roof top	No supporting structure
Distance from flow obstructions on roof	No obstructions
Distance from flow obstructions not on roof	No obstructions
Distance from tree drip line	> 20 m
Distance to furnace or incinerator flue	No furnace/flue
Distance between collocated PM monitors	Not applicable
Unrestricted airflow (deg)	360
Probe height (agl)	Not applicable
Probe material	Not applicable
Residence time	Not applicable
Changes in next 18 months?	No
Frequency of one-point QC check	N/A
Last Annual Performance Evaluation	4/11/13

## 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.

It measures O<sub>3</sub>, CO (trace level), NO<sub>2</sub>, NO<sub>y</sub>, SO<sub>2</sub> (trace level), NMHC, speciated VOC (C2-C12), Carbonyl, PM<sub>10</sub> (SSI- main and collocated), PM<sub>10</sub> TEOM, PM<sub>10</sub> coarse, Pb-PM<sub>10</sub>, PM<sub>2.5</sub> FRM (main and collocated), PM<sub>2.5</sub> BAM, Speciated PM<sub>2.5</sub> (SASS), Black Carbon (Aethalometer), Scattering Coefficient (Nephelometer), WD-resultant, WS-resultant, ambient temperature, relative humidity, and total solar radiation.

Located just downwind of Downtown Sacramento, Del Paso Manor is a PAMS Type II primary site. Besides the required meteorological parameters, this site also monitors for NMHC year-round and speciated VOC (C2-C12) and carbonyl from July 1 thru September 30.

Speciation monitors at this site are part of the Chemical Speciation Network (CSN) and Speciated Trends Network. A URG3000N sampler was installed in April 2009 joining the Met One Spiral Aerosol Speciation Sampler (SASS) that has been in service for many years. This site is the current PM<sub>2.5</sub> design value site for this MSA.

In October 2009, EPA-Region IX approved this monitoring site as an NCore site. This is one of six NCore sites operating in California. To accommodate the NCore monitoring instrumentation, the District expanded the size of the existing roof deck, added a 10 meter NOY converter tower, and upgraded the electrical capacity in Spring 2010.

Site Name	Sacramento-Del Paso Manor
AQS Site No.	06-067-0006
Geographic Coordinates	38.613804°, -121.368007° (WGS84)
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-15**  
**Panoramic view toward north from roof (May 2015)**



**Figure A-16**  
**Panoramic view toward east from roof (May 2015)**



**Figure A-17**  
**Panoramic view toward south from roof (May 2015)**



**Figure A-18**  
**Panoramic view toward west from roof (May 2015)**



**Figure A-19**  
**Sacramento-Del Paso Manor Google Earth Virtual View**



This virtual 3-D Google Earth image from 7/2/14<sup>20</sup> shows a number of potential flow obstacles around Sacramento-Del Paso Manor air monitoring station. Heights of the trees and building were calculated on-site on 5/11/15 with an inclinometer. The distances between probe and obstacle were measured with a laser distance measurer whenever possible. Otherwise, the distance is determined with the latest satellite imagery and ruler tool from Google Earth.

Table A-5 thru A-7 shows that the distance from each tree/building to each probe/inlet is at least twice the height that the tree/building protrudes above the probe/inlet as set forth in 40 CFR Part 58, Appendix E, Section 4(a).

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<sup>20</sup> No observed or notable changes from the Google Earth image per 5/11/15 site inspection by District Staff

Table A-8 thru A-10 shows the distance between each probe/inlet to the closest tree dripline. All of the trees meet the 10 m dripline criteria as set forth in 40 CFR Part 58, Appendix E, Section 5(a).

As shown in Table A-5 thru A-10, criteria for flow obstruction and distance from the dripline are met per 40 CFR Part 58, Appendix E, Section 4(a) and 5(a). Therefore all active monitors at the Sacramento-Del Paso Manor air monitoring site demonstrate a 360 degree unrestricted air flow.

**Table A-5**  
**Sacramento-Del Paso Manor Flow obstruction, Part I**

Flow Obstruction (Object height, above ground level (m))	Height of Gaseous Inlet, Speciated VOC, Carbonyl = 5.4 m		Height of NOY = 10.0 m		Height of PM10 Sampler (Primary) = 5.3 m		Height of PM10 Sampler (Collocated) = 5.3 m	
	Distance	Protrusion height	Distance	Protrusion height	Distance	Protrusion height	Distance	Protrusion height
A: Tree (7.4)	34.0	2.0	25.0	-2.6	22.1	2.1	24.9	2.1
B: Tree (8.9)	37.6	3.5	34.6	-1.1	33.5	3.6	34.6	3.6
C: Tree (4.4)	28.1	-1.0	24.6	-5.6	24.6	-0.9	24.6	-0.9
D: Tree (7.9)	41.9	2.5	38.3	-2.1	38.6	2.6	38.3	2.6
E: Tree (8.0)	54.1	2.6	50.4	-2.0	51.6	2.7	50.4	2.7
F: Tree (7.2)	32.3	1.8	29.2	-2.8	31.6	1.9	29.3	1.9
G: Tree (8.6)	57.6	3.2	53.8	-1.4	55.7	3.3	53.9	3.3
H: Building (4.7)	17.4	-0.7	16.7	-5.3	19.5	-0.6	16.8	-0.6
I: Tree (11.8)	41.7	6.4	41.7	1.8	44.3	6.5	41.8	6.5
J: Tree (8.9)	44.8	3.5	45.8	-1.1	48.0	3.6	45.9	3.6
K: Tree (11.7)	47.0	6.3	49.2	1.7	50.6	6.4	49.2	6.4
Is the distance less than two times the protrusion height? <sup>21</sup>	No		No		No		No	

<sup>21</sup> 40 CFR Part 58, Appendix E, Section 4(a).

**Table A-6**  
**Sacramento-Del Paso Manor Flow obstruction, Part II**

Flow Obstruction (Object height, above ground level (m))	Height of PM2.5 Sampler (Primary) = 5.3 m		Height of PM2.5 Sampler (Collocated) = 5.3 m		Height of PM10 Sampler (Continuous) = 5.3 m		Height of PM10 Sampler (Speciation) = 5.3 m	
	Distance	Protrusion height	Distance	Protrusion height	Distance	Protrusion height	Distance	Protrusion height
A: Tree (7.4)	24.2	2.1	25.8	2.1	22.1	2.1	24.9	2.1
B: Tree (8.9)	39.5	3.6	39.9	3.6	33.5	3.6	34.6	3.6
C: Tree (4.4)	30.0	-0.9	30.3	-0.9	24.6	-0.9	24.6	-0.9
D: Tree (7.9)	43.9	2.6	43.7	2.6	38.6	2.6	38.3	2.6
E: Tree (8.0)	55.7	2.7	55.0	2.7	51.6	2.7	50.4	2.7
F: Tree (7.2)	33.3	1.9	32.1	1.9	31.6	1.9	29.3	1.9
G: Tree (8.6)	58.6	3.3	57.5	3.3	55.7	3.3	53.9	3.3
H: Building (4.7)	17.2	-0.6	15.6	-0.6	19.5	-0.6	16.8	-0.6
I: Tree (11.8)	40.5	6.5	38.0	6.5	44.3	6.5	41.8	6.5
J: Tree (8.9)	43.1	3.6	41.7	3.6	48.0	3.6	45.9	3.6
K: Tree (11.7)	44.6	6.4	43.7	6.4	50.6	6.4	49.2	6.4
Is the distance less than two times the protrusion height? <sup>22</sup>	No		No		No		No	

**Table A-7**  
**Sacramento-Del Paso Manor Flow obstruction, Part III**

Flow Obstruction (Object height, above ground level (m))	Height of Organic/Elemental Carbon = 5.3 m		Height of PMCoarse/Pb = 5.3m	
	Distance	Protrusion height	Distance	Protrusion height
A: Tree (7.4)	22.4	2.1	25.6	2.1
B: Tree (8.9)	38.6	3.6	37.9	3.6
C: Tree (4.4)	30.0	-0.9	28.4	-0.9
D: Tree (7.9)	44.0	2.6	41.8	2.6
E: Tree (8.0)	56.2	2.7	53.1	2.7
F: Tree (7.2)	34.4	1.9	30.7	1.9
G: Tree (8.6)	59.4	3.3	55.9	3.3
H: Building (4.7)	18.9	-0.6	15.9	-0.6
I: Tree (11.8)	42.2	6.5	39.5	6.5
J: Tree (8.9)	44.7	3.6	430	3.6
K: Tree (11.7)	45.9	6.4	45.3	6.4
Is the distance less than two times the protrusion height? <sup>23</sup>	No		No	

<sup>22</sup> 40 CFR Part 58, Appendix E, Section 4(a).

<sup>23</sup> 40 CFR Part 58, Appendix E, Section 4(a).

**Table A-8**  
**Sacramento-Del Paso Manor Distance from dripline, Part I**

Distance to dripline, all units in meter	Gaseous Inlet, Speciated VOC, Carbonyl	NOY Inlet	PM10 Sampler (Primary)	PM10 Sampler (Collocated)
A: Tree	21	26	20	26
B: Tree	32	30	28	30
C: Tree	26	24	23	24
D: Tree	38	34	35	34
E: Tree	51	47	48	47
F: Tree	28	25	28	25
G: Tree	55	51	53	51
H: Building	Not Applicable			
I: Tree	39	38	41	38
J: Tree	42	41	45	41
K: Tree	43	44	47	44
Are tree driplines at least 10 m from probe and inlet? <sup>24</sup>	Yes	Yes	Yes	Yes

**Table A-9**  
**Sacramento-Del Paso Manor Distance from dripline, Part II**

Distance to dripline, all units in meter	PM2.5 Sampler (Primary)	PM2.5 Sampler (Collocated)	PM2.5 Sampler (Continuous)	PM2.5 Mass Speciation
A: Tree	22	24	21	20
B: Tree	35	36	33	31
C: Tree	29	30	28	26
D: Tree	40	40	29	38
E: Tree	53	52	52	51
F: Tree	29	29	30	30
G: Tree	57	56	57	56
H: Building	Not Applicable			
I: Tree	37	35	39	40
J: Tree	40	37	42	42
K: Tree	40	39	42	44
Are tree driplines at least 10 m from probe and inlet? <sup>25</sup>	Yes	Yes	Yes	Yes

<sup>24</sup> 40 CFR Part 58, Appendix E, Section 5(a)

<sup>25</sup> 40 CFR Part 58, Appendix E, Section 5(a)

**Table A-10**  
**Sacramento-Del Paso Manor Distance from dripline, Part III**

Distance to dripline, all units in meter	Organic/Elemental Carbon	PMCoarse/Pb
A: Tree	20	24
B: Tree	34	33
C: Tree	29	27
D: Tree	21	38
E: Tree	53	50
F: Tree	31	27
G: Tree	58	54
H: Building	Not Applicable	
I: Tree	39	36
J: Tree	41	38
K: Tree	42	10
Are tree driplines at least 10 m from probe and inlet? <sup>26</sup>	Yes	Yes

<sup>26</sup> 40 CFR Part 58, Appendix E, Section 5(a)

