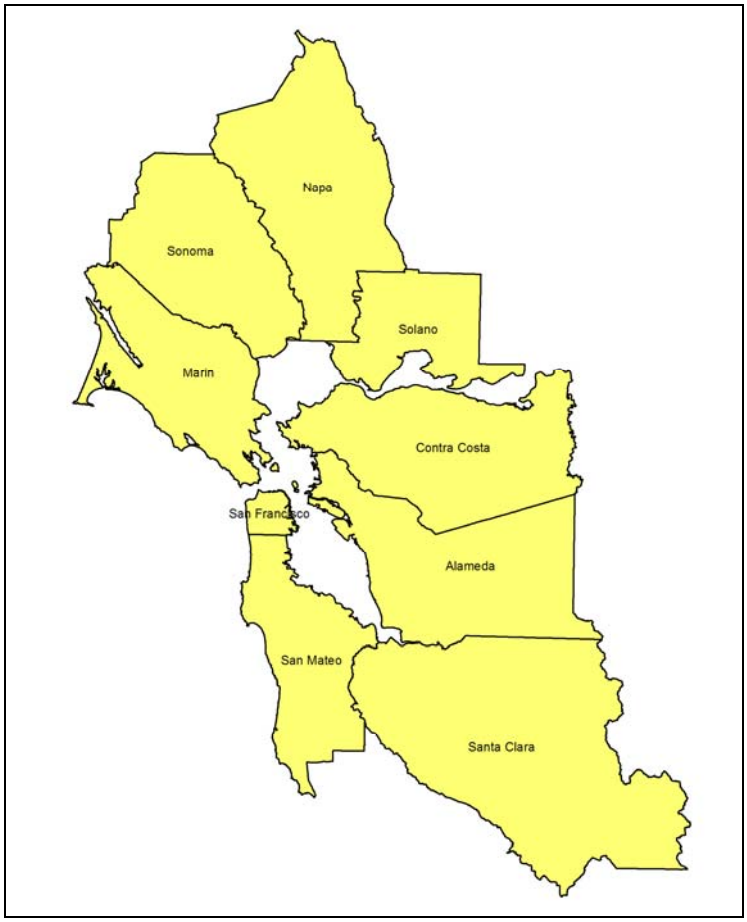
BAY AREA AIR QUALITY MANAGEMENT DISTRICT

2009 Air Monitoring Network Report

July 1, 2010



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Definition of Terms

ADT ……. Average Daily Traffic
AGL ……. Above Ground Level
AQS ……. Air Quality System; the EPA national air quality database
Air District …… Bay Area Air Quality Management District (BAAQMD)
BAM ……. Beta Attenuation Monitor, a type of continuous $PM_{2.5}$ monitor
CARB …… California Air Resources Board
CFR ……. Code of Federal Regulations
CO ……. Carbon Monoxide
CH_4 ……. Methane
DL ……. (Tree) Drip Line
EPA ……. U. S. Environmental Protection Agency
FEM ……. Federal Equivalent Method
FRM ……. Federal Reference Method
GIS ……... Geographic Information System
HC ……. Hydrocarbons, including CH_4 and NMOC
HiVol …… High Volume
H_2S ……. Hydrogen Sulfide
Maintenance Plan.. A Plan submitted by states to EPA that outlines how the NAAQS will be maintained for a particular region.
MSA ……. Metropolitan Statistical Area
NAAQS …… National Ambient Air Quality Standards
NATTS …….. National Air Toxics Trends Stations
NMOC …….. Non-methane Organic Carbon
NO ..……... Nitric Oxide
NO_2 ……... Nitrogen Dioxide
NO_x ……... Oxides of Nitrogen
NO_y ……... Total Reactive Nitrogen
O_3 ……... Ozone
PPB ……. Parts per billion
PM ……. Particulate Matter
$PM_{2.5}$…… Particulates less than or equal to in size
$PM_{2.5F}$ …… $PM_{2.5}$ measured using a filter-based monitor
$PM_{2.5C}$ …… $PM_{2.5}$ measured using a continuous monitor
PM_{10} ……... Particulates less than or equal to 10 microns in size
PM_{10C} ……. PM_{10} measured using a continuous monitor
$PM_{10-2.5}$ …….. PM less than or equal to 10 microns and greater than 2.5 microns in size
SIP ……. State Implementation Plan – A Plan submitted by states to EPA that outlines how the NAAQS will be met for a particular region.
SLAMS ……. State or Local Air Monitoring Station
SO_2 ……..... Sulfur Dioxide
SPM …… Special Purpose Monitor
STN …… Speciation Trends Network
VOC ……... Volatile Organic Compound

Overview of Network Operation

Network Design

The Bay Area Air Quality Management District (Air District) is the public agency responsible for air quality management in the nine Bay Area counties: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, southwestern Solano, and southern Sonoma. The Air District operates air monitoring stations in each of these nine counties. The Air District began measuring air quality in the San Francisco Bay Area in 1957. In 2009 there were 28 air monitoring stations in the Air District air monitoring network including one station operated by the California Air Resources Board.

Twenty-four of the 28 stations are classified by EPA as SLAMS stations (State and Local Air Monitoring Stations), which are permanently sited and meet all EPA monitor siting criteria. The other four stations are classified as SPM stations (Special Purpose Monitoring). These are stations that either do not meet EPA siting criteria (Crockett), or only measure a pollutant for which there are no siting criteria (Fort Cronkhite), or are short-term sites (Berkeley and Cupertino). For these sites, re-locatable trailers and shelters are placed at a location for a minimum of one year to characterize the area's air quality. The instruments are operated on the same sampling schedule as the permanent network which allows comparison with other sites. Statistical relationships can be made with nearby permanent sites, thereby allowing estimates of air quality at the temporary sites in future years after the instruments have been removed to a new location.

The Air District also performs air monitoring as part of other programs. These include programs that the Air District has initiated, such as meteorological monitoring, the ambient toxics program, and the West Oakland studies; or programs required by EPA. EPA programs currently include the Cupertino School Air Toxics Monitoring Program, the NATTS Program, the NCore Program, and the PM2.5 Speciation Sampling Program (STN). Summaries of these programs can be found later in this report.

The San Francisco Bay Area contains over 100 cities. Although resources do not allow placement of air pollution monitors in every city, it can be demonstrated that air pollution levels, in the absence of significant local sources, are similar within each geographical region of the Bay Area. That is, cities within each of the major valleys of the Bay Area can have similar air quality levels. Consequently, a few sites can characterize an area. Generally, locations for permanent air monitoring sites are initially based on knowledge of population density and local wind patterns, while the final site selection is determined after analyzing preliminary air quality measurements collected from field studies, temporary monitoring studies, and mobile monitoring data.

The purpose of the Air District monitoring network is:

- To provide air pollution data to the general public in a timely manner.
- To support compliance with California and national ambient air quality standards. When sites do not meet the standards, attainment plans are developed to attain the standards.
- To support air pollution research studies.

To meet its monitoring objectives the Air District monitoring network collects ambient air data at locations with a variety of monitoring site types. These site types, as defined in 40 CFR Part 58, Appendix D, Table D-1, are intended to characterize air pollution levels in areas of high pollution, high population, transported air pollution, and air pollution near specific sources.

Ambient air monitoring at Air District stations is intended to meet one or more of the following monitoring objectives:

- A determination of typical concentrations in areas of high population density.
- A determination of the highest concentrations expected to occur in the area covered by the network.
- A determination of impacts from significant sources.
- A determination of general background concentration levels.
- A determination of the extent of regional pollutant transport.

Population Oriented

As the primary purpose of air quality standards is to protect the public health, air monitoring stations have been placed in areas with high population density to determine the air pollution levels to which the majority of the population is exposed. In most cases these are within the largest cities of each county. Because people spend more time at home than at work, air monitoring sites generally have been located in residential areas rather than at downtown locations. To be consistent with EPA's list of Site Types in Table D-1 of 40CFR Part 58, the term "population orientated" will be used in place of "typical concentrations in areas of high population density", for clarity in this monitoring objective.

Highest Concentration

EPA regulations require that air quality in areas where the public has access be reduced to levels below the national ambient air standards. Consequently, monitoring must also be done at locations expected to have the highest concentrations, even if populations are sparse in that area. High concentrations may be found close to major sources, or further downwind if pollutants are emitted from tall stacks. High concentrations may also be found at distant downwind locations when the pollutants such as ozone or secondary particulate matter are a result of chemical reactions in the atmosphere.

Source Impact

There are five refineries within the Air District: Chevron, Shell, Tesoro, ConcocoPhillips, and Valero. Because these sources have the potential to emit significant amounts of SO_2 and H_2S, the Air District operates SO_2 and H_2S monitoring stations near these sources. When the monitors downwind of the source show concentrations above the applicable standards or exceed concentrations listed in Air District Regulation 9, Rules 1 and 2, a notice of violation may be issued to the source. The Port of Oakland also can be a significant source of particulates, carbon monoxide, and toxics and the Oakland West air monitoring station is located downwind of the Port to measure pollution impacts on West Oakland.

General Background

The Air District operates stations in areas that have no significant emissions from mobile, area, or industrial sources. At these sites, the measured concentrations reflect the transported air quality levels from upwind areas. When designing control strategies to reduce pollution levels, it is important to know if areas outside the boundaries of the Air District are contributing to high pollutant levels within the Air District. Where there are no significant emission sources upwind of a site, then the site is considered to be a general background site.

Regional Transport

The Air District shares a common boundary with six other air districts: Monterey Bay Unified APCD, San Joaquin Valley APCD, Sacramento Metropolitan AQMD, Yolo-Solano AQMD, Lake County AQMD, and Northern Sonoma County APCD. When upwind areas have significant air pollution sources, pollutants transported into the Bay Area Air District result in overall higher air pollution levels in the Bay Area. The Air District operates monitoring stations near the borders of the Air District to measure the air pollution concentrations transported into and out of the Bay Area Air District.

Each monitoring objective is associated with a spatial scale for each site. For example, a regional transport site is meant to represent air quality levels over a large area, while a highest concentration site may represent a spatial scale of no more than a few blocks or so, in size. Spatial scales are defined in 40 CFR, Part 58, Appendix D. They are: micro scale – having dimensions of several meters up to 100 meters; middle scale – having dimensions of 100 meters to 0.5 km; neighborhood scale – having dimensions of 0.5 km to 4.0 km; urban scale – having dimensions of 4 to 50 km; and regional scale – having dimensions of up to hundreds of km. Table 1 lists the appropriate scales for each monitoring objective.

Table 1. SLAMS Monitoring Objectives and Appropriate Spatial Scales.

Monitoring Objective	Appropriate Spatial Scale
1. Highest Concentration	Micro, middle, neighborhood
2. Population Oriented	Neighborhood, urban
3. Source Impact	Micro, middle, neighborhood
4. General Background	Urban, regional
5. Regional Transport	Urban, regional

The desired spatial scale of a monitoring site must conform to established criteria for the distance from roadways, based on traffic volumes. There are different distance requirements for each pollutant, which can be found in 40 CFR Part 58, Appendix E. Additionally, the spatial scale can also be affected if trees or obstructions are too close to the monitoring probe. The goal in siting monitoring stations is to match the spatial scale with the desired monitoring objective. Table 2 lists the stations, their monitoring objectives, and the pollutants measured at each site.

Table 2. List of Monitoring Stations within the Air District for 2009.

Site	SLAMS Stations	Type[1]	Monitoring Objective	Pollutants Monitored[1]
1	Bethel Island	SLAMS	Regional Transport& Highest Concentration	O_3, NO_x, SO_2, CO, PM_{10}, Toxics
2	Concord	SLAMS	Population Oriented, Highest Concentration	O_3, NO_x, SO_2, CO, HC, PM_{10}, $PM_{2.5F}$, Toxics
3	Fairfield	SLAMS	Population Oriented & Regional Transport	O_3
4	Fremont	SLAMS	Population Oriented	O_3, NO_x, CO, HC, $PM_{2.5F,}$ $PM_{2.5C}$, Toxics
5	Gilroy	SLAMS	Population Oriented, Highest Concentration, & Regional Transport	O_3, $PM_{2.5F,}$ $PM_{2.5C}$
6	Hayward	SLAMS	Population Oriented & Regional Transport	O_3
7	Livermore	SLAMS	Population Oriented & Highest Concentration	O_3, NO_x, CO, HC, $PM_{2.5F}$, $PM_{2.5C}$, Speciated $PM_{2.5}$, Toxics
8	Los Gatos	SLAMS	Population Oriented & Highest Concentration	O_3
9	Martinez	SLAMS	Source Impact	SO_2, Toxics
10	Napa	SLAMS	Population Oriented	O_3, NO_x, CO, PM_{10}, $PM_{2.5C}$, Toxics
11	Oakland	SLAMS	Population Oriented	O_3, NO_x, CO, $PM_{2.5F,}$ $PM_{2.5C}$, Toxics
12	Oakland West	SLAMS	Source Impact & Highest Concentration	NO_x, SO_2, CO, $PM_{2.5C,}$ Speciated $PM_{2.5}$, Toxics
13	Pt Reyes[2]	SLAMS	General Background	$PM_{2.5C}$
14	Pt Richmond	SLAMS	Source Impact	H_2S
15	Redwood City	SLAMS	Population Oriented	O_3, NO_x, CO, $PM_{2.5F}$, $PM_{2.5C}$, Toxics
16	Richmond 7th	SLAMS	Source Impact	SO_2, H_2S, Toxics
17	Rodeo	SLAMS	Source Impact	H_2S
18	San Francisco	SLAMS	Population Oriented	O_3, NO_x, CO, HC, PM_{10}, $PM_{2.5F}$, $PM_{2.5C}$, Toxics
19	San Jose	SLAMS	Population Oriented & Highest Concentration	O_3, NO_x, SO_2, CO, HC, PM_{10}, $PM_{2.5F}$, $PM_{2.5C}$, Speciated $PM_{2.5,}$ Toxics
20	San Martin	SLAMS	Highest Concentration	O_3
21	San Pablo	SLAMS	Population Oriented	O_3, NO_x, SO_2, CO, PM_{10}, Toxics
22	San Rafael	SLAMS	Population Oriented	O_3, NO_x, CO, PM_{10}, $PM_{2.5C}$, Toxics
23	Santa Rosa	SLAMS	Population Oriented	O_3, NO_x, CO, $PM_{2.5F,}$ $PM_{2.5C}$, Toxics
24	Vallejo	SLAMS	Population Oriented	O_3, NO_x, SO_2, CO, $PM_{2.5F}$, $PM_{2.5C}$, Speciated $PM_{2.5}$, Toxics

Table 2 continued. List of Monitoring Stations within the Air District for 2009.

Site	Non-SLAMS Stations	Type[1]	Monitoring Objective	Pollutants Monitored[1]
25	Berkeley	SPM	Population Oriented & Source Impact	O_3, NO_x, SO_2, CO, HC, PM_{10}, $PM_{2.5C}$, Toxics
26	Crockett	SPM	Source Impact	SO_2, Toxics
27	Cupertino	SPM	Population Oriented & Source Impact	PM_{10C}
28	Fort Cronkhite	SPM	General Background	Toxics

[1] See page 6 for acronym definitions.
[2] Operated by the California Air Resources Board.

EPA suggests that the appropriate spatial scale for population oriented sites should be neighborhood or urban. Using the current EPA methodology to determine spatial scales, the air monitoring sites in Napa, Oakland, San Pablo and San Rafael would be characterized as middle scale. However, the Air District believes the spatial scale of the site would be better characterized as neighborhood scale. This is because EPA's distance requirements from roads are based on 1979 vehicle emission levels. Current fleet average vehicle emission factors in the Bay Area are 95% lower for HC, 95% lower for CO, 82% lower for NO_x, and 48% lower for PM_{10} in 2009 compared to 1979.

Figure 1 is a map of the 2009 Air District SLAMS and SPM monitoring sites. Tables 3, 4 and 5 list the minimum number of monitors required within the network for each pollutant. The section following Table 6 describes recent changes to the monitoring network, and proposed changes to the monitoring network.

The final section provides detailed descriptions of the monitoring objectives for each air monitoring site and a brief explanation for choosing the type of monitor at each site.

