

**SACRAMENTO METROPLITAN
AIR QUALITY MANAGEMENT DISTRICT**

**2012
ANNUAL MONITORING
NETWORK PLAN**

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LIST OF ABBREVIATIONS AND ACRONYMS

AADT	Annual average daily traffic
ADT	Average daily traffic
AGL	Above ground level
AIR	Sacramento-Airport Road Air Monitoring Site
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
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-Goldenland Court Air Monitoring Site
HC	Highest Concentration
IM	Source Impact

M	Meters
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
NH	North Highlands-Blackfoot Air Monitoring Site
NMHC	Non-Methane Hydrocarbon
NO₂	Nitrogen Dioxide
NO_x	Oxides of Nitrogen
NO_y	Reactive Oxides of Nitrogen
NPAP	National Performance Audit Program (Criteria pollutant monitors)
NPEP	National Performance Evaluation Program (PM _{2.5} FRM)
NS	Neighborhood Scale
O₃	Ozone
PAMS	Photochemical Assessment Monitoring Sites
Pb	Lead
PEP	Performance Evaluation Program (PM _{2.5} FRM)
PM	Particulate Matter
PM_{2.5}	Particulate Matter 2.5 micron
PM₁₀	Particulate Matter 10 micron
PM-Coarse	Particulate Matter > 2.5 micron and < 10 micron (PM _{10-2.5})
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	PM2.5 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
SO₂	Sulfur Dioxide
SO₄	Sulfate
SPM	Special Purpose Monitoring
SRD	Solar Radiation
SSI	Size Selective Inlet (PM10 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

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, starting July 1, 2007. 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. This report covers the period: January 1, 2011- December 31, 2011.

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. Though not required by 40 CFR Part 58, the 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.

2. OVERVIEW OF NETWORK OPERATIONS

The County of Sacramento is located in the middle of California's Central Valley, at the southern end of the Sacramento Valley. Sacramento County has a population of 1.4 million¹. Sacramento County is the most populated part of the Sacramento--Arden Arcade--Roseville, California Metropolitan Statistical area (MSA) which includes the western sections of Placer and El Dorado County, Yolo County, and parts of Solano and Sutter Counties. The Sacramento MSA is the 24th largest MSA in the USA by population, with 2.2 million people¹. The Sacramento MSA is a non-attainment area for the Federal 8 hr averaged O₃ standard and is referred to as the Sacramento Federal Nonattainment Area (SFNA). This network plan focuses on the monitors that are operated within Sacramento County. For details on the monitors operated in the other

¹ 2010 U.S. Census

counties within the SFNA, please refer to the Annual Monitoring Network Report for Small Districts in California dated June 2011 prepared by CARB (<http://www.arb.ca.gov/aqd/amnr/smnetrpt11.pdf>).

Sacramento County is a nonattainment area for the Federal O₃ and PM_{2.5} standards. Sacramento County is in attainment for the Federal CO, NO₂, and SO₂ standards. It has attained the Federal PM₁₀ standard and has requested resignation to attainment status. Sacramento County is a non-attainment area for the California O₃, PM₁₀, and PM_{2.5} health standards. The California Air Resources Board recommended that EPA designate Sacramento County as unclassified for the 2008 Federal Pb standard.

The primary focus of the current ambient air monitoring network is the collection of O₃ and photochemical pollutant precursors such as NO_x and VOC, and PM_{2.5} data to support SIP development, attainment/non-attainment decisions, public notification, and data for air quality modeling efforts. Sacramento is one of 24 areas in the nation that are required to operate PAMS. Sacramento is one of the 54 areas in the US, with a PM_{2.5} CSN trend site. The map below identifies the locations of current air monitoring stations within Sacramento County, whether they are a SLAMS site or not. Figure 2-1 shows the approximate location of each monitoring station in Sacramento County. Table 2-1 gives detailed information of each station, including location, AQS ID, pollutants monitored and designates whether it is a SLAMS site.

**Table 2-1
List of monitoring sites in Sacramento County**

Site Name	Purpose	AQS ID	Pollutants/Parameters Monitored
Sacramento-Branch Center Rd #2	SLAMS	06-067-0284	PM ₁₀ -SSI
Elk Grove-Bruceville Road	SLAMS/ PAMS	06-067-0011	O ₃ , NO ₂ , Total NMHC, Speciated VOC, PM _{2.5} BAM, Ambient Temp., Wind Dir., Wind Speed, Relative Humidity, Barometric Pressure, Precipitation, Ultraviolet Rad., Solar Rad., Upper Level Meteorology (Wind Dir., Wind Speed, Virtual Temp.)
Sacramento-Del Paso Manor	SLAMS/ PAMS/ CSN/ NCORE/ SPM	06-067-0006	O ₃ , CO (trace level), NO ₂ , NO _y , SO ₂ (trace level), Total NMHC, Speciated VOC, Carbonyl, PM _{2.5} BAM, PM _{2.5} FRM (main & collocated), PM ₁₀ SSI (main & collocated), Speciated PM _{2.5} (SASS, URG 3000N), Black Carbon, Scattering Coeff., Ambient Temp., Wind Dir., Wind Speed, Relative Humidity, Solar Rad.
Sacramento-El Camino/Watt	SLAMS	06-067-0007	CO
Folsom-Natoma Street	SLAMS/ PAMS	06-067-0012	O ₃ , NO ₂ , Total NMHC, Speciated VOC, PM _{2.5} BAM, Ambient Temp., Wind Dir., Wind Speed, Relative Humidity, Solar Rad.
Sacramento-Goldenland	SLAMS/ PAMS	06-067-0014	O ₃ , CO, NO ₂ , Total NMHC, PM ₁₀ TEOM, PM ₁₀ SSI, Ambient Temp, Wind Dir., Wind Speed, Relative Humidity, Solar Rad.
North Highlands-Blackfoot Way	SLAMS/ SPM	06-067-0002	O ₃ , CO, NO ₂ , PM ₁₀ SSI
Sacramento Health Dept-Stockton Blvd.	SLAMS	06-067-4001	PM _{2.5} FRM, PM ₁₀ TEOM, PM ₁₀ SSI
Sloughhouse	SPM	06-067-5003	O ₃ , Wind Dir., Wind Speed, PM _{2.5} E-BAM (winter PM _{2.5} SPM study)

Table 2-1 (cont.)

Site Name	Purpose	AQS ID	Pollutants/Parameters Monitored
Sacramento-1309 T Street	SLAMS	06-067-0010	O ₃ , NO ₂ , PM ₁₀ SSI, PM _{2.5} BAM, PM _{2.5} FRM, Speciated PM _{2.5} (SASS, URG 300N), Ambient Temp., Wind Dir., Wind Speed, Relative Humidity, Barometric Pressure
Walnut Grove Tower	Upper Air Research	N/A	Upper level ozone and met (Wind Dir., Wind Speed, and Ambient Temp.)
Rancho Seco	SPM	N/A	PM _{2.5} -E-BAM (winter PM _{2.5} SPM study)

2.1 MONITORING OBJECTIVES AND SPATIAL SCALES

The basic three monitoring objectives are to: 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.

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 2-2 shows the different types of site and the appropriate spatial scale. Table 2-3 shows each of the monitoring sites in Sacramento County and its criteria pollutant monitoring objectives and spatial scales. The categories of spatial scale are:

- **Microscale** – An area of uniform pollutant concentration ranging from several meters up to 100 meters
- **Middle Scale** – Uniform pollutant concentrations in an area of about 100 meters to 0.5 kilometers
- **Neighborhood Scale** – An area with dimensions in the 0.5 to 4.0 kilometer range
- **Urban Scale** – Citywide pollutant conditions with dimensions ranging from 4 to 50 kilometers
- **Regional Scale** – A large area, usually rural, of the same general geography and without large sources that extends from tens to hundreds of kilometers

**Table 2-2
Site Type and Associated Spatial Scale**

Site Type	Appropriate Spatial Scale
Highest Concentration	Micro, Middle, Neighborhood
Population Exposure	Neighborhood, Urban
Source Impact	Micro, Middle, Neighborhood
General/background levels	Urban, Regional
Regional transport	Urban, Regional
Welfare-Related	Urban, Regional

**Table 2-3
Sacramento County Air Monitoring Station Site Types**

<u>Site Type</u>				<u>Spatial Scale</u>			
HC – High concentration				MI – Microscale			
RC - Representative Concentration				MS – Middle scale			
IM – Source Impact				NS – Neighborhood scale			
BL – General/Background				US – Urban scale			
WF – Welfare-based							
Site Name	O3	CO	NO2	SO2	VOC	PM2.5	PM10
Sacramento-Branch Center Rd #2							RC/NS
Elk Grove-Bruceville Rd	RC/NS		RC/NS		BL/NS	BL/NS	
Sacramento-Del Paso Manor	HC/NS	RC/NS	RC/NS	HC/NS	HC/NS	HC/NS	RC/NS
Sacramento-El Camino Watt		HC/MI					
Folsom – 50 Natoma	HC/NS		HC/NS		RC/NS	RC/NS	
Sacramento-Goldenland Ct.	RC/NS	RC/NS	HC/NS		HC/NS		RC/NS
North Highlands-Blackfoot Way	RC/NS	RC/NS	RC/NS				RC/NS
Sacramento Health Dept – Stockton Blvd.						RC/NS	RC/NS
Sloughouse	RC/NS						
Sacramento-1309 T Street	RC/US		RC/MS			RC/NS	HC/NS

3. MINIMUM MONITORING REQUIREMENTS

Sacramento County is within the Sacramento-Arden Arcade-Roseville MSA as discussed in Section 2. The minimum number of monitors for each pollutant is based on the MSA population as described in 40 CFR 58 Appendix D. For current National Ambient Air Quality Standards, please refer to the NAAQS Table (<http://epa.gov/air/criteria.html>).

Details of the minimum monitoring requirements of all criteria pollutants are provided in tables 3-1, 3-2, and 3-3. Minimum monitoring requirement is based on the population of Sacramento-Arden Arcade-Roseville MSA, which is 2.2 million according to 2010 U.S. Census. Sacramento-Arden Arcade-Roseville MSA is composed of El Dorado, Placer, Sacramento, and Yolo Counties.

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

Pollutant & Type	2009-2011 Design Value	Design Value Site	# of Required Monitors	# of Active Monitors(# within Sacramento County)	Add't Monitors Needed	Met Minimum Monitoring Requirements?	
O ₃ 8-hr	0.095 ppm	Folsom-Natoma St, 06-067-0012	2	15 (7)	0	Yes	
PM _{2.5}	SLAMS Annual	10.0µg/cu.m	3 FRM,	5 (3) FRM	0	Yes	
	SLAMS Daily	35µg/cu.m					Sacramento-Del Paso Manor, 06-067-0006
	Continuous Annual	N/A ^a	N/A ^a	2 BAM	9 (4) BAM	0	Yes
	Continuous Daily	N/A ^a	N/A ^a				

^a Current PM_{2.5} BAM monitors are not FEM, thus not comparable to NAAQS as per Appendix N to 40 CFR Part 50

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

Pollutant & Type	2011 Max Conc.	Max Conc. Site	# of Required Monitors	# of Active Monitors(# within Sacramento County)	Add't Monitors Needed	Met Minimum Monitoring Requirements?
PM ₁₀	69 µg/cu.m	Sacramento-Branch Center #2, 06-0667-0284	2-4	10 (6) SSI	0	Yes

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

Pollutant & Type	# of Required Monitors	# of Active Monitors (# within Sacramento County)	Add't Monitors Needed	Additional Information	Met Minimum Monitoring Requirements?	
NO ₂	Area-wide	2 ^a	8 (6)	0	Maximum AADT: 246,000	Yes
	Near-road	1	0 (0)	1 ^b		
SO ₂		1 ^c	1 (1)	0	876 Tons SO ₂ /Year; PWEI 1927 million persons-tons per year	Yes
CO		2 ^d	0	1 ^e		Yes
Pb		1 ^f	1 (1)	0	NCore Site: Sacramento-Del Paso Manor, 06-067-0006	Yes

^a Two monitors needed per PAMS requirement, one of which also serves as the required area-wide NO₂ monitor

^b Near-road NO₂ monitor is required to be operational by January 1, 2013, per 40 CFR 58.13(c)

^c Trace level monitor required at the NCore site

^d One trace level monitor required at the NCore site, which also satisfies the requirement to have one CO monitor as per the CO Maintenance Plan; the second monitor is a required near-road monitor per as Appendix D to 40 CFR Part 58

^e Near-road CO monitor is required to be operational by January 1, 2017, per 40 CFR 58.13(e)(2)

^f Required at the NCore site, source oriented lead monitor is not required in this MSA since there is no point source that emits more than 0.5 tpy or airport that emits more than 1.0 tpy based on the National Emission Inventory (<http://www.epa.gov/ttnchie1/trends/>).