Site	Sacramento-Del Paso Manor			
Start Date	12/1/1979	7/1/2011	5/1/2013	7/1/2011
Collecting Agency	SMAQMD	SMAQMD	SMAQMD	SMAQMD
Analytical Lab	Not applicable	Not applicable	Not applicable	Not applicable
Reporting Agency	CARB	CARB	CARB	CARB
Pollutant	Ozone	Carbon Monoxide (trace level)	Nitrogen Dioxide	Reactive Nitrogen Oxide
Parameter code	44201	42101	42602	42600
POC	1	1	1	1
Instrument manufacturer and model	TAPI 400E	TAPI 300EU	TAPI200UP	TEI 42I-Y
Sampling Method	Instrumental	Instrumental	Instrumental	Instrumental
Method Code	087	593	074	574
Analysis Method	Ultra Violet Absorption	Gas Filter Correlation	Photolytic- Chemiluminescence	Chemiluminescence
FRM/FEM/ARM/Other	FEM	FRM	FEM	Other
Comparable to annual PM2.5 NAAQS?	N/A	N/A	N/A	N/A
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	Neighborhood
Sampling Frequency	Continuous	Continuous	Continuous	Continuous
Sampling season	Year Round	Year Round	Year Round	Year Round
Distance from supporting structure/roof top	2.1 m from roof top	2.1 m from roof top	2.1 m from roof top	6.7 m from roof top
Distance from flow obstructions on roof	No obstructions	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof	No obstructions	No obstructions	No obstructions	No obstructions
Distance from tree drip line	21 m	21 m	21 m	26 m
Distance to furnace or incinerator flue	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors	Not applicable	Not applicable	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360	360	360
Probe height (agl)	5.4 m	5.4 m	5.4 m	10 m
Probe material	FEP Teflon	FEP Teflon	FEP Teflon	FEP Teflon
Residence time	15 seconds	13 seconds	14 seconds	4 seconds
Changes in next 18 months?	No	No	No	No
Frequency of one-point QC check	Every fourth day	Every fourth day	Every fourth day	Every fourth day
Last Annual Performance Evaluation	10/27/14	10/28/14	10/27/14	NA

Site	Sacramento-Del Paso Manor			
Start Date	7/1/2011	8/1/1994	8/1/1994	8/1/1996
Collecting Agency	SMAQMD	SMAQMD	SMAQMD	SMAQMD
Analytical Lab	N/A	N/A	ERG, Inc	ERG, Inc.
Reporting Agency	CARB	CARB	CARB	CARB
Pollutant	Sulfur Dioxide (trace level)	Total NMHC	Speciated VOC	Carbonyl
Parameter code	42401	43102	43102	Multiple
POC	2	2	1	1
Instrument 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 FID	(multiple)
FRM/FEM/ARM/Other	FEM	Other	Other	Other
Comparable to annual PM2.5 NAAQS?	N/A	N/A	N/A	N/A
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 dow nw ind edge of central business district	Measures O3 precursor emission near dow nw ind edge of central business district	Measures O3 precursor emission near dow nw ind 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	Neighborhood	Neighborhood	Neighborhood
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/roof top	2.1 m from roof top	2.1 m from roof top	2.2 m from roof top	2.2 m from roof top
Distance from flow obstructions on roof	No obstructions	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof	No obstructions	No obstructions	No obstructions	No obstructions
Distance from tree drip line	21 m	21 m	21 m	21 m
Distance to furnace or incinerator flue	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors	Not applicable	Not applicable	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360	360	360
Probe height (agl)	5.4 m	5.4 m	5.5 m	5.5 m
Probe material	FEP Teflon	FEP Teflon	Stainless Steel	Stainless Steel
Residence time	14 seconds	17 seconds	3 seconds	3 seconds
Changes in next 18 months?	No	No	No	No
Frequency of one-point QC check	Every fourth day	Every fourth day	Not applicable	Not applicable
Last Annual Performance Evaluation	10/28/14	12/6/13	Not applicable	Not applicable

Site	Sacramento-Del Paso Manor			
Start Date	12/1/2001	12/1/2001	1/1/1986	1/1/1986
Collecting Agency	SMAQMD	SMAQMD	SMAQMD	SMAQMD
Analytical Lab	N/A	SMAQMD	CARB	RTI
Reporting Agency	CARB	CARB	CARB	CARB
Pollutant	Black Carbon	Scattering Coefficient	PM10 (Primary Monitor)	PM10 (Audit Monitor)
Parameter code	84313	11203	81102	81102
POC	1	1	1	2
Instrument manufacturer and model	Anderson RTAA 800	Radiance Research M903	Sierra-Anderson 1200	Sierra-Anderson 1200
Sampling Method	Aethalometer	Low volume w with heated inlet	Hi Volume	Hi Volume
Method Code	862	771	063	063
Analysis Method	Optical Absorption	Nephelometry	Gravimetric	Gravimetric
FRM/FEW/ARW/Other	Other	Other	FRM	FRM
Comparable to annual PM2.5 NAAQS?	N/A	No	N/A	N/A
Monitoring objective	Research	Research	NAAQS comparison, public info	NAAQS comparison, public info
Statement of Purpose	Installed for CRPAQS study in 1999	Installed for CRPAQS study in 1999	Measures w intertime elevated PM level from motor vehicles and residential wood combustion	Collocated for QA purpose and Provides substitute data if necessary
Monitor type	SPM	SPM	SLAMS	SLAMS
Affiliation	None	None	None	None
Site type	Population Exposure	Population Exposure	Population Exposure	Population Exposure
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling Frequency	Continuous	Continuous	1 in 6 days	1 in 6 days
Sampling season	Year Round	Year Round	Year Round	Year Round
Distance from supporting structure/roof top	2.0 m from roof top	1.0 m from roof top	2.0 m from roof top	2.0 m from roof top
Distance from flow obstructions on roof	No obstructions	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof	No obstructions	No obstructions	No obstructions	No obstructions
Distance from tree drip line	22 m	22 m	20 m	26 m
Distance to furnace or incinerator flue	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors	Not applicable	Not applicable	2 m	2 m
Unrestricted airflow (deg)	360	360	360	360
Probe height (agl)	5.3 m	4.3 m	5.3 m	5.3 m
Probe material	Aluminum	PVC Plastic	Not applicable	Not applicable
Residence time	1 seconds	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	Yes	Yes	No	No
Frequency of flow rate verification	Not applicable	Not applicable	Monthly	Monthly
Last Annual Performance Evaluation	Not applicable	Not applicable	5/7/14, 10/28/14	5/7/14, 10/28/14

Site	Sacramento-Del Paso Manor			
Start Date	1/1/1999	2/1/1999	5/1/2000	2/1/2000
Collecting Agency	SMAQMD	SMAQMD	SMAQMD	SMAQMD
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
POC	1	2	3	5
Instrument 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
Comparable to annual PM2.5 NAAQS?	Yes	Yes	No	No
Monitoring objective	NAAQS Comparison, research, public info	NAAQS Comparison, research	Public info, research	Research
Statement of Purpose	Measures w intertime elevated PM level from motor vehicles and residential w ood combustion	Collocated for QA purpose and Provides substitute data if necessary	Provides real time PM Measurement from motor vehicles and residential w ood 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/roof top	2.0 m from roof top	2.0 m from roof top	2.0 m from roof top	2.0 m from roof top
Distance from flow obstructions on roof	No obstructions	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof	No obstructions	No obstructions	No obstructions	No obstructions
Distance from tree drip line	22 m	24 m	21 m	20 m
Distance to furnace or incinerator flue	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors	2 m	2 m	2 m	2 m
Unrestricted airflow (deg)	360	360	360	360
Probe height (agl)	5.3 m	5.3 m	5.3 m	5.3 m
Probe material	Not applicable	Not applicable	Not applicable	Not applicable
Residence time	Not applicable	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	No	Yes	No
Frequency of flow rate verification	Bi-Monthly	Bi-Monthly	Bi-monthly	Monthly
Last Annual Performance Evaluation	5/7/14, 10/27/14	5/7/14, 10/27/14	5/7/14, 10/27/14	6/26/14, 12/24/14

Site	Sacramento-Del Paso Manor		
Start Date	4/1/2009	4/1/2012	4/1/2012
Collecting Agency	SMAQMD	SMAQMD	SMAQMD
Analytical Lab	RTI	CARB	RTI
Reporting Agency	RTI	CARB	CARB
Pollutant	Organic and elemental carbon	PM10 (PM <sub>10-2.5</sub> )	Lead
Parameter code	(multiple)	85101	85129
POC	5	7	4
Instrument 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) <sup>(A)</sup>	Gravimetric	X-Ray Fluorescence (EDXRF)
FRM/FEM/ARM/Other	Other	FRM	FRM
Comparable to annual PM2.5 NAAQS?	N/A	N/A	N/A
Monitoring objective	Research	NAAQS comparison, 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 6 days	1 in 6 days
Sampling season	Year Round	Year Round	Year Round
Distance from supporting structure/roof top	2.0 m from roof top	2.0 m from roof top	2.0 m from roof top
Distance from flow obstructions on roof	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof	No obstructions	No obstructions	No obstructions
Distance from tree drip line	20 m	24 m	24 m
Distance to furnace or incinerator flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors	2 m	2 m	2 m
Unrestricted airflow (deg)	360	360	360
Probe height (agl)	5.2	5.0 m	5.0 m
Probe material	Not applicable	Not applicable	Not applicable
Residence time	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	No	No	No
Frequency of flow rate verification	Monthly	Bi-monthly	Bi-monthly
Last Annual Performance Evaluation	6/26/14, 12/24/14	5/7/14, 10/27/14	5/7/14, 10/27/14

<sup>(A)</sup> 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	SMAQMD	SMAQMD	SMAQMD	SMAQMD	SMAQMD
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
POC	1	1	1	1	1
Instrument manufacturer and model	Cimatronics 100093	Cimatronics 101669	Cimatronics 100848	Cimatronics F-460	Cimatronics F-460
Sampling Method	Instrumental	Instrumental	Instrumental	Instrumental	Instrumental
Method Code	042	012	011	020	020
Analysis Method	Machine Average	Hygrosopic Plastic Film	Pyranometer	Vector Summation	Vector Summation
FRM/FEM/ARM/Other	Other	Other	Other	Other	Other
Comparable to annual PM <sub>2.5</sub> NAAQS?	N/A	N/A	N/A	N/A	N/A
Monitoring objective	Public info, research	Public info, research	Public info	Public info, research	Public info, research
Statement of Purpose	Measures representative meteorology				
Monitor type	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS
Affiliation	NCORE, PAMS (Type II)				
Site type	N/A	N/A	N/A	N/A	N/A
Spatial scale	N/A	N/A	N/A	N/A	N/A
Sampling Frequency	Continuous	Continuous	Continuous	Continuous	Continuous
Sampling season	Year Round				
Distance from supporting structure/roof top	No supporting structure				
Distance from flow obstructions on roof	No obstructions				
Distance from flow obstructions not on roof	No obstructions				
Distance from tree drip line	22 m				
Distance to furnace or incinerator flue	No furnace/flue				
Distance between collocated PM monitors	Not applicable				
Unrestricted airflow (deg)	360	360	360	360	360
Probe height (agl)	10 m				
Probe material	Not applicable				
Residence time	Not applicable				
Changes in next 18 months?	No	No	No	No	No
Frequency of one-point QC check	N/A	N/A	N/A	N/A	N/A
Last Annual Performance Evaluation	10/27/14	N/A	N/A	10/27/14	10/27/14

## A.5 Sacramento-El Camino Watt

Sacramento-El Camino/Watt has been in existence since 1981. This site is a micro-scale CO monitoring station.