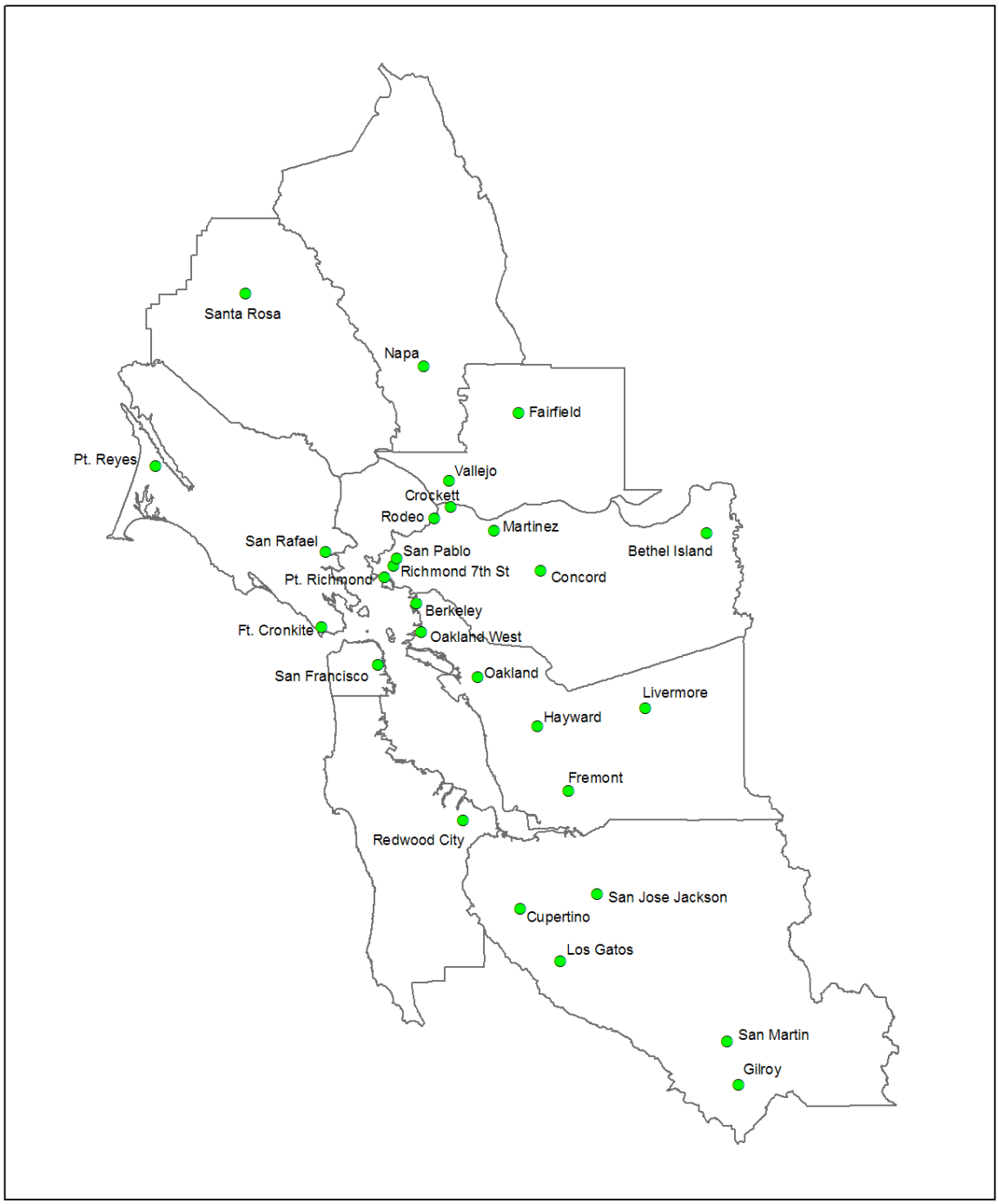

Figure 1. Map of Air District SLAMS and SPM Sites for 2009.

Minimum Monitoring Requirements for SLAMS Sites

Minimum Monitoring Requirements for Ozone

The number of required ozone monitors for each MSA in the Bay Area is determined by its population and design value, as specified in Table D-2 of 40 CFR Part 58, Appendix D – SLAMS Minimum O_3 Monitoring Requirements. Ozone design values are a calculated concentration (see footnote no.1 below) which are used for comparison with the national standard to determine the attainment status of an area for that pollutant. Table 3 shows that the Air District monitoring network meets or exceeds the ozone minimum monitoring requirements. No additional monitors have been required in the State Implementation Plan (SIP) or Maintenance Plan for ozone.

Table 3. Minimum Monitoring Requirements for Ozone SLAMS Sites.

MSA	County	Population (2009)	8-hour Design Value[1] (ppb) 2009	Number of Monitors Required	Number of Monitors Active	Additional Monitors Needed
San Francisco-Oakland-Fremont	SF, Marin, Alameda, San Mateo, Contra Costa	4,317,853	78	3	10	0
San Jose-Sunnyvale-Santa Clara	Santa Clara, San Benito	1,839,700	72	2	6[2]	0
Santa Rosa-Petaluma	Sonoma	472,102	52	1	1	0
Vallejo-Fairfield	Solano	407,234	67	2	3[3]	0
Napa	Napa	134,650	61	1	1	0

[1] Design values are calculated at each monitoring site by taking the 3-year mean (2007-2009) of the 4th highest 8-hour concentration. The design values shown for each MSA in this table are the highest design value of monitors in the MSA that are within the boundaries of the BAAQMD. Design values at or below the 0.075 ppm National Ambient Air Quality 8-hour Ozone Standard meet the standard.

[2] One of the monitors is located in Hollister in San Benito County and is operated by the Monterey Bay Unified Air Pollution Control District. Another monitor is located in Pinnacles National Monument and is operated by the National Park Service.

[3] One of the monitors is located in Vacaville in Solano County and is operated by the Yolo-Solano Air Pollution Control District.

Minimum Monitoring Requirements for $PM_{2.5}$

The number of required $PM_{2.5}$ monitors for each MSA in the Bay Area is determined by its population and design value, as specified in Table D-5 of Appendix D to 40 CFR Part 58 – $PM_{2.5}$ Minimum Monitoring Requirements. $PM_{2.5}$ design values are a calculated concentration (see footnotes no.1 & 2) which are used for comparison with the national standard to determine the attainment status of an area for that pollutant. Table 4 shows that the Air District monitoring network meets or exceeds the $PM_{2.5}$ minimum monitoring requirements. No additional monitors are required for the State Implementation Plan (SIP) or Maintenance Plan because the Bay Area has never been designated as non-attainment for $PM_{2.5}$, and no SIP or Maintenance Plans have been prepared for $PM_{2.5}$.

Table 4. Minimum Monitoring Requirements for $PM_{2.5}$ SLAMS Sites.

MSA	County	Population (2009)	Annual Design Value[1] ($\mu g/m^3$) 2009	Daily Design Value[2] ($\mu g/m^3$) 2009	Number of Monitors Required	Number of Monitors Active	Additional Monitors Needed
San Francisco-Oakland-Fremont	SF, San Mateo, Alameda, Marin, Contra Costa	4,317,853	9.4	34	3	7	0
San Jose-Sunnyvale-Santa Clara	Santa Clara, San Benito	1,839,700	10.8	34	3	3[3]	0
Santa Rosa-Petaluma	Sonoma	472,102	8.2	28	1	1	0
Vallejo-Fairfield	Solano	407,234	9.8	36	1	1	0
Napa	Napa	134,650	N/A[4]	N/A[4]	0	0	0

[1] Annual design values are calculated at each monitoring site by taking the 3-year mean (2007-2009) of the annual averages for each site. The design values shown for each MSA in this table are the highest design value of monitors in the MSA that are within the boundaries of the BAAQMD. Design values at or below the national $PM_{2.5}$ annual standard of 15 $\mu g/m^3$ indicate the area meets the standard.

[2] Daily design values are calculated by taking the 3-year mean (2007-2009) of the 98th percentiles for each site. The design values shown for each MSA in this table are the highest design value of monitors in the MSA that are within the boundaries of the BAAQMD. Monitors outside of the BAAQMD may have a higher design value. Design values at or below the national $PM_{2.5}$ 24-hour standard of 35 $\mu g/m^3$ indicate the area meets the standard.

[3] One of the monitors is located in Hollister in San Benito County and is operated by the Monterey Bay Unified Air Pollution Control District.

[4] There are no EPA FRM or FEM $PM_{2.5}$ monitors in Napa County.

Minimum Monitoring Requirements for PM_{10}

The number of required PM_{10} monitors for each MSA in the Bay Area is determined by its population and design value, as specified in Table D-4 of Appendix D to 40 CFR Part 58 – PM_{10} Minimum Monitoring Requirements. PM_{10} design values are a calculated concentration (see footnote no.1) which are used for comparison with the national standard to determine the attainment status of an area for that pollutant. Table 5 shows that the Air District monitoring network meets or exceeds the PM_{10} minimum monitoring requirements. No additional monitors are required for the State Implementation Plan (SIP) or Maintenance Plan because the Bay Area has never been designated as non-attainment for PM_{10}, and no SIP or Maintenance Plans have been prepared for PM_{10}.

Table 5. Minimum Monitoring Requirements for PM_{10} SLAMS Sites.

MSA	County	Population estimate (2009)	Daily Design[1] Value ($\mu g/m^3$) 2009	Number of Monitors Required	Number of Monitors Active	Additional Monitors Needed
San Francisco-Oakland-Fremont	SF, San Mateo, Alameda, Marin, Contra Costa	4,317,853	78.2	2	5	0
San Jose-Sunnyvale-Santa Clara	Santa Clara, San Benito	1,839,700	72.9	2	2[2]	0
Santa Rosa-Petaluma	Sonoma	472,102	N/A[3]	0	0	0
Vallejo-Fairfield	Solano	407,234	N/A[3]	0	0	0
Napa	Napa	134,650	51.7	0	1	0

[1] For PM_{10}, the design value is defined as the expected number of exceedances per year, which is calculated by averaging the number of exceedances for the past 3 years (2007-2009). Since there were no exceedances in the past 3 years, the PM_{10} design value is zero for all MSA's within the Bay Area Air Quality Management District. The 24-hour standard (150 $\mu g/m^3$) is attained when the design value is less than or equal to one. Instead of the PM_{10} design value, the number shown in this column is the highest 24-hour PM_{10} concentration in 2007-2009.

[2] One of the monitors is located in Hollister in San Benito County and is operated by the Monterey Bay Unified Air Pollution Control District.

[3] There are no FRM or FEM PM_{10} monitors in this MSA.

Minimum Monitoring Requirements for SO_2

In 2009, 40 CFR Part 58, Appendix D, Section 4.4 stated that there are no minimum requirements for the number of SO_2 monitoring sites. No additional monitors are required for SIP or Maintenance Plans, because the Air District has never been designated as non-attainment for SO_2, and no SIP or maintenance plans have been prepared for SO_2. The Air District operates 9 SO_2 permanent monitors in its network.

On June 2, 2010 the EPA strengthened National Ambient Air Quality Standard for SO_2. New monitoring requirements based on the new 1-hour SO_2 primary standard take affect on January 1, 2013. Under the new monitoring requirements the Air District already meets the minimum number of SO_2 monitors and will not need to add any additional monitors to the network. Details can be seen in Table 6.

Table 6. Minimum Monitoring Requirements for SO_2 SLAMS Sites in 2013.

MSA	County	Number of Monitors Required by 2013	Number of Monitors Active in 2009	Addi-tional Monitors Needed by 2013
San Francisco-Oakland-Fremont	SF, San Mateo, Alameda, Marin, Contra Costa	2	7[1]	0
San Jose-Sunnyvale-Santa Clara	Santa Clara, San Benito	1	1	0
Santa Rosa-Petaluma	Sonoma	0	0	0
Vallejo-Fairfield	Solano	0	1	0
Napa	Napa	0	0	0

[1] The permanent SO_2 monitor at Crockett does not meet certain SLAMS siting criteria and is designated as an SPM.

Minimum Monitoring Requirements for NO_2

In 2009, 40 CFR Part 58, Appendix D, Section 4.3 stated that there were no minimum requirements for the number of NO_2 monitoring sites. No additional monitors were required for the SIP or Maintenance Plans because the Air District had not been designated as non-attainment for NO_2 and no SIP or maintenance plans were prepared for NO_2.

The Air District operated 15 NO_2 monitors in the Bay Area in 2009 because NO_2 is a criteria pollutant and because NO_2 and NO are important precursors in ozone formation. NO and NO_2 are formed from vehicle, power plant and other industrial emissions, and contributes to the formation of fine particulate pollution and smog.

On February 25, 2010 the EPA revised the minimum monitoring requirements for NO_2. By January 1, 2013, the Air District must operate NO_2 monitors at population-oriented sites and at sites within 50 meters of major freeways. Based on Bay Area population and traffic counts, the Bay Area will need to operate at least two monitors sited to measure the area-wide NO_2 concentrations, and at three sites near freeways. Details can be seen in Table 7.

Table 7. Minimum Monitoring Requirements for NO_2 SLAMS Sites in 2013.

MSA	County	Population estimate (2009)	Annual Design[1] Value (ppb) 2009	Daily Design[2] Value (ppb) 2009	Number of Area-wide Monitors Required	Number of Area-wide Monitors Active	Additional Area-wide Monitors Needed
					Number of Roadside Monitors Required	Number of Roadside Monitors Active	Additional Roadside Monitors Needed
San Francisco-Oakland-Fremont	SF, San Mateo, Alameda, Marin, Contra Costa	4,317,853	16	54	1	10	0
					2	0	2
San Jose-Sunnyvale-Santa Clara	Santa Clara, San Benito	1,839,700	15	53	1	1	0
					1	0	1
Santa Rosa-Petaluma	Sonoma	472,102	9	38	0	1	0
					0	0	0
Vallejo-Fairfield	Solano	407,234	10	42	0	1	0
					0	0	0
Napa	Napa	134,650	10	39	0	1	0
					0	0	0

[1] Annual design values are determined for each monitoring site by calculating the arithmetic average of all of the reported 1-hour values for the most current year. The design values shown for each MSA in this table are the highest design value of monitors in the MSA that are within the boundaries of the BAAQMD. Design values at or below the national NO_2 annual standard of 53 ppb meet the standard.

[2] Daily design values are calculated at each monitoring site by taking the 3-year mean (2007-2009) of the 8th highest daily maximum 1-hour concentration. The design values shown for each MSA in this table are the highest design value of monitors in the MSA that are within the boundaries of the BAAQMD. Design values at or below the national NO_2 1-hour standard of 100 ppb meet the standard.

Minimum Monitoring Requirements for CO

40 CFR Part 58, Appendix D, Section 4.2 states that there are no minimum requirements for the number of CO monitoring sites. No additional monitors are required for SIP or Maintenance Plans. The Air District was re-designated attainment for the 8-hour average CO NAAQS in 1998. The Air District carbon monoxide maintenance plan is contained within

the California Air Resource Board document "2004 Revision to the California State Implementation Plan for Carbon Monoxide." The maintenance plan does not specify the number of CO monitors needed. Generally, the Air District operates one CO monitor within each of the nine Bay Area counties plus additional CO monitors in large cities. Also, CO monitors are used to provide a Q/C function at full stations. CO monitoring could take on future importance because EPA is expected to review the current CO NAAQS and may revise the NAAQS to be more stringent. The Air District currently operates 13 CO monitors in its network.

Modifications Made to Network in 2009

This section discusses specific changes made to instrumentation at Air District air monitoring stations in 2009. A more complete discussion of all instrumentation operating at the air monitoring stations can be found later in this document.

Concord

A collocated $PM_{2.5}$ sampler at Concord has been operated once every 6 days to collect a 24-hour sample which is compared with the sample from the primary $PM_{2.5}$ sampler as a method of checking the precision of the primary monitor. Over the past 10 years, concentrations from the two samplers have shown good agreement. New regulations from EPA currently only require collocated $PM_{2.5}$ measurements every 12^{th} day. The Air District changed operation of the collocated $PM_{2.5}$ sampler from a 1 in 6 day schedule to a 1 in 12 day schedule in April 2009. The primary sampler will continue to be operated every day during the winter and every 3^{rd} day during the summer.

Denverton

The Air District is collaborating with the San Joaquin Valley Wide Air Quality Study Agency to monitor O_3, NO/NO_2, speciated hydrocarbons, and meteorology at a site near Denverton along Highway 12 in Solano County which began operations in 2009. The purpose is to measure the transport of ozone and its precursors between the Bay Area and the Central Valley. The station will be operated for a minimum of 3 years.

Livermore

Carbon monoxide monitoring was discontinued in May 2009 at the Livermore station to create space for an automatic gas chromatograph (GC). Carbon monoxide levels over the most recent 5 years at Livermore have been well below State and national standards, so further monitoring was not needed to show attainment. The GC is being added as part of the Precursor Air Monitoring Study listed below.

Oakland

The Air District has been operating a filter-based $PM_{2.5}$ sampler in Oakland since November 2007. The Air District replaced the $PM_{2.5}$ filter-based sampler with a continuous FEM-BAM $PM_{2.5}$ sampler in October 2009. The new sampler allows real-time display of the data on the Air District webpage, and allows hourly analysis of the data.

Oakland West

The Air District opened an air monitoring station in West Oakland in February 2009. It is located downwind of the Port of Oakland and measures SO_2, NO/NO_2, CO, black carbon, continuous $PM_{2.5}$, speciated $PM_{2.5}$, and toxics. It is intended to be a long-term site.

Precursor Air Monitoring Stations

EPA is funding the operation of three precursor monitoring stations. The first site began operation during summer 2009 at the Air District's Livermore air monitoring station. Two sites will become operational in July 2010: along the Highway 680 corridor in San Ramon, and at Patterson Pass. All three sites will measure O_3, NO/NO_2, speciated hydrocarbons, and meteorology, the same as at the Denverton site. The stations are expected to be operated for a minimum of 3 years.

Particulate Matter (PM2.5) Sites

The Air District replaced filter-based $PM_{2.5}$ samplers with Federal Equivalent Method continuous $PM_{2.5}$ monitors at five stations in 2009: Fremont, San Francisco, Redwood City, Gilroy, and Santa Rosa. These sites were chosen because the samplers had been operated on a 1 in 3 day schedule in the past during winter months using filter-based samplers. The new FEM samplers allow $PM_{2.5}$ sampling every hour of every day without requiring additional staff resources.