4. RECENT AND PROPOSED MODIFICATIONS TO THE NETWORK

Sacramento-Bercut Dr. (Proposed Site)

Contingent on approval from the EPA, Bercut Dr. is tentatively selected as the near-road NO₂ site required by the new NO₂ monitoring requirement. Appendix C to this network plan discusses site selection criteria and the rationale for locating the near-road NO₂ station at this location.

As per Appendix D to 40 CFR Part 58, this station will monitor the required pollutants – NO₂ and CO – as well as optional pollutants and meteorological parameters – black carbon, wind direction, wind speed, temperature, and relative humidity. This air monitoring station was required to be installed and operational by January 1, 2013. However, EPA advised that they plan to revise 40 CFR 58 to extend the deadline January 1, 2014, for CBSA with population greater than 1 million, during the 2012 Air Quality Conference.

Elk Grove-Bruceville Rd.

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

Sacramento-Del Paso Manor

In March 2012, the District was added to EPA's national lead analysis contract. Thus, lead sampling began in April 2012 using with a PM₁₀ low volume sampler. As per 40 CFR 58, Appendix C, Section 2.10.2, the District will install and operate a Pb-TSP sampler at Sacramento-Del Paso Manor within six months, if the maximum Pb-PM₁₀ three-month arithmetic mean concentration is greater than or equal to 0.10 ug/m³. The District also may cease operation of the Pb-PM₁₀ sampler when the Pb-TSP sampler becomes operational.

The District plans to replace the existing non-FEM PM_{2.5} BAM monitor with an FEM by November 1, 2012. This FEM monitor will operate continuously and thus satisfy the sampling requirement in 40 CFR 58.12(d). The non-FEM monitor will be relocated to Sloughhouse.

The District is evaluating to shut down the Nephelometer. It is a PM related instrument installed in 1999 for California Regional Particulate Air Quality Study. After the study ended, the monitor was not removed and became a special purpose monitor in 2001.

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 termination process was postponed, as the street/sidewalk project was delayed until April 2013. This site will be terminated in early 2013 when the project proceeds.

Sacramento-Goldenland Ct

The District is evaluating to terminate this site. Sacramento-Goldenland 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 number of monitors within this CBSA to satisfy the monitoring requirement in Appendix D to 40 CFR Part 58.

North Highlands-Blackfoot Way

The District is considering to reorganize this site. North Highland-Blackfoot Way was originally sited to support a proposed power plant project at McClellan AFB, which was canceled during the early 1980s. The District is considering to request approval for termination of PM₁₀ SSI sampler. Also, the district is evaluating to adapt a seasonal sampling schedule for O₃ and CO. Staff resource used to support this air monitoring site would reassigned to support the new NO₂ near roadway monitoring sites.

Sacramento Health Dept.-Stockton Blvd.

The District will submit a request for termination of the PM₁₀ TEOM and PM_{2.5} FRM at this site. The PM₁₀ SSI is not necessary, as the remaining number of SSI samplers is more than the required number of SSI samplers, etc. The TEOM data is not usable for forecasting or analysis due to negative bias during the winter time when there is wood combustion. The PM_{2.5} FRM is redundant, as it collects the same PM_{2.5} data as the nearby T St site.

Sloughhouse

A non-FEM PM_{2.5} BAM monitor will be relocated from Sacramento-Del Paso manor in November 2012. It will replace the existing PM_{2.5} E-BAM (SPM).

5. PM COLLOCATION REQUIREMENT

Quality Assurance Requirements for SLAMS found in Appendix A to 40 CFR Part 58 requires collocation for PM₁₀, PM_{2.5} FRM and FEM, and PM_{10-2.5} 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 a small air quality management district and does not maintain a PQAO. Collocated monitors operated by SMAQMD are part of the CARB PQAO. Currently, PM_{2.5} FRM and PM₁₀ FRM monitors at Sacramento-Del Paso Manor are collocated. For complete details on PM collocation, please refer to the Section 6, Required Quality Assurance of the Monitoring Program, in the Annual Monitoring Network Report for Small Districts in California dated June 2011 prepared by CARB (<http://www.arb.ca.gov/aqd/amnr/smnetrpt11.pdf>).

6. PROCESS TO REVIEW CHANGES TO PM_{2.5} 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_{2.5} monitoring network that impact the location of a violating PM_{2.5} 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_{2.5} NAAQS as set forth in Appendix N to Part 58 in 40 CFR 58. 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_{2.5} monitors by area and population has been included. The analysis can be found in Appendix A.

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.

7. DATA SUBMISSION REQUIREMENTS

- 2011 Precision/Accuracy reports submitted to AQS: Spring 2012
- 2011 Annual data certification submitted: May 2012 (by CARB)

8. REVIEW OF EXISTING SMAQMD/CARB AIR MONITORING SITES

For each monitor at each monitoring site, the tables in Appendix B were used 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.

(For site photos, site surveys, and site location maps, please refer to California Air Resources Board Website at <http://www.arb.ca.gov/qaweb/site.php>)

9. BIBLIOGRAPHY

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CRPAQS Initial Data Analysis of Field Program Measurements (Draft Final Report), Desert Research Institute, Reno, NV, July 29, 2005

Federal Register, 40 CFR Parts 53 and 58, October 17, 2006

Near-Road NO₂ Monitoring Technical Assistance Document, Draft, U.S. Environmental Protection Agency/OAQPS, December 21, 2011

SI 473 Course, Introduction to Environmental Statistics, Air Pollution Training Institute, US Environmental Protection Agency.

SMAQMD Air Monitoring Network Review, Sacramento Metropolitan AQMD/Program Coordination Division, August 15, 2005

State and Local Air Monitoring Network Plan, California Air Resources Board/Planning and Technical Support Division, Sacramento, CA, June 2008.

APPENDIX A - COMPARISON OF NUMBER OF PM_{2.5} MONITORS BY AREA AND POPULATION

The Sacramento MSA has a total of 16 PM_{2.5} monitors: 5 FRM, 9 BAM, and 2 SASS monitor. 8 of the 16 PM_{2.5} monitors are located in areas of high population density to monitor for population exposure.

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

**Table A-1
Comparison of Number of PM_{2.5} Monitors in Several Air Basins**

District	Square Miles	Population (millions)	Number of PM _{2.5} Monitors	PM _{2.5} Monitors per person	PM _{2.5} 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_{2.5} monitors per person show that the Sacramento MSA has a higher than average number of monitors per person. The numbers of PM_{2.5} 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 B - CURRENT DETAILED SITE INFORMATION

B.1 SACRAMENTO-BRANCH CENTER #2

Sacramento-Branch Center #2 is a PM₁₀ 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 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	40 m
Average Daily Traffic	26,274 (Bradshaw Road) Vehicles/Day (SACDOT, 2010)
Ground Cover	Paved
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

Particulate Samplers:

Site	Sacramento-Branch Center
Start Date	4/1/06
Collecting Agency	SMAQMD
Analytical Lab	SMAQMD
Reporting Agency	CARB
Pollutant	PM ₁₀
Parameter code	81102
POC	1
Instrument manufacturer and model	Sierra Anderson 1200
Sampling method	Hi-Volume/Size Selective Inlet
Sampling method code	063
FRM/FEM/ARM/Other	FRM
Suitable for comparison against annual PM _{2.5}	N/A
Monitoring objective	NAAQS Comparison
Monitor type	SLAMS
Site type	Highest concentration
Spatial scale	Neighborhood
Current sampling frequency	1:6
Sampling season	Year Round
Distance from supporting structure (m)	1.7
Distance from obstructions on roof (m)	N/A
Distance from obstructions not on roof (m)	N/A
Distance from trees (m)	30
Distance to furnace or incinerator flue (m)	N/A
Distance between collocated monitors	N/A
Unrestricted airflow >= 270 deg arc	Yes
Probe height (m, agl)	6.2
Probe material	N/A
Residence time	N/A
Any changes in the next 18 months?	No
Frequency of flow rate verification for PM monitors	Monthly
Last two semi-annual flow rate audits for PM monitors	3/8/11 10/6/11

B.2 ELK GROVE-BRUCEVILLE

Sited in a rural area 4 miles south of Elk Grove, CA, Bruceville air monitoring site was initiated in 1992. It replaced the former Sacramento-Meadowview Road O₃ monitoring site.

This site is the upwind O₃ and ozone precursor monitoring site for our network. It is also a PAMS Type I site. It measures O₃, NO₂, total NMHC, speciated VOC (episodic only), PM_{2.5} 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
Average Daily Traffic	1,407 Vehicles/Day (SACDOT, 2011)
Ground Cover	Vegetated
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

Gaseous Monitors:

Site	Elk Grove-Bruceville			
Start Date	7/1/92	7/1/92	7/1/96	7/1/96
Collecting Agency	SMAQMD	SMAQMD	SMAQMD	SMAQMD
Analytical Lab	N/A	N/A	N/A	VCAPCD
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 400	TEI 42I	TEI 55C	Xontech 910A/912
Sampling method	UV Absorption	Chemiluminescence	GC	Summa Canister
Sampling method code	087	074	164	123
FRM/FEM/ARM/Other	FEM	FRM	Other	Other
Suitable for comparison against annual PM _{2.5}	N/A			
Monitoring objective	Public info			
Monitor type	Unofficial PAMS (Type 1)			
Site type	Upwind/Background			
Spatial scale	Neighborhood			
Current sampling frequency	Continuous	Continuous	Continuous	1:3
Sampling season	Year Round	Year Round	Year Round	July-September
Distance from supporting structure (m)	1.3	1.3	1.3	2
Distance from obstructions on roof (m)	N/A	N/A	N/A	N/A
Distance from obstructions not on roof (m)	N/A	N/A	N/A	N/A
Distance from trees (m)	20	20	20	20
Distance to furnace or incinerator flue (m)	N/A	N/A	N/A	N/A
Distance between collocated monitors	N/A	N/A	N/A	N/A
Unrestricted airflow >= 270 deg arc	Yes	Yes	Yes	Yes
Probe height (m, agl)	4.4	4.4	4.4	5.1
Probe material	FEP Teflon	FEP Teflon	FEP Teflon	Stainless Steel
Residence time	11	13	16	2
Any changes in the next 18 months?	No	No	No	Yes
Frequency of one-point QC check	Every other day	Every other day	Every other day	Every other day
Last Annual Performance Evaluation	10/17/11	10/17/11	1/25/12	N/A

Particulate Matter Monitor:

Site	Elk Grove-Bruceville
Start Date	12/1/00
Collecting Agency	SMAQMD
Analytical Lab	N/A
Reporting Agency	CARB
Pollutant	PM _{2.5}
Parameter code	88501
POC	3
Instrument manufacturer and model	Met One 1020 BAM
Sampling method	Low Volume/VSCC
Sampling method code	731
FRM/FEM/ARM/Other	Pre-FEM
Suitable for comparison against annual PM _{2.5}	No
Monitoring objective	Public info
Monitor type	SPM
Site type	General/Background
Spatial scale	Neighborhood
Current sampling frequency	Continuous
Sampling season	Year Round
Distance from supporting structure (m)	15
Distance from obstructions on roof (m)	N/A
Distance from obstructions not on roof (m)	N/A
Distance from trees (m)	20
Distance to furnace or incinerator flue (m)	N/A
Distance between collocated monitors	N/A
Unrestricted airflow >= 270 deg arc	Yes
Probe height (m, agl)	4.3
Probe material	N/A
Residence time	N/A
Any changes in the next 18 months?	No
Frequency of flow rate verification for PM monitors	Bi-monthly
Last two semi-annual flow rate audits for PM monitors	4/14/11 10/17/11

Meteorology:

Site	Elk Grove-Bruceville			
Start Date	8/1/96	8/1/96	7/1/97	8/1/97
Collecting Agency	SMAQMD			
Analytical Lab	N/A			
Reporting Agency	CARB			
Pollutant	Ambient 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	Thermistor	Hygroscopic Plastic Film	Barometric sensor	Tipping Bucket
Sampling method code	042	012	011	011
FRM/FEM/ARM/Other	Other	Other	Other	Other
Suitable for comparison against annual PM _{2.5}	N/A			
Monitoring objective	Public info			
Monitor type	Unofficial PAMS (Type 1)			
Site type	N/A			
Spatial scale	N/A			
Current sampling frequency	Continuous			
Sampling season	Year Round			
Distance from supporting structure (m)	N/A	N/A	N/A	N/A
Distance from obstructions on roof (m)	N/A	N/A	N/A	N/A
Distance from obstructions not on roof (m)	N/A	N/A	N/A	N/A
Distance from trees (m)	20	20	20	20
Distance to furnace or incinerator flue (m)	N/A	N/A	N/A	N/A
Distance between collocated monitors	N/A	N/A	N/A	N/A
Unrestricted airflow >= 270 deg arc	Yes	Yes	Yes	Yes
Probe height (m, agl)	10	10	2	3
Probe material	N/A	N/A	N/A	N/A
Residence time	N/A	N/A	N/A	N/A
Any changes in the next 18 months?	No	No	No	No
Frequency of one-point QC check	N/A	N/A	N/A	N/A
Last Annual Performance Evaluation	10/17/11	N/A	10/17/11	N/A

Site	Elk Grove-Bruceville				
Start Date	8/1/96	8/1/97	8/1/96	8/1/96	6/1/96
Collecting Agency	SMAQMD				SMAQMD
Analytical Lab	N/A				N/A
Reporting Agency	CARB				Not reported to AQS
Pollutant	Solar Radiation	UV Radiation	Wind Direction	Wind Speed	Upper Level Wind Direction/Speed and Virtual Temp
Parameter code	63301	63302	61104	61103	N/A
POC	1	1	1	1	N/A
Instrument manufacturer and model	Climatronics 100848	Climatronics 100TUVR	Climatronics F460 WD Sensor	Climatronics F-460 WS Sensor	Radian LAP-3000 with RASS option
Sampling method	Pyranometer	Pyranometer	Wind Vane	Anemometer	915 MHz Radar Wind Profiler, with RASS
Sampling method code	011	011	020	020	N/A
FRM/FEM/ARM/Other	Other	Other	Other	Other	Other
Suitable for comparison against annual PM _{2.5}	N/A				N/A
Monitoring objective	Public info				Public info
Monitor type	Unofficial PAMS (Type 1)				PAMS (Type 1)
Site type	N/A				N/A
Spatial scale	N/A				N/A
Current sampling frequency	Continuous				Continuous
Sampling season	Year Round				Year Round
Distance from supporting structure (m)	N/A	N/A	N/A	N/A	N/A
Distance from obstructions on roof (m)	N/A	N/A	N/A	N/A	N/A
Distance from obstructions not on roof (m)	N/A	N/A	N/A	N/A	N/A
Distance from trees (m)	20	20	20	20	N/A
Distance to furnace or incinerator flue (m)	N/A	N/A	N/A	N/A	N/A
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A
Unrestricted airflow >= 270 deg arc	Yes	Yes	Yes	Yes	Yes
Probe height (m, agl)	10	10	10	10	N/A
Probe material	N/A	N/A	N/A	N/A	N/A
Residence time	N/A	N/A	N/A	N/A	N/A
Any changes in the 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	N/A	N/A	10/17/11	10/17/11	4/27/11

B.3 SACRAMENTO-DEL PASO MANOR

This site has been in existence since 1979. This air monitoring site is the largest air monitoring site in the Sacramento Valley air basin. This site is one of the largest air monitoring sites in Northern California, in terms of number of parameters measured.

It measures O₃, CO (trace level), NO₂, NO_y, SO₂ (trace level), NMHC, speciated VOC (C2-C12), Carbonyl, PM₁₀ (SSI- main and collocated), PM₁₀ TEOM, PM₁₀ coarse, Pb-PM₁₀, PM_{2.5} FRM (main and collocated), PM_{2.5} BAM, Speciated PM_{2.5} (SASS), Black Carbon (Aethalometer), Scattering Coefficient (Nephelometer), WD-resultant, WS-resultant, ambient temperature, relative humidity, and total solar radiation.

This site is a PAMS Type II primary site and a PM_{2.5} Chemical Speciation Network (CSN) site. This site is the current PM_{2.5} 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 NO_y 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	30 m
Average Daily Traffic	1,000 Vehicles/Day (estimated)
Ground Cover	Vegetated
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

Gaseous Monitors:

Site	Sacramento-Del Paso Manor			
Start Date	7/1/11	12/1/79	12/1/79	7/1/11
Collecting Agency	SMAQMD			
Analytical Lab	N/A			
Reporting Agency	CARB			
Pollutant	Ozone	Carbon Monoxide (trace level)	Nitrogen Dioxide	NOY
Parameter code	44201	42101	42602	42600
POC	1	1	1	1
Instrument manufacturer and model	TAPI 400	TAPI 300EU	TEI 42C	TEI 42I-Y
Sampling method	UV Absorption	NDIR	Chemiluminescence	Chemiluminescence
Sampling method code	087	593	074	574
FRM/FEM/ARM/Other	FEM	FRM	FRM	Other
Suitable for comparison against annual PM _{2.5}	N/A			N/A
Monitoring objective	Public info			Public info
Monitor type	SLAMS, NCORE, PAMS (Type 2)			NCORE
Site type	Population Exposure			Population Exposure
Spatial scale	Neighborhood			Neighborhood
Current sampling frequency	Continuous			Continuous
Sampling season	Year Round			Year Round
Distance from supporting structure (m)	2	2	2	
Distance from obstructions on roof (m)	N/A	N/A	N/A	N/A
Distance from obstructions not on roof (m)	N/A	N/A	N/A	N/A
Distance from trees (m)	22	22	22	22
Distance to furnace or incinerator flue (m)	N/A	N/A	N/A	N/A
Distance between collocated monitors	N/A	N/A	N/A	N/A
Unrestricted airflow >= 270 deg arc	Yes	Yes	Yes	Yes
Probe height (m, agl)	5.3	5.3	5.3	10
Probe material	FEP Teflon	FEP Teflon	FEP Teflon	FEP Teflon
Residence time	7	12	8	4
Any changes in the 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	10/7/11	N/A	10/7/11	NA

Site	Sacramento-Del Paso Manor			
Start Date	7/1/11	8/1/94	8/1/94	8/1/96
Collecting Agency	SMAQMD	SMAQMD	SMAQMD	SMAQMD
Analytical Lab	N/A	N/A	VCAPCD	ERG, Inc.
Reporting Agency	CARB	CARB	CARB	CARB
Pollutant	Sulfur Dioxide (trace level)	Total NMHC	Speciated VOC	Carbonyl
Parameter code	42401	43102	43102	various
POC	2	2	1	1
Instrument manufacturer and model	TAPI 100EU	TEI 55C	Xontech 910A/912	Xontech 925
Sampling method	UV Fluorescence	GC-FID	Summa Canister	DNPH-Silica Gel Cartridge
Sampling method code	060	164	123	202
FRM/FEM/ARM/Other	FEM	Other	Other	Other
Suitable for comparison against annual PM _{2.5}	N/A	N/A	N/A	N/A
Monitoring objective	Public info	Research	Research	Research
Monitor type	SLAMS, NCORE	SLAMS, PAMS (Type 2)	SLAMS, PAMS (Type 2)	PAMS (Type 2)
Site type	Highest concentration	Highest concentration	Highest concentration	Highest concentration
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Current sampling frequency	Continuous	Continuous	1:3	1:3
Sampling season	Year Round	Year Round	July-September	July-September
Distance from supporting structure (m)	2	2	2.1	2.1
Distance from obstructions on roof (m)	N/A	N/A	N/A	N/A
Distance from obstructions not on roof (m)	N/A	N/A	N/A	N/A
Distance from trees (m)	22	22	22	22
Distance to furnace or incinerator flue (m)	N/A	N/A	N/A	N/A
Distance between collocated monitors	N/A	N/A	N/A	N/A
Unrestricted airflow >= 270 deg arc	Yes	Yes	Yes	Yes
Probe height (m, agl)	5.3	5.3	5.4	5.4
Probe material	FEP Teflon	FEP Teflon	Stainless Steel	Stainless Steel
Residence time	16	12	3	3
Any changes in the next 18 months?	No	No	No	No
Frequency of one-point QC check	Every fourth day	Every fourth day	N/A	N/A
Last Annual Performance Evaluation	NA	2/2/12	N/A	N/A

Particulate Matter Monitors:

Site	Sacramento-Del Paso Manor			
Start Date	12/1/01	12/1/01	1/1/86	1/1/86
Collecting Agency	SMAQMD		SMAQMD	
Analytical Lab	N/A		SMAQMD	
Reporting Agency	CARB		CARB	
Pollutant	Black Carbon	Scattering Coefficient	PM ₁₀	PM ₁₀ (collocated)
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	Light Absorption	Light Scattering	Hi-Volume/ Size Selective Inlet	Hi-Volume/ Size Selective Inlet
Sampling method code	862	011	063	063
FRM/FEM/ARM/Other	Other	Other	FRM	FRM
Suitable for comparison against annual PM _{2.5}	N/A	No	N/A	N/A
Monitoring objective	Research	Research	Public info	Public info
Monitor type	SPM	SPM	SLAMS	SLAMS
Site type	General/Background	General/Background	Population Exposure	Population Exposure
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Current sampling frequency	Continuous	Continuous	1:6	1:6
Sampling season	Year Round	Year Round	Year Round	Year Round
Distance from supporting structure (m)	1.8	1	2	2
Distance from obstructions on roof (m)	N/A	N/A	N/A	N/A
Distance from obstructions not on roof (m)	N/A	N/A	N/A	N/A
Distance from trees (m)	22	22	22	22
Distance to furnace or incinerator flue (m)	N/A	N/A	N/A	N/A
Distance between collocated monitors	N/A	N/A	2	2
Unrestricted airflow >= 270 deg arc	Yes	Yes	Yes	Yes
Probe height (m, agl)	5.1	4.5	5	5
Probe material	Aluminum	PVC Plastic	N/A	N/A
Residence time	1	N/A	N/A	N/A
Any changes in the next 18 months?	No	Yes	No	No
Frequency of flow rate verification for PM monitors	N/A	N/A	Monthly	Monthly
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	3/8/11 10/7/11	3/8/11 10/7/11

Site	Sacramento-Del Paso Manor			
Start Date	1/1/99	2/1/99	5/1/00	2/1/00
Collecting Agency	SMAQMD	SMAQMD	SMAQMD	SMAQMD
Analytical Lab	CARB	CARB	N/A	RTI
Reporting Agency	CARB	CARB	CARB	RTI
Pollutant	PM _{2.5}	PM _{2.5} (collocated)	PM _{2.5}	Speciated PM _{2.5}
Parameter code	88101	88101	88502	68103
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/VSCC	Low volume/VSCC	Low Volume/VSCC	SASS
Sampling method code	118	118	731	810, 812
FRM/FEM/ARM/Other	FRM	FRM	Pre-FEM	Other
Suitable for comparison against annual PM _{2.5}	Yes	Yes	No	No
Monitoring objective	NAAQS Comparison	NAAQS Comparison	Public info	Public info
Monitor type	SLAMS, NCORE	SLAMS, NCORE	SPM	SLAMS, CSN, NCORE
Site type	Highest concentration	Highest concentration	Highest concentration	Highest concentration
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Current sampling frequency	1:3	1:12	Continuous	1:3
Sampling season	Year Round	Year Round	Year Round	Year Round
Distance from supporting structure (m)	2	2	2	1.9
Distance from obstructions on roof (m)	N/A	N/A	N/A	N/A
Distance from obstructions not on roof (m)	N/A	N/A	N/A	N/A
Distance from trees (m)	22	22	22	22
Distance to furnace or incinerator flue (m)	N/A	N/A	N/A	N/A
Distance between collocated monitors	2	2	N/A	N/A
Unrestricted airflow >= 270 deg arc	Yes	Yes	Yes	Yes
Probe height (m, agl)	5	5	5.3	5.2
Probe material	N/A	N/A	N/A	N/A
Residence time	N/A	N/A	N/A	N/A
Any changes in the next 18 months?	No	No	Yes	No
Frequency of flow rate verification for PM monitors	Bi-Monthly	Bi-Monthly	Bi-monthly	Monthly
Last two semi-annual flow rate audits for PM monitors	3/8/11 10/7/11	3/8/11 10/7/11	3/8/11 10/7/11	3/8/11 10/7/11