In September 2011, EPA approved the District's site termination request due to a street/sidewalk improvement project in 2012 that requires termination or relocation of this air monitoring station. The site termination is contingent on the construction project obtaining funding and being approved to proceed.

On November 5, 2014, Sacramento County Department of Transportation mandated the removal of station, as construction would resume in the following spring. Air monitoring operation ceased on December 17, 2014. Siting criteria for air flow obstacles is not evaluated because this site has been terminated.

Site Name	Sacramento- El Camino/Watt
AQS Site No.	06-067-0007
Geographic Coordinates	38.61°, -121.38° (NAD27)
Location	Shopping Center located 6.5 miles east-northeast of downtown Sacramento.
Address	3535 El Camino Avenue, Sacramento, CA 95825
County	Sacramento
Distance from roadway	2 m
Annual Average Daily Traffic (Vehicles/Day)	El Camino Ave. east of Watt Ave.: 17,138 (SACDOT, 5/14/2014)
Ground Cover	Paved
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

**Figure A-20**  
**Panoramic view toward north from roof (May 2014)**



**Figure A-21**  
**Panoramic view toward east from roof (May 2014)**



**Figure A-22**  
**Panoramic view toward south from roof (May 2014)**



**Figure A-23**  
**Panoramic view toward west from roof (May 2014)**



Site	Sacramento-El Camino Watt
Start Date	11/1/2001
Collecting Agency	SMAQMD
Analytical Lab	N/A
Reporting Agency	CARB
Pollutant	Carbon Monoxide
Parameter code	42101
POC	1
Instrument manufacturer and model	TEI 48C
Sampling Method	Instrumental
Method Code	054
Analysis Method	Nondispersive Infrared
FRM/FEM/ARM/Other	FRM
Comparable to annual PM <sub>2.5</sub> NAAQS?	N/A
Monitoring objective	NAAQS comparison, public info
Statement of Purpose	Measures CO concentration near a busy traffic intersection with rush hour congestion
Monitor type	SLAMS
Affiliation	None
Site type	Highest concentration
Spatial scale	Micro-scale
Sampling Frequency	Continuous
Sampling season	Year Round
Distance from supporting structure/roof top	1.1 m
Distance from flow obstructions on roof	No obstruction
Distance from flow obstructions not on roof	No obstruction
Distance from tree drip line	13 m <sup>(A)</sup>
Distance to furnace or incinerator flue	No furnace/flue
Distance between collocated PM monitors	Not applicable
Unrestricted airflow (deg)	360
Probe height (agl)	3.0 m
Probe material	FEP Teflon
Residence time	16 seconds
Changes in next 18 months?	Yes
Frequency of one-point QC check	Every Other Day
Last Annual Performance Evaluation	2/18/14, 12/8/14

## A.6 Folsom-Natoma St.

This site is in operation since 1996. This site replaced the former Folsom-Liedesdoff Street site. Approximately 20 miles northeast of Downtown Sacramento, Folsom-Natoma site is the maximum summertime O<sub>3</sub> monitoring site within Sacramento County, for days with the prevailing afternoon southwesterly winds.

This site measures: O<sub>3</sub>, NO<sub>2</sub>, PM<sub>2.5</sub> BAM, Total NMHC, Speciated VOC, WD, WS, Temp, RH, and SRD. This site is a PAMS Type III site.

This site has measured PM<sub>2.5</sub> since May 2002 with a continuous beta attenuation monitor (BAM). A new generation of BAM, meeting federal equivalent method (FEM) criteria, was installed in April 2013. The new BAM is designated as a special purpose monitor (SPM) for assisting with daily air quality forecasting. This SPM meets quality assurance criteria and siting criteria in 40 CFR Part 58 Appendix A and E, respectively. For comparability assessment discussion, please refer to Section 4, Recent and Proposed Modification to the Network, page 14.

Site Name	Folsom-Natoma Street
AQS Site No.	06-067-0012
Geographic Coordinates	38.683304°, -121.164457° (WGS84)
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-24**  
**Panoramic view toward north from roof (May 2014)**



**Figure A-25**  
**Panoramic view toward east from roof (May 2014)**



**Figure A-26**  
**Panoramic view toward south from roof (May 2014)**



**Figure A-27**  
**Panoramic view toward west from roof (May 2014)**



**Figure A-28**  
**Folsom-Natoma St. Google Earth Image**



This virtual 3-D Google Earth image from 4/18/14<sup>27</sup> shows a number of potential flow obstacles around Folsom-Natoma St. air monitoring station. Heights of the trees and building were calculated on-site on 5/12/15 with an inclinometer. The distances between probe and obstacle were measured with a laser distance measurer whenever possible. Otherwise, the distance is determined with the latest satellite imagery and ruler tool from Google Earth.

Table A-11 shows that the distance from each tree/building to each probe/inlet is at least twice the height that the tree/building protrudes above the probe/inlet as set forth in 40 CFR Part 58, Appendix E, Section 4(a).

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<sup>27</sup> No observed or notable changes from the Google Earth image per 5/12/15 site inspection by District Staff

Table A-12 shows the distance between each probe/inlet to the closest tree dripline. All of the trees meet the 10 m dripline criteria as set forth in 40 CFR Part 58, Appendix E, Section 5(a).

As shown in Table A-11 and A-12, criteria for flow obstruction and distance from the dripline are met per 40 CFR Part 58, Appendix E, Section 4(a) and 5(a). Therefore all active monitors at the Folsom-Natoma St. air monitoring site demonstrate a 360 degree unrestricted air flow.

**Table A-11**  
**Folsom-Natoma St. Flow obstruction**

Flow Obstruction (Object height, above ground level (m))	Gaseous Inlet, Speciated VOC = 5.4 m		NO <sub>y</sub> Inlet = 10.0 m		PM <sub>10</sub> 24-hr Sampler = 5.3 m	
	Distance	Protrusion height	Distance	Protrusion height	Distance	Protrusion height
A: Antenna Tower (25.2) <sup>(A)</sup>	6.2	19.8	7.2	14.2	8.0	19.9
B: Building (2.4)	10.5	-3.0	9.9	-7.6	12.6	-2.9
C: Building (2.4)	14.1	-3.0	12.6	-7.6	16.0	-2.9
D: Building (2.4)	5.8	-3.0	4.0	-7.6	7.4	-2.9
E: Building (3.0)	7.2	-2.4	9.0	-7.0	6.7	-2.3
F: Tree (5.3)	14.4	-0.1	20.1	-4.7	17.0	0.0
G: Building (2.5)	13.1	-2.9	14.6	-7.5	11.1	-2.8
Is the distance less than two times the protrusion height? <sup>28</sup>	No		No		No	

<sup>(A)</sup> The antenna tower, as shown in Figure A-26, does not restrict air flow. The tower is constructed using only metal frames

**Table A-12**  
**Folsom-Natoma St. Distance from dripline**

Distance to dripline, all units in meter	Gaseous Inlet, Speciated VOC	NO <sub>y</sub> Inlet	PM <sub>10</sub> 24-hr Sampler
A: Antenna Tower	Not applicable		
B: Building	Not applicable		
C: Building	Not applicable		
D: Building	Not applicable		
E: Building	Not applicable		
F: Tree	16	17	14
G: Building	Not applicable		
Are tree driplines at least 10 m from probe and inlet? <sup>29</sup>	Yes	Yes	Yes

<sup>28</sup> 40 CFR Part 58, Appendix E, Section 4(a).

<sup>29</sup> 40 CFR Part 58, Appendix E, Section 5(a)

Site	Folsom-Natoma St.		
Start Date	7/1/1996	7/1/1996	7/1/2011
Collecting Agency	SMAQMD	SMAQMD	SMAQMD
Analytical Lab	N/A	N/A	N/A
Reporting Agency	CARB	CARB	CARB
Pollutant	Ozone	Nitrogen Dioxide	NOY
Parameter code	44201	42602	42600
POC	1	1	1
Instrument manufacturer and model	TAPI 400E	TEI 42C	TEI 42I-Y
Sampling Method	Instrumental	Instrumental	Instrumental
Method Code	087	074	574
Analysis Method	Ultra Violet Absorption	Chemiluminescence	Chemiluminescence
FRM/FEM/ARM/Other	FEM	FRM	Other
Comparable to annual PM <sub>2.5</sub> NAAQS?	Not applicable	Not applicable	Not applicable
Monitoring objective	NAAQS comparison, public info	NAAQS comparison, public info	Public info
Statement of Purpose	Measure highest summer O <sub>3</sub> level downwind of urban area	Measures concentration downwind of urban area	Measures representative concentration
Monitor type	SLAMS	SLAMS	SLAMS
Affiliation	PAMS (Type III)	PAMS (Type III)	PAMS (Type III)
Site type	Max O <sub>3</sub> Concentration, Population Exposure	Highest concentration	Population Exposure
Spatial scale	Neighborhood	Neighborhood	Neighborhood
Sampling Frequency	Continuous	Continuous	Continuous
Sampling season	Year Round	Year Round	Year Round
Distance from supporting structure/roof top	2.1 m from roof top	2.1 m from roof top	2.1 m from roof top
Distance from flow obstructions on roof	No obstruction	No obstruction	No obstruction
Distance from flow obstructions not on roof	No obstruction	No obstruction	No obstruction
Distance from tree drip line	16 m	16 m	17 m
Distance to furnace or incinerator flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors	Not applicable	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360	360
Probe height (agl)	5.4 m	5.4 m	5.4 m
Probe material	FEP Teflon	FEP Teflon	FEP Teflon
Residence time	12.0 s	12.7 s	9 seconds
Changes in next 18 months?	No	No	No
Frequency of one-point QC check	Every other day	Every other day	Every other day
Last Annual Performance Evaluation	3/12/14	3/12/14	Not available

Site	Folsom-Natoma St.	
Start Date	7/1/1996	7/1/1996
Collecting Agency	SMAQMD	SMAQMD
Analytical Lab	N/A	N/A
Reporting Agency	CARB	CARB
Pollutant	Total NMHC	Speciated VOC
Parameter code	43102	43102
POC	1	2
Instrument manufacturer and model	TEI 55C	Xontech 910A/912
Sampling Method	Instrumental	6L Pressurized Canister
Method Code	164	123
Analysis Method	FID	Dual FID
FRM/FEM/ARM/Other	Other	Other
Comparable to annual PM2.5 NAAQS?	N/A	N/A
Monitoring objective	Public info, research	Research
Statement of Purpose	Measures concentration down wind of urban area	Measures concentration down wind of urban area
Monitor type	SLAMS	SLAMS
Affiliation	PAMS (Type III)	PAMS (Type III)
Site type	Highest concentration	Highest concentration
Spatial scale	Neighborhood	Neighborhood
Sampling Frequency	Continuous	1 in 3 days
Sampling season	Year Round	July thru Sep
Distance from supporting structure/roof top	2.1 m from roof top	2.1 m from roof top
Distance from flow obstructions on roof	No obstruction	No obstruction
Distance from flow obstructions not on roof	No obstruction	No obstruction
Distance from tree drip line	16 m	16 m
Distance to furnace or incinerator flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360
Probe height (agl)	5.4 m	5.4 m
Probe material	FEP Teflon	Stainless Steel
Residence time	13.7 s	3 s
Changes in next 18 months?	No	No
Frequency of one-point QC check	Every other day	Not applicable
Last Annual Performance Evaluation	12/26/13	Not available