San Jose

A trace SO_2 monitor was added to the San Jose station in February 2009 to meet the NCore monitoring requirements. Trace level monitors provide accurate measurements at the low SO_2 concentrations found in San Jose.

San Pablo

The station ceased operation due to heavy damage from a fire in the building in March 2009. It is expected to reopen in 2010 after repairs are completed.

San Rafael

The Air District added a continuous FEM-BAM $PM_{2.5}$ sampler in October 2009. The new sampler allows real-time display of the data on the Air District webpage, and allows hourly analysis of the data.

School Air Toxics Monitoring Program

The Air District has been operating a sampler and meteorological system at the Stevens Creek Elementary School in Cupertino since June 2009. The project is part of an EPA nation-wide monitoring study at schools across the country to gather data on whether outdoor toxic air pollution poses health concerns to schoolchildren. While the EPA study was designed to be a two month sampling project, the Air District has chosen to continue it for an additional 10 months to obtain a full year of samples. The samplers are operated on a 1 in 6 day schedule, and the samples are sent to an EPA lab for analysis. Samples are analyzed for levels of hexavalent chromium. The site was chosen because of its proximity to the Lehigh Southwest Cement Company in Cupertino. Sampling will continue until July 2010.

Proposed Modifications to Network in 2010-2011

This section discusses proposed changes to be made to the instrumentation at Air District air monitoring stations in the next 18 months. A more complete discussion of instrumentation and programs operating at the air monitoring stations can be found later in this document.

Berkeley

The Air District began operation of a temporary air monitoring station in Berkeley on December 13, 2007. The site will be shut down at the end of 2010. The purpose of the monitoring study is to determine air quality in West Berkeley downwind of Highway 80 and Pacific Steel Casting. Monitoring includes O_3, SO_2, NO/NO_2, CO, CH_4/NMOC, continuous $PM_{2.5}$, PM_{10}, toxics, metals, and aldehydes. Data from the site may be viewed on the Air District's real time air quality web page at http://gate1.baaqmd.gov/aqmet/aq.aspx

Concord

A collocated $PM_{2.5}$ filter-based sampler has been operated at Concord on a one in 12 day sampling schedule since April 2009. This meets current EPA collocated monitoring requirements. The purpose of collocated sampling is to determine the precision of the sampling program by comparing collocated samples with the samples from the primary $PM_{2.5}$ sampler. In April 2010 the collocated sampling schedule was changed back to a 1 in 6 day schedule to improve the precision estimates.

Contra Costa County

The Air District is considering locating a monitoring trailer to a location in northeastern Contra Costa County. This is an area of rapid development, and a one-year monitoring study would demonstrate if further monitoring is needed. Monitoring would include O_3, SO_2, NO/NO_2, CO, continuous $PM_{2.5}$, PM_{10}, and toxics.

Cupertino

The Air District installed a continuous PM_{10} sampler at a site on Stevens Creek Boulevard in Cupertino near the Lehigh Cement Plant in November 2008. The purpose was to determine if the residential area downwind of the cement plant and associated truck traffic are experiencing elevated particulate levels. The sampling will continue through fall 2010. After that time, the monitoring site will be moved to Monte Vista Park in Cupertino and a fully-instrumented trailer will replace the PM_{10} monitor. The trailer will house instruments to measure O_3, CH_4/NMOC, NO/NO_2, CO, SO_2, PM_{10}, $PM_{2.5}$, toxics, metals, and meteorology. The instrumented trailer is expected to operate for one year. Hourly air quality and meteorological data from the site may be viewed on the Air District's real time air quality web page at http://gate1.baaqmd.gov/aqmet/aq.aspx

Fremont

The Air District is considering closing the Fremont air monitoring station. Additional monitoring requirements from EPA combined with current resource limitations may necessitate the closure of a station. Fremont air quality levels are similar to nearby stations

and exceedances of the NAAQS are rare. Further study will be done before a decision is made.

Lead Monitoring

On October 15, 2008, EPA strengthened the National Ambient Air Quality Standard for lead by lowering it from 1.5 $\mu g/m^3$ to 0.15 $\mu g/m^3$. EPA is in the process of revising the monitoring requirements for lead, with an expected promulgation date of fall 2010. Early versions of the regulation suggest that lead monitors will need to be placed at larger private-airplane airports. After that regulation is finalized, the Air District will have up to one year to install any required lead monitors.

Livermore

The Air District will replace the filter-based $PM_{2.5}$ sampler at Livermore with a continuous FEM-BAM $PM_{2.5}$ sampler. The new sampler will allow real-time display of the data on the Air District webpage, and will allow hourly analysis of the data.

NO2 Monitoring

On April 12, 2010, EPA revised the National Ambient Air Quality Standard for NO_2 by creating a one-hour standard of 100 ppb. The annual standard was left at 53 ppb. The new regulation also requires that NO_2 monitoring be performed at 3 sites within 50 meters of major roadways by January 1, 2013. The Air District expects to locate the new sites in 2011.

Particulate Matter (PM10) Sites

The Air District plans to replace high-volume PM_{10} samplers with low-volume PM_{10} samplers at the San Jose air monitoring station and will consider replacing high-volume PM_{10} samplers at other stations with low-volume PM_{10} samplers. These samplers use less power and are more accurate than the current high-volume PM_{10} technology, and are also needed to meet the PM coarse sampling requirements beginning in 2011.

Precursor Air Monitoring Stations

The Air District is conducting a precursor monitoring program to obtain hourly measurements of NOx and organic hydrocarbon compounds. These compounds will be compared with the concentrations simulated in photochemical model runs to verify that the model is producing hourly concentrations at the correct levels both in time and space. A GC/FID analyzer was installed at the Livermore air monitoring station during the summer of 2009 as part of the program. Two additional sites will become operational in 2010. One site will be in San Ramon, and the other at Patterson Pass. All sites will measure O_3, NO/NO_2, speciated hydrocarbons, and meteorology. The program is expected to continue for a minimum of 3 years.

Redwood City

When the Federal Equivalent Method continuous $PM_{2.5}$ monitors were installed in 2009, EPA regulations required that a second collocated monitor be added in the monitoring network. The Redwood City station was chosen for the location of the collocated monitor. When the collocated monitor was installed at Redwood City in October 2009, it was operated

on a 1 in 12 day schedule. This meets current EPA collocated monitoring requirements. In April 2010 it was changed to a one in 6 day schedule to gather more data allowing a more robust (accurate) estimate of the precision.

Richmond 7th Street

The Air District is considering closing the Richmond 7th Street air monitoring station and moving the H_2S and SO_2 monitors to the San Pablo air monitoring station. The two stations are close to each other and consolidation would conserve staff resources. Further study will be done before a decision is made.

San Jose

The Air District intends to designate the San Jose station as an NCore site on January 1, 2011. Before then, a meteorological system, an NO_y monitor, and a PM_{10} low-flow filter-based sampler will be added to meet NCore requirements, The addition of the low-flow PM_{10} sampler will allow a determination of 24-hour $PM_{10-2.5}$ course particle concentrations by the subtraction of on-site filter-based 24-hour $PM_{2.5}$ concentrations from the filter-based 24-hour PM_{10} concentrations.

San Pablo

The station began operating again in May 2010 after repairs were completed. The station was temporarily closed due to fire damage in the building in March 2009.

South San Jose

The Air District may agree to operate a monitoring station near the Metcalf Energy Center power plant in South San Jose. This site is being established as part of an agreement between the City of San Jose and the Metcalf Energy Center. The station will be located in a residential neighborhood 1 mile northwest of the power plant and will monitor ambient levels of pollutants emitted by the power plant. Those pollutants are PM_{10}, NO/NO_2, and CO. It is intended to be a long-term site. If the Air District takes over operation of the site, ozone levels may also be monitored as part of a special field study for 2 years.

SO2 Monitoring

EPA revised the National Ambient Air Quality Standard for SO_2 on June 2, 2010. Based on new monitoring requirements that take effect on January 1, 2013, no additional SO_2 monitoring will be required in the Air District.

Vallejo

The Air District will replace the filter-based $PM_{2.5}$ sampler at Vallejo with a continuous FEM-BAM $PM_{2.5}$ sampler. The new sampler will allow real-time display of the data on the Air District webpage, and will allow hourly analysis of the data.

Wood Smoke Monitoring

As part of its wintertime wood smoke study, the Air District is planning to purchase and operate 5 to 10 nephelometers. These instruments measure the amount of light scattered by particles and can be used to estimate the contribution of wood smoke to total $PM_{2.5}$ levels

when collocated with $PM_{2.5}$ monitors. The data can also provide an estimate of the effectiveness of the wood burning ban on Spare the Air Days.

Removing a NAAQS Compliance Monitor

When the Air District proposes changes to the air monitoring network, the proposed changes are included in the annual Monitoring Network Plan. The annual Monitoring Network Plan is posted on the Air District web site for 30 days to allow public comment on the proposed changes to the network. After the public comment period, the Air District reviews and considers the comments before making a final decision. The Air District then submits the Plan and any comments received to the EPA Region IX Regional Administrator.

Before shutting down a SLAMS (State or Local Air Monitoring Station) monitor, 40 CFR Part 58.14c requires that the Air District obtain the Regional Administrator's written approval. The Regional Administrator will normally approve the shutdown of a SLAMS monitor when any of the following situations apply:

1) Criteria pollutant monitors which have shown attainment of the national standards during the previous five years may be removed if the probability is less than 10% that the monitor will exceed 80% of NAAQS during the next three years, and if the monitor is not required by an attainment or maintenance plan.
2) CO, PM_{10}, SO_2, or NO_2 monitors may be removed if the monitor has shown consistently lower concentrations than another monitor for the same pollutant in the same county during the previous five years.
3) Criteria pollutant monitors that have not violated the national standards in the most recent five years may be removed if the State Implementation Plan (SIP) provides a method of representing the air quality in the applicable county.
4) $PM_{2.5}$ monitors may be removed when EPA determines that measurements are not comparable to the relevant NAAQS because of siting issues.
5) Criteria pollutant monitors which are located upwind of an urban area to characterize transport may be removed if the monitor has not recorded violations of the relevant NAAQS in the previous five years, and if the monitor is being replaced by another monitor that characterizes transport.
6) Criteria pollutant monitors not eligible for removal under any of the above criteria may be moved to a nearby location with the same scale of representation if logistical problems beyond the agency's control make it impossible to continue operation at its current site.

The closure of a SPM (Special Purpose Monitor) monitor does not require approval from EPA, but a change in the designation of a monitoring site from SLAMS to SPM requires approval of the Regional Administrator.

Data Submission Requirement

- Precision/Accuracy reports are submitted monthly to the EPA AQS database.
- The certification letter for 2009 data was submitted to EPA Region 9 on May 1, 2010.

Site Information Definitions

The next section describes each air quality station operated within the Bay Area Air Quality Management District. In 2009 there were 28 stations operating in the Air District: 26 long-term stations (24 SLAMS stations and two SPM stations), and 2 temporary stations. Long-term stations are generally operated for decades, while temporary stations are expected to operate for 1 to 2 years.

The station description includes siting information about the station and the individual monitors at the station. Monitors must be operated following EPA requirements found in 40 CFR Part 58. These regulations also specify monitor siting criteria. Table 8 below lists these siting criteria where applicable.

Table 8. Monitor Information and EPA Air Monitoring Siting Criteria.

Monitor Information	Definition of Terms
Monitoring Objective	The purpose for monitoring at that location. Choices include Highest Concentration, Population Oriented, Source Impact, General Background, and Regional Transport.
Spatial scale	The relative distance over which the air pollution measurements are representative. Choices are Micro, Middle, Neighborhood, Urban, and Regional scales.
Sampling method	*40 CFR Part 58 Appendix C, 2.0*: requires that the monitor used must be from EPA's current List of Designated Reference and Equivalent Methods.
PM filter analysis method	Describes whether the PM filters are analyzed in-house by the local agency or at an outside laboratory.
Start date	The date valid data collection began for that pollutant at that air monitoring station.
Operation schedule	Describes if the monitor is operated continuously or intermittently (as for PM).
Sampling season	Most monitors operate all year, but some monitors may only operate during months when pollution potential is highest, e.g. ozone.
Distance to road from gaseous probe	*40 CFR Part 58 Appendix E, 6.0*: requires that monitors be located far enough from roadways to minimize local mobile impacts on measurements. Recommended distances are found in Table E-1 for NO_x and ozone, Table E-2 for CO, and Figure E-1 for PM.
Ground cover	*40 CFR Part 58 Appendix E, 3.0*: states that particulate samplers should not be located in an unpaved area unless there is vegetative ground cover year round, so that the impact of wind blown dusts will be kept to a minimum.
Probe height (AGL)	*40 CFR Part 58 Appendix E, 2.0*: requires that probe height be 2-15 meters above ground level (AGL).
Probe height above roof	*40 CFR Part 58 Appendix E, 2.0*: requires the probe be at least 1 meter vertically or horizontally away from any supporting structure.
Distance from obstructions on roof	*40 CFR Part 58 Appendix E, 4.0*: requires that the distance from the obstacle to the probe or inlet must be at least twice the height that the obstacle protrudes above the probe or inlet. PM samplers must have a 2 meter separation from walls, parapets and structures. 4.0 (b)

Table 8 continued. Monitor Information and EPA Air Monitoring Siting Criteria.

Monitor Information	Definition of Terms
Distance from obstructions not on roof	*40 CFR Part 58 Appendix E, 4.0*: requires that the distance from the obstacle to the probe or inlet must be at least twice the height that the obstacle protrudes above the probe or inlet.
Distance from tree (DL)	*40 CFR Part 58 Appendix E, 5.0*: requires that probe be at least 10 meters from the nearest tree drip line.
Distance to furnace or incinerator flue	*40 CFR Part 58 Appendix E, 3.0*: requires that scavenging be minimized by keeping the probe away from furnace or incineration flues or other minor sources of SO_2 or NO. The separation distance should take into account the heights of the flues, type of waste or fuel burned, and the sulfur content of the fuel.
Distance between collocated monitors	*40 CFR Part 58 appendix A, 3.2.5.6*: requires that PM monitors be 2-4 meters apart for flow rates >200L/m and have a 1-4 meter separation for flow rates <200 L/m.
Unrestricted airflow	*40 CFR Part 58 Appendix E, 4.0*: requires the probe or inlet to have unrestricted airflow in an arc of at least 180 degrees. This arc must include the predominant wind direction for the season of greatest pollutant concentration potential.
Probe material	*40 CFR Part 58, Appendix E, 9.0*: requires that either Pyrex glass or FEP Teflon be used for intake sampling lines.
Residence time	*40 CFR Part 58, Appendix E, 9.0*: recommends a residence time of 20 seconds or less for gaseous sampling.
Will there be changes within the next 18 mos?	Describes if any changes are expected to occur to that monitor at that station within the next 18 months.
Is it suitable for comparison against the annual $PM_{2.5}$?	*40 CFR 58.30*: requires that $PM_{2.5}$ data that are representative, not of area-wide, but rather of relatively unique population-oriented micro-scale, localized hot spot, or unique population-oriented middle-scale impact sites are only eligible for comparison to the 24-hour $PM_{2.5}$ NAAQS.
Frequency of flow rate verification for manual PM samplers	*40 CFR 58, Appendix A, 3.3.2*: requires that a one-point flow rate verification check must be performed at least once every month for low-volume PM samplers and quarterly for hi-volume PM samplers.
Frequency of flow rate verification for automated PM analyzers	*40 CFR 58, Appendix A 3.2.3*: requires a one-point flow rate verification check must be performed at least once every month.
Frequency of one-point QC check (gaseous)	*40 CFR Part 58 Appendix A, 3.2.1*: requires that QC checks be performed at least once every 2 weeks.
Last Annual Performance Evaluation (gaseous)	*40 CFR Part 58 Appendix A, 3.2.2*: requires that SO_2, CO, O_3, and NO_2 monitors have annual performance evaluations. Section 3.2.7 requires that performance evaluations of PM monitors must be performed annually through the PEP (Performance Evaluation Program).
Last two semi-annual flow rate audits for PM monitors	*40 CFR Part 58 Appendix A, 3.2.4 (automated methods) and 3.3.3 (manual methods)*: require that PM samplers have flow rate checks every 6 months.

Detailed Site Information for SLAMS Stations

Bethel Island

Site Name	Bethel Island – 2021
AQS ID	06-013-1002
GIS coordinates	38.0063° N, 121.6419° W
Location	Trailer in parking lot
Address	5551 Bethel Island Rd, Bethel Island CA 94511
County	Contra Costa
Distance to road from gaseous probe	Bethel Island Rd: 63 meters Sandmound Blvd: 110 meters
Traffic count	Bethel Island Rd: 6,492 ADT (2006) Sandmound Blvd: 1,537 ADT (2006)
Groundcover	Gravel surrounded by grassy fields
Representative Area	San Francisco-Oakland-Fremont MSA

Bethel Island was chosen for an air monitoring site to measure pollutant transport between the California Central Valley and the San Francisco Bay Area. The site lies in the only sea-level gap between the two regions, in the Sacramento-San Joaquin River Delta, just east of the Carquinez Strait region. Local pollution emissions are low due to the rural nature of the area and the lack of any industrial sources within 6 miles of the site. The nearest town is Bethel Island, 0.6 miles to the north, with a population of 2,312 in 2000. The site is located next to a public-storage facility, surrounded by grassy fields. The Bethel Island station was operated by CARB from 1981 until late 1986; and then it was transferred to the Air District.