Site	Sacramento-Del Paso Manor		
Start Date	4/1/09	4/1/12	4/1/12
Collecting Agency	SMAQMD	SMAQMD	SMAQMD
Analytical Lab	RTI	CARB	RTI
Reporting Agency	RTI	CARB	CARB
Pollutant	Organic and elemental carbon	PM ₁₀ (coarse)	Pb
Parameter code	(various parameter code)	85101	85129
POC	5	5	5
Instrument manufacturer and model	URG 3000N	R & P 2025	R & P 2025
Sampling method	Quartz filter and Cyclone Inlet	Low volume/VSCC	Low volume/VSCC
Sampling method code	842, 826	127	811
FRM/FEM/ARM/Other	Other	FRM	FRM
Suitable for comparison against annual PM _{2.5}	N/A	N/A	N/A
Monitoring objective	Public info	Public info	Public info
Monitor type	SLAMS, CSN, NCORE	NCORE	NCORE
Site type	Highest concentration	Population Exposure	Population Exposure
Spatial scale	Neighborhood	Neighborhood	Neighborhood
Current sampling frequency	1:3	1:6	1:6
Sampling season	Year Round	Year Round	Year Round
Distance from supporting structure (m)	1.9	2	2
Distance from obstructions on roof (m)	N/A	N/A	N/A
Distance from obstructions not on roof (m)	N/A	N/A	N/A
Distance from trees (m)	22	22	22
Distance to furnace or incinerator flue (m)	N/A	N/A	N/A
Distance between collocated monitors	N/A	2	N/A
Unrestricted airflow >= 270 deg arc	Yes	Yes	Yes
Probe height (m, agl)	5.2	5	5
Probe material	N/A	N/A	N/A
Residence time	N/A	N/A	N/A
Any changes in the next 18 months?	No	No	No
Frequency of flow rate verification for PM monitors	Monthly	Bi-monthly	Bi-monthly
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A

Meteorology:

Site	Sacramento-Del Paso Manor				
Start Date	8/1/94	8/1/94	9/1/94	8/1/94	8/1/94
Collecting Agency	SMAQMD				
Analytical Lab	N/A				
Reporting Agency	CARB				
Pollutant	Ambient 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	Climatronics 100093	Climatronic 101669	Climatronics 100848	Climatronics F460 WD sensor	Climatronics F-460 WS sensor
Sampling method	Thermistor	Hygroscopic plastic film	Pyranometer	Wind Vane	Anemometer
Sampling method code	042	012	011	020	020
FRM/FEM/ARM/Other	Other	Other	Other	Other	Other
Suitable for comparison against annual PM _{2.5}	N/A				
Monitoring objective	Public info				
Monitor type	SLAMS, N CORE, PAMS (Type 2)				
Site type	N/A				
Spatial scale	N/A				
Current sampling frequency	Continuous				
Sampling season	Year Round				
Distance from supporting structure (m)	N/A	N/A	N/A	N/A	N/A
Distance from obstructions on roof (m)	N/A	N/A	N/A	N/A	N/A
Distance from obstructions not on roof (m)	N/A	N/A	N/A	N/A	N/A
Distance from trees (m)	22	22	22	22	22
Distance to furnace or incinerator flue (m)	N/A	N/A	N/A	N/A	N/A
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A
Unrestricted airflow >= 270 deg arc	Yes	Yes	Yes	Yes	Yes
Probe height (m, agl)	10	10	10	10	10
Probe material	N/A	N/A	N/A	N/A	N/A
Residence time	N/A	N/A	N/A	N/A	N/A
Any changes in the 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	10/7/11	N/A	N/A	10/7/11	10/7/11

B.4 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.

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
Average Daily Traffic	18,891 Vehicles/Day (SACDOT, 2010)
Ground Cover	Paved
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

Gaseous Monitors:

Site	Sacramento-El Camino Watt
Start Date	11/1/01
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	NDIR
Sampling method code	054
FRM/FEM/ARM/Other	FRM
Suitable for comparison against annual PM _{2.5}	N/A
Monitoring objective	Public info
Monitor type	SLAMS
Site type	Highest concentration
Spatial scale	Micro-scale
Current sampling frequency	Continuous
Sampling season	Year Round
Distance from supporting structure (m)	1.1
Distance from obstructions on roof (m)	N/A
Distance from obstructions not on roof (m)	4 m
Distance from trees (m)	N/A
Distance to furnace or incinerator flue (m)	N/A
Distance between collocated monitors	N/A
Unrestricted airflow >= 270 deg arc	Yes
Probe height (m, agl)	3
Probe material	FEP Teflon
Residence time	16
Any changes in the next 18 months?	Yes
Frequency of one-point QC check	Every Other Day
Last Annual Performance Evaluation	10/18/11

B.5 FOLSOM-NATOMA STREET

This site is in operation since 1996. This site replaced the former Folsom-Liedesdoff Street site. The Folsom-Natoma site is the maximum summertime O₃ monitoring site within Sacramento County, for days with the prevailing afternoon southwesterly winds.

This site measures: O₃, NO₂, PM_{2.5} BAM, Total NMHC, Speciated VOC, WD, WS, Temp, RH, and SRD.

This site is a PAMS Type III site.

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	183 m
Average Daily Traffic	20,891 Vehicles/Day @ Natoma St. & Riley St. (City of Folsom, 2009)
Ground Cover	Vegetated
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

Gaseous Monitors:

Site	Folsom-Natoma St.				
Start Date	7/1/96	7/1/96	7/1/11	7/1/96	7/1/96
Collecting Agency	SMAQMD				
Analytical Lab	N/A				
Reporting Agency	CARB				
Pollutant	Ozone	Nitrogen Dioxide	NOY	Total NMHC	Speciated VOC
Parameter code	44201	42602	42600	43102	43102
POC	1	1	1	1	2
Instrument manufacturer and model	TAPI 400	TEI 42C	TEI 42I-Y	TEI 55C	Xontech 910A/912
Sampling method	UV absorption	Chemiluminescence	Chemiluminescence	GC	Summa Canister
Sampling method code	087	074	574	164	123
FRM/FEM/ARM/Other	FEM	FRM	Other	Other	Other
Suitable for comparison against annual PM _{2.5}	N/A	N/A	N/A	N/A	N/A
Monitoring objective	NAAQS Comparison	Public info	Public info	Public info	Research
Monitor type	SLAMS, PAMS (Type 3)	SLAMS, PAMS (Type 3)	SLAMS, PAMS (Type 3)	SLAMS, PAMS (Type 3)	SLAMS, PAMS (Type 3)
Site type	Max O ₃ concentration	Highest concentration	General/Background	Highest concentration	Highest concentration
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Current sampling frequency	Continuous	Continuous	Continuous	Continuous	1:3
Sampling season	Year Round	Year Round	Year Round	Year Round	July-September
Distance from supporting structure (m)	1.1	1.8	N/A	1.8	1.8
Distance from obstructions on roof (m)	N/A	N/A	N/A	N/A	N/A
Distance from obstructions not on roof (m)	N/A	N/A	N/A	N/A	N/A
Distance from trees (m)	N/A	N/A	N/A	N/A	N/A
Distance to furnace or incinerator flue (m)	N/A	N/A	N/A	N/A	N/A
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A
Unrestricted airflow >= 270 deg arc	Yes	Yes	Yes	Yes	Yes
Probe height (m, agl)	5.3	5.3	10	5.3	5.3
Probe material	FEP Teflon	FEP Teflon	FEP Teflon	FEP Teflon	Stainless Steel
Residence time	11	11	9	12	3
Any changes in the next 18 months?	No	No	No	No	No
Frequency of one-point QC check	Every other day	Every other day	Every other day	Every other day	N/A
Last Annual Performance Evaluation	10/12/11	10/12/11	N/A	1/25/12	N/A

Particulate Matter Monitor:

Site	Folsom-Natoma St.
Start Date	5/1/02
Collecting Agency	SMAQMD
Analytical Lab	N/A
Reporting Agency	CARB
Pollutant	PM _{2.5}
Parameter code	88501
POC	3
Instrument manufacturer and model	Met One 1020 BAM
Sampling method	Low Volume/VSCC
Sampling method code	731
FRM/FEM/ARM/Other	Pre-FEM
Suitable for comparison against annual PM _{2.5}	No
Monitoring objective	Public info
Monitor type	SPM
Site type	General/Background
Spatial scale	Neighborhood
Current sampling frequency	Continuous
Sampling season	Year Round
Distance from supporting structure (m)	1.5
Distance from obstructions on roof (m)	N/A
Distance from obstructions not on roof (m)	N/A
Distance from trees (m)	N/A
Distance to furnace or incinerator flue (m)	N/A
Distance between collocated monitors	N/A
Unrestricted airflow >= 270 deg arc	Yes
Probe height (m, agl)	4.3
Probe material	N/A
Residence time	N/A
Any changes in the next 18 months?	No
Frequency of flow rate verification for PM monitors	Bi-monthly
Last two semi-annual flow rate audits for PM monitors	4/14/11 10/12/11

Meteorology:

Site	Folsom-Natoma St.				
Start Date	7/1/96	7/1/96	7/1/96	7/1/96	7/1/96
Collecting Agency	SMAQMD				
Analytical Lab	N/A				
Reporting Agency	CARB				
Pollutant	Ambient 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	Climatronics 100093	Climatronics 101669	Climatronics 100848	Climatronics F-460 WD sensor	Climatronics F-460 WS sensor
Sampling method	Thermistor	Hygroscopic Plastic film	Pyranometer	Wind Vane	Anemometer
Sampling method code	042	012	011	020	020
FRM/FEM/ARM/Other	Other	Other	Other	Other	Other
Suitable for comparison against annual PM _{2.5}	N/A				
Monitoring objective	Public info				
Monitor type	SLAMS, PAMS (Type 3)				
Site type	N/A				
Spatial scale	N/A				
Current sampling frequency	Continuous				
Sampling season	Year Round				
Distance from supporting structure (m)	N/A	N/A	N/A	N/A	N/A
Distance from obstructions on roof (m)	N/A	N/A	N/A	N/A	N/A
Distance from obstructions not on roof (m)	N/A	N/A	N/A	N/A	N/A
Distance from trees (m)	N/A	N/A	N/A	N/A	N/A
Distance to furnace or incinerator flue (m)	N/A	N/A	N/A	N/A	N/A
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A
Unrestricted airflow >= 270 deg arc	Yes	Yes	Yes	Yes	Yes
Probe height (m, agl)	10	10	10	10	10
Probe material	N/A	N/A	N/A	N/A	N/A
Residence time	N/A	N/A	N/A	N/A	N/A
Any changes in the 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	10/12/11	N/A	N/A	10/12/11	10/12/11

B.6 SACRAMENTO – GOLDENLAND COURT

This site replaced the former Airport Rd. monitoring site. This PAMS Type II (secondary) site began monitoring in October 2008.