Site	Folsom-Natoma St.	
Start Date	4/1/2013	7/1/2015
Collecting Agency	SMAQMD	SMAQMD
Analytical Lab	N/A	N/A
Reporting Agency	CARB	CARB
Pollutant	PM2.5 (Primary)	PM2.5 (Audit Monitor)
Parameter code	88101	88101
POC	3	4
Instrument 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
Comparable to annual PM2.5 NAAQS?	No	No
Monitoring objective	Public info	Public info
Statement of Purpose	Measures representative concentration	Collocated for QA purpose and Provides substitute data if necessary
Monitor type	SPM <sup>(A)</sup>	SPM <sup>(A)</sup>
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/roof top	2.0 m from roof top	2.2 m from roof top
Distance from flow obstructions on roof	No obstruction	No obstruction
Distance from flow obstructions not on roof	No obstruction	No obstruction
Distance from tree drip line	14 m	13 m
Distance to furnace or incinerator flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors	2.0 m	2.0 m
Unrestricted airflow (deg)	360	360
Probe height (agl)	5.3 m	5.5 m
Probe material	Aluminum	Aluminum
Residence time	Not applicable	Not applicable
Changes in next 18 months?	No	No
Frequency of flow rate verification	Bi-monthly	Bi-monthly
Last Annual Performance Evaluation	3/12/14, 9/4/14	Not yet in operation

<sup>(A)</sup> This SPM meets requirement in Appendix A and E to 40 CFR Part 58

Site	Folsom-Natoma St.				
Start Date	7/1/1996	7/1/1996	7/1/1996	7/1/1996	7/1/1996
Collecting Agency	SMAQMD	SMAQMD	SMAQMD	SMAQMD	SMAQMD
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
POC	1	1	1	1	1
Instrument manufacturer and model	Cimatronics 100093	Cimatronics 101669	Cimatronics 100848	Cimatronics F-460	Cimatronics 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
Comparable to annual PM <sub>2.5</sub> NAAQS?	N/A	N/A	N/A	N/A	N/A
Monitoring objective	Public info				
Statement of Purpose	Measures representative meteorology				
Monitor type	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS
Affiliation	PAMS (Type III)				
Site type	Not applicable				
Spatial scale	Not applicable				
Sampling Frequency	Continuous	Continuous	Continuous	Continuous	Continuous
Sampling season	Year Round				
Distance from supporting structure/roof top	No supporting structure				
Distance from flow obstructions on roof	No obstruction				
Distance from flow obstructions not on roof	No obstruction				
Distance from tree drip line	12 m				
Distance to furnace or incinerator flue	No furnace/flue				
Distance between collocated PM monitors	Not applicable				
Unrestricted airflow (deg)	360	360	360	360	360
Probe height (agl)	10 m				
Probe material	Not applicable				
Residence time	Not applicable				
Changes in next 18 months?	No	No	No	No	No
Frequency of one-point QC check	Not applicable				
Last Annual Performance Evaluation	3/12/14	Not available	Not available	3/12/14	3/12/14

## A.7 Sacramento-Goldenland Ct.

This site was established in late 2008 to replace the former Airport Rd. monitoring site, which was one mile away.

This site measures O<sub>3</sub>, CO, NO<sub>2</sub>, Total NMHC, PM<sub>10</sub>, WD, WS, Temp, RH, and SRD.

Site Name	Goldenland Court
AQS Site No.	06-067-0014
Geographic Coordinates	38.650716°, -121.506650° (WGS84)
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

**Figure A-29**  
**Panoramic view toward north from roof (May 2015)**



**Figure A-30**  
**Panoramic view toward east from roof (May 2015)**



**Figure A-31**  
**Panoramic view toward south from roof (May 2015)**



**Figure A-32**  
**Panoramic view toward west from roof (May 2015)**



**Figure A-33**  
**Sacramento-Goldenland Ct. Google Earth Virtual View**



This virtual 3-D Google Earth image from 7/2/14<sup>30</sup> shows a number of potential flow obstacles around Sacramento-Goldenland Ct. air monitoring station. Heights of the trees and building were calculated on-site on 5/11/15 with an inclinometer. The distances between probe and obstacle were measured with a laser distance measurer whenever possible. Otherwise, the distance is determined with the latest satellite imagery and ruler tool from Google Earth.

Table A-13 shows that the distance from each tree/building to each probe/inlet is at least twice the height that the tree/building protrudes above the probe/inlet as set forth in 40 CFR Part 58, Appendix E, Section 4(a).

<sup>30</sup> No observed or notable changes from the Google Earth image per 5/11/15 site inspection by District Staff

Table A-14 shows the distance between each probe/inlet to the closest tree dripline. All of the trees meet the 10 m dripline criteria as set forth in 40 CFR Part 58, Appendix E, Section 5(a).

As shown in Table A-13 and A-14, criteria for flow obstruction and distance from the dripline are met per 40 CFR Part 58, Appendix E, Section 4(a) and 5(a). Therefore all active monitors at the Sacramento-Goldenland Ct. air monitoring site demonstrate a 360 degree unrestricted air flow.

**Table A-13**  
**Sacramento-Goldenland Ct. Flow obstruction**

Flow Obstruction (Object height, above ground level (m))	Gaseous Inlet = 5.3 m		PM10 Sampler (Primary) = 5.7 m		PM10 Sampler (Continuous) = 5.7 m	
	Distance	Protrusion height	Distance	Protrusion height	Distance	Protrusion height
A: Tree (10.8)	34.0	5.5	44.1	5.1	42.3	5.1
B: Building (4.8)	21.5	-0.5	20.8	-0.9	20.0	-0.8
C: Tree (9.3)	26.3	4.0	24.6	3.6	24.5	3.6
Is the distance less than half the protrusion height? <sup>31</sup>	No		No		No	

**Table A-14**  
**Sacramento-Goldenland Ct. Distance from dripline**

Distance to dripline, all units in meter	Gaseous Inlet	PM10 Sampler (Primary)	PM10 Sampler (Continuous)
A: Tree	23	21	21
B: Building	Not applicable		
C: Tree	27	29	29
Are tree driplines at least 10 m from probe and inlet? <sup>32</sup>	Yes	Yes	Yes

<sup>31</sup> 40 CFR Part 58, Appendix E, Section 4(a).

<sup>32</sup> 40 CFR Part 58, Appendix E, Section 5(a)

Site	Sacramento-Goldenland Ct.			
Start Date	10/1/2008	10/1/2008	10/1/2008	10/1/2008
Collecting Agency	SMAQMD	SMAQMD	SMAQMD	SMAQMD
Analytical Lab	N/A	N/A	N/A	N/A
Reporting Agency	CARB	CARB	CARB	CARB
Pollutant	Ozone	Carbon Monoxide	Nitrogen Dioxide	Total NMHC
Parameter code	44201	42101	42602	43102
POC	1	1	1	1
Instrument manufacturer and model	TAPI 400E	TEI 48	TEI 42C	TEI 55C
Sampling Method	Instrumental	Instrumental	Instrumental	Instrumental
Method Code	087	054	074	164
Analysis Method	Ultra Violet Absorption	Nondispersive Infrared	Chemiluminescence	Flame ionization detector
FRM/FEM/ARM/Other	FEM	FRM	FRM	Other
Comparable to annual PM2.5 NAAQS?	Not applicable	Not applicable	Not applicable	Not applicable
Monitoring objective	NAAQS comparison, public info	NAAQS comparison, public info	NAAQS comparison, public info	Public info, research
Statement of Purpose	Measures O3 concentration near dow nw ind edge of Central Business District	Measures representation concentrations	Measures precursor concentration near dow nw ind edge of Central Business District	Measures precursor concentration near dow nw ind edge of Central Business District
Monitor type	SLAMS	SLAMS	SLAMS	SLAMS
Affiliation	PAMS (Type II)	None	PAMS (Type II)	PAMS (Type II)
Site type	Population Exposure	Population Exposure	Population Exposure	Population Exposure
Spatial scale	Urban	Neighborhood	Neighborhood	Neighborhood
Sampling Frequency	Continuous	Continuous	Continuous	Continuous
Sampling season	Year Round	Year Round	Year Round	Year Round
Distance from supporting structure/roof top	1.6 m from rooftop	1.6 m from rooftop	1.6 m from rooftop	1.6 m from rooftop
Distance from flow obstructions on roof	No obstruction	No obstruction	No obstruction	No obstruction
Distance from flow obstructions not on roof	No obstruction	No obstruction	No obstruction	No obstruction
Distance from tree drip line	23 m	23 m	23 m	23 m
Distance to furnace or incinerator flue	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors	Not applicable	Not applicable	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360	360	360
Probe height (agl)	5.3 m	5.3 m	5.3 m	5.3 m
Probe material	FEP Teflon	FEP Teflon	FEP Teflon	FEP Teflon
Residence time	7.5 seconds	7.7 seconds	7.9 seconds	9 seconds
Changes in next 18 months?	Yes	Yes	Yes	Yes
Frequency of one-point QC check	Every other day	Every other day	Every other day	Every other day
Last Annual Performance Evaluation	3/17/14	3/17/14	3/17/14	12/16/14

Site	Sacramento-Goldenland Ct.	
Start Date	10/1/2008	6/1/2010
Collecting Agency	SMAQMD	SMAQMD
Analytical Lab	SMAQMD	N/A
Reporting Agency	CARB	CARB
Pollutant	PM10 (Primary)	PM10
Parameter code	81102	85101
POC	1	3
Instrument manufacturer and model	Sierra Anderson 1200	R & P 1400A
Sampling Method	Hi Volume	Instrumental
Method Code	063	079
Analysis Method	Gravimetric	TEOM-Gravimetric
FRM/FEM/ARM/Other	FRM	FEM
Comparable to annual PM2.5 NAAQS?	Not applicable	Not applicable
Monitoring objective	NAAQS comparison, public info	NAAQS comparison, public info
Statement of Purpose	Measures representation concentrations	Measures representation concentrations
Monitor type	SLAMS	SLAMS
Affiliation	None	None
Site type	Population Exposure	Population Exposure
Spatial scale	Neighborhood	Neighborhood
Sampling Frequency	1 in 6 days	Continuous
Sampling season	Year Round	Year Round
Distance from supporting structure/roof top	2.0 m from rooftop	2.0 m from rooftop
Distance from flow obstructions on roof	No obstruction	No obstruction
Distance from flow obstructions not on roof	No obstruction	No obstruction
Distance from tree drip line	21 m	21 m
Distance to furnace or incinerator flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors	1.0 m*	1.0 m*
Unrestricted airflow (deg)	360	360
Probe height (agl)	5.7 m	5.7 m
Probe material	Not applicable	Not applicable
Residence time	Not applicable	Not applicable
Changes in next 18 months?	Yes	Yes
Frequency of flow rate verification	Monthly	Monthly
Last Annual Performance Evaluation	3/17/14, 9/5/14	3/17/14

\* The District is performing necessary electrical upgrade prior to relocating the SA1200 sampler to increase collocation distance