Ozone and NO_2 are measured because the area is in the transport corridor between the San Francisco Bay Area and the California Central Valley, both of which are major sources of ozone, ozone precursors, and particulates. Traffic volume near the site is low, so carbon monoxide measurements tend to be representative of natural background levels, or regional transport. SO_2 is measured because the area is downwind from numerous refineries, which can be large sources of SO_2. PM_{10} is measured because easterly winds occasionally transport particulates from the Central Valley, and because the filters can be analyzed to determine sulfate and nitrate levels transported from the Central Valley.

Background levels of toxic compounds are also determined from canister samples taken at Bethel Island on a 1 in 12 day schedule and later analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

During the most recent 3 years, the 75 ppb national 8-hour ozone standard was exceeded eight times at this site. The California 24-hour PM_{10} standard was exceeded three times in the most recent 3 years. There were no exceedances of any NO_2, SO_2 or carbon monoxide standards measured in the most recent 3 years.

Bethel Island Monitor Information

Pollutant	O3	CO	NO/NO2	SO2	PM10
Monitoring Objective	Regional Transport & Highest Conc.	General Background	Regional Transport	Regional Transport	Regional Transport
Spatial scale	Regional	Regional	Regional	Regional	Regional
Sampling method	TECO 49i	TECO 48A	TECO 42C	TECO 43C	Andersen GUV-16HBLA
PM filter analysis method	N/A	N/A	N/A	N/A	Weighed by Air District
Start date	01/01/87*	01/01/87*	01/01/87*	01/01/87*	11/05/86
Operation schedule	Continuous	Continuous	Continuous	Continuous	1 in 6
Sampling season	All year	All year	All year	All year	All year
Probe height (AGL)	6.7 m	6.7 m	6.7 m	6.7 m	5.2 m
Probe height above roof	3.0 m	3.0 m	3.0 m	3.0 m	1.5 m
Distance from obstructions on roof	None	None	None	None	None
Distance from obstructions not on roof	None	None	None	None	None
Distance from tree (DL)	13.3 m	13.3 m	13.3 m	13.3 m	14.4 m
Distance to furnace or incinerator flue	None	None	None	None	None
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A
Unrestricted airflow	270°	270°	270°	270°	270°
Probe material	Teflon	Teflon	Teflon	Teflon	N/A
Residence time	14 s	15 s	14 s	14 s	N/A
Will there be changes within the next 18 mos?	No	No	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	N/A	N/A
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	N/A	Weekly
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Daily	Daily	Daily	Daily	N/A
Last Annual Performance Evaluation (gaseous)	12/08/09	12/08/09	12/08/09	12/08/09	N/A
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	N/A	12/07/09 04/28/09

* Start date of data collected by the Air District. Data was collected by CARB back to 03/01/81.

Concord

Site Name	Concord - 2036
AQS ID	06-013-0002
GIS coordinates	37.9360° N, 122.0262° W
Location	One story commercial building
Address	2956-A Treat Blvd, Concord CA 94518
County	Contra Costa
Distance to road from gaseous probe	Treat Blvd: 181 meters Oak Grove Rd: 244 meters
Traffic count	Treat Blvd: 41,218 ADT (2005) Oak Grove Rd: 26,742 ADT (2005) Interstate 680 242,000 ADT (2008)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

Concord was chosen for an air monitoring site because it is the largest city in Contra Costa County, with a 2009 population estimate of 125,864; and because of the high pollution potential due to locally emitted and transported pollutants into the area. Since Concord is located in the Diablo Valley, locally emitted pollutants can become trapped when winds are light. Large emission sources in the valley include the two major freeways, Interstate 680 and California Highway 4; and two refineries at the north end of the valley.

The air monitoring site is located in the back of a shopping center, near the intersection of two major streets, and surrounded by residential neighborhoods. There is no industry in the immediate vicinity. NO/NO_2 and NMOC and CH_4 are measured because of local mobile emissions. Ozone is measured at the site because hot, inland summertime temperatures combined with precursor pollutants stagnating in the surrounding valley often produces high ozone levels. Carbon monoxide is measured because the site is near two major roads, Treat Blvd and Oak Grove Road. SO_2 is measured because the site is 6 miles downwind from the Tesoro and the Shell Refineries, both potential major sources of SO_2. PM_{10} and $PM_{2.5}$ are measured because light winds combined with surface-based inversions during the winter months can cause elevated particulate levels in the valley.

VOC toxic compounds are also sampled at Concord on a 1 in 12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

During the most recent 3 years, this site recorded nine exceedances of the 75 ppb national 8-hour ozone standard, and 11 exceedances of the national 24-hour $PM_{2.5}$ standard. The California 24-hour PM_{10} standard was exceeded on three days. There were no exceedances of any NO_2, SO_2 or carbon monoxide standards measured during the most recent 3 years.

Concord Monitor Information

Pollutant	O3	CO	NO/NO2	SO2	CH4/NMOC
Monitoring Objective	Population oriented & Highest Conc.	Population oriented	Population oriented	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Urban	Neighborhood
Sampling method	TECO 49i	TECO 48A	TECO 42C	TECO 43C	TECO 55C
PM filter analysis method	N/A	N/A	N/A	N/A	N/A
Data Start date	04/08/80	02/21/80	NO2: 01/01/80 NO: 03/01/80	02/01/80	CH4:12/31/99 NMOC:05/10/06
Operation schedule	Continuous	Continuous	Continuous	Continuous	Continuous
Sampling season	All year	All year	All year	All year	All year
Probe height (AGL)	9.2 m	9.2 m	9.2 m	9.2 m	9.2 m
Probe height above roof	3.1 m	3.1 m	3.1 m	3.1 m	3.1 m
Distance from obstructions on roof	None	None	None	None	None
Distance from obstructions not on roof	None	None	None	None	None
Distance from tree (DL)	18.6 m	18.6 m	18.6 m	18.6 m	18.6 m
Distance to furnace or incinerator flue	None	None	None	None	None
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A
Unrestricted airflow	360°	360°	360°	360°	360°
Probe material	Teflon	Teflon	Teflon	Teflon	Teflon
Residence time	8 s	12 s	10 s	13 s	10 s
Will there be changes within the next 18 mos?	No	No	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	N/A	N/A
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	N/A	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Daily	Daily	Daily	Daily	Daily
Last Annual Performance Evaluation (gaseous)	08/13/09	08/19/09	08/19/09	08/19/09	08/19/09
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	N/A	N/A

Concord Monitor Information

Pollutant	PM10	FRM PM2.5	FRM PM2.5 Collocated
Monitoring Objective	Population oriented	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood
Sampling method	Andersen HiVol 1200	Partisol-Plus 2025 w/VSCC	Partisol-Plus 2025 w/VSCC
PM filter analysis method	Weighed by Air District	Weighed by Air District	Weighed by Air District
Data Start date	11/04/86	03/19/99	03/19/99
Operation schedule	1 in 6	Apr-Sep: 1 in 3 Oct-Mar: daily	Jan-Apr: 1 in 6 May-Dec: 1 in 12
Sampling season	All year	All year	All year
Probe height (AGL)	5.8 m	5.9 m	5.9 m
Probe height above roof	1.5 m	2 m	2 m
Distance from obstructions on roof	None	None	None
Distance from obstructions not on roof	None	None	None
Distance from tree (DL)	19.5 m	13.1 m	17.4 m
Distance to furnace or incinerator flue	None	None	None
Distance between collocated monitors	N/A	3.2 m	3.2 m
Distance between PM10 and PM2.5 monitors	7.5 m	7.5 m	3.2 m
Unrestricted airflow	360°	360°	360°
Probe material	N/A	N/A	N/A
Residence time	N/A	N/A	N/A
Will there be changes within the next 18 mos?	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	Yes	Yes
Frequency of flow rate verification for manual PM samplers	Weekly	Monthly	Monthly
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	N/A	N/A	N/A
Last Annual Performance Evaluation (gaseous)	N/A	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	11/05/09 05/14/09	11/05/09 05/14/09	11/05/09 05/14/09

Fairfield

Site Name	Fairfield – 8007
AQS ID	06-095-0005
GIS coordinates	38.2271° N, 122.0756° W
Location	Small trailer in open field
Address	1010 Chadborne Rd, Fairfield CA 94534
County	Solano
Distance to road from gaseous probe	Cordelia Rd: 194 meters
Traffic count	Cordelia Rd: 3,751 ADT (2007 estimate)
Groundcover	Vegetative
Representative Area	Vallejo-Fairfield MSA

Fairfield was chosen for monitoring ozone transport between the San Francisco Bay Area and the Sacramento Valley. Fairfield lies in the northeast part of the District in the Carquinez Strait Region, the only sea level gap between the Bay Area and the Central Valley. Prevailing westerly winds carry ozone and its precursors into the Sacramento Valley from the Bay Area. Occasionally, easterly winds transport elevated ozone levels into this region from the Sacramento Valley.

Over the past decade the Fairfield/Suisun City urban area has grown considerably, now having a combined 2009 population estimate of 134,917, the largest urban area in Solano County. As a result, Fairfield is also a population oriented ozone monitoring site. The monitoring site is located in a rural area, situated between the nearby urban area of Fairfield/Suisun City urban area, and the greater Bay Area. Prevailing winds are west, and the monitor normally measures ozone concentrations coming from the Bay Area.

Ozone concentrations measured at Fairfield exceeded the 75 ppb national 8-hour ozone standard on three days during the most recent 3 years.

Fairfield Monitor Information

Pollutant	**O3**
Monitoring Objective	Regional transport & Population oriented
Spatial scale	Regional
Sampling method	TECO 49C
Analysis method	N/A
Start date	05/29/02
Operation schedule	Continuous
Sampling season	Apr 1-Nov 30
Probe height (AGL)	3.7 m
Probe height above roof	1.0 m
Distance from obstructions on roof	None
Distance from obstructions not on roof	None
Distance from tree (DL)	>50 m
Distance to furnace or incinerator flue	None
Unrestricted airflow	360°
Probe material	Teflon
Residence time	5 s
Will there be changes within the next 18 mos?	No
Is it suitable for comparison against the annual PM2.5?	N/A
Frequency of flow rate verification for manual PM samplers	N/A
Frequency of flow rate verification for automated PM analyzers	N/A
Frequency of one-point QC check (gaseous)	Daily
Last Annual Performance Evaluation (gaseous)	11/16/09
Last two semi-annual flow rate audits for PM monitors	N/A

Fremont

Site Name	Fremont – 1014
AQS ID	06-001-1001
GIS coordinates	37.53584° N, 121.96185° W
Location	One story commercial building
Address	40733 Chapel Way, Fremont CA 94538
County	Alameda
Distance to road from gaseous probe	Fremont Boulevard: 120.0 meters Chapel Way: 31.0 meters
Traffic count	Fremont Boulevard: 33,390 ADT (2008) Chapel Way: 500 ADT (estimate)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

Fremont was chosen as an air monitoring site because it is the second largest city in Alameda County, with a 2009 population estimate of 218,128, and because it is downwind of large sources of ozone precursors. Studies have shown that on high ozone days, ozone can be transported southward along the East Bay Hills into Fremont, with concentrations that may exceed the ozone standards. Fremont also has potential for high levels of particulate in the winter due to local emissions. The monitoring site is centrally located in Fremont, in a residential and commercial area. Ozone and its precursors, NMOC/CH_4 and NO_2, are measured because the area is downwind of populated and industrial portions of the San Francisco Bay Area, which can be large sources of ozone precursor emissions. Carbon monoxide is measured because of the high volume of traffic in the city, which includes two major freeways. $PM_{2.5}$ is collected because light winds combined with surface -based inversions during the winter months can cause elevated particulate levels.

In October 2009, the existing FRM (filter-based) $PM_{2.5}$ monitor at this site was replaced with a Federal Equivalent Method (FEM) continuous $PM_{2.5}$ monitor. The FEM monitor was recently approved by EPA and provides hourly measurements of $PM_{2.5}$ concentrations that can be used both for determination of attainment of national $PM_{2.5}$ standards and for real-time reporting.

VOC toxic compounds, carbonyls, and metals and are sampled at Fremont on a 1 in 12 day schedule and analyzed by the CARB laboratory. More information about the CARB toxics monitoring program can be found at http://www.arb.ca.gov/toxics/toxics.htm. Information about toxics monitoring by the Air District can be found in the Toxics Program section of this report.

During the most recent 3 years, the 75 ppb national 8-hour ozone standard was exceeded once at this site. The national 24-hour $PM_{2.5}$ standard was exceeded on three days in the last 3 years. There were no exceedances of any NO_2 or carbon monoxide standards measured during the most recent 3 years.

Fremont Monitor Information

Pollutant	O3	CO	NO/NO2	CH4/NMOC
Monitoring Objective	Population oriented	Population oriented	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling method	TECO 49i	TECO 48A	TECO 42C	TECO 55C
PM filter analysis method	N/A	N/A	N/A	N/A
Start date	07/29/76	01/01/71	NO: 07/01/76 NO2: 04/12/74	CH4: 01/01/94 NMOC: 05/25/06
Operation schedule	Continuous	Continuous	Continuous	Continuous
Sampling season	All year	All year	All year	All year
Probe height (AGL)	8.4 m	8.4 m	8.4 m	8.4 m
Probe height above roof	4.3 m	4.3 m	4.3 m	4.3 m
Distance from obstructions on roof	None	None	None	None
Distance from obstructions not on roof	None	None	None	None
Distance from tree (DL)	25.9 m	25.9 m	25.9 m	25.9 m
Distance to furnace or incinerator flue	3.7 m	3.7 m	3.7 m	3.7 m
Distance between collocated monitors	N/A	N/A	N/A	N/A
Unrestricted airflow	360°	360°	360°	360°
Probe material	Teflon	Teflon	Teflon	Teflon
Residence time	13 s	14 s	12 s	13 s
Will there be changes within the next 18 mos?	No	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	N/A
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Daily	Daily	Daily	Daily
Last Annual Performance Evaluation (gaseous)	12/02/09	12/02/09	12/02/09	12/02/09
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	N/A

Fremont Monitor Information

Pollutant	Continuous PM2.5 FEM BAM	FRM PM2.5*
Monitoring Objective	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood
Sampling method	Met One BAM FEM 1020	Partisol-Plus 2025 w/VSCC
PM filter analysis method	N/A	Weighed by Air District
Start date	10/01/09	01/03/99
Operation schedule	Continuous	Jan-Mar: 1 in 3 Apr-Sep: 1 in 6*
Sampling season	All year	All year
Probe height (AGL)	6.2 m	6.4 m
Probe height above roof	2.1 m	2.4 m
Distance from obstructions on roof	None	None
Distance from obstructions not on roof	None	None
Distance from tree (DL)	28.9 m	26.8 m
Distance to furnace or incinerator flue	4.1 m	4.9 m
Distance between collocated monitors	N/A	N/A
Unrestricted airflow	360°	360°
Probe material	N/A	N/A
Residence time	N/A	N/A
Will there be changes within the next 18 mos?	No	N/A *
Is it suitable for comparison against the annual PM2.5?	Yes	Yes
Frequency of flow rate verification for manual PM samplers	N/A	Monthly
Frequency of flow rate verification for automated PM analyzers	Every two weeks	N/A
Frequency of one-point QC check (gaseous)	N/A	N/A
Last Annual Performance Evaluation (gaseous)	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	12/01/09 08/13/09	09/29/09 04/20/09

* FRM PM2.5 discontinued on 09/30/09; replaced by continuous FEM PM2.5 BAM on 10/01/09

Gilroy

Site Name	Gilroy - 7015
AQS ID	06-085-0002
GIS coordinates	36.9993° N 121.5749° W
Location	Air monitoring shelter next to water pump station
Address	9th and Princevalle St, Gilroy CA 95020
County	Santa Clara
Distance to road from gaseous probe	Princevalle St: 18.3 meters 9th St: 15.7 meters 10th St. 185.0 meters
Traffic count	Princevalle St: 5,000 ADT (2008) 9th St: 1,400 ADT (2008 estimate) 10th St. 12,700 ADT (2008)
Groundcover	paved
Representative Area	San Jose-Sunnyvale-Santa Clara MSA

Gilroy was originally chosen as an air monitoring site to measure ozone transport out of the southern part of the Air District. Prevailing northwesterly afternoon winds carry ozone and ozone precursors from the San Jose area southward down the Santa Clara Valley. When temperatures are hot, and solar insolation is strong, these precursors react and can form high concentrations of ozone in the Gilroy area. As Gilroy grew in population (2009 population of 52,027) the site was considered not only an ozone transport site but also a population oriented ozone and $PM_{2.5}$ monitoring site. In 2007 $PM_{2.5}$ monitoring began.

The monitoring site is located in a residential area of Gilroy on the west side of the Santa Clara Valley. Air quality studies have shown that the west side of the valley has higher ozone levels than the east side. This is due to elevated terrain on the west side that shelters the western part of Gilroy from the strong winds in the afternoon produced by the Monterey Bay sea breeze. Residents have preferred the sheltered area and built most of the town on the west side of the Valley.