This site measures O₃, CO, NO₂, Total NMHC, PM₁₀, 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
Average Daily Traffic	750 Vehicles/Day (Estimated)
Ground Cover	Vegetated
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

Gaseous Monitors:

Site	Sacramento-Goldenland Ct.			
Start Date	10/1/08	10/1/08	10/1/08	10/1/08
Collecting Agency	SMAQMD			
Analytical Lab	N/A			
Reporting Agency	CARB			
Pollutant	Ozone	Carbon Monoxide/42101	Nitrogen Dioxide	Total NMHC
Parameter code	44201	42101	42602	43102
POC	1	1	1	1
Instrument manufacturer and model	TAPI 400	TEI 48 CO Analyzer	TEI 42C	TEI 55C
Sampling method	UV Absorption	NDIR	Chemiluminescence	GC
Sampling method code	087	054	074	164
FRM/FEM/ARM/Other	FEM	FRM	FRM	Other
Suitable for comparison against annual PM _{2.5}	N/A	N/A	N/A	N/A
Monitoring objective	Public info	Public info	Public info	Public info
Monitor type	SLAMS, Unofficial PAMS (Type 2 Secondary)	SLAMS	SLAMS, Unofficial PAMS (Type 2 Secondary)	SLAMS, Unofficial PAMS (Type 2 Secondary)
Site type	Population Exposure	Population Exposure	Population Exposure	Population Exposure
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Current sampling frequency	Continuous	Continuous	Continuous	Continuous
Sampling season	Year Round	Year Round	Year Round	Year Round
Distance from supporting structure (m)	1.9	1.9	1.9	1.9
Distance from obstructions on roof (m)	N/A	N/A	N/A	N/A
Distance from obstructions not on roof (m)	N/A	N/A	N/A	N/A
Distance from trees (m)	20	20	20	20
Distance to furnace or incinerator flue (m)	N/A	N/A	N/A	N/A
Distance between collocated monitors	N/A	N/A	N/A	N/A
Unrestricted airflow >= 270 deg arc	Yes	Yes	Yes	Yes
Probe height (m, agl)	5.3	5.3	5.3	5.3
Probe material	FEP Teflon	FEP Teflon	FEP Teflon	FEP Teflon
Residence time	17	15	17	17
Any changes in the 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	10/3/11	10/3/11	10/3/11	1/22/12

Particulate Matter Monitors:

Site	Sacramento-Goldenland Ct.	
Start Date	10/1/08	6/1/10
Collecting Agency	SMAQMD	SMAQMD
Analytical Lab	SMAQMD	N/A
Reporting Agency	CARB	CARB
Pollutant	PM ₁₀	PM ₁₀
Parameter code	81102	85101
POC	1	3
Instrument manufacturer and model	Sierra Anderson 1200	R & P 1400A
Sampling method	Hi-Volume/Size Selective Inlet	Low Volume
Sampling method code	063	079
FRM/FEM/ARM/Other	FRM	FEM
Suitable for comparison against annual PM _{2.5}	N/A	N/A
Monitoring objective	Public info	Public info
Monitor type	SLAMS	SLAMS
Site type	Population Exposure	Population Exposure
Spatial scale	Neighborhood	Neighborhood
Current sampling frequency	1:6	Continuous
Sampling season	Year Round	Year Round
Distance from supporting structure (m)	2	1.8
Distance from obstructions on roof (m)	N/A	N/A
Distance from obstructions not on roof (m)	N/A	N/A
Distance from trees (m)	20	20
Distance to furnace or incinerator flue (m)	N/A	N/A
Distance between collocated monitors	N/A	N/A
Unrestricted airflow >= 270 deg arc	Yes	Yes
Probe height (m, agl)	5.4	5
Probe material	N/A	N/A
Residence time	N/A	N/A
Any changes in the next 18 months?	Yes	Yes
Frequency of flow rate verification for PM monitors	Monthly	Bi-monthly
Last two semi-annual flow rate audits for PM monitors	3/8/11 10/3/11	3/8/11 10/3/11

Meteorology:

Site	Sacramento-Goldenland Ct.				
Start Date	10/1/08	10/1/08	10/1/08	10/1/08	10/1/08
Collecting Agency	SMAQMD				
Analytical Lab	N/A				
Reporting Agency	CARB				
Pollutant	Ambient 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	Climatronics 100093	Climatronics 101669	Climatronics 100848	Climatronics F-460 WD sensor	Climatronics F-460 WS sensor
Sampling method	Thermistor	Hygroscopic Plastic Film	Pyranometer	Wind Vane	Anemometer
Sampling method code	042	012	011	020	020
FRM/FEM/ARM/Other	Other	Other	Other	Other	Other
Suitable for comparison against annual PM _{2.5}	N/A				
Monitoring objective	Public info				
Monitor type	SLAMS, Unofficial PAMS (Type 2 Secondary)				
Site type	N/A				
Spatial scale	N/A				
Current sampling frequency	Continuous				
Sampling season	Year Round				
Distance from supporting structure (m)	N/A	N/A	N/A	N/A	N/A
Distance from obstructions on roof (m)	N/A	N/A	N/A	N/A	N/A
Distance from obstructions not on roof (m)	N/A	N/A	N/A	N/A	N/A
Distance from trees (m)	> 20 m	> 20 m	> 20 m	> 20 m	> 20 m
Distance to furnace or incinerator flue (m)	N/A	N/A	N/A	N/A	N/A
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A
Unrestricted airflow >= 270 deg arc	Yes	Yes	Yes	Yes	Yes
Probe height (m, agl)	10	10	10	10	10
Probe material	N/A	N/A	N/A	N/A	N/A
Residence time	N/A	N/A	N/A	N/A	N/A
Any changes in the next 18 months?	Yes	Yes	Yes	Yes	Yes
Frequency of one-point QC check	N/A	N/A	N/A	N/A	N/A
Last Annual Performance Evaluation	10/3/11	N/A	N/A	10/3/11	10/3/11

B.7 NORTH HIGHLANDS-BLACKFOOT

North Highlands- Blackfoot has been in existence since 1979. It is a Special Purpose Monitoring site for O₃, CO, and NO₂. This site is a SLAMS site for PM-10 SSI. SO₂ was terminated in late 2010.

This entire site was designated as SPM upon its establishment. 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. The Air Force Base was closed in 2001.

During an annual review of network design in the mid-1990s, the District needed additional NAMS sites for SO₂ and PM₁₀ to meet minimum monitoring requirements. Thus, the designation of the SO₂ and PM₁₀ monitors at North Highlands was changed from SPM to NAMS, which is now categorized as SLAMS².

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
Average Daily Traffic	1,000 Vehicles/Day (Estimated)
Ground Cover	Paved (to north), vegetated (to south)
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

² According to the National Monitoring Program Fact Sheets, found in Appendix A to Quality Assurance Handbook for Air Pollution Measurement Systems, SLAMS network includes stations that are formerly classified as NAMS.

Gaseous Monitors:

Site	North Highlands		
Start Date	12/1/79	12/1/79	12/1/79
Collecting Agency	SMAQMD		
Analytical Lab	N/A		
Reporting Agency	CARB		
Pollutant	Ozone	Carbon Monoxide	Nitrogen Dioxide
Parameter code	44201	42101	42602
POC	1	1	1
Instrument manufacturer and model	TAPI 400	TEI 48C	TEI 42I
Sampling method	UV Absorption	NDIR	Chemiluminescence
Sampling method code	019	054	074
FRM/FEM/ARM/Other	FEM	FRM	FRM
Suitable for comparison against annual PM _{2.5}	N/A		
Monitoring objective	Research		
Monitor type	SPM		
Site type	Population Exposure		
Spatial scale	Neighborhood		
Current sampling frequency	Continuous		
Sampling season	Year Round		
Distance from supporting structure (m)	2	2	2
Distance from obstructions on roof (m)	N/A	N/A	N/A
Distance from obstructions not on roof (m)	N/A	N/A	N/A
Distance from trees (m)	10	10	10
Distance to furnace or incinerator flue (m)	N/A	N/A	N/A
Distance between collocated monitors	N/A	N/A	N/A
Unrestricted airflow >= 270 deg arc	Yes	Yes	Yes
Probe height (m, agl)	5	5	5
Probe material	FEP Teflon	FEP Teflon	FEP Teflon
Residence time	16	19	19
Any changes in the next 18 months?	Yes	Yes	No
Frequency of one-point QC check	Every Other Day	Every Other Day	Every Other Day
Last Annual Performance Evaluation	10/5/11	10/5/11	10/5/11

Particulate Matter Monitor:

Site	North Highlands
Start Date	1/1/89
Collecting Agency	SMAQMD
Analytical Lab	SMAQMD
Reporting Agency	CARB
Pollutant	PM ₁₀
Parameter code	81102
POC	1
Instrument manufacturer and model	Sierra Anderson 1200
Sampling method	Hi-Volume/Size Selective Inlet
Sampling method code	063
FRM/FEM/ARM/Other	FRM
Suitable for comparison against annual PM _{2.5}	N/A
Monitoring objective	Public info
Monitor type	SLAMS
Site type	Population Exposure
Spatial scale	Neighborhood
Current sampling frequency	1:6
Sampling season	Year Round
Distance from supporting structure (m)	2
Distance from obstructions on roof (m)	N/A
Distance from obstructions not on roof (m)	N/A
Distance from trees (m)	10
Distance to furnace or incinerator flue (m)	N/A
Distance between collocated monitors	N/A
Unrestricted airflow >= 270 deg arc	Yes
Probe height (m, agl)	5
Probe material	N/A
Residence time	N/A
Any changes in the next 18 months?	Yes
Frequency of flow rate verification for PM monitors	Monthly
Last two semi-annual flow rate audits for PM monitors	3/8/11 10/11/11

B.8 SLOUGHHOUSE

Located in a rural area 16.5 miles southeast of Downtown Sacramento, this site measures O₃, wind direction, wind speed, and PM_{2.5}.

Sloughhouse was established in 1997 as a seasonal (April-October) O₃ special purpose monitoring site to measure elevated afternoon O₃ concentrations, under northwesterly winds, in support of the District's summer Spare the Air (O₃ episodic control measure) program. It was sited to cover "data gaps" in the O₃ monitoring network, which is used for forecasting summer AQI levels.

A tree 10 m southeast of the O₃ inlet was removed in May 2011. Since the site now complies with Appendix E (Probe and Monitoring Path Siting Criteria), the O₃ monitor was re-classified from SPM to SLAMS.

Since November 2008, seasonal (November-February) monitoring for PM_{2.5} is conducted at this site. A special purpose PM_{2.5} E-BAM monitor collects data in support of the South Sacramento County Winter PM_{2.5} study. This study has been extended, due to the extremely low data capture rates during the 2008 and 2009 winter seasons

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
Average Daily Traffic	200 Vehicles/Day (Estimated)
Ground Cover	Vegetated
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

Gaseous Monitor & Meteorology:

Site	Sloughhouse-Sloughhouse Rd.		
Start Date	7/1/97	7/1/97	7/1/97
Collecting Agency	SMAQMD		
Analytical Lab	N/A		
Reporting Agency	CARB		
Pollutant	Ozone	Wind Direction	Wind Speed
Parameter code	44201	61104	61103
POC	1	1	1
Instrument manufacturer and model	TAPI 400	Climatronics F-460 WD sensor	Climatronics F-460 WS sensor
Sampling method	UV Absorption	Wind Vane	Anemometer
Sampling method code	087	020	020
FRM/FEM/ARM/Other	FEM	Other	Other
Suitable for comparison against annual PM _{2.5}	N/A	N/A	N/A
Monitoring objective	Public info	Public info	Public info
Monitor type	SLAMS	SLAMS	SLAMS
Site type	Max O ₃ concentration	N/A	N/A
Spatial scale	Neighborhood	N/A	N/A
Current sampling frequency	Continuous	Continuous	Continuous
Sampling season	Year Round	Year Round	Year Round
Distance from supporting structure (m)	1.8	2.4	2.4
Distance from obstructions on roof (m)	N/A	N/A	N/A
Distance from obstructions not on roof (m)	6 m	6	6
Distance from trees (m)	16	16	16
Distance to furnace or incinerator flue (m)	N/A	N/A	N/A
Distance between collocated monitors	N/A	N/A	N/A
Unrestricted airflow >= 270 deg arc	Yes	Yes	Yes
Probe height (m, agl)	4.6	5.2	5.2
Probe material	FEP Teflon	N/A	N/A
Residence time	2	N/A	N/A
Any changes in the next 18 months?	No	No	No
Frequency of one-point QC check	Daily	N/A	N/A
Last Annual Performance Evaluation	10/13/11	10/13/11	10/13/11

Particulate Matter Monitor:

Site	Sloughhouse-Sloughhouse Rd.
Start Date	11/1/08
Collecting Agency	SMAQMD
Analytical Lab	N/A
Reporting Agency	N/A
Pollutant	PM _{2.5}
Parameter code	88501
POC	N/A
Instrument manufacturer and model	Met One E-BAM
Sampling method	Low Volume/VSCC
Sampling method code	731
FRM/FEM/ARM/Other	Non-FEM
Suitable for comparison against annual PM _{2.5}	No
Monitoring objective	Research
Monitor type	SPM
Site type	Upwind/Background
Spatial scale	N/A
Current sampling frequency	Continuous
Sampling season	November-February
Distance from supporting structure (m)	N/A
Distance from obstructions on roof (m)	N/A
Distance from obstructions not on roof (m)	N/A
Distance from trees (m)	16
Distance to furnace or incinerator flue (m)	N/A
Distance between collocated monitors	N/A
Unrestricted airflow >= 270 deg arc	Yes
Probe height (m, agl)	2
Probe material	N/A
Residence time	N/A
Any changes in the next 18 months?	Yes
Frequency of flow rate verification for PM monitors	N/A
Last two semi-annual flow rate audits for PM monitors	N/A

B.9 SACRAMENTO HEALTH DEPT-STOCKTON BLVD

This PM monitoring site has been in existence since the late 1950s. This site measures PM-10 SSI, PM-10 TEOM, and PM-2.5 FRM.