Site	Sacramento-Goldenland Ct.				
Start Date	10/1/2008	10/1/2008	10/1/2008	10/1/2008	10/1/2008
Collecting Agency	SMAQMD	SMAQMD	SMAQMD	SMAQMD	SMAQMD
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
POC	1	1	1	1	1
Instrument manufacturer and model	Cimatronics 100093	Cimatronics 101669	Cimatronics 100848	Cimatronics F-460	Cimatronics F-460
Sampling Method	Instrumental	Instrumental	Instrumental	Instrumental	Instrumental
Method Code	042	012	011	020	020
Analysis Method	Machine Average	Hygrosopic Plastic Film	Pyranometer	Vector Summation	Vector Summation
FRM/FEM/ARM/Other	Other	Other	Other	Other	Other
Comparable to annual PM <sub>2.5</sub> NAAQS?	Not applicable				
Monitoring objective	Public info				
Statement of Purpose	Measures representative meteorology				
Monitor type	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS
Affiliation	PAMS (Type II)				
Site type	Not applicable				
Spatial scale	Not applicable				
Sampling Frequency	Continuous	Continuous	Continuous	Continuous	Continuous
Sampling season	Year Round				
Distance from supporting structure/roof top	No supporting structure				
Distance from flow obstructions on roof	No obstruction				
Distance from flow obstructions not on roof	No obstruction				
Distance from tree drip line	24 m				
Distance to furnace or incinerator flue	No furnace/flue				
Distance between collocated PM monitors	Not applicable				
Unrestricted airflow (deg)	360	360	360	360	360
Probe height (agl)	10 m				
Probe material	Not applicable				
Residence time	Not applicable				
Changes in next 18 months?	Yes	Yes	Yes	Yes	Yes
Frequency of one-point QC check	Not applicable				
Last Annual Performance Evaluation	3/17/14	Not available	Not available	3/17/14	3/17/14

## A.8 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 (Prevention of Significant Deterioration) at McClellan Air Force Base, which was located 3 miles southwest of the site. The purposed 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, the District needed additional NAMS sites for SO<sub>2</sub> and PM<sub>10</sub> to meet minimum monitoring requirements. Thus, the designation of the SO<sub>2</sub> and PM<sub>10</sub> monitors at North Highlands was changed from SPM to NAMS, which is now categorized as SLAMS. The SO<sub>2</sub> monitor was terminated in late 2010.

In its comments on the District's 2013 Annual Network Plan, U.S. EPA "recommend for the District to evaluate in particular the purpose of continuing to operate SPM parameters for extended periods of time." The District does not have any plan to terminate this site. It will re-classify all monitors currently operating as SPM (O<sub>3</sub>, CO, and NO<sub>2</sub>) as SLAMS.

Site Name	North Highlands-Blackfoot
AQS Site No.	06-067-0002
Geographic Coordinates	38.71209°, -121.38109° (WGS84)
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-34**  
**Panoramic view toward north from roof (May 2014)**



**Figure A-35**  
**Panoramic view toward east from roof (May 2014)**



**Figure A-36**  
**Panoramic view toward south from roof (May 2014)**



**Figure A-37**  
**Panoramic view toward west from roof (May 2014)**



**Figure A-38**  
**North Highlands-Blackfoot Google Earth Virtual View**



This virtual 3-D Google Earth image from 4/18/14<sup>33</sup> shows a number of potential flow obstacles around North Highlands-Blackfoot air monitoring station. Heights of the trees and building were calculated on-site on 5/11/15 with an inclinometer. The distances between probe and obstacle were measured with a laser distance measurer whenever possible. Otherwise, the distance is determined with the latest satellite imagery and ruler tool from Google Earth. Objects H, I, J, K as identified in Figure A-38 are not evaluated because they are below the probes/inlets.

Table A-15 shows that the distance from each tree/building to each probe/inlet is at least twice the height that the tree/building protrudes above the probe/inlet as set forth in 40 CFR Part 58, Appendix E, Section 4(a).

<sup>33</sup> No observed or notable changes from the Google Earth image per 5/11/15 site inspection by District Staff

Table A-16 shows the distance between each probe/inlet to the closest tree dripline. All of the trees meet the 10 m dripline criteria as set forth in 40 CFR Part 58, Appendix E, Section 5(a).

As shown in Table A-15 and A-16, criteria for flow obstruction and distance from the dripline are met per 40 CFR Part 58, Appendix E, Section 4(a) and 5(a). Therefore all active monitors at the North Highlands-Blackfoot air monitoring site demonstrate a 360 degree unrestricted air flow.

**Table A-15**  
**North Highlands-Blackfoot Way Flow obstruction**

Flow Obstruction (Object height, above ground level (m))	Gaseous Inlet = 5.0 m		PM <sub>10</sub> Sampler = 5.0 m	
	Distance	Protrusion height	Distance	Protrusion height
A: Tree (11.9)	45.7	6.9	44.6	6.9
B: Tree (15.9)	44.8	10.9	44.3	10.9
C: Tree (13.0)	39.1	8.0	37.3	8.0
D: Tree (12.5)	24.0	7.5	24.2	7.5
E: Tree (14.8)	35.3	9.8	36.3	9.8
F: Tree (13.7)	45.2	8.7	45.2	8.7
G: Building <sup>(A)</sup>	Not applicable			
Is the distance less than two times the protrusion height? <sup>34</sup>	No		No	

<sup>(A)</sup>This building was burned down on October 9, 2014, and demolished on December 9, 2014.

**Table A-16**  
**North Highlands-Blackfoot Way Distance from dripline**

Distance to dripline, all units in meter	Gaseous Inlet	PM <sub>10</sub> Sampler
A: Tree	26	37
B: Tree	33	34
C: Tree	30	30
D: Tree	13	14
E: Tree	25	26
F: Tree	43	41
G: Building	Not Applicable	
Are tree driplines at least 10 m from probe and inlet? <sup>35</sup>	Yes	Yes

<sup>34</sup> 40 CFR Part 58, Appendix E, Section 4(a).

<sup>35</sup> 40 CFR Part 58, Appendix E, Section 5(a)

Site	North Highlands-Blackfoot Way		
Start Date	12/1/1979	12/1/1979	12/1/1979
Collecting Agency	SMAQMD	SMAQMD	SMAQMD
Analytical Lab	N/A	N/A	N/A
Reporting Agency	CARB	CARB	CARB
Pollutant	Ozone	Carbon Monoxide	Nitrogen Dioxide
Parameter code	44201	42101	42602
POC	1	1	1
Instrument manufacturer and model	TAPI 400E	TEI 48C	TEI 42I
Sampling Method	Instrumental	Instrumental	Instrumental
Method Code	087	054	074
Analysis Method	Ultra Violet Absorption	Nondispersive Infrared	Chemiluminescence
FRM/FEM/ARM/Other	FEM	FRM	FRM
Comparable to annual PM2.5 NAAQS?	N/A	N/A	N/A
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	SLAMS	SLAMS	SLAMS
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/roof top	2.0 m from roof top	2.0 m from roof top	2.0 m from roof top
Distance from flow obstructions on roof	No obstruction	No obstruction	No obstruction
Distance from flow obstructions not on roof	No obstruction	No obstruction	No obstruction
Distance from tree drip line	13 m	13 m	13 m
Distance to furnace or incinerator flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors	Not applicable	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360	360
Probe height (agl)	5.0 m	5.0 m	5.0 m
Probe material	FEP Teflon	FEP Teflon	FEP Teflon
Residence time	16.4 seconds	15.8 seconds	16.3 seconds
Changes in next 18 months?	No	No	No
Frequency of one-point QC check	Every Other Day	Every Other Day	Every Other Day
Last Annual Performance Evaluation	3/19/14	3/19/14	3/19/14

Site	North Highlands-Blackfoot Way
Start Date	1/1/1989
Collecting Agency	SMAQMD
Analytical Lab	SMAQMD
Reporting Agency	CARB
Pollutant	PM10
Parameter code	81102
POC	1
Instrument manufacturer and model	Sierra Anderson 1200
Sampling Method	Hi Volume
Method Code	063
Analysis Method	Gravimetric
FRM/FEM/ARM/Other	FRM
Comparable to annual PM <sub>2.5</sub> NAAQS?	N/A
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/roof top	2.0 m from roof top
Distance from flow obstructions on roof	No obstruction
Distance from flow obstructions not on roof	No obstruction
Distance from tree drip line	14 m
Distance to furnace or incinerator flue	No furnace/flue
Distance between collocated PM monitors	Not Collocated
Unrestricted airflow (deg)	360
Probe height (agl)	5.0 m
Probe material	Not applicable
Residence time	Not applicable
Changes in next 18 months?	Yes
Frequency of flow rate verification	Monthly
Last Annual Performance Evaluation	3/19/14, 9/5/14

## A.9 Rancho Seco

This outlying site is the furthest away from urban area. It was established in 2008 as a seasonal PM<sub>2.5</sub> special purpose monitoring site. The PM<sub>2.5</sub> data collected during the months of November through February is used for the South Sacramento County Winter PM<sub>2.5</sub> Study. Data collected at this rural, upwind site also assist with winter PM<sub>2.5</sub> forecasting.

This SPM meets siting criteria in Appendix E to 40 CFR Part 58 but does not meet quality assurance criteria in Appendix A; specifically, semi-annual flow rate audit for particulate matter was not conducted. The District is not submitting data collected with the e-BAM because it is not an FEM, FRM or ARM monitor, and 40 CFR §58.20(b) only require data submittal of FEM, FRM or ARM monitor.

Site Name	Rancho Seco
AQS Site No.	NA
Geographic Coordinates	38.343812°, -121.109977° (WGS84)
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	SMAQMD
Analytical Lab	N/A
Reporting Agency	N/A
Pollutant	PM2.5
Parameter code	88501
POC	3
Instrument 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
Comparable to annual PM2.5 NAAQS?	No
Monitoring objective	Public info, research
Statement of Purpose	Measures rural, background PM2.5 concentration
Monitor type	SPM <sup>(A)</sup>
Affiliation	None
Site type	Upw ind/ Background
Spatial scale	Neighborhood
Sampling Frequency	Continuous
Sampling season	November-February
Distance from supporting structure/roof top	Not applicable
Distance from flow obstructions on roof	No obstruction
Distance from flow obstructions not on roof	No obstruction
Distance from tree drip line	15.0 m
Distance to furnace or incinerator flue	No furnace/flue
Distance between collocated PM monitors	Not Collocated
Unrestricted airflow (deg)	360
Probe height (agl)	2 m
Probe material	Not applicable
Residence time	Not applicable
Changes in next 18 months?	No
Frequency of flow rate verification	N/A
Last Annual Performance Evaluation	Not available

<sup>(A)</sup> This SPM does not meet requirement in Appendix A but meet requirement in Appendix E to 40 CFR Part 58

## A.10 Sloughhouse

Located in a rural area 16.5 miles southeast of Downtown Sacramento, this site measures O<sub>3</sub>, wind direction, wind speed, and PM<sub>2.5</sub>.

Sloughhouse was established in 1997 as a seasonal (April-October) O<sub>3</sub> special purpose monitoring site to measure elevated afternoon O<sub>3</sub> concentrations, under northwesterly winds, in support of the District's summer Spare the Air (O<sub>3</sub> episodic control measure) program. It was sited to cover "data gaps" in the O<sub>3</sub> monitoring network, which is used for forecasting summer AQI levels.