On October 31, 2009, the existing FRM (filter-based) $PM_{2.5}$ monitor at this site was replaced with a Federal Equivalent Method (FEM) continuous $PM_{2.5}$ monitor. The FEM monitor was recently approved by EPA and provides hourly measurements of $PM_{2.5}$ concentrations that can be used both for determination of attainment of national $PM_{2.5}$ standards and for real-time reporting.

In the most recent 3 years, the 75 ppb national 8-hour ozone standard was exceeded three times at this site. $PM_{2.5}$ monitoring began on March 1, 2007 and one exceedance of the national 24-hour $PM_{2.5}$ standard was recorded due to smoke from a wildfire on 8/14/2009.

Gilroy Monitor Information

Pollutant	O3	Continuous PM2.5 FEM BAM	FRM PM2.5*
Monitoring Objective	Regional Transport, Highest Concentration, Population oriented	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood
Sampling method	TECO 49C	Met One BAM 1020	Partisol-Plus 2025 w/VSCC
PM filter analysis method	N/A	N/A	Weighed by Air District
Data Start date	07/01/80	10/31/09	03/01/07
Operation schedule	Continuous	Continuous	Jan-Oct: 1 in 3*
Sampling season	Apr 1 – Nov 30	All year	all year
Probe height (AGL)	4.7 m	2.9 m	2.7 m
Probe height above roof	2.6 m	N/A	N/A
Distance from obstructions on roof	None	N/A	N/A
Distance from obstructions not on roof	None	1.8 m	1.8 m
Distance from tree (DL)	26 m	26 m	26 m
Distance to furnace or incinerator flue	14.3 m	14.3 m	14.3 m
Distance between collocated monitors	N/A	N/A	N/A
Unrestricted airflow	360º	360°	360º
Probe material	Teflon	N/A	N/A
Residence time	13 s	N/A	N/A
Will there be changes within the next 18 mos?	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	Yes	Yes
Frequency of flow rate verification for manual PM samplers	N/A	N/A	Monthly
Frequency of flow rate verification for automated PM analyzers	N/A	Every two weeks	N/A
Frequency of one-point QC check (gaseous)	Daily	N/A	N/A
Last Annual Performance Evaluation (gaseous)	11/18/09	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	N/A	10/30/09	10/30/09 4/15/09

*FRM PM2.5 discontinued on 10/30/09; replaced by continuous FEM PM2.5 BAM on 10/31/09.

Hayward

Site Name	Hayward - 1015
AQS ID	06-001-2001
GIS coordinates	37.6544° N, 122.0317° W
Location	Pump house near water tank
Address	3466 La Mesa Drive, Hayward CA 94542
County	Alameda
Distance to road from gaseous probe	Hayward Drive: 26.2 meters La Mesa Dr: 38 meters
Traffic count	Hayward Drive: 4,400 ADT (2007) La Mesa Dr: 500 ADT (estimate)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

The Hayward air monitoring site was chosen to measure ozone at a higher elevation. Located on the east side of Hayward at an elevation of 951 feet, it is the highest elevation air monitoring site in the Air District. Studies had shown that on high ozone days, a cloud of ozone and precursors moves southward from Oakland on the west side of the East Bay Hills.

Because ozone monitoring sites were already in place in the low-lying areas of the East Bay, i.e. in San Leandro and Fremont, this site was chosen to be between them, but at a higher elevation. Thus, the site gives an indication of ozone levels aloft. The Hayward site is also important because it provides air quality forecasting information concerning residual ozone from the previous day. Although there is a large water tank onsite in the upwind direction, the instrument probe is high enough to avoid the tank being an obstacle. The scale of this site is considered to be regional because it is representative of ozone levels aloft.

The Hayward site was temporarily shut down on November 6, 2009, due to the demolition and reconstruction of the water tank nearby the site. The construction project is expected to be completed in mid-summer 2010.

During the most recent 3 years, the 75 ppb national 8-hour ozone standard was exceeded four times at this site.

Hayward Monitor Information

Pollutant	**O3**
Monitoring Objective	Population oriented & Regional Transport
Spatial scale	Regional
Sampling method	TECO 49C
PM filter analysis method	N/A
Start date	05/31/77
Operation schedule	Continuous
Sampling season	April 1-November 30
Probe height (AGL)	6.7 m
Probe height above roof	3.1 m
Distance from obstructions on roof	None
Distance from obstructions not on roof	None
Distance from tree (DL)	11.4 m
Distance to furnace or incinerator flue	N/A
Distance between collocated monitors	N/A
Unrestricted airflow	360°
Probe material	Teflon
Residence time	16 s
Will there be changes within the next 18 months?	No
Is it suitable for comparison against the annual PM2.5?	N/A
Frequency of flow rate verification for manual PM samplers	N/A
Frequency of flow rate verification for automated PM analyzers	N/A
Frequency of one-point QC check (gaseous)	Daily
Last Annual Performance Evaluation (gaseous)	11/03/09
Last two semi-annual flow rate audits for PM monitors	N/A

Livermore

Site Name	Livermore – 1023
AQS ID	06-001-0007
GIS coordinates	37.6875° N, 121.7842° W
Location	One story commercial building
Address	793 Rincon Avenue, Livermore CA 94551
County	Alameda
Distance to road from gaseous probe	Rincon Ave: 67 meters Pine St: 94 meters Interstate 580: 1,400 meters
Traffic count	Rincon Ave: 2,400 ADT (2005) Pine St: 4,800 ADT (2005) Interstate 580 at Portola Ave: 166,000 ADT (2008)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

Livermore was chosen for an air monitoring site because it is the largest city in eastern Alameda County, with a 2009 population estimate of 85,312, and because measurements have shown this area can have the highest ozone levels in the Bay Area. Livermore is located within the Livermore Valley, an east-west oriented inland valley between the San Francisco Bay and the Central Valley. Air flow analyses on high ozone days have shown ozone precursors to move into this valley from the region surrounding the San Francisco Bay through the Hayward and Niles Canyon Gaps to the west, and from the San Ramon Valley to the north.

The air monitoring site is situated west of the city center, in a residential neighborhood. The station is located in a small one-story shopping center, with a little-used parking lot in front of the station and a city park behind it. There are no industrial sources in the immediate vicinity. Ozone and its precursors, CH_4/NMOC and NO/NO_2, are measured because the area is downwind of large sources of ozone precursors. $PM_{2.5}$ is measured because light winds combined with surface-based inversions during the winter months can cause elevated particulate levels.

Although traffic levels near the station are low, carbon monoxide was measured because the city has significant traffic, and Interstate 580 is only 0.87 miles to the north of the site. However, since monitoring began (12/3/99) concentrations have always stayed well below the standards and so the monitor was closed as on 5/5/09.

VOC toxic compounds are also sampled at Livermore on a 1 in 12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

Livermore has been selected to be part of a Bay Area precursor monitoring program. This is an EPA funded program to measure speciated hydrocarbons using a continuous GC/FID analyzer at three locations in the Bay Area. The other two locations are in San Ramon and

Patterson Pass. The program is funded for a minimum of 3 years. The purpose of the program is to obtain hourly measurements of organic hydrocarbon compounds which can then be compared with the concentrations simulated in photochemical model runs to verify that the model is producing organic hydrocarbon concentrations at the correct levels both in time and space.

During the most recent 3 years, this site recorded 14 exceedances of the 75 ppb national 8-hour ozone standard, and eight exceedances of the national 24-hour $PM_{2.5}$ standard. The California 24-hour PM_{10} standard was exceeded on nine days. There were no exceedances of any NO_2 or carbon monoxide standards measured during the most recent 3 years.

Livermore Monitor Information

Pollutant	O3	CO*	NO/NO2	CH4/NMOC
Monitoring Objective	Population oriented & Highest Conc.	Population oriented	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling method	TECO 49i	TECO 48A	TECO 42C	TECO 55C
PM filter analysis method	N/A	N/A	N/A	N/A
Data Start date	01/01/00	12/31/99	NO2:12/31/99 NO: 01/01/00	CH4: 12/31/99 NMOC:04/20/05
Operation schedule	Continuous	Continuous	Continuous	Continuous
Sampling season	All year	All year	All year	All year
Probe height (AGL)	6.1 m	6.1 m	6.1 m	6.1 m
Probe height above roof	3.3 m	3.3 m	3.3 m	3.3 m
Distance from obstructions on roof	None	None	None	None
Distance from obstructions not on roof	None	None	None	None
Distance from tree (DL)	51 m	51 m	51 m	51 m
Distance to furnace or incinerator flue	16.5 m	16.5 m	16.5 m	16.5 m
Distance between collocated monitors	N/A	N/A	N/A	N/A
Unrestricted airflow	360°	360°	360°	360°
Probe material	Teflon	Teflon	Teflon	Teflon
Residence time	11 s	10 s	12 s	11 s
Will there be changes within the next 18 months?	No	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	N/A
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Daily	Daily	Daily	Daily
Last Annual Performance Evaluation (gaseous)	07/29/08	07/29/08	07/29/08	07/29/08
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	N/A

* CO analyzer removed from service 5/5/09.

Livermore Monitor Information

Pollutant	FRM PM2.5	Continuous PM2.5 BAM	Speciated PM2.5
Monitoring Objective	Population oriented	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood
Sampling method	Partisol-Plus 2025 w/VSCC	Met One BAM 1020	Met One SASS
PM filter analysis method	Weighed by Air District	N/A	Weighed by DRI
Data Start date	12/02/99	07/01/00	06/11/08
Operation schedule	Jan-Mar 1 in 3 Apr-Sep: 1in 6 Oct-Dec: daily	Continuous	1 in 6
Sampling season	All year	All year	All year
Probe height (AGL)	5.4 m	5.1 m	5.1 m
Probe height above roof	2.3 m	2.0 m	2.0 m
Distance from obstructions on roof	None	None	None
Dist from obstructions not on roof	None	None	None
Dist from tree (DL)	53 m	52 m	55 m
Distance to furnace or incinerator flue	16 m	21 m	17 m
Distance between collocated monitors	N/A	N/A	N/A
Distance between PM10 and PM2.5 monitors	PM2.5 to SASS: 2.7 m PM2.5 to BAM: 5.2 m	BAM to PM2.5: 5.2 m BAM to SASS: 3.5 m	SASS to BAM: 3.5 m SASS to PM2.5: 2.7 m
Unrestricted airflow	360°	360°	360°
Probe material	N/A	N/A	N/A
Residence time	N/A	N/A	N/A
Will there be changes w/in the next 18 mos?	No	No	No
Is it suitable for comparison against the annual PM2.5?	Yes	No – not reference or equivalent method	No
Frequency of flow rate verification for manual PM samplers	Monthly	N/A	Monthly
Frequency of flow rate verification for automated PM analyzers	N/A	Every two weeks	N/A
Frequency of one-point QC check (gaseous)	N/A	N/A	N/A
Last Annual Perform. Evaluation (gaseous)	N/A	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	10/6/09 05/11/09	10/6/09 05/5/09	10/6/09 08/3/09

Los Gatos

Site Name	Los Gatos - 7006
AQS ID	06-085-1001
GIS coordinates	37.2267° N 121.9796° W
Location	Top of fire station's hose drying tower
Address	306 University Ave, Los Gatos CA 95030
County	Santa Clara
Distance to road From gaseous probe	University Ave: 37.2 meters Bentley Ave: 26.5 meters State Route 17: 291 meters
Traffic count	University Ave: 13,600 ADT (2005) Bentley Ave: 400 ADT (estimate) State Route 17: 62,000 ADT (2008)
Groundcover	Paved
Representative Area	San Jose- Sunnyvale- Redwood City MSA

Los Gatos was chosen for an ozone monitoring site because prevailing northerly winds transport ozone and ozone precursors from the densely populated area around the south Bay Area down the west side of the Santa Clara Valley. Mobile sampling studies as well as long-term monitoring in the Saratoga and Los Gatos areas showed Los Gatos to have the highest ozone levels in the area.

High ozone levels are in part due to Los Gatos being situated at the base of the Santa Cruz Mountains, which act as a barrier to the movement of polluted air. The monitoring site is located near the downtown area at a fire station surrounded by residential neighborhoods. The city of Los Gatos has an estimated 2009 population of 30,802.

In the most recent 3 years, this site recorded six exceedances of the 75 ppb national 8-hour ozone standard.

Los Gatos Monitor Information

Pollutant	**O3**
Monitoring Objective	Population oriented & Highest concentration
Spatial scale	Neighborhood
Sampling method	TECO 49i
PM filter analysis method	N/A
Data Start date	04/01/72
Operation schedule	Continuous
Sampling season	All year
Probe height (AGL)	11.0 m
Probe height above roof	3.2 m
Distance from obstructions on roof	None
Distance from obstructions not on roof	None
Distance from tree (DL)	15.5 m
Distance to furnace or incinerator flue	4.3 m
Distance between collocated monitors	N/A
Unrestricted airflow	360º
Probe material	Teflon
Residence time	11 s
Will there be changes within the next 18 mos?	No
Is it suitable for comparison against the annual PM2.5?	N/A
Frequency of flow rate verification for manual PM samplers	N/A
Frequency of flow rate verification for automated PM analyzers	N/A
Frequency of one-point QC check (gaseous)	Daily
Last Annual Performance Evaluation (gaseous)	11/19/09
Last two semi-annual flow rate audits for PM monitors	N/A

Martinez

Site Name	Martinez - 2014
AQS ID	06-013-2001
GIS coordinates	38.0128° N, 122.1346° W
Location	Small sampling shelter next to fire station
Address	521 Jones St, Martinez CA 94553
County	Contra Costa
Distance to road from gaseous probe	Jones St: 22 meters Alhambra Ave: 19 meters
Traffic count	Jones St: 2,000 ADT est. (2008) Alhambra Ave: 9,800 ADT est. (2008)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

Martinez was chosen for SO_2 source impact monitoring because the Shell Oil Refinery is located on the northern and eastern borders of the city. The Tesoro Refinery is also nearby, 2.5 miles to the east. Although the prevailing winds in the area are from the west, east winds can transport SO_2 emissions from the refineries over populated areas within the city.

The monitoring site is located near downtown Martinez and 0.5 miles from the Shell Refinery property. Martinez has a 2009 population estimate of 36,663 with no industrial activities or SO_2 sources nearby other than the refineries.

VOC toxic compounds are also sampled at Martinez on a 1 in 12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

Pollutant concentrations measured at Martinez did not exceed any SO_2 air quality standards during the most recent 3 years.

Martinez Monitor Information

Pollutant	SO2
Monitoring Objective	Source Impact
Spatial scale	Neighborhood
Sampling method	TECO 43C
Analysis method	N/A
Start date	07/02/73
Operation schedule	Continuous
Sampling season	All year
Probe height (AGL)	7.2 m
Probe height above roof	2.7 m
Distance from obstructions on roof	None
Distance from obstructions not on roof	None
Distance from tree (DL)	11.2 m
Distance to furnace or incinerator flue	None
Unrestricted airflow	360°
Probe material	Teflon
Residence time	13 s
Will there be changes within the next 18 mos?	No
Is it suitable for comparison against the annual PM2.5?	N/A
Frequency of flow rate verification for manual PM samplers	N/A
Frequency of flow rate verification for automated PM analyzers	N/A
Frequency of one-point QC check (gaseous)	Weekly
Last Annual Performance Evaluation (gaseous)	09/02/09
Last two semi-annual flow rate audits for PM monitors	N/A

Napa

Site Name	Napa – 4001
AQS ID	06-055-0003
GIS coordinates	38.3110° N, 122.2962° W
Location	One story commercial building
Address	2552 Jefferson St, Napa CA 94558
County	Napa
Distance to road from gaseous probe	Jefferson St: 15 meters
Traffic count	Jefferson St: 19,143 ADT (2007)
Groundcover	Paved
Representative Area	Napa MSA

Napa was chosen for an air monitoring location because it is the largest city in Napa County with a 2009 population estimate of 78,791. The city is located in the center of Napa Valley where agricultural burning and fireplace usage during the fall and winter can result in high particulate levels. In summer months, Napa can have elevated ozone levels when central Bay Area ozone precursors are transported northward into the valley.

The air monitoring site is situated about a mile north of downtown Napa in a mixed residential and commercial neighborhood. There are no industrial sources in the immediate vicinity. Ozone and NO/NO_2 are measured because southerly winds carry ozone and its precursors into Napa. Carbon monoxide is measured because the Napa Valley is a major tourist attraction with resulting high traffic volumes through the city. PM_{10} and continuous $PM_{2.5}$ are measured because of agricultural and household wood burning.

VOC toxic compounds are also sampled at Napa on a 1 in 12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

During the most recent 3 years, this site recorded three exceedances of the 75 ppb national 8-hour ozone standard and one exceedance of the California 24-hour PM_{10} standard. There were no exceedances of any NO_2 or carbon monoxide standards. The continuous $PM_{2.5}$ (BAM) monitor has recorded measurements above the national 24-hour $PM_{2.5}$ standard on fifteen days since it began operating in January 2007. However, this monitor is not a recognized FRM or FEM method, and the data cannot be used to determine violations of the national $PM_{2.5}$ standards, or its attainment status. Only FRM or FEM based $PM_{2.5}$ measurements may be used for comparison with national $PM_{2.5}$ standards.