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
Average Daily Traffic	28,090 Vehicles/Day (City of Sacramento, 2005)
Ground Cover	Rooftop (surrounding area is paved)
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

Particulate Matter Monitors:

Site	Sacramento-Health Dept.		
Start Date	1/1/86	8/1/94	1/1/99
Collecting Agency	SMAQMD	SMAQMD	SMAQMD
Analytical Lab	SMAQMD	N/A	CARB
Reporting Agency	CARB	CARB	CARB
Pollutant	PM ₁₀	PM ₁₀	PM _{2.5}
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/Size Selective Inlet	Low Volume	Low Volume/VSCC
Sampling method code	063	079	118
FRM/FEM/ARM/Other	FRM	FEM	FRM
Suitable for comparison against annual PM _{2.5}	N/A	N/A	Yes
Monitoring objective	Public info	Public info	Public info
Monitor type	SLAMS	SLAMS	SLAMS
Site type	Population Exposure	Population Exposure	Population Exposure
Spatial scale	Neighborhood	Neighborhood	Neighborhood
Current sampling frequency	1:6	Continuous	1:3
Sampling season	Year Round	Year Round	Year Round
Distance from supporting structure (m)	2	2	2
Distance from obstructions on roof (m)	N/A	N/A	N/A
Distance from obstructions not on roof (m)	N/A	N/A	N/A
Distance from trees (m)	20	20	20
Distance to furnace or incinerator flue (m)	N/A	N/A	N/A
Distance between collocated monitors	N/A	N/A	N/A
Unrestricted airflow >= 270 deg arc	Yes	Yes	Yes
Probe height (m, agl)	5.4	5.4	5.4
Probe material	N/A	N/A	N/A
Residence time	N/A	N/A	N/A
Any changes in the next 18 months?	Yes	Yes	Yes
Frequency of flow rate verification for PM monitors	Monthly	Bi-Monthly	Monthly
Last two semi-annual flow rate audits for PM monitors	3/8/11 10/6/11	3/8/11 10/6/11	3/8/11 10/6/11

B.10 SACRAMENTO-1309 T STREET

The Sacramento-1309 T Street site is operated by the California Air Resources Board/Monitoring and Laboratory Division/Special Purpose Monitoring Section. This site has been in existence since 1989.

This middle scale SLAMS air monitoring site measures O₃, NO₂, PM_{2.5} FRM, Speciated PM_{2.5}, PM_{2.5} BAM, PM₁₀ SSI, WD, WS, TMP, RH, and Atmospheric Pressure.

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
Average Daily Traffic	3,102 Vehicles/Day (City of Sacramento, 2009)
Ground Cover	Rooftop site (residential area is paved)
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

Gaseous Monitors:

Site	Sacramento-1309 T St.	
Start Date	4/1/89	4/1/89
Collecting Agency	CARB	
Analytical Lab	N/A	
Reporting Agency	CARB	
Pollutant	Ozone	Nitrogen Dioxide
Parameter code	44201	42602
POC	1	1
Instrument manufacturer and model	TAPI 400	TEI 42C
Sampling method	UV Absorption	Chemiluminescence
Sampling method code	087	074
FRM/FEM/ARM/Other	FEM	FRM
Suitable for comparison against annual PM _{2.5}	N/A	N/A
Monitoring objective	Public info	Public info
Monitor type	SLAMS	SLAMS
Site type	Population Exposure	Population Exposure
Spatial scale	Urban	Middle
Current sampling frequency	Continuous	Continuous
Sampling season	Year Round	Year Round
Distance from supporting structure (m)	3	3
Distance from obstructions on roof (m)	N/A	N/A
Distance from obstructions not on roof (m)	N/A	N/A
Distance from trees (m)	50	50
Distance to furnace or incinerator flue (m)	N/A	N/A
Distance between collocated monitors	N/A	N/A
Unrestricted airflow >= 270 deg arc	Yes	Yes
Probe height (m, agl)	11.7	11.7
Probe material	FEP Teflon	FEP Teflon
Residence time	5.4	6
Any changes in the next 18 months?	No	No
Frequency of one-point QC check	Daily	Daily
Last Annual Performance Evaluation	Please contact site operator (California Air Resource Board)	

Particulate Matter Monitors:

Site	Sacramento-1309 T St.			
Start Date	4/1/89	12/1/98	5/1/04	4/1/07
Collecting Agency	CARB	CARB	CARB	CARB
Analytical Lab	SMAQMD	CARB	N/A	RTI
Reporting Agency	CARB	CARB	CARB	RTI
Pollutant	PM ₁₀	PM _{2.5}	PM _{2.5}	Speciated PM _{2.5}
Parameter code	81102	88101	88501	68103
POC	1	1	3	5
Instrument manufacturer and model	Sierra Anderson 1200	R & P 2025	Met One 1020 BAM	Met One SASS
Sampling method	Hi-Volume/Size Selective Inlet	Low volume/VSCC	Low Volume/VSCC	SASS
Sampling method code	063	118	731	810, 812
FRM/FEM/ARM/Other	FRM	FRM	Pre-FEM	Other
Suitable for comparison against annual PM _{2.5}	N/A	Yes	No	No
Monitoring objective	Public info	Public info	Public info	Research
Monitor type	SLAMS	SLAMS	SPM	SPM (not a CSN site)
Site type	Population Exposure	Population Exposure	Population Exposure	Population Exposure
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Current sampling frequency	1:6	1:3	Continuous	1:6
Sampling season	Year Round	Year Round	Year Round	Year Round
Distance from supporting structure (m)	1.5	1.5	2	1.9
Distance from obstructions on roof (m)	N/A	N/A	N/A	N/A
Distance from obstructions not on roof (m)	N/A	N/A	N/A	N/A
Distance from trees (m)	50	50	50	50
Distance to furnace or incinerator flue (m)	N/A	N/A	N/A	N/A
Distance between collocated monitors	N/A	N/A	N/A	N/A
Unrestricted airflow >= 270 deg arc	Yes	Yes	Yes	Yes
Probe height (m, agl)	10	10	10	10
Probe material	N/A	N/A	N/A	N/A
Residence time	N/A	N/A	N/A	N/A
Any changes in the next 18 months?	No	No	No	No
Frequency of flow rate verification for PM monitors	Monthly	Monthly	Bi-monthly	Monthly
Last two semi-annual flow rate audits for PM monitors	Please contact site operator (California Air Resource Board)			N/A

Meteorology:

Site	Sacramento-1309 T St.				
Start Date	2/1/92	2/1/92	2/1/92	2/1/92	2/1/92
Collecting Agency	CARB				
Analytical Lab	N/A				
Reporting Agency	CARB				
Pollutant	Ambient Temperature	Relative Humidity	Barometric Pressure	Wind Direction	Wind Speed
Parameter code	62101	62201	64101	61102	61101
POC	1	1	1	1	1
Instrument manufacturer and model	Met-One 060A-2	Met-One 083D-0-6	Met-One 090D-26	Met-One 020-C	Met-One 010-C
Sampling method	Thermistor	Polymer Thin Film Capacitor	Barometric sensor	Wind Vane	Wind Cups
Sampling method code	040	061	014	066	066
FRM/FEM/ARM/Other	Other	Other	Other	Other	Other
Suitable for comparison against annual PM _{2.5}	N/A				
Monitoring objective	Public info				
Monitor type	SLAMS				
Site type	N/A				
Spatial scale	N/A				
Current sampling frequency	Continuous				
Sampling season	Year Round				
Distance from supporting structure (m)	9	9	2	9	9
Distance from obstructions on roof (m)	N/A	N/A	N/A	N/A	N/A
Distance from obstructions not on roof (m)	N/A	N/A	N/A	N/A	N/A
Distance from trees (m)	50	50	50	50	50
Distance to furnace or incinerator flue (m)	N/A	N/A	N/A	N/A	N/A
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A
Unrestricted airflow >= 270 deg arc	Yes	Yes	Yes	Yes	Yes
Probe height (m, agl)	15	15	12	15	15
Probe material	N/A	N/A	N/A	N/A	N/A
Residence time	N/A	N/A	N/A	N/A	N/A
Any changes in the 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	Please contact site operator (California Air Resource Board)				

B.11 RANCHO SECO

Rancho Seco is a seasonal PM_{2.5} special purpose monitoring site, established in November 2008. The PM_{2.5} E-BAM data will be collected, during the months of November through March, for the South Sacramento County Winter PM_{2.5} Study.

This study is extended due to poor data capture rate at the beginning of the study period.

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	Approximately 75 feet
Average Daily Traffic	500 Vehicles/Day (estimated)
Ground Cover	Vegetated
Representative Area (MSA)	Sacramento--Arden-Arcade--Roseville, CA

Particulate Samplers:

Site	Rancho Seco
Start Date	11/1/08
Collecting Agency	SMAQMD
Analytical Lab	N/A
Reporting Agency	N/A
Pollutant	PM _{2.5}
Parameter code	88501
POC	N/A
Instrument manufacturer and model	Met One E-BAM
Sampling method	Low Volume/VSCC
Sampling method code	731
FRM/FEM/ARM/Other	Non-FEM
Suitable for comparison against annual PM _{2.5}	No
Monitoring objective	Research
Monitor type	SPM
Site type	Upwind/Background
Spatial scale	N/A
Current sampling frequency	Continuous
Sampling season	November-February
Distance from supporting structure (m)	N/A
Distance from obstructions on roof (m)	N/A
Distance from obstructions not on roof (m)	N/A
Distance from trees (m)	> 10 meters
Distance to furnace or incinerator flue (m)	N/A
Distance between collocated monitors	N/A
Unrestricted airflow >= 270 deg arc	Yes
Probe height (m, agl)	2
Probe material	N/A
Residence time	N/A
Any changes in the next 18 months?	No
Frequency of flow rate verification for PM monitors	N/A
Last two semi-annual flow rate audits for PM monitors	N/A

APPENDIX C – NEAR-ROAD NO₂ MONITORING

Introduction

In 2010, U.S. EPA promulgated new nitrogen dioxide (NO₂) monitoring requirements. Local agencies are required to install and operate new near-road monitoring stations where hourly maximum NO₂ emissions are expected. The Sacramento—Arden-Arcade—Roseville CBSA is required to have one near-road NO₂ monitoring site as per population and traffic criteria given in Appendix D to Part 58 in Title 40, Code of Federal Regulation. The near-road NO₂ monitoring site must be operational by January 1, 2013 as this CBSA MSA is in phase one of U.S. EPA's Build and Hold plan. Recently, the EPA postponed the operational deadline to January 1, 2014.

To determine the location with the maximum NO₂ emissions, a number of potential locations were reviewed. Each of these locations was reviewed according to the guidelines provided by U.S. EPA in the Near-Road NO₂ Technical Assistance Document (TAD). For example, AADT, number of heavy duty trucks, site characteristics, and other logical issues are among the factors considered. The final site selection meets the probe and siting criteria provided in Appendix D and E to 40 CFR Part 58. This appendix explains the reasons for selecting Bercut Dr. as the candidate near-road NO₂ monitoring site for this CBSA.