A tree 10 m southeast of the O<sub>3</sub> inlet was removed in May 2011 in order to comply with 40 CFR 58 Appendix E (Probe and Monitoring Path Siting Criteria). The O<sub>3</sub> monitor was then re-classified from SPM to SLAMS.

Since November 2008, seasonal (November-February) monitoring for PM<sub>2.5</sub> is conducted at this site in support of the South Sacramento County Winter PM<sub>2.5</sub> study. This study is ongoing and continued to be extended in support of the winter PM<sub>2.5</sub> forecasting.

From November 2008 thru February 2013, data was collected with an SPM PM<sub>2.5</sub> monitor (Met One Instruments e-BAM). In November 2013, a non-FEM BAM sampler was relocated here to improve data quality, sampling season was also increased to year-round to monitor potential exceptional event impacts (e.g. wildland fires). This monitor meets quality assurance criteria and siting criteria in 40 CFR Part 58 Appendix A and E. The District is voluntarily submitting data collected with the non-FEM SPM BAM sampler.

Site Name	Sloughhouse
AQS Site No.	06-067-5003
Geographic Coordinates	38.494475°, -121.211131° (WGS84)
Location	Fire Station in rural area located 16.5 miles east-southeast of downtown Sacramento.
Address	7520 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-39**  
**Panoramic view toward north from roof (May 2015)**



**Figure A-40**  
**Panoramic view toward east from roof (May 2015)**



**Figure A-41**  
**Panoramic view toward south from roof (May 2015)**



**Figure A-42**  
**Panoramic view toward west from roof (May 2015)**



**Figure A-43**  
**Sloughouse-Sloughouse Rd. Google Earth Image**



This virtual 3-D Google Earth image from 4/18/14<sup>36</sup> shows a number of potential flow obstacles around Sloughouse air monitoring station. Heights of the trees and building were calculated on-site on 5/11/15 with an inclinometer. The distances between probe and obstacle were measured with a laser distance measurer whenever possible. Otherwise, the distance is determined with the latest satellite imagery and ruler tool from Google Earth.

Table A-17 shows that the distance from each tree/building to each probe/inlet is at least twice the height that the tree/building protrudes above the probe/inlet as set forth in 40 CFR Part 58, Appendix E, Section 4(a).

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<sup>36</sup> No observed or notable changes from the Google Earth image per 5/11/15 site inspection by District Staff

Table A-18 shows the distance between each probe/inlet to the closest tree dripline. All of the trees meet the 10 m dripline criteria set forth in 40 CFR Part 58, Appendix E, Section 5(a).

As shown in Table A-17 and A-18, criteria for flow obstruction and distance from the dripline are met per 40 CFR Part 58, Appendix E, Section 4(a) and 5(a). Therefore all active monitors at the Sloughhouse air monitoring site demonstrate a 360 degree unrestricted air flow.

**Table A-17**  
**Sloughhouse-Sloughhouse Rd. Flow obstruction**

Flow Obstruction (Object height, above ground level (m))	Gaseous Inlet = 5.0 m		PM2.5 Sampler = 5.0 m	
	Distance	Protrusion height	Distance	Protrusion height
A: Tree (10.7)	23.5	5.3	22.6	5.3
B: Building (3.4)	14.8	-1.6	14.8	-1.6
C: Tree (6.0)	21.9	1.0	23.1	1.0
Is the distance less than two times the protrusion height? <sup>37</sup>	No		No	

**Table A-18**  
**Sloughhouse-Sloughhouse Rd. Distance from dripline**

Distance to dripline, all units in meter	Gaseous Inlet	PM2.5 Sampler
A: Tree	20	20
B: Building	Not applicable	
C: Tree	18	18
Are tree driplines at least 10 m from probe and inlet? <sup>38</sup>	Yes	Yes

<sup>37</sup> 40 CFR Part 58, Appendix E, Section 4(a).

<sup>38</sup> 40 CFR Part 58, Appendix E, Section 5(a)

Site	Sloughhouse-Sloughhouse Rd.		
Start Date	7/1/1997	7/1/1997	7/1/1997
Collecting Agency	SMAQMD	SMAQMD	SMAQMD
Analytical Lab	N/A	N/A	N/A
Reporting Agency	CARB	CARB	CARB
Pollutant	Ozone	Wind Direction	Wind Speed
Parameter code	44201	61104	61103
POC	1	1	1
Instrument manufacturer and model	TAPI 400E	Climatronics F-460	Climatronics F-460
Sampling Method	Instrumental	Instrumental	Instrumental
Method Code	087	020	020
Analysis Method	Ultra Violet Absorption	Vector Summation	Vector Summation
FRM/FEM/ARM/Other	FEM	Other	Other
Comparable to annual PM <sub>2.5</sub> NAAQS?	N/A	N/A	N/A
Monitoring objective	NAAQS comparison, public info	Public info	Public info
Statement of Purpose	Measures elevated O <sub>3</sub> concentration under northwesterly wind	Measures representative meteorology	Measures representative meteorology
Monitor type	SLAMS	SLAMS	SLAMS
Affiliation	None	None	None
Site type	Max O <sub>3</sub> concentration	N/A	N/A
Spatial scale	Neighborhood	N/A	N/A
Sampling Frequency	Continuous	Continuous	Continuous
Sampling season	Year Round	Year Round	Year Round
Distance from supporting structure/roof top	1.8 m from roof top	No supporting structure	No supporting structure
Distance from flow obstructions on roof	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof	No obstructions	No obstructions	No obstructions
Distance from tree drip line	18 m	18 m	18 m
Distance to furnace or incinerator flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors	Not applicable	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360	360
Probe height (agl)	4.6 m	5.2 m	5.2 m
Probe material	FEP Teflon	Not applicable	Not applicable
Residence time	6 seconds	Not applicable	Not applicable
Changes in next 18 months?	No	No	No
Frequency of one-point QC check	Daily	N/A	N/A
Last Annual Performance Evaluation	3/18/14	3/18/14	3/18/14

Site	Sloughhouse-Sloughhouse Rd.
Start Date	11/5/2013
Collecting Agency	SMAQMD
Analytical Lab	N/A
Reporting Agency	N/A
Pollutant	PM2.5
Parameter code	88501
POC	3
Instrument 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
Comparable to annual PM2.5 NAAQS?	No
Monitoring objective	Public info, research
Statement of Purpose	Measures rural, background PM2.5 concentration
Monitor type	SPM
Affiliation	None
Site type	Upw ind/ Background
Spatial scale	Neighborhood
Sampling Frequency	Continuous
Sampling season	Year Round
Distance from supporting structure/roof top	2.2 m from roof top
Distance from flow obstructions on roof	No obstructions
Distance from flow obstructions not on roof	No obstructions
Distance from tree drip line	18 m
Distance to furnace or incinerator flue	No furnace/flue
Distance between collocated PM monitors	Not Collocated
Unrestricted airflow (deg)	360
Probe height (agl)	5.0 m
Probe material	Not applicable
Residence time	Not applicable
Changes in next 18 months?	No
Frequency of flow rate verification	Bi-monthly
Last Annual Performance Evaluation	3/18/14

### A.11 Sacramento Health Dept.-Stockton Blvd

According to old documentation, this PM monitoring site has been in existence since the late 1950s. This site measures PM<sub>10</sub> SSI, PM<sub>10</sub> TEOM, and PM<sub>2.5</sub> FRM.

Since the District is evaluating to terminate this site (see Section 4, Recent and Proposed Modification to the Network), it will postpone trimming a vigorous, old-growth tree. This tree should have minimal impact to air monitoring because it is nine meters southeast of the monitors, and this location has northwest and southwest predominate wind.

Site Name	Sacramento Health Department-Stockton Blvd.
AQS Site No.	06-067-4001
Geographic Coordinates	38.556326°, -121.458499° (WGS84)
Location	Rooftop in urban area located 2 miles east-southeast of downtown Sacramento.
Address	2221 Stockton Blvd, Sacramento, CA 95817
County	Sacramento
Distance from roadway	46 m
Annual Average Daily Traffic (Vehicles/Day)	Stockton Blvd. south of U St.: 24,015 (City of Sacramento, 2012)
Ground Cover	Rooftop (surrounding area is paved)
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

**Figure A-44**  
**Panoramic view toward north from roof (May 2015)**



**Figure A-45**  
**Panoramic view toward east from roof (May 2015)**



**Figure A-46**  
**Panoramic view toward south from roof (May 2015)**



**Figure A-47**  
**Panoramic view toward west from roof (May 2015)**



**Figure A-48**  
**Sacramento-Health Dept. Google Earth Image**



This virtual 3-D Google Earth image from 7/2/14<sup>39</sup> shows a number of potential flow obstacles around Sacramento-Health Dept. air monitoring station. Heights of the trees and building were calculated on-site on 5/11/15 with an inclinometer. The distances between probe and obstacle were measured with a laser distance measurer whenever possible. Otherwise, the distance is determined with the latest satellite imagery and ruler tool from Google Earth.

Table A-19 shows that the distance from each tree/building to each probe/inlet is at least twice the height that the tree/building protrudes above the probe/inlet as set forth in 40 CFR Part 58, Appendix E, Section 4(a).

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<sup>39</sup> No observed or notable changes from the Google Earth image per 5/11/15 site inspection by District Staff

**Table A-19**  
**Sacramento-Health Dept. Stockton Blvd. Flow Obstruction**

Flow Obstruction (Object height, above ground level (m))	PM <sub>10</sub> 24-hr Sampler = 5.4 m		PM <sub>10</sub> Continuous Sampler = 5.4 m		PM <sub>2.5</sub> 24-hr Sampler = 5.4 m	
	Distance	Protrusion height	Distance	Protrusion height	Distance	Protrusion height
A: Tree (9.4)	20.8	4.0	16.7	4.0	18.4	4.0
B: Tree (10.2)	22.6	4.8	26.9	4.8	24.9	4.8
C: Building (9.1)	41.2	3.7	41.9	3.7	41.7	3.7
D: Tree (5.6)	18.0	0.2	15.0	0.2	16.5	0.2
Is the distance less than two times the protrusion height? <sup>40</sup>	No		No		No	

Table A-20 shows the distance between each probe/inlet to the closest tree dripline. All but one of the trees meets the 10 m dripline criteria (40 CFR Part 58, Appendix E, Section 5(a)). The monitor within 10 m of Tree “A” dripline is the PM<sub>10</sub> TEOM (continuous) sampler, which is currently inoperable due to malfunction. As noted in Section 4, the District is evaluating whether to terminate the sampler. If the District repairs and continues to operate this monitor, it will evaluate its options in order to keep the monitor at least 10 m away from the dripline, such as relocating the monitor. Another option would be requesting a waiver per 40 CFR Part 58, Appendix E, Section 1(b).

The angle of flow obstruction from Tree A is 60°, leaving 300° of unrestricted airflow. The angle was estimated by overlaying a protractor on Google satellite image (figure A-49).

Otherwise, as shown in Table A-19 and A-20, criteria for flow obstruction and distance from the dripline are met per 40 CFR Part 58, Appendix E, Section 4(a) and 5(a). Therefore all active monitors at the air monitoring site demonstrate a 360 degree unrestricted air flow.