Napa Monitor Information

Pollutant	O3	CO	NO/NO2
Monitoring Objective	Population oriented	Population oriented	Population oriented
Spatial scale	Middle	Middle	Middle
Sampling method	TECO 49C	TECO 48	TECO 42C
PM filter analysis method	N/A	N/A	N/A
Start date	07/01/76	07/01/73	07/01/73
Operation schedule	Continuous	Continuous	Continuous
Sampling season	All year	All year	All year
Probe height (AGL)	8.9 m	8.9 m	8.9 m
Probe height above roof	5.2 m	5.2 m	5.2 m
Distance from obstructions on roof	None	None	None
Distance from obstructions not on roof	None	None	None
Distance from tree (DL)	25 m	25 m	25 m
Distance to furnace or incinerator flue	5.7 m	5.7 m	5.7 m
Distance between collocated monitors	N/A	N/A	N/A
Unrestricted airflow	360°	360°	360°
Probe material	Teflon	Teflon	Teflon
Residence time	8 s	8 s	9 s
Will there be changes within the next 18 mos?	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Daily	Daily	Daily
Last Annual Performance Evaluation (gaseous)	08/13/09	08/13/09	08/13/09
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A

Napa Monitor Information

Pollutant	PM10	PM10 Collocated	Continuous PM2.5 BAM
Monitoring Objective	Population oriented	Population oriented	Population oriented
Spatial scale	Middle	Middle	Middle
Sampling method	Tisch Env. HiVol TE-6000	Tisch Env. HiVol TE-6000	Met One BAM 1020
PM filter analysis method	Weighed by Air District	Weighed by Air District	N/A
Start date	11/04/86	06/08/04	01/04/07
Operation schedule	1 in 6	1 in 6	Continuous
Sampling season	All year	All year	All year
Probe height (AGL)	5.5 m	5.3 m	5.5 m
Probe height above roof	1.8 m	1.8 m	1.8 m
Distance from obstructions on roof	None	None	None
Distance from obstructions not on roof	None	None	None
Distance from tree (DL)	21 m	20.7 m	26 m
Distance to furnace or incinerator flue	5.0 m	3.4m	8.8 m
Distance between collocated monitors	3.4 m	3.4m	N/A
Distance between PM10 and PM2.5 monitors	6.1 m	8.8 m	Prim: 6.1 m Col: 8.8 m
Unrestricted airflow	360°	360°	360°
Probe material	N/A	N/A	N/A
Residence time	N/A	N/A	N/A
Will there be changes within the next 18 mos?	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	No – not reference or equivalent method
Frequency of flow rate verification for manual PM samplers	Weekly	Weekly	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	Every two weeks
Frequency of one-point QC check (gaseous)	N/A	N/A	N/A
Last Annual Performance Evaluation (gaseous)	N/A	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	11/04/09 05/05/09	11/04/09 05/05/09	11/04/09 05/05/09

Oakland

Site Name	Oakland - 1025
AQS ID	06-001-0009
GIS coordinates	37.7431 ° N, 122.1699° W
Location	Two-story commercial building
Address	9925 International Blvd, Oakland CA 94603
County	Alameda
Distance to road from gaseous probe	International Blvd: 19 meters 99th St: 23 meters 98th St: 43 meters
Traffic count	International Blvd: 26,912 ADT (2006) 99th St: 100 ADT (Estimate) 98th St: 31,340 ADT (2002)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

The Air District opened a new air monitoring station in Oakland in November 2007, replacing a partial station in downtown Oakland that had been operating for 25 years. The partial station measured ozone and carbon monoxide, the only pollutants for which the Bay Area was not meeting the national standards during most of that period. A larger station was needed when the Air District decided to expand its $PM_{2.5}$ and toxics sampling networks.

Oakland is an important area for air pollution monitoring because it is the largest city in Alameda County, with a 2009 population estimate of 430,666. It has large emission sources within its boundaries, such as a major maritime port, an international airport, extensive areas of industry, and a number of major freeways. These sources have the potential to emit significant amounts of carbon monoxide and ozone precursors, as well as particulates and organic toxic compounds.

The monitoring site is located 7 miles southeast of downtown Oakland, on a commercial strip in a residential area. Ozone and NO_2 are measured to monitor population exposure to these pollutants. Carbon monoxide is measured because of the high volume of traffic in the city, which includes several major freeways. $PM_{2.5}$ is measured due to the large emission sources in the area, and because light winds combined with wood burning, vehicular traffic, and surfaced based inversions during winter can cause elevated particulate concentrations.

In October 2009, the existing FRM (filter-based) $PM_{2.5}$ monitor at this site was replaced with a Federal Equivalent Method (FEM) continuous $PM_{2.5}$ monitor. The FEM monitor was recently approved by EPA and provides hourly measurements of $PM_{2.5}$ concentrations that can be used both for determination of attainment of national $PM_{2.5}$ standards and for real-time reporting.

VOC toxic compounds are also sampled at Oakland on a 1 in 12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

The national 24-hour $PM_{2.5}$ standard was exceeded once since this site opened in November 2007. There have been no exceedances of any ozone, NO_2 or carbon monoxide standards measured since the site opened in November 2007.

Oakland Monitor Information

Pollutant	O3	CO	NO/NO2	Continuous FEM PM2.5 BAM	FRM PM2.5*
Monitoring Objective	Population oriented	Population oriented	Population oriented	Population oriented	Population oriented
Spatial scale	Middle	Middle	Middle	Middle	Middle
Sampling method	TECO 49i	API 300E	TECO 42i	Met One FEM BAM 1020	Partisol-Plus 2025 w/VSCC
Analysis method	N/A	N/A	N/A	N/A	Weighed by Air District
Start date	11/01/07	11/01/07	11/01/07	10/01/2009	11/01/07
Operation schedule	Continuous	Continuous	Continuous	Continuous	Jan-Mar: 1 in 3 Apr-Sep: 1 in 6*
Sampling season	All year	All year	All year	All year	All year
Probe height (AGL)	10 m	10 m	10 m	8.0 m	8.0 m
Probe height above roof	4 m	4 m	4 m	2.4 m	2.4 m
Distance from obstructions on roof	None	None	None	None	None
Distance from obstructions not on roof	None	None	None	None	None
Distance from tree (DL)	21 m	21 m	21 m	21 m	21 m
Distance to furnace or incinerator flue	8.2 m	8.2 m	8.2 m	5.0 m	8.0 m
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A
Unrestricted airflow	360°	360°	360°	360°	360°
Probe material	Teflon	Teflon	Teflon	N/A	N/A
Residence time	12 s	14 s	13 s	N/A	N/A
Will there be changes within the next 18 mos?	No	No	No	No	N/A*
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	Yes	Yes
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	N/A	Monthly
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	Every two weeks	N/A
Frequency of one-point QC check (gaseous)	Daily	Daily	Daily	N/A	N/A
Last Annual Performance Evaluation (gaseous)	11/05/09	11/05/09	11/05/09	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	11/04/09*	09/15/09 06/16/09

* FRM PM2.5 discontinued on 09/30/09; replaced by continuous FEM PM2.5 BAM on 10/01/09

Oakland West

Site Name	Oakland – 1027
AQS ID	06-001-0011
GIS coordinates	37.8148 ° N, 122.28236° W
Location	Trailer in parking lot
Address	1100 21st St, Oakland CA 94607
County	Alameda
Distance to road from gaseous probe	Grand Ave: 34 meters Linden St: 35 meters Adeline St: 168 meters 21st St: 80 meters
Traffic count	Grand Ave: 19,796 ADT (2002) Linden St: 421 ADT (1994) Adeline St: 7,586 ADT (2002) 21st St: 500 ADT (estimate)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

The Air District opened a monitoring station one mile downwind of the Port of Oakland in February 2009 because the Port of Oakland is considered a major area source of diesel particulate matter emissions. Studies have shown that the West Oakland community is exposed to higher concentrations of diesel particulate matter than elsewhere in the Bay Area, resulting in higher potential cancer risks.

Carbon monoxide, NO_2, and continuous $PM_{2.5}$ are measured to determine the impact of emissions from the Port of Oakland and its associated diesel-truck traffic, and vehicle traffic from nearby highways. SO_2 is measured to determine the impact of emissions from ship traffic. Measurements of all these criteria pollutants are also used for comparisons to data obtained from non-standard sampling methodologies employed in West Oakland Measurement Study (WOMS) project, described later in this report.

Because the Port of Oakland can be a large source of VOC toxic compounds, the Air District has been sampling for toxics since 2001 at a site several blocks from the current Oakland West monitoring site. Toxics monitoring was moved to the new station when it opened in February 2009. VOC toxic compounds are sampled at Oakland West on a 1 in 12 day schedule, and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

There have been no exceedances of any NO_2, CO or SO_2 standards since the site opened in February 2009. There have also been no measurements above the national 24-hour $PM_{2.5}$ standard.

Oakland West Monitor Information

Pollutant	CO	NO/NO2	SO2	Continuous PM2.5 (BAM)	Speciated PM2.5
Monitoring Objective	Source Impact	Source Impact	Source Impact	Source Impact & Highest Concentration	Source Impact
Spatial scale	Neighborhood	Neighborhood	Urban	Neighborhood	Neighborhood
Sampling method	Teledyne 300E	TECO 42C	TECO 43C	Met One BAM 1020	Met One SASS
Analysis method	N/A	N/A	N/A	N/A	Weighed by DRI
Start date	02/25/09	02/25/09	02/25/09	02/25/09	02/12/09
Operation schedule	Continuous	Continuous	Continuous	Continuous	1 in 6
Sampling season	All year	All year	All year	All year	All year
Probe height (AGL)	5.7 m	5.7 m	5.7 m	5.2 m	4.7 m
Probe height above roof	3.1 m	3.1 m	3.1 m	2.6 m	2.1 m
Distance from obstructions on roof	None	None	None	None	None
Distance from obstructions not on roof	None	None	None	None	None
Distance from tree (DL)	40 m	40 m	40 m	40 m	39 m
Distance to furnace or incinerator flue	N/A	N/A	N/A	N/A	N/A
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A
Distance between PM10 and PM2.5 monitors	N/A	N/A	N/A	BAM to SASS: 1.1 m	SASS to BAM: 1.1 m
Unrestricted airflow	360°	360°	360°	360°	360°
Probe material	Teflon	Teflon	Teflon	N/A	N/A
Residence time	14 s	14 s	14 s	N/A	N/A
Will there be changes within the next 18 mos?	No	No	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	No – not reference or equivalent method	No
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	N/A	Monthly
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	Every two weeks	N/A
Frequency of one-point QC check (gaseous)	Daily	Daily	Daily	N/A	N/A
Last Annual Performance Evaluation (gaseous)	04/09/09	04/09/09	04/09/09	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	10/14/09 04/08/09	10/14/09 04/08/09

Point Reyes

Site Name	Pt Reyes
AQS ID	06-041-0003
GIS coordinates	38.1269° N, 122.9138° W
Location	At ground level behind a ranger residence
Address	170 Pierce Point Rd, Pt Reyes CA 94956
County	Marin
Distance to road from probe	Pierce Point Rd: 95 meters
Traffic count	Pierce Point Rd: 223 ADT (2006)
Groundcover	Grass
Representative Area	San Francisco-Oakland-Fremont MSA

Point Reyes was chosen for an air monitoring site because it is representative of background $PM_{2.5}$ levels. Air pollution levels at this site are usually low due to the rural nature of the area and because the upwind air flow is usually from the Pacific Ocean 2.5 miles to the west.

The site is located within the Point Reyes National Seashore. Within the park are scattered dairy farms. There are no industrial sources within 20 miles of the park. Between the ocean and the air monitoring site the land is relatively flat with low vegetation. The air monitoring site is located behind a ranger residence at the north end of the park. The closest towns are Marshall, 3 miles to the northeast with a population of a few hundred; and Inverness 3.5 miles to the southeast with a 2009 population estimate of 1,500.

The continuous $PM_{2.5}$ (BAM) monitor at Point Reyes has recorded measurements above the national 24-hour $PM_{2.5}$ standard on two days during the most recent 3 years. However, this monitor is not a recognized FRM or FEM method, and the data cannot be used to determine violations of the national $PM_{2.5}$ standards, or its attainment status. Only FRM or FEM based $PM_{2.5}$ measurements may be used for comparison with national $PM_{2.5}$ standards. This site is operated by the California Air Resources Board.

Point Reyes Monitor Information

Pollutant	Continuous PM2.5 BAM
Monitoring Objective	General Background
Spatial scale	Regional
Sampling method	Met One BAM 1020
PM filter analysis method	N/A
Start date	12/01/00
Operation schedule	Continuous
Sampling season	All year
Probe height (AGL)	2.1 m
Probe height above ground	2.1 m
Distance from obstructions on roof	None
Distance from obstructions not on roof	None
Distance from tree (DL)	35 m
Distance to furnace or incinerator flue	>50 m
Distance between collocated monitors	N/A
Unrestricted airflow	360°
Probe material	N/A
Residence time	N/A
Will there be changes within the next 18 mos?	No
Is it suitable for comparison against the annual PM2.5?	No – not reference or equivalent method
Frequency of flow rate verification for manual PM samplers	N/A
Frequency of flow rate verification for automated PM analyzers	2 times per month
Frequency of one-point QC check (gaseous)	N/A
Last Annual Performance Evaluation (gaseous)	N/A
Last two semi-annual flow rate audits for PM monitors	10/15/09 09/09/08

Point Richmond

Site Name	Point Richmond - 2013
AQS ID	06-013-0005
GIS coordinates	37.9261° N, 122.3856° W
Location	Air monitoring shelter next to fire station
Address	140 W. Richmond Ave, Richmond CA 94801
County	Contra Costa
Distance to road From gaseous probe	W. Richmond Ave: 10.2 meters Interstate 580: 266 meters
Traffic count	W. Richmond Ave: 1,340 ADT (2003) Interstate 580: 70,000 ADT (2007)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont (MSA)

Point Richmond was chosen for H_2S source impact monitoring because the community is at the immediate southern periphery of the Chevron Refinery. Although prevailing winds in the area are from the south-southwest, occasional northerly winds will transport H_2S emissions from the refinery over the community. H_2S gases at Chevron can be emitted from the processing units, one mile to the north, or the Chevron Richmond Long Wharf Complex, one mile to the west, where crude oil and other feedstock chemicals from tankers are unloaded.

The monitoring site is located in downtown Point Richmond, 0.2 miles south of the Chevron Refinery boundary. Point Richmond, which is actually a neighborhood within the city of Richmond, had an estimated population of 1,300 as of the 2000 Census.

H_2S concentrations measured at Point Richmond did not exceed the California 1-hour standard in the most recent 3 years.

Point Richmond Monitor Information

Pollutant	H2S
Monitoring Objective	Source impact
Spatial scale	Neighborhood
Sampling method	TECO 45C
PM filter analysis method	N/A
Data Start date	01/01/99
Operation schedule	Continuous
Sampling season	All year
Probe height (AGL)	3.4 m
Probe height above roof	0.9 m
Distance from obstructions on roof	None
Distance from obstructions not on roof	None
Distance from tree (DL)	17 m
Distance to furnace or incinerator flue	7.3 m
Distance between collocated monitors	N/A
Unrestricted airflow	360º
Probe material	Teflon
Residence time	5 s
Will there be changes within the next 18 mos?	No
Is it suitable for comparison against the annual PM2.5?	N/A
Frequency of flow rate verification for manual PM samplers	N/A
Frequency of flow rate verification for automated PM analyzers	N/A
Frequency of one-point QC check (gaseous)	Every two weeks
Last Annual Performance Evaluation (gaseous)	10/02/08
Last two semi-annual flow rate audits for PM monitors	N/A

Redwood City

Site Name	Redwood City - 6004
AQS ID	06-081-1001
GIS coordinates	37.4830° N 122.2036° W
Location	One-story commercial building
Address	897 Barron Ave, Redwood City CA 94063
County	San Mateo
Distance to road from gaseous probe	Barron Ave: 13 meters Bay Road: 24 meters Washington Ave: 131 meters US Highway 101: 455 meters
Traffic count	Barron Ave: 1,200 ADT (2009) Bay Road: 8350 ADT (2008) Washington Ave: 1140 ADT (2008) US Highway 101: 194,000 ADT (2008)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

Redwood City was chosen for an air monitoring site because it is one of the largest cities in San Mateo County, with a 2009 population estimate of 78,568. Being approximately midway between San Francisco and San Jose, it is well positioned to monitor the progression of ozone precursors and ozone moving southward down the peninsula as they are channeled by the Santa Cruz Mountains. Generally, Redwood City characterizes an area between South San Francisco and Palo Alto, which has a low air pollution potential due to the frequent presence of the sea breeze. Although the sea breeze typically keeps pollution levels low, when winds are light high levels of ozone precursors, ozone, or particulates can occur due to the large number of sources in the area.

The air monitoring site is located in a commercial/industrial zone bordered by US Highway 101 on one side and residential areas on the other three sides. NO, NO_2 and ozone are collected because the area is a large source of ozone precursor emissions and ozone. Carbon monoxide is monitored because of the high volume of traffic in the area, and US Highway 101 is only 0.3 miles north of the site. $PM_{2.5}$ is collected because light winds combined with surface-based inversions during the winter months can cause particulate levels to become elevated.