Traffic Data

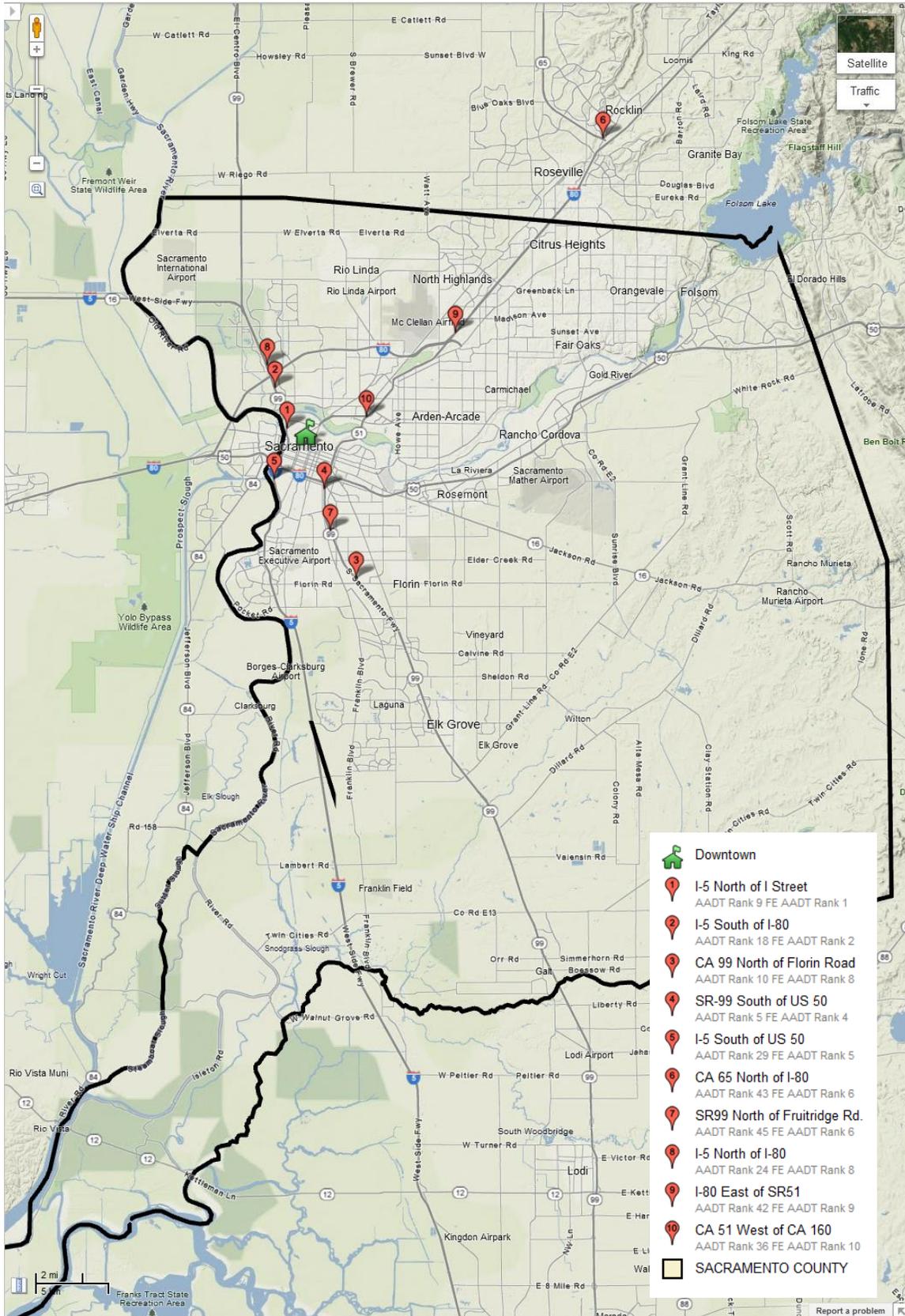
Bercut Dr. would monitor NO₂ emissions from Interstate 5. The 150 block of Bercut Dr. is located north of I Street exit on Interstate 5 (ahead leg of postmile 23.799), which is less than one mile northeast of Downtown Sacramento. Interstate 5 is a major highway that runs parallel to the West Coast. In addition to linking with two regional highways, it also links with Interstate 80, a transcontinental highway. Figure C-1 shows the locations of top potential sites and highways in the region. According to the 2010 latest statistics maintained by the Traffic Data Branch of California Department of Transportation ("Caltrans"), AADT on this targeted roadway is 186,000, of which 18,000 is heavy duty truck traffic.

Although AADT at the Bercut Dr. site ranks #9 in the region, it ranks #1 in terms of fleet equivalent (FE) AADT. FE AADT is a quantitative way to compare NO₂ emissions between roadways with different fleet mix. It is calculated with the heavy duty trucks vs. non-heavy duty vehicles emissions ratio. According to the Emission FACTors (EMFAC 2011) model developed by California Air Resource Board in 2011, heavy duty trucks and non-heavy duty vehicles produce 9.65 and 0.562 oz of NO_x per vehicle per day, respectively, for scenario year 2010 in Sacramento County. The emission ratio is calculated and rounded to 17. At this ratio, the Bercut Dr. site is estimated to have 17% more NO₂ emissions than the next highest location. If the national default emission ratio, 10, is used to calculate the FE AADT, this site would still rank the highest in FE AADT, which is 16% more emissions than the next highest location.

Level of service (LOS) is another important factor considered. In the Transportation Corridor Concept Report (TCCR) prepared by Caltrans in 2010, LOS on Interstate 5 north of I Street is rated “F”, the most congested condition. In April 2012, Sacramento Council of Government, the regional transportation project coordinator, adopted future construction projects in its Metropolitan Transportation Plan 2035. The plan includes the construction of two high occupancy vehicle lanes, one in each direction, north of I St. on Interstate 5 by 2035. Despite the additional lanes, the TCCR forecasts the LOS to remain at “F” for the next twenty years.

Table C-1 details the AADT, fleet equivalent AADT, its ranking, and level of service (LOS) of the top ranking sites in this CBSA. For brevity, only potential sites among the highest ranked AADT or FE AADT are listed. Table C-2 details the NOx model emission in Sacramento County for calculation of emission ratio.

Figure C-1 Maps of Potential Sites



**Table C-1
AADT Matrix of Top Ranking in Sacramento MSA**

Route	Direction	Location	Postmile	Latitude	Longitude	AADT	AADT Rank	Trucks	FE AADT (ER. = 10)	FE AADT Rank (ER. = 10)	FE AADT (ER. = 17)	FE AADT Rank (ER. = 17)	LOS
5	N. of	I St.	23.799	38.5926°	-121.5040°	186K	9	18K	347K	1	475K	1	F
5	S. of	Jct. Rte. 80	26.722	38.6176°	-121.5137°	159K	18	15K	296K	4	406K	2	F
99	N. of	Florin Rd.	19.612	38.4988°	-121.4488°	179K	10	12K	283K	7	367K	3	F
99	S. of	Jct. Rtes. 50/51/5	24.351	38.5550°	-121.4744°	212K	5	10K	298K	2	367K	4	F
5	S. of	Jct. Rte. 50	22.565	38.5610°	-121.5146°	143K	29	14K	267K	12	365K	5	F
65	N. of	Jct. Rte. 80 (Placer Cnty)	4.863	38.7723°	-121.2526°	104K	43	16K	245K	20	358K	6	D
99	N. of	Fruitridge Rd.	21.944	38.5287°	-121.4696°	191K	8	10K	282K	8	354K	7	F
5	N. of	Jct. Rte. 80	26.722	38.6315°	-121.5201°	152K	24	12K	263K	13	351K	8	E
80	E. of	Jct. Rte. 51	10.989	38.6519°	-121.3702°	213K	4	8K	288K	6	347K	9	F
51	W. of	Jct. Rte. 160 West	3.688	38.5995°	-121.4409°	117K	36	14K	245K	21	347K	10	F
50	E. of	Jct. Rtes. 51/99	0			216K	3	8K	288K	5	346K	11	F
50	E. of	65th St.	2.628			206K	6	8K	281K	9	341K	12	F
50	E. of	Jct. Rte. 160 15th/16th St	1.37			246K	1	6K	297K	3	338K	13	F
50	W. of	65th St.	2.628			200K	7	8K	275K	11	334K	14	F
80	E. of	Antelope Rd.	16.685			168K	15	10K	259K	16	332K	15	F
99	S. of	Fruitridge Rd.	21.944			172K	14	10K	260K	14	331K	16	F
80	W. of	West Jct. Rte. 50 (Yolo Cnty)	9.905			150K	26	11K	249K	18	329K	17	D
80	E. of	Greenback Ln.	14.454			179K	10	9K	260K	15	324K	18	F
50	E. of	Jct. Rte. 5	0.35			226K	2	6K	280K	10	323K	19	F
99	N. of	Mack Rd.	17.656			161K	17	10K	248K	19	317K	20	F
5	N. of	Pocket/Meadowview Rds.	16.147			101K	45	13K	221K	31	317K	21	F
99	S. of	Stockton Blvd.	17.242			153K	23	10K	241K	23	312K	22	F
5	S. of	Jct. Rte. 99 North	29.907			108K	42	12K	220K	32	310K	23	E
50	E. of	Jct. Rte. 16	3.674			179K	10	8K	250K	17	306K	24	F
80	E. of	Atlantic St. (Placer Cnty)	3.07			157K	21	9K	238K	24	303K	25	F
80	W. of	Riverside Dr. (Placer Cnty)	0.268			165K	16	9K	242K	22	303K	26	F
80	W. of	Richards Blvd. (Yolo Cnty)	0.237			125K	33	11K	224K	29	303K	27	D
99	N. of	Stockton Blvd.	17.242			130K	32	10K	223K	30	298K	28	F
80	W. of	Jct. Rte. 65 (Placer Cnty)	4.16			147K	27	9K	229K	28	294K	29	F

**Table C-2
Model NO_x Emission for Sacramento County**

EMFAC 2011
2010 Estimated Annual Emissions
EMFAC 2011 Vehicle Categories
Sacramento COUNTY
Sacramento Valley AIR BASIN
Sacramento Metropolitan AQMD

Veh ^a	Fuel	Pop (Vehicles)	NOX_TOTEX (Tons/day)	Emission (oz/d/V)
LDA	GAS&DSL	474,531	5.719	
LDT1	GAS&DSL	67,074	1.535	
LDT2	GAS&DSL	162,705	3.440	
MDV	GAS&DSL	139,198	4.121	
Total		843,508	14.82	0.562
LHD1	GAS&DSL	39,537	5.683	
LHD2	GAS&DSL	5,573	1.028	
T6 Ag	DSL	740	0.3099	
T6 CAIRP heavy	DSL	10	0.0060	
T6 CAIRP small	DSL	32	0.0173	
T6 instate construction heavy	DSL	245	0.1529	
T6 instate construction small	DSL	596	0.3546	
T6 instate heavy	DSL	1,759	1.090	
T6 instate small	DSL	4,312	2.529	
T6 OOS heavy	DSL	6	0.0034	
T6 OOS small	DSL	18	0.0099	
T6 Public	DSL	2,072	0.4451	
T6 utility	DSL	110	0.0210	
T6TS	GAS	3,023	0.4807	
T7 Ag	DSL	327	0.4426	
T7 CAIRP	DSL	449	1.504	
T7 CAIRP construction	DSL	15	0.0518	
T7 NNOOS	DSL	453	1.271	
T7 NOOS	DSL	164	0.5506	
T7 other port	DSL	8	0.0294	
T7 POAK	DSL	18	0.0582	
T7 POLA	DSL	0	0.0000	
T7 Public	DSL	522	0.2976	
T7 Single	DSL	339	0.4083	
T7 single construction	DSL	121	0.1463	
T7 SWCV	DSL	145	0.1345	
T7 tractor	DSL	438	1.180	
T7 tractor construction	DSL	91	0.1211	
T7 utility	DSL	19	0.0093	
T7IS	GAS	331	0.2007	
Total		61,475	18.53	9.65

^a Motorcycles, motorhomes, motor coaches, and buses are excluded from this calculation

Physical Considerations for the Selected Site

Bercut Dr. Site is selected partly for its site characteristics. According to the Near-Road NO₂ TAD, there are four components to physical site characteristics to consider: roadway design, roadside structure, terrain, and meteorology. Each of these components may have desirable or undesirable attributes that alter NO₂ concentration captured. The characteristics of Bercut Dr. Site are listed below.