**Table A-20**  
**Sacramento-Health Dept. Stockton Blvd. Distance from Dripline**

Distance to dripline, all units in meter	1: PM <sub>10</sub> 24-hr Sampler	2: PM <sub>10</sub> Continuous Sampler	3: PM <sub>2.5</sub> 24-hr Sampler
A: Tree	11	8.7	11
B: Tree	18	16	12
C: Building	Not applicable		
D: Tree	13	14	16
Are tree driplines at least 10 m from probe and inlet? <sup>41</sup>	Yes	No <sup>42</sup>	Yes

**Figure A-49**  
**Sacramento-Health Dept. Stockton Blvd PM<sub>10</sub> Monitor Unobstructed Airflow**



<sup>40</sup> 40 CFR Part 58, Appendix E, Section 4(a).

<sup>41</sup> 40 CFR Part 58, Appendix E, Section 5(a)

<sup>42</sup> Only tree A does not meet the 10 m dripline criteria



Site	Sacramento-Health Dept.		
Start Date	1/1/1986	8/1/1994	1/1/1999
Collecting Agency	SMAQMD	SMAQMD	SMAQMD
Analytical Lab	SMAQMD	N/A	CARB
Reporting Agency	CARB	CARB	CARB
Pollutant	PM10 (Primary)	PM10	PM2.5
Parameter code	81102	85101	88101
POC	2	3	1
Instrument manufacturer and model	Sierra Anderson 1200	R & P 1400A	R & P 2025
Sampling Method	Hi Volume	Instrumental	Low volume with WINS
Method Code	063	079	118
Analysis Method	Gravimetric	Teom-Gravimetric	Gravimetric
FRM/FEM/ARM/Other	FRM	FEM	FRM
Comparable to annual PM2.5 NAAQS?	N/A	N/A	Yes
Monitoring objective	NAAQS comparison, public info	NAAQS comparison, public info	NAAQS comparison, public info
Statement of Purpose	Measures representative concentration in urban area	Measures representative concentration in urban area	Measures representative concentration in urban area
Monitor type	SLAMS	SLAMS	SLAMS
Affiliation	None	None	None
Site type	Population Exposure	Population Exposure	Population exposure
Spatial scale	Neighborhood	Neighborhood	Neighborhood
Sampling Frequency	1 in 6 days	Continuous	1 in 3 days
Sampling season	Year Round	Year Round	Year Round
Distance from supporting structure/roof top	2.0 m from rooftop	2.0 m from rooftop	2.0 m from rooftop
Distance from flow obstructions on roof	No obstructions	No obstructions	No obstructions
Distance from flow obstructions not on roof	No obstructions	No obstructions	No obstructions
Distance from tree drip line	11 m	9 m	11 m
Distance to furnace or incinerator flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors	2.3 m	2.5 m	2.3 m
Unrestricted airflow (deg)	360	300 <sup>(B)</sup>	360
Probe height (agl)	5.4 m	5.4 m	5.4 m
Probe material	Not applicable	Not applicable	Not applicable
Residence time	Not applicable	Not applicable	Not applicable
Changes in next 18 months?	Yes	Yes	Yes
Frequency of flow rate verification	Monthly	Bi-Monthly	Monthly
Last Annual Performance Evaluation	5/6/14, 10/3/14	3/8/11, 10/6/11 <sup>(A)</sup>	5/6/14, 10/3/14

<sup>(A)</sup> Malfunctioning since 2012

<sup>(B)</sup> Estimated with Google satellite imagery (4/16/2015) and protractor, see figure A-49

## A.12 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.

This middle scale SLAMS air monitoring site measures O<sub>3</sub>, NO<sub>2</sub>, PM<sub>2.5</sub> FRM, Speciated PM<sub>2.5</sub>, PM<sub>2.5</sub> BAM, PM<sub>10</sub> SSI, WD, WS, TMP, RH, and Atmospheric Pressure.

T Street is part of the CSN and STN. Met One SASS has been in service since January 2002, and the URG3000N sampler has been in operation since April 2009.

Site Name	Sacramento-1309 T Street
AQS Site No.	06-067-0010
Geographic Coordinates	38.558333°, -121.491944 (NAD27)
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 11 <sup>th</sup> 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	4/1/1989	5/15/2013
Collecting Agency	CARB	CARB
Analytical Lab	N/A	N/A
Reporting Agency	CARB	CARB
Pollutant	Ozone	Nitrogen Dioxide
Parameter code	44201	42602
POC	1	3
Instrument manufacturer and model	TAPI 400E	TAPI 200 EU/501
Sampling Method	Instrumental	Instrumental
Method Code	087	599
Analysis Method	Ultra Violet Absorption	Chemiluminescence
FRM/FEM/ARM/Other	FEM	FEM
Comparable to annual PM2.5 NAAQS?	N/A	N/A
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/roof top	3.0 m	3.0 m
Distance from flow obstructions on roof	N/A	N/A
Distance from flow obstructions not on roof	N/A	N/A
Distance from tree drip line	50 m	50 m
Distance to furnace or incinerator flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360
Probe height (agl)	11.7	11.7
Probe material	FEP Teflon	FEP Teflon
Residence time	5.4 seconds	6 seconds
Changes in next 18 months?	No	No
Frequency of one-point QC check	Daily	Daily
Last Annual Performance Evaluation	8/28/14	8/28/14

Site	Sacramento-1309 T St.				
Start Date	5/1/2013	12/1/1998	5/1/2004	5/20/2014 <sup>(A)</sup>	4/1/2007
Collecting Agency	CARB	CARB	CARB	CARB	CARB
Analytical Lab	CARB	CARB	N/A	N/A	CARB
Reporting Agency	CARB	CARB	CARB	CARB	CARB
Pollutant	PM10	PM2.5 (Primary)	PM2.5	PM2.5	PM2.5 Mass Speciated
Parameter code	81102	88101	88501	88101	88502
POC	4	1	3	3	5
Instrument manufacturer and model	Met One 4 Models	Thermo 2025i	Met One 1020 BAM	Met One 1020 BAM	Met One SASS
Sampling Method	Instrumental	Low volume w with WINS	Sharp cut cyclone	Very sharp cut cyclone	Sharp cut cyclone
Method Code	122	118	731	170	810
Analysis Method	Beta Attenuation	Gravimetric	Beta Attenuation	Beta Attenuation	Gravimetric
FRM/FEM/ARM/Other	FEM	FRM	Other	FEM	Other
Comparable to annual PM2.5 NAAQS?	N/A	Yes	No	No	No
Monitoring objective	NAAQS comparison, public info	NAAQS comparison, public info	Public info	Public info, NAAQS comparison	Research
Statement of Purpose	Measures representative concentration in urban area	Provide speciation data of urban emission			
Monitor type	SLAMS	SLAMS	SLAMS	SPM	SLAMS
Affiliation	None	None	None	None	CSN Supplemental
Site type	Population Exposure	Highest concentration, population exposure	Highest concentration, population exposure	Population Exposure	Highest concentration, population exposure
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling Frequency	Continuous	1 in 3 days	Continuous	Continuous	1 in 3 days
Sampling season	Year Round	Year Round	Year Round	Year Round	Year Round
Distance from supporting structure/roof top	2.0m	2.0m	2.0 m	2.0 m	2.0m
Distance from flow obstructions on roof	N/A	N/A	N/A	N/A	N/A
Distance from flow obstructions not on roof	N/A	N/A	N/A	N/A	N/A
Distance from tree drip line	50 m	50 m	50 m	50 m	50 m
Distance to furnace or incinerator flue	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors	Not available	Not available	Not available	Not available	Not available
Unrestricted airflow (deg)	360	360	360	360	360
Probe height (agl)	10 m	10 m	10 m	10 m	10 m
Probe material	N/A	N/A	N/A	N/A	N/A
Residence time	N/A	N/A	N/A	N/A	N/A
Changes in next 18 months?	No	Yes	Yes	Yes	No
Frequency of flow rate verification	Bi-Monthly	Monthly	Bi-monthly	Bi-monthly	Monthly
Last Annual Performance Evaluation	2/27/14	2/27/14, 8/28/14	2/27/14	N/A	N/A

<sup>(A)</sup> This monitor was removed on 6/1/2015

Site	Sacramento-1309 T St.	
Start Date	2/1/1992	2/1/1992
Collecting Agency	CARB	CARB
Analytical Lab	N/A	N/A
Reporting Agency	CARB	CARB
Pollutant	Wind Direction	Wind Speed
Parameter code	61102	61101
POC	1	1
Instrument manufacturer and model	Rm Young 3D Sonic	Rm Young 3D Sonic
Sampling Method	Instrumental	Instrumental
Method Code	066	066
Analysis Method	Ultrasonic Anemometer	Ultrasonic Anemometer
FRM/FEM/ARM/Other	Other	Other
Comparable to annual PM <sub>2.5</sub> NAAQS?	N/A	N/A
Monitoring objective	Public info	Public info
Statement of Purpose	Measures representative meteorology	Measures representative meteorology
Monitor type	SLAMS	SLAMS
Affiliation	None	None
Site type	N/A	N/A
Spatial scale	N/A	N/A
Sampling Frequency	Continuous	Continuous
Sampling season	Year Round	Year Round
Distance from supporting structure/roof top	9.0 m	9.0 m
Distance from flow obstructions on roof	N/A	N/A
Distance from flow obstructions not on roof	N/A	N/A
Distance from tree drip line	50 m	50 m
Distance to furnace or incinerator flue	No furnace/flue	No furnace/flue
Distance between collocated PM monitors	Not applicable	Not applicable
Unrestricted airflow (deg)	360	360
Probe height (agl)	15 m	15 m
Probe material	N/A	N/A
Residence time	N/A	N/A
Changes in next 18 months?	No	No
Frequency of one-point QC check	N/A	N/A
Last Annual Performance Evaluation	N/A	N/A

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## Appendix B Minimum Monitoring Requirement Assessment

**Table B-1**  
**Monitors Operated by Organizations within Sacramento MSA**

Pollutant	Required Monitors in Sacramento MSA	California Air Resources Board (CARB)	El Dorado County APCD	Placer County AQMD	Sacramento Metropolitan AQMD	Yolo-Solano AQMD	Total Monitors in Sacramento MSA	
O <sub>3</sub>	2	4	0	4	6	1	15	
CO	2	0	0	0	4	0	4	
NO <sub>2</sub>	Area Wide	1	3	0	0	5	0	8
	Near-Road	1	0	0	0	1	0	1
SO <sub>2</sub>	1	0	0	0	1	0	1	
Pb	NCore	1	0	0	0	1	0	1
	Non-Source Oriented	0	0	0	0	0	0	0
	Source Oriented	0	0	0	0	0	0	0
PM <sub>10</sub>	2-4	2	0	2	5	2	11	
PM <sub>2.5</sub>	24-hr	3	2	0	0	2	1	5
	Continuous	2	3	0	4	4	0	11
PM <sub>10-2.5</sub>	1	0	0	0	1	0	1	

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

 <b>Matthew Rodriguez</b> <i>Secretary for Environmental Protection</i>	<b>Air Resources Board</b> <b>Mary D. Nichols, Chairman</b> 1001 I Street • P.O. Box 2815 Sacramento, California 95812 • <a href="http://www.arb.ca.gov">www.arb.ca.gov</a>	 <b>Edmund G. Brown Jr.</b> <i>Governor</i>
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August 8, 2014

Ms. Brigette Tollstrup  
Sacramento Metropolitan Air Quality Management District  
777 12<sup>th</sup> 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 PM<sub>2.5</sub> 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](mailto:carissa.ganapathy@arb.ca.gov) of the Quality Management Section, or myself at (916) 324-7630 or [kenneth.stroud@arb.ca.gov](mailto: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>.