VOC toxic compounds are also sampled at Redwood City on a 1 in 12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

In October 2009, the existing FRM (filter-based) $PM_{2.5}$ monitor and continuous $PM_{2.5}$ monitor at this site were replaced with a Federal Equivalent Method (FEM) continuous $PM_{2.5}$ monitor. An FRM $PM_{2.5}$ monitor has also been installed as a collocated monitor. The FEM monitor was recently approved by EPA and provides hourly measurements of $PM_{2.5}$

concentrations that can be used both for determination of attainment of national $PM_{2.5}$ standards and for real-time reporting.

The national 24-hour $PM_{2.5}$ standard was exceeded on one day during the last 3 years. There were no exceedances of any ozone, NO_2 or carbon monoxide standards measured during the most recent 3 years.

Redwood City Monitor Information

Pollutant	**O3**	**CO**	**NO/NO2**
Monitoring Objective	Population oriented	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood
Sampling method	TECO 49i	TECO 48A	TECO 42C
PM filter analysis method	N/A	N/A	N/A
Data Start date	07/01//76	03/01/67	03/01/67
Operation schedule	Continuous	Continuous	Continuous
Sampling season	All year	All year	All year
Probe height (AGL)	6.8 m	6.8 m	6.8 m
Probe height above roof	3.6 m	3.6 m	3.6 m
Distance from obstructions on roof	None	None	None
Distance from obstructions not on roof	None	None	None
Distance from tree (DL)	46 m	46 m	46 m
Distance to furnace or incinerator flue	12.7 m	12.7 m	12.7 m
Distance between collocated monitors	N/A	N/A	N/A
Unrestricted airflow	360º	360º	360º
Probe material	Teflon	Teflon	Teflon
Residence time	12 s	13 s	12 s
Will there be changes within the next 18 mos?	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Daily	Daily	Daily
Last Annual Performance Evaluation (gaseous)	09/03/09	09/03/09	09/03/09
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A

Redwood City Monitor Information

Pollutant	Continuous PM2.5 FEM BAM	FRM PM2.5 Collocated	FRM PM2.5 *	Continuous PM2.5 BAM *
Monitoring Objective	Population oriented	Population oriented	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling method	Met One FEM 1020	Partisol-Plus 2025 w/VSCC	Partisol-Plus 2025 w/VSCC	Met One Model 1020
PM filter analysis method	N/A	Weighed by Air District	Weighed by Air District	N/A
Data Start date	10/01/09	10/01/09	02/26/99	01/01/04
Operation schedule	Continuous	1 in 12	Jan-Mar: 1 in 3 Apr-Sep: 1 in 6*	Continuous*
Sampling season	All year	All year	All year	All year
Probe height (AGL)	5.5 m	5.3 m	5.3 m	5.5 m
Probe height above roof	2.2 m	2.2 m	2.2 m	2.2 m
Distance from obstructions on roof	None	None	None	None
Dist from obstructions not on roof	None	None	None	None
Distance from tree (DL)	47 m	44 m	44 m	47 m
Distance to furnace or incinerator flue	13.7 m	14.0 m	14.0 m	13.7 m
Distance between collocated monitors	4 m	4 m	N/A	N/A
Distance between PM2.5 samplers	BAM to PM2.5: 4.0 m	PM2.5 to FEM BAM : 4.0 m	PM2.5 to BAM : 4.0 m	BAM to PM2.5: 4.0 m
Unrestricted airflow	360º	360º	360º	360º
Probe material	N/A	N/A	N/A	N/A
Residence time	N/A	N/A	N/A	N/A
Will there be changes within the next 18 mos?	No	No	N/A*	N/A*
Is it suitable for comparison against the annual PM2.5?	Yes	Yes	Yes	No
Frequency of flow rate verification for manual PM samplers	N/A	Monthly	Monthly	N/A
Frequency of flow rate verification for automated PM analyzers	Every two weeks	N/A	N/A	Every two weeks
Frequency of one-pt QC check (gaseous)	N/A	N/A	N/A	N/A
Last Annual Perform. Evaluation (gaseous)	N/A	N/A	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	10/29/09	10/29/09 06/11/09	10/29/09 06/11/09	06/11/09

*FRM PM2.5 and continuous PM2.5 BAM discontinued on 09/30/09; replaced by continuous PM2.5 FEM BAM on 10/01/09.

Richmond 7th

Site Name	Richmond 7th - 2019
AQS ID	06-013-0006
GIS coordinates	37.94812° N, 122.36479° W
Location	Fire station
Address	1065 7th Street, Richmond CA 94801
County	Contra Costa
Distance to road from gaseous probe	7th St: 21.5 meters Hensley St: 29.9 meters Richmond Parkway: 200 meters
Traffic count	7th St: 3,125 ADT (2007) Hensley St: 2,125 ADT (2007) Richmond Parkway: 35,650 (2007)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

Richmond 7th was chosen for H_2S and SO_2 source impact monitoring because it is near the eastern boundary of the Chevron Refinery. Normally, monitoring is done downwind of the prevailing wind direction. However, the prevailing winds are from the south, and carry emissions over San Pablo Bay. Since it is impractical to monitor over San Pablo Bay, a monitoring site was chosen downwind of the secondary wind direction, on the east side of the refinery. The site is located 0.5 miles east of the refinery boundary, where the monitor is expected to measure the highest concentrations in an area where the public has access.

VOC toxic compounds are also sampled at Richmond 7th on a 1 in 12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

No exceedances of the California 1-hour H_2S standard or any SO_2 standards were measured in the most recent 3 years.

Richmond 7th Monitor Information

Pollutant	SO2	H2S
Monitoring Objective	Source impact	Source impact
Spatial scale	Neighborhood	Neighborhood
Sampling method	TECO 43C	TECO 45C
PM filter analysis method	N/A	N/A
Start date	07/01/80	10/01/99
Operation schedule	Continuous	Continuous
Sampling season	All year	All year
Probe height (AGL)	8.4 m	8.4 m
Probe height above roof	2.8 m	2.8 m
Distance from obstructions on roof	None	None
Distance from obstructions not on roof	None	None
Distance from tree (DL)	10 m	10 m
Distance to furnace or incinerator flue	12.2 m	12.2 m
Distance between collocated monitors	N/A	N/A
Unrestricted airflow	360°	360°
Probe material	Teflon	Teflon
Residence time	14 s	16 s
Will there be changes within the next 18 mos?	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A
Frequency of flow rate verification for manual PM samplers	N/A	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	N/A
Frequency of one-point QC check (gaseous)	Every two weeks	Every two weeks
Last Annual Performance Evaluation (gaseous)	10/07/09	10/07/09
Last two semi-annual flow rate audits for PM monitors	N/A	N/A

Rodeo

Site Name	Rodeo - 2034
AQS ID	06-013-0007
GIS coordinates	38.03431º N, 122.27039º W
Location	Single story storage area at fire station
Address	326 Third Street, Rodeo CA 94572
County	Contra Costa
Distance to road from gaseous probe	Third St: 13.3 meters Parker St: 249.0 meters
Traffic count	Third St: 500 ADT (estimate) Parker St: 7,316 ADT (2008)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont (MSA)

Rodeo was chosen for H_2S source impact monitoring because the ConocoPhillips Refinery is on the eastern boundary of the town of Rodeo. Although the prevailing winds in the area are from the southwest, northeast winds can transport H_2S emissions from the refinery over the populated area of the town. Rodeo had a population of 8,717 in 2000. The monitoring site is located in a residential area 0.6 miles southwest of the ConocoPhillips Refinery boundary.

There were no exceedances of the California 1-hour H_2S standard measured in the most recent 3 years.

Rodeo Monitor Information

Pollutant	**H2S**
Monitoring Objective	Source impact
Spatial scale	Neighborhood
Sampling method	TECO 45C
PM filter analysis method	N/A
Start date	04/01/02
Operation schedule	Continuous
Sampling season	All year
Probe height (AGL)	6.7 m
Probe height above roof	2.0 m
Distance from obstructions on roof	None
Distance from obstructions not on roof	None
Distance from tree (DL)	>50 m
Distance to furnace or incinerator flue	10.9 m
Distance between collocated monitors	N/A
Unrestricted airflow	360°
Probe material	Teflon
Residence time	15 s
Will there be changes within the next 18 mos?	No
Is it suitable for comparison against the annual PM2.5?	N/A
Frequency of flow rate verification for manual PM samplers audit	N/A
Frequency of flow rate verification for automated PM analyzers	N/A
Frequency of one-point QC check (gaseous)	Every two weeks
Last Annual Performance Evaluation (gaseous)	09/02/09
Last two semi-annual flow rate audits for PM monitors	N/A

San Francisco

Site Name	San Francisco – 5011
AQS ID	06-075-0005
GIS coordinates	37.7660° N, 122.3992° W
Location	One-story commercial building
Address	10 Arkansas St, Suite N, San Francisco CA 94107
County	San Francisco
Distance to road from gaseous probe	16th St: 32.0 meters Arkansas St: 17.0 meters Interstate 280: 300 meters U.S. Highway 101: 504 meters
Traffic count	16th St: 12,278 ADT (2006) Arkansas St: 500 ADT (estimate) Interstate 280: 90,000 ADT (2008) U.S. Highway 101: 224,000 (2008)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

San Francisco was chosen for an air monitoring site because it is the second largest city in the San Francisco Bay Area, with a 2007 population estimate of 856,095. Although the sea breeze typically keeps pollution levels low, light wind conditions can result in high levels of ozone precursors or particulates due to the large number of sources in the city. The east side of the city was selected for a monitoring site because it is more densely populated (including a large number of daytime visitors and commuters), has some industry, and as a transportation hub, has generally higher traffic volume. The site is located near the fringe of the central business district, in an area of light industry that is close to a residential area and two major freeways.

Ozone is measured because of the very high population density of the city. NO/NO_2 and $NMOC/CH_4$ are measured because this is a source area for these ozone precursors. Carbon monoxide is measured because of the high traffic volume. PM_{10} and $PM_{2.5}$ are measured because stagnant days combined with surface based-based inversions can cause elevated particulate levels, and because of the contribution of heavy vehicular traffic to PM levels.

In October 2009, the existing FRM (filter-based) $PM_{2.5}$ monitor and continuous $PM_{2.5}$ monitor at this site were replaced with a Federal Equivalent Method (FEM) continuous $PM_{2.5}$ monitor. The FEM monitor was recently approved by EPA and provides hourly measurements of $PM_{2.5}$ concentrations that can be used both for determination of attainment of national $PM_{2.5}$ standards and for real-time reporting.

VOC toxic compounds are sampled at San Francisco by both the Air District and CARB on a 1 in 12 day schedule and analyzed by their respective laboratories. Carbonyls and metals are also sampled by CARB on the same 1 in 12 day schedule. Information about the CARB toxics monitoring program can be found at http://www.arb.ca.gov/toxics/toxics.htm.

Information about toxics monitoring by the Air District can be found in the Toxics Program section of this report.

During the most recent 3 years, this site recorded two exceedances of the California 24-hour PM_{10} standard. The national 24-hour $PM_{2.5}$ standard was exceeded on six days. No exceedances of any ozone, NO_2, or carbon monoxide standards were measured in the most recent 3 years.

San Francisco Monitor Information

Pollutant	**O3**	**CO**	**NO/NO2**	**CH4/NMOC**
Monitoring Objective	Population oriented	Population oriented	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling method	TECO 49C	TECO 48	TECO 42i	TECO 55C
PM Filter Analysis method	N/A	N/A	N/A	N/A
Start date	01/01/86	01/01/86	NO: 12/01/85 NO2: 01/01/86	CH4: 01/01/94 NMOC: 07/12/06
Operation schedule	Continuous	Continuous	Continuous	Continuous
Sampling season	All year	All year	All year	All year
Probe height (AGL)	10.5 m	10.5 m	10.5 m	10.5 m
Probe height above roof	4.4 m	4.4 m	4.4 m	4.4 m
Distance from obstructions on roof	None	None	None	None
Distance from obstructions not on roof	None	None	None	None
Distance from tree (DL)	15.3 m	15.3 m	15.3 m	15.3 m
Distance to furnace or incinerator flue	5.2 m	5.2 m	5.2 m	5.2 m
Distance between collocated monitors	N/A	N/A	N/A	N/A
Unrestricted airflow	360°	360°	360°	360°
Probe material	Teflon	Teflon	Teflon	Teflon
Residence time	11 s	11 s	12 s	11 s
Will there be changes within the next 18 mos?	No	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	N/A
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Daily	Daily	Daily	Daily
Last Annual Performance Evaluation (gaseous)	12/17/09	12/17/09	12/17/09	12/17/09
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	N/A

San Francisco Monitor Information

Pollutant	PM10	Continuous FEM PM2.5 BAM	FRM PM2.5*	Continuous PM2.5 BAM*
Monitoring Objective	Population oriented	Population oriented	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling method	Andersen HiVol 1200	Met One FEM BAM 1020	Partisol-Plus 2025 w/VSCC	Met One BAM 1020
PM Filter Analysis method	Weighed by Air District	N/A	Weighed by Air District	N/A
Start date	11/16/86	10/01/2009	01/01/1999	01/01/2004
Operation schedule	1 in 6	Continuous	Jan-Mar: 1 in 3 Apr-Sep: 1 in 6*	Continuous*
Sampling season	All year	All year	All year	All year
Probe height (AGL)	7.6 m	8.3 m	8.2 m	8.3 m
Probe height above roof	1.5 m	2.2 m	2 .0 m	2.2 m
Distance from obstructions on roof	None	None	None	None
Distance from obstructions not on roof	None	None	None	None
Distance from tree (DL)	17.5 m	15.9 m	16.5 m	13.8 m
Distance to furnace or incinerator flue	7.0 m	7.3 m	7.3 m	3.4 m
Distance between collocated monitors	N/A	N/A	N/A	N/A
Distance between PM10 and PM2.5 samplers	PM10 to FEM BAM: 2.3 m PM10 to PM2.5: 2..3 m PM10 to BAM: 3.8 m	FEM BAM to PM10: 2.3 m	PM2.5 to PM10: 2.3 m PM2.5 to BAM: 3.9 m	BAM to PM10: 3.8 m BAM to PM2.5: 3.9 m
Unrestricted airflow	360°	360°	360°	360°
Probe material	N/A	N/A	N/A	N/A
Residence time	N/A	N/A	N/A	N/A
Will there be changes within the next 18 mos?	No	No	N/A*	N/A*
Is it suitable for comparison against the annual PM2.5?	N/A	Yes	Yes	No – not reference or equivalent method
Frequency of flow rate verification for manual PM samplers	Weekly	N/A	Monthly	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	Every two weeks	N/A	Every two weeks
Frequency of one-point QC check (gaseous)	N/A	N/A	N/A	N/A
Last Annual Performance Evaluation (gaseous)	N/A	N/A	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	12/06/09 02/25/09	12/16/09 10/27/09	09/29/09 05/12/09	09/29/09 05/12/09

* FRM PM2.5 and non-FEM continuous PM2.5 discontinued on 09/30/09; replaced by continuous FEM PM2.5 BAM

San Jose

Site Name	San Jose – 7032
AQS ID	06-085-0005
GIS coordinates	37.3484° N, 121.8949° W
Location	Top floor of two-story commercial building
Address	158 E. Jackson St, San Jose CA 95112
County	Santa Clara
Distance to road from gaseous probe	Jackson St: 15.1 meters 4th St: 34.7 meters
Traffic count	Jackson St: 3,990 ADT (2007) 4th St: 6,000 ADT (2007)
Groundcover	Paved
Representative Area	San Jose-Sunnyvale-Santa Clara MSA

San Jose was chosen for an air monitoring site because it is the largest city in Santa Clara County and the largest city in the Bay Area, with an estimated 2009 population of 1,023,083.

Ozone precursors emitted within the central San Francisco Bay Area are often carried into the San Jose area by the prevailing northwesterly winds. The northern half of the Santa Clara Valley is densely populated and the associated activities of the residents also add significant pollutant emissions into the air.

The air monitoring site is located in the center of northern Santa Clara Valley, in a commercial and residential part of downtown San Jose. This area is completely encircled by major freeways, and has a large airport just to the northwest. The air quality in this location is representative of a large part of the valley due to the diurnal up valley and down valley air flow, which mixes the pollutants throughout the valley.

NO/NO_2, NMOC, CH_4 and ozone are monitored because of the large amount of ozone precursor emissions near the area as well as from upwind areas. Carbon monoxide is measured because of the significant traffic volume in the area. PM_{10} and $PM_{2.5}$ are monitored because light winds combined with surface based inversions within the valley during winter months can cause elevated particulate levels.

Gaseous VOC toxic compounds, carbonyls, and metals are sampled at San Jose on a one in six day schedule as part of the NATTS program. Gaseous toxic compounds and carbonyls are analyzed by the Air District laboratory while metals are analyzed by an outside laboratory. CARB also does sampling for VOC toxic compounds, carbonyls, and metals at San Jose but this sampling is on a 1 in 12 day schedule and the analysis is done by the CARB laboratory. More information about the CARB toxics monitoring program can be found at http://www.arb.ca.gov/toxics/toxics.htm. Information about toxics monitoring by the Air District can be found in the Toxics Program section of this report.