- Roadway Design – Interstate 5, north of I St., is elevated and can be divided into two portions: bridge and solid fill. The Bercut Dr. site is located next to the elevated roadway with solid fill and is 250 m away from the bridge portion to avoid enhanced dispersion effect. Maximum NO₂ can be captured at this location for two reasons. First, the elevated roadway, approximately 5 m above surrounding ground level, with solid fill has a similar emissions profile as a flat roadway, which allows direct sampling. Also, the inlet probe will be placed slightly above roadway level, at 6 m, to minimize sample dispersion. At this height placement, the inlet probe also meets the Probe and Monitoring Path Siting Criteria as specified in 40 CFR Part 58.
- Roadside structure – This portion of Interstate 5 does not have obstructions (i.e., sound wall) that funnels NO₂ downwind and prevents the capture of the highest NO₂ concentration. The District is working with Caltrans to remove short vegetation along the roadway to minimize any adsorption or reaction effect on NO₂.
- Terrain – Sacramento is located in a flat valley. Terrain does not present a challenge.
- Meteorology – According to meteorological data observed at an airport five miles south of Bercut Dr., Sacramento Executive Airport, prevailing wind is at this location from the south-southwest. Hence, the station would be downwind of Interstate 5.

Bercut Dr. Site has no undesirable attributes that would decrease the maximum NO₂ captured. Electric power and phone service are also readily accessible. The site can also be easily accessed by a site operator. The District is currently working with the land owner to draft a lease agreement.

The sampling inlet probe will be placed approximately 20 m from the closest highway lane. This is as close as practical due to the obstruction of the slope of the solid-fill, elevated roadway and a drainage canal that is parallel to the highway. The probe placement meets the recommendation provided in the Near-Road NO₂ TAD as well as the Near-Road NO₂ Siting Criteria in Appendix E to 40 CFR, Part 58.

Table C-3 lists the site characteristics of among top ranking sites.

Population Exposure

As instructed by the TAD, Bercut Dr. Site was selected despite having limited population exposure to NO₂. The TAD states that population exposure should only be used if two identical sites existed. Currently, most of area near Bercut Dr. is not developed for residential housing. Future urban development would likely increase population exposure, due to planned high density housing and commercial retail.

Conclusion

The Bercut Dr. site has the highest number of heavy duty truck traffic in the region that contributes to the highest FE-AADT and emissions compared to other near-road locations. Because of the site characteristic at Bercut Dr., it allows direct sampling of NO₂ emissions. Therefore, this site is likely to measure the highest NO₂ concentration in Sacramento—Arden-Arcade-Roseville CBSA.

**Table C-3
Site Characteristic**

Route	Description		AADT Rank	FE AADT Rank (ER = 17)	Roadway Design	Roadway Structure	Infrastructure	Interchanges / Lane Merge
5	N. of	I St.	9	1	Section of bridge and elevated roadway with solid fill (18ft, 1:3 slope)	None	Above ground power pole	Upwind of on-ramp
5	S. of	Jct. Rte. 80	18	2	Mostly at grade with surrounding	Sound wall on east side (residential side) of hwy	Business park and parking lot on west side of hwy	Upwind of interchange
99	N. of	Florin Rd.	10	3	At grade with surrounding	Guardrail, sound wall on both side of hwy except SB off-ramp	Commercial building/ parking lot	Downwind of on-ramp
99	S. of	Jct. Rtes. 50/51/5	5	4	Bridge, becomes elevated roadway with solid fill, becomes depressed roadway	Sound wall on both side of hwy, except for bridge portion	Street lamps inside ROW	Interchange and lane merge
5	S. of	Jct. Rte. 50	29	5	Elevated bridge, gradually becoming flat	Sound wall on east side (residential side) of hwy	Street lamps inside ROW	Interchange/ Merge lane
65	N. of	Jct. Rte. 80 (Placer Cnty)	43	6	Bridge and slightly depressed roadway	None	Stores/ Commercial Parking Lot	Interchange
99	N. of	Fruitridge Rd.	8	7	At grade with surrounding	Sound wall on both side of hwy, except the very end of SB off-ramp	Street lamps inside ROW	Downwind of on-ramp

Table C-3 (cont.)

Route		Description	AADT Rank	FE AADT Rank (ER = 17)	Roadway Design	Roadway Structure	Infrastructure	Interchanges / Lane Merge
5	N. of	Jct. Rte. 80	24	8	Bridge overpass, becomes at grade with surrounding to the north	None	Street lamps inside ROW	Downwind of interchange
80	E. of	Jct. Rte. 51	4	9	At grade with surrounding	Sound wall on both side of hwy		None
51	W. of	Jct. Rte. 160 West	36	10	At grade with surrounding	Guardrail separates hwy 51 from 16	Above ground power pole	None
50	E. of	Jct. Rtes. 51/99	3	11				
50	E. of	65th St.	6	12	Elevated roadway with solid fill	Guardrail	Small parking lot with lights	None
50	E. of	Jct. Rte. 160 15th/16th St	1	13	Bridge	None	Parking lot, light rail station	None
50	W. of	65th St.	7	14	Bridge and elevated roadway with solid fill	None	Above ground power line	None
80	E. of	Antelope Rd.	15	15	At grade with surrounding	Sound wall on both side of highway		Downwind of on-ramp
99	S. of	Fruitridge Rd.	14	16	Moderately sunken roadway	None	Above ground power pole nearby	Relatively upwind of onramp
80	W. of	West Jct. Rte. 50 (Yolo Cnty)	26	17	Slightly elevated with solid fill	None	Street lamps inside ROW	Lane merge, relatively upwind of interchange
80	E. of	Greenback Ln.	10	18				
50	E. of	Jct. Rte. 5	2	19	Mostly bridge, 2ft high, with limited elevated roadway with 1:3 slope	None	Parking lot in bridge portion of hwy	None
99	N. of	Mack Rd.	17	20				

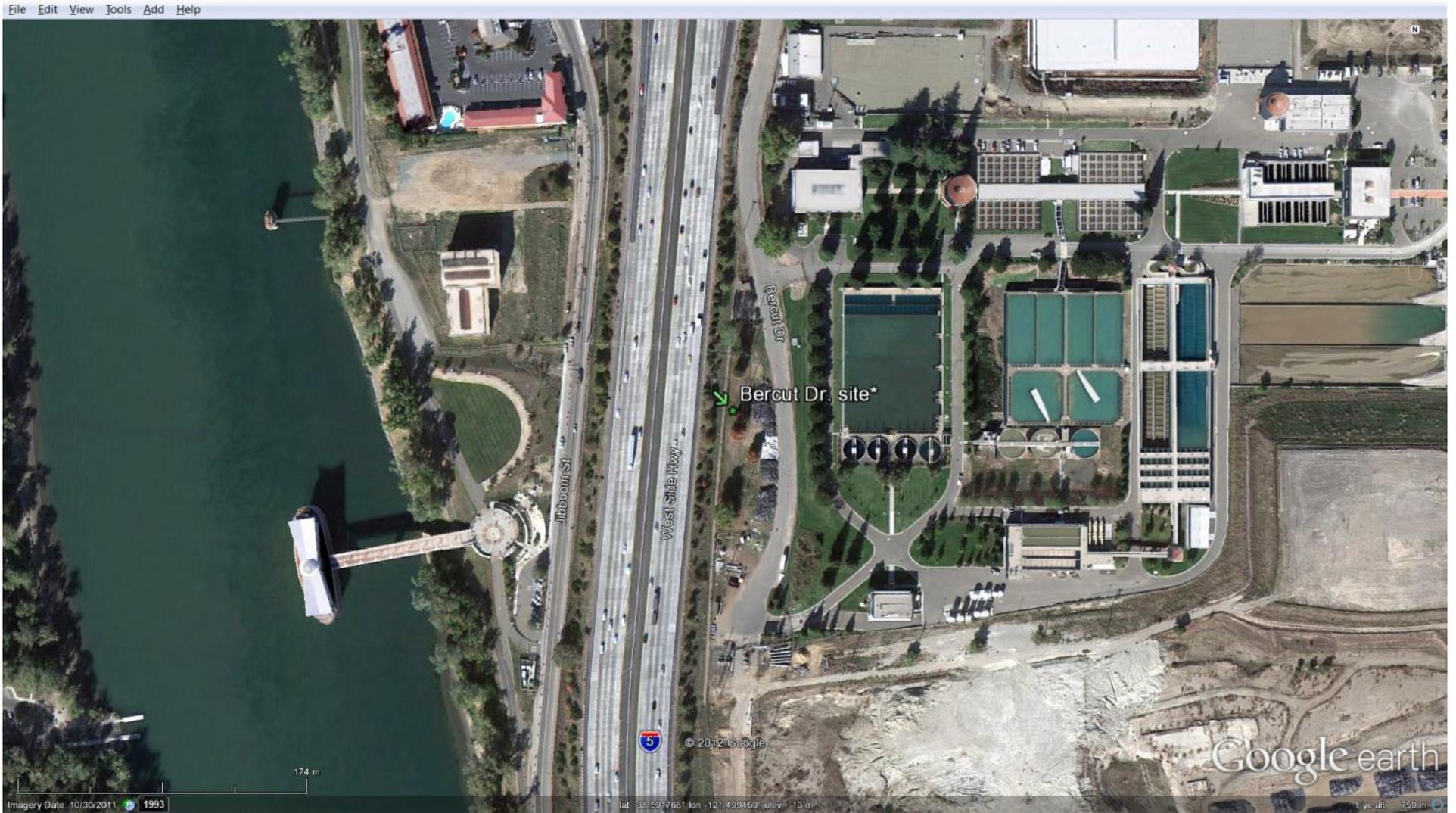
**Table C-4
Land Use and Potential Logistical Issues**

Route		Description	AADT Rank	FE AADT Rank (ER. = 17)	Surrounding Land Use	Logistical
5	N. of	I St.	9	1	Mostly commercial (water treatment plant, small-mid size business, motels, very few residences); open area to be developed into museum, high density housing (10-12K units), and retail	Power and phone line readily available, easy site access
5	S. of	Jct. Rte. 80	18	2	Commercial (business park) and suburban residential area	Difficult to meet siting criteria due to tall, mature tree near the only location for a potential station
99	N. of	Florin Rd.	10	3	Small and big business, including big box retail, suburban residence	Limited space available, power and phone nearby
99	S. of	Jct. Rtes. 50/51/5	5	4	Mostly residential	Sound wall on both side of hwy, except for bridge portion
5	S. of	Jct. Rte. 50	29	5	Open water with marina and urban forest, medium density residential area; elementary school within 1000ft	Difficult to meet siting criteria due to tall, mature tree near the only location for a potential station
65	N. of	Jct. Rte. 80 (Placer Cnty)	43	6	Commercial (shopping area)	Required to sough permission from private property owner
99	N. of	Fruitridge Rd.	8	7	Commercial/ Residential	Sound wall on both side of hwy, except the very end of SB off-ramp

Table C-4 (cont.)

Route		Description	AAADT Rank	FE AAADT Rank (ER. = 17)	Surrounding Land Use	Logistical
5	N. of	Jct. Rte. 80	24	8	Open area in the immediate vicinity; suburban residence nearby (approx 700ft from roadway)	Lack of power and phone, may have difficulty accessing this site
80	E. of	Jct. Rte. 51	4	9	Residential	
51	W. of	Jct. Rte. 160 West	36	10	Commercial (small business, warehouse, hotels), with a few residence	Limited space available, power and phone likely easily available
50	E. of	Jct. Rtes. 51/99	3	11		
50	E. of	65th St.	6	12	Residential/ Commercial	
50	E. of	Jct. Rte. 160 15th/16th St	1	13	Commercial/ Residential	
50	W. of	65th St.	7	14	Commercial/ Residential	
80	E. of	Antelope Rd.	15	15	Residential	Sound wall on both side of highway
99	S. of	Fruitridge Rd.	14	16	Commercial/ Residential	Moderately sunken roadway
80	W. of	West Jct. Rte. 50 (Yolo Cnty)	26	17	Commercial/ Residential	May of difficulty accessing, power and phone available
80	E. of	Greenback Ln.	10	18		
50	E. of	Jct. Rte. 5	2	19	Residential/ Commercial	
99	N. of	Mack Rd.	17	20		

Figure C-2
Aerial View of Bercut Dr.



*Nearby brown, dead pine trees are planned for removal; other trees are not a flow obstacle

Figure C-3
Street Level View of Bercut Dr. (looking toward SSW)