**California Environmental Protection Agency**

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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**  
**A Copy of 2015 Data Certification Letter, Page 1**

 <b>Matthew Rodriguez</b> Secretary for Environmental Protection	<b>Air Resources Board</b> <hr style="width: 100%;"/> <b>Mary D. Nichols, Chairman</b> 1001 I Street • P.O. Box 2815 Sacramento, California 95812 • <a href="http://www.arb.ca.gov">www.arb.ca.gov</a>	 <b>Edmund G. Brown Jr.</b> Governor
<p>May 8, 2015</p> <p>Ms. Deborah Jordan, Director          Air Division, Region 9          Mail Code: AIR-1          U.S. Environmental Protection Agency          75 Hawthorne Street          San Francisco, California 94105</p> <p>Dear Ms. Jordan:</p> <p>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.</p> <p>In accordance with Title 40, Part 58.15 of the Code of Federal Regulations, this letter certifies the 2014 ambient data, except for a few instances that are identified in Attachment A. The data that are being certified have been reviewed and are accurate to the best of my knowledge, taking into consideration the quality assurance findings. In addition, this letter also certifies previously certified data that has subsequently been modified. Along with this letter, I am submitting the following attachments:</p> <ul style="list-style-type: none"> <li>• Attachment A      Summary of 2014 data not certified</li> <li>• Attachment B      Copies of letters supporting data certification</li> <li>• Attachment C      AMP600 Report</li> <li>• Attachment D      AMP450NC Report</li> </ul>		
<p><small>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: <a href="http://www.arb.ca.gov">http://www.arb.ca.gov</a>.</small></p> <p><b>California Environmental Protection Agency</b></p> <hr style="width: 50%; margin: auto;"/> <p><small>Printed on Recycled Paper</small></p>		

**Figure C-2**  
**A Copy of 2015 Data Certification Letter, Page 2**

Ms. Deborah Jordan  
May 8, 2015  
Page 2

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

Sincerely,



Ravi Ramalingam, Chief  
Consumer Products and Air Quality Assessment Branch

Enclosures (4)

cc: via email:

Wendy Caruso, North Coast United Air Pollution Control District  
(wcaruso@ncuaqmd.org)

Yushuo Chang, Ph.D., Placer County Air Pollution Control District  
(YChang@placer.ca.gov)

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

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

Janice Lam, Sacramento Metropolitan Air Quality Management District  
(JLam@airquality.org)

Warren Massey, Mendocino County Air Pollution Control District  
(massiew@co.mendocino.ca.us)

Continued next page.

**Figure C-3**  
**Copy of 2015 Data Certification Letter, Page 3<sup>43</sup>**

Ms. Deborah Jordan  
May 8, 2015  
Page 3

cc: (continued)

Eric Olsen, Siskiyou County Air Pollution Control District  
(eolson@co.siskiyou.ca.us)

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

Craig Tallman, Northern Sonoma County Air Pollution Control District  
(Craig.Tallman@sonoma-county.org)

Joe Trona, Tehama County Air Pollution Control District  
(jtona@tehcoapcd.net)

Joseph Fish, Northern Sierra Air Quality Management District  
(joe@myairdistrict.com)

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

Fletcher Clover, U.S. EPA Region 9  
(Clover.Fletcher@epa.gov)

Ranjit Bhullar, Manager  
Monitoring and Laboratory Division

Gayle Sweigert, Manager  
Air Quality Planning and Science Division

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<sup>43</sup> The enclosure to this letter is not reproduced in this annual network plan. Please contact CARB for a copy of this letter in entirety.

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## Appendix D Comparison of number of PM<sub>2.5</sub> Monitors by area and population

The Sacramento MSA has a total of 16 PM<sub>2.5</sub> monitors: 5 FRM, 9 BAM, and 2 SASS monitor. 8 of the 16 PM<sub>2.5</sub> monitors are located in areas of high population density to monitor for population exposure. These monitors include those outside of SMAQMD's operation. All monitors in Sacramento MSA are a part of CARB's PQAO.

**Table D-1**  
**Sacramento MSA PM<sub>2.5</sub> Monitors by Operating/Collection Organization**

Operating/Collection Agency	FRM	BAM	SASS
CARB	2	3	1
El Dorado APCD	0	0	0
Placer County APCD	0	4	0
Sacramento Metropolitan AQMD	2	4	1
Yolo Solano AQMD	1	0	0

To illustrate how the Sacramento MSA compares to other air districts in terms of monitoring PM<sub>2.5</sub>, a comparison of the number of PM<sub>2.5</sub> monitors by geographic area and population in several air districts in California is shown in the table below.

**Table D-2**  
**Comparison of Number of PM<sub>2.5</sub> Monitors**

District	Square Miles	Population (millions)	Number of PM <sub>2.5</sub> Monitors	PM <sub>2.5</sub> Monitors per person	PM <sub>2.5</sub> Monitors per square mile
Bay Area	5,340	6.8	20	1 per 340,000	1 per 267
Sacramento MSA	5,309	2.1	16	1 per 131,350	1 per 332
South Coast	15,000	16.5	33	1 per 500,000	1 per 455
San Joaquin Valley	25,000	3.9	26	1 per 150,000	1 per 962

The numbers of PM<sub>2.5</sub> monitors per person show that the Sacramento MSA has a higher than average number of monitors per person. The numbers of PM<sub>2.5</sub> monitors per square mile show that the Sacramento MSA has a higher than average number of monitors per square mile.

However, caution should be used when doing these types of comparisons, as these four Districts have different ratios of urbanized area vs. rural areas and rural vs. urban population, etc. For example, Bay Area has a similar size (number of square miles) compared to the Sacramento MSA, but Bay Area has a higher population density per square mile, in the urbanized areas. San Joaquin Valley has a highest amount of area,

more rural population, and lowest population density per square mile. In addition, San Joaquin Valley has the typical  $PM_{2.5}$  sources of motor vehicles and residential wood combustion, but it also has agricultural sources of  $PM_{2.5}$ . Thus, the size of a monitoring network is largely determined by the number of monitors needed to satisfy the local/regional monitoring needs, depending upon the unique features and needs of that District.

## Appendix E Copy of Approval Letter to Select Bercut Dr. Site for Establishing a Near-Road NO<sub>2</sub> Monitor

### Figure E-1 Near-road Monitoring Station Approval Letter, Page 1



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX

75 Hawthorne Street  
San Francisco, CA 94105-3901  
DEC 11 2013

Mr. Larry Greene  
Air Pollution Control Officer  
Sacramento Metropolitan Air Quality Management District  
777 12<sup>th</sup> Street  
Sacramento, California 95814

Dear Mr. Greene:

Thank you for your submission of the Sacramento Metropolitan Air Quality Management District (SMAQMD) 2013 Annual Monitoring Network Plan in July 2013. We have reviewed the submitted document based on the requirements set forth under 40 CFR 58. Based on the information provided in the plan, EPA approves all portions of the network plan except those specifically identified below. With this plan approval, we also formally approve the following system modification: selection of the Bercut Dr. site to meet the requirement for establishing a single near-road NO<sub>2</sub> monitor in the Sacramento-Roseville-Arden-Arcade, CA Core Based Statistical Area (CBSA).

Please note that we cannot approve portions of the annual network plan for which the information in the plan is insufficient to judge whether the requirement has been met, or for which the information, as described, does not meet the requirements as specified in 40 CFR 58.10 and the associated appendices. EPA Region 9 also cannot approve portions of the plan for which the EPA Administrator has not delegated approval authority to the regional offices. Accordingly, the first enclosure (*A. Annual Monitoring Network Plan Items where EPA is Not Taking Action*) provides a listing of specific items of your agency's annual monitoring network plan where EPA is not taking action. The second enclosure (*B. Additional Items Requiring Attention*) is a listing of additional items in the plan that EPA wishes to bring to your agency's attention.

The third enclosure (*C. Annual Monitoring Network Plan Checklist*) is the checklist EPA used to review your plan for overall items that are required to be included in the annual network plan along with our assessment of whether the plan submitted by your agency addresses those requirements. The fourth enclosure (*D. Region 9 Near-road NO<sub>2</sub> Plan Review Checklist*) is the checklist EPA used to review those elements of your annual monitoring network plan that deal specifically with near-road NO<sub>2</sub> monitoring. Please see specific comments within this checklist for recommendations for next year's plan for your NO<sub>2</sub> near-road site.

The first two enclosures highlight a subset of the more extensive list of items reviewed in the third and fourth enclosures. All comments conveyed via this letter (and enclosures) should be addressed (through corrections within the plan, additional information being included, or

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**Figure E-2**  
**Near-road Monitoring Station Approval Letter, Page 2**

discussion) in next year's annual monitoring network plan. If you have any questions regarding this letter or the enclosed comments, please feel free to contact me at (415) 947-4534 or Elfego Felix at (415) 947-4141.

Sincerely,



Meredith Kurpius, Manager  
Air Quality Analysis Office

Enclosures:

- A. Annual Monitoring Network Plan Items where EPA is Not Taking Action
- B. Additional Items Requiring Attention
- C. Annual Monitoring Network Plan Checklist
- D. Region 9 Near-road NO<sub>2</sub> Plan Review Checklist

cc: Brigette Tollstrup, SMAQMD  
Janice Lam, SMAQMD  
Gayle Sweigert, California Air Resources Board

**Appendix F      Copy of Approval Letter to Close Sacramento-El Camino/Watt (AIRS Site #06-067-0007)**

**Figure F-1  
Sacramento-El Camino/Watt Termination Approval Letter**



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

September 9, 2011

Brigette Tollstrup, Manager  
Program Coordinator Division  
Sacramento Metropolitan Air Quality Management District  
777 12th Street, 3rd Floor  
Sacramento, CA 95814-1908

Dear Ms. Tollstrup,

We have reviewed your April 12, 2011 request to close the carbon monoxide (CO) micro-scale monitoring site at Sacramento-El Camino/Watt (AIRS Site No. 06-067-0007).

The CO monitor at El Camino/Watt has been operating since 1980. From 2000 to 2009 the CO monitor's highest eight-hour mean was 6.25 ppm (69% of the standard). A statistical analysis shows that there is a probability of less than 10 percent of exceeding 80 percent of the 9 ppm CO National Ambient Air Quality Standard (NAAQS) during the next three years. The CO monitor is not specifically required by an attainment or maintenance plan, and is not required in order for Sacramento Metropolitan Air Quality Management District (SMAQMD) to meet 40 CFR 58 Appendix D. Therefore, the site closure meets the criteria set forth in 40 CFR 58.14(c)(1) for monitor discontinuation at a state and local air monitoring station (SLAMS).

EPA approves termination of CO monitoring at Sacramento-El Camino/Watt. Please include these modifications in your next annual network plan. If you have any questions, please contact me at (415) 972-3851 or Katherine Hoag (Hoag.Katherine@epa.gov) at (415) 972-3970.

Sincerely,

/s/

Matthew Lakin  
Manager, Air Quality Analysis Office

cc: John Ching, Sacramento Metropolitan AQMD  
Aleta Kennard, Sacramento Metropolitan AQMD  
Karen Magliano, California ARB  
Ken Stroud, California ARB  
Mike Miguel, California ARB