The San Jose station will be a National Core (NCore) multi-pollutant monitoring station beginning in 2011. Measurements are made for carbon monoxide, ozone, sulfur dioxide, nitrogen oxide, $PM_{2.5}$ and speciated $PM_{2.5}$ (the STN Program). High sensitivity instruments are used to monitor sulfur dioxide and carbon monoxide concentrations at San Jose because ambient levels are very low and EPA needs accurate measurements for all pollutants at NCore sites for trends studies and scientific research.

In the most recent 3 years, this site recorded two exceedances of the 75 ppb national 8-hour ozone standard, 14 exceedances of the national 24-hour $PM_{2.5}$ standard, and four exceedances of the California 24-hour PM_{10} standard. There were no exceedances of any NO_2, SO_2 or carbon monoxide standards measured during the most recent 3 years.

San Jose Monitor Information

Pollutant	O3	CO*	NO/NO2	CH4/NMOC	SO2*
Monitoring Objective	Population oriented	Population oriented & Highest concentration	Population oriented & Highest concentration	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling method	TECO 49i	TECO 48iTLE	TECO 42C	TECO 55C	TECO 49iTLE
PM filter analysis method	N/A	N/A	N/A	N/A	N/A
Data start date	11/01/02	11/01/02	11/01/02	CH4: 11/22/02 NMOC: 07/06/06	02/10/09
Operation schedule	Continuous	Continuous	Continuous	Continuous	Continuous
Sampling season	All year	All year	All year	All year	All year
Probe height (AGL)	11.9 m	11.9 m	11.9 m	11.9 m	11.9 m
Probe height above roof	4.3 m	4.3 m	4.3 m	4.3 m	4.3 m
Distance from obstructions on roof	None	None	None	None	None
Distance from obstructions not on roof	None	None	None	None	None
Distance from tree (DL)	13.1 m	13.1 m	13.1 m	13.1 m	13.1 m
Distance to furnace or incinerator flue	4.6 m	4.6 m	4.6 m	4.6 m	4.6 m
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A
Unrestricted airflow	360º	360º	360º	360º	360º
Probe material	Teflon	Teflon	Teflon	Teflon	Teflon
Residence time	12 s	13 s	12 s	11 s	14 s
Will there be changes within the next 18 mos?	No	No	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	N/A	N/A
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	N/A	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Daily	Daily	Daily	Daily	Daily
Last Annual Performance Evaluation (gaseous)	10//21/09	10//21/09	10//21/09	10//21/09	10/22/09
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	N/A	N/A

* High sensitivity instruments required at NCore sites. CO TLE installed on 6/07/2007, and SO_2 TLE installed on 2/10/2009.

San Jose Monitor Information

Pollutant	PM10	FRM PM2.5	Continuous PM2.5 BAM	Speciated PM2.5
Monitoring Objective	Population oriented	Population oriented	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling method	Andersen HiVol 1200	Partisol-Plus 2025 w/VSCC	Met One Model 1020	Met One SASS
PM filter analysis method	Weighed by Air District	Weighed by Air District	N/A	Weighed by RTI
Data start date	10/15/02	10/05/02	01/01/04	10/05/02
Operation schedule	1 in 6	Apr-Sep:1 in 3 Oct-Mar: daily	Continuous	1 in 3
Sampling season	All year	All year	All year	All year
Probe height	8.3 m	8.9 m	9.8m	8.9 m
Probe height above roof	1.6 m	2.2 m	2.0 m	2.1 m
Distance from obstructions on roof	None	None	None	None
Dist from obstructions not on roof	None	None	None	None
Distance from tree (DL)	11.0 m	14.9 m	11.9 m	16.1 m
Distance to furnace or incinerator flue	1.5 m	3.0 m	3.4 m	2.4 m
Distance between collocated monitors	N/A	N/A	N/A	N/A
Distance between PM10 and PM2.5 samplers	PM10 to PM2.5: 3.2m PM10 to SASS: 4.1m PM10 to BAM: 3.5 m	PM2.5 to PM10: 3.2 m PM2.5 to PM10: 4.1 m PM2.5 to BAM: 3.9 m	BAM to PM10: 3.5 m BAM to PM2.5: 3.9 m BAM to SASS: 7.9 m	SASS to PM10: 4.1 m SASS to BAM: 7.9 m SASS to PM2.5: 4.1 m
Unrestricted airflow	360º	360º	360º	360º
Probe material	N/A	N/A	N/A	N/A
Residence time	N/A	N/A	N/A	N/A
Will there be changes within the next 18 mos?	Yes	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	Yes	No – not reference or equivalent method	No
Frequency of flow rate verification for manual PM samplers	Weekly	Monthly	N/A	Monthly
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	Every two weeks	N/A
Frequency of 1-pt QC check (gaseous)	N/A	N/A	N/A	N/A
Last Annual Perform. Evaluation (gaseous)	N/A	N/A	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	10/20/09 05/20/09	10/20/09 05/20/09	10/20/09 05/20/09	10/20/09 05/20/09

San Martin

Site Name	San Martin - 7022
AQS ID	06-085-2006
GIS coordinates	37.0792° N 121.5999° W
Location	Air monitoring shelter next to maintenance shed
Address	13030 Murphy Ave, San Martin CA 95046
County	Santa Clara
Distance to road from gaseous probe	Murphy Ave: 57.0 meters US Highway 101: 455 meters
Traffic count	Murphy Ave: 500 ADT (estimate) US Highway 101: 107,000 ADT (2008)
Groundcover	Vegetative
Representative Area	San Jose- Sunnyvale- Santa Clara MSA

San Martin was chosen as an ozone air monitoring site because earlier field measurements showed this area to have the highest ozone concentrations in the Santa Clara Valley. Prevailing winds transport ozone and ozone precursors down the valley from the densely populated San Jose area as well as the surrounding San Francisco Bay. Because ozone in the tropospheric layer (the lowest 10 – 20 km) is formed from a chemical reaction between organic and nitrogen oxide gases in the presence of sunlight, the highest ozone concentrations are usually observed tens of miles downwind from the highest concentration of emission sources (freeways, power generating facilities, etc), because the reactions involving the organic gases are relatively slow.

San Martin is located in an agricultural area at the south end of the Santa Clara Valley approximately 24 miles southeast of downtown San Jose. The town has a small population of 4,230 (2000 Census) and no industrial sources. The air monitoring site is located at the South County Airport, in the center of the valley and about 0.3 miles west of US Highway 101.

In the most recent 3 years, this site recorded seven exceedances of the 75 ppb national 8-hour ozone standard.

San Martin Monitor Information

Pollutant	**O3**
Monitoring Objective	Highest concentration
Spatial scale	Neighborhood
Sampling method	TECO 49C
PM filter analysis method	N/A
Data Start date	04/30/94
Operation schedule	Continuous
Sampling season	Apr 1 – Nov 30
Probe height (AGL)	4.8 m
Probe height above roof	2.8 m
Distance from obstructions on roof	None
Distance from obstructions not on roof	None
Distance from tree (DL)	23 m
Distance to furnace or incinerator flue	N/A
Distance between collocated monitors	N/A
Unrestricted airflow	360º
Probe material	Teflon
Residence time	14 s
Will there be changes within the next 18 mos?	No
Is it suitable for comparison against the annual PM2.5?	N/A
Frequency of flow rate verification for manual PM samplers	N/A
Frequency of flow rate verification for automated PM analyzers	N/A
Frequency of one-point QC check (gaseous)	Daily
Last Annual Performance Evaluation (gaseous)	11/18/09
Last two semi-annual flow rate audits for PM monitors	N/A

San Pablo

Site Name	San Pablo - 2035
AQS ID	06-013-1004
GIS coordinates	37.96041° N, 122.35685° W
Location	One story commercial building
Address	1865-D Rumrill Blvd, San Pablo CA 94806
County	Contra Costa
Distance to road from gaseous probe	Rumrill Blvd: 15.8 meters
Traffic count	Rumrill Blvd: 25,106 ADT (2006)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

San Pablo was chosen for an air monitoring site because the area is in the most populated portion of western Contra Costa County. San Pablo, with a 2009 population estimate of 32,131, is almost completely surrounded by the city of Richmond, with a 2009 population estimate of 105,630. This area has heavy industry, high traffic volume, including two major freeways, and it is very close to the Chevron Refinery. Ozone and NO_2 are measured because the area is downwind of the central San Francisco Bay Area, which is a large source of ozone precursor emissions. Carbon monoxide is measured because the high traffic volume in the area. SO_2 is measured because the site is 1.2 miles downwind of the Chevron refinery, which can be a significant source of SO_2 emissions. PM_{10} is measured because stagnant days in the fall and winter can result in elevated particulate levels.

VOC toxic compounds are also sampled at San Pablo on a 1 in 12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

The station ceased operation due to heavy damage from a fire in the building in March 2009. It reopened in mid-May 2010.

This site recorded four exceedances of the California 24-hour PM_{10} standard from 2006-2008. There were no exceedances of any ozone, NO_2, SO_2, or carbon monoxide standards measured from 2006-2008. There were no exceedances of any standards in 2009 before suspension of operations in March.

San Pablo Monitor Information – as of March 2009[*] (station reopened in May 2010)

Pollutant	O3	CO	NO/NO2	SO2	PM10
Monitoring Objective	Population oriented	Population oriented	Population oriented	Source Impact	Population oriented
Spatial scale	Middle	Middle	Middle	Neighborhood	Middle
Sampling method	TECO 49i	API 300E	TECO 42i	TECO 43i	Tisch Env. HiVol TE-6000
PM filter analysis method	N/A	N/A	N/A	N/A	Weighed by Air District
Start date	09/13/02	09/13/02	09/13/02	09/13/02	09/23/02
Operation schedule	Continuous	Continuous	Continuous	Continuous	1 in 6
Sampling season	All year	All year	All year	All year	All year
Probe height (AGL)	9.0 m	9.0 m	9.0 m	9.0 m	6.4 m
Probe height above roof	5.6 m	5.6 m	5.6 m	5.6 m	2.2 m
Distance from obstructions on roof	None	None	None	None	None
Distance from obstructions not on roof	None	None	None	None	None
Distance from tree (DL)	>50 m	>50 m	>50 m	>50 m	>50 m
Distance to furnace or incinerator flue	None	None	None	None	None
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A
Unrestricted airflow	360°	360°	360°	360°	360°
Probe material	Teflon	Teflon	Teflon	Teflon	N/A
Residence time	12 s	13 s	14 s	13 s	N/A
Will there be changes within the next 18 mos?	Yes	Yes	Yes	Yes	Yes
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	N/A	N/A
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	N/A	Weekly
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Daily	Daily	Daily	Daily	N/A
Last Annual Performance Evaluation (gaseous)	02/19/09	02/19/09	02/19/09	02/19/09	N/A
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	N/A	02/19/09*

[*] Operations suspended late March 2009 – resumed mid-May 2010.

San Rafael

Site Name	San Rafael - 3005
AQS ID	06-041-0001
GIS coordinates	37.9724° N, 122.5200° W
Location	Second floor of two-story commercial building
Address	534 4th Street, San Rafael CA 94901
County	Marin
Distance to road from gaseous probe	4th St: 18 meters Irwin St: 48 meters US Highway 101: 112 meters
Traffic count	4th St: 6,000 ADT est. (2007) Irwin St: 17,530 ADT (2007) US Highway 101: 131,000 ADT (2006)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

San Rafael was chosen for an air monitoring site because it is the largest city in Marin County with a 2009 population estimate of 58,822. The city's climate and air quality is representative of that found throughout the populous eastern side of the county. Afternoon sea breezes typically keep pollution levels low. However, when the sea breeze is absent, local sources can cause elevated pollution levels.

The monitoring site is located in a commercial building about a block east of US Highway 101 and near major highway access ramps. It is one half mile east of the downtown San Rafael business district. There is no industrial activity in the immediate area. Ozone and NO/NO_2 are measured to monitor general population exposure to these pollutants. Carbon monoxide and PM_{10} are measured because the site is close to a major transportation corridor. $PM_{2.5}$ is measured because light winds combined with wood burning, vehicular traffic, and surfaced based inversions during winter can cause elevated particulate concentrations.

VOC toxic compounds are also sampled at San Rafael on a 1 in 12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

In October 2009, a continuous Federal Equivalent Method (FEM) $PM_{2.5}$ monitor was added to this site as the Air District's PM2.5 network was expanded to have at least one monitor per county. The FEM $PM_{2.5}$ monitor provides hourly measurements of $PM_{2.5}$ concentrations.

During the most recent 3 years, this site recorded one exceedance of the California 24-hour PM_{10} standard and no exceedances of any ozone, NO_2, or carbon monoxide standards. Although there were no exceedances of the national 24-hour $PM_{2.5}$ standard in 2009, there were four exceedances of the standard in January 2010.

San Rafael Monitor Information

Pollutant	O3	CO	NO/NO2	PM10	Continuous PM2.5 FEM BAM
Monitoring Objective	Population oriented	Population oriented	Population oriented	Population oriented	Population oriented
Spatial scale	Middle	Middle	Middle	Middle	Middle
Sampling method	TECO 49i	TECO 48A	TECO 42C	Andersen HiVol 1200	Met One FEM 1020
PM filter Analysis method	N/A	N/A	N/A	Weighed by Air District	N/A
Start date	07/01/76	10/01/67	NO: 01/01/68 NO2:10/01/67	11/04/86	10/27/09
Operation schedule	Continuous	Continuous	Continuous	1 in 6	Continuous
Sampling season	All year	All year	All year	All year	All year
Probe height (AGL)	11.9 m	11.9 m	11.9 m	7.0 m	7.1 m
Probe height above roof	5.2 m	5.2 m	5.2 m	1.9 m	2.0 m
Distance from obstructions on roof	None	None	None	None	None
Distance from obstructions not on roof	21 m	21 m	21 m	20 m	18.5 m
Distance from tree (DL)	14 m	15 m	15 m	14 m	12.5 m
Distance to furnace or incinerator flue	3.5 m	3.5 m	3.5 m	2.3 m	3.4 m
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A
Distance between PM10 and PM2.5 samplers	N/A	N/A	N/A	3.2 m	3.2 m
Unrestricted airflow	360°	360°	360°	360°	360°
Probe material	Teflon	Teflon	Teflon	N/A	N/A
Residence time	10 s	11 s	12 s	N/A	N/A
Will there be changes within the next 18 mos?	No	No	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	N/A	Yes
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	Weekly	Every two weeks
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Daily	Daily	Daily	N/A	N/A
Last Annual Performance Evaluation (gaseous)	09/15/09	09/15/09	09/15/09	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	12/22/09 06/22/09	12/22/09 11/13/09

Santa Rosa

Site Name	Santa Rosa - 9004
AQS ID	06-097-0003
GIS coordinates	38.4435° N, 122.7102° W
Location	Second floor of two-story commercial building
Address	837 5th St, Santa Rosa CA 95404
County	Sonoma
Distance to road from gaseous probe	5th St: 24 meters E St: 79 meters College Ave: 210 meters Brookwood Ave: 228 meters US Highway 101: 918 meters
Traffic count	5th St: 2,608 ADT (2004-2006) E St: 7,804 ADT (2004-2006) College Ave: 19,062 ADT (2004-2006) Brookwood Ave: 21,297 ADT (2004-2006) US Highway 101: 120,000 ADT (2006)
Groundcover	Paved
Representative Area	Santa Rosa-Petaluma MSA

Santa Rosa was chosen for an air monitoring site because it is the largest city in Sonoma County with a 2009 population estimate of 163,436. The city's climate is strongly influenced by the Pacific Ocean and the marine air flow typically keeps pollution levels low. However, during light winds or strong nighttime temperature inversions, local sources can cause elevated pollution levels. The monitoring site is located just east of the downtown urban core and 0.5 miles east of US Highway 101.

There are no industrial sources in the immediate area. Ozone and NO/NO_2 are measured to monitor general population exposure to these pollutants. Carbon monoxide is measured because of the local urban traffic volume and proximity to the Highway 101 transportation artery. $PM_{2.5}$ is measured because light winds combined with wood burning, vehicular traffic, and surface based-based inversions during the winter months can cause elevated particulate concentrations.

VOC toxic compounds are also sampled at Santa Rosa on a 1 in 12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

In October, 2009 the existing FRM (filter-based) $PM_{2.5}$ monitor at this site was replaced with a Federal Equivalent Method (FEM) continuous $PM_{2.5}$ monitor. The FEM monitor was recently approved by EPA and provides hourly measurements of $PM_{2.5}$ concentrations that can be used both for determination of attainment of national $PM_{2.5}$ standards and for real-time reporting.

Pollutant concentrations measured at Santa Rosa did not exceed any ozone, $PM_{2.5}$, NO_2, or carbon monoxide standards during the most recent 3 years.

Santa Rosa Monitor Information

Pollutant	**O3**	**CO**	**NO/NO2**	**Continuous PM2.5 FEM BAM***	**FRM PM2.5***
Monitoring Objective	Population oriented	Population oriented	Population oriented	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling method	TECO 49i	TECO 48	TECO 42i	Met One FEM 1020	Partisol-Plus 2025 w/VSCC
Analysis method	N/A	N/A	N/A	N/A	Weighed by Air District
Start date	04/17/81	04/17/81	NO: 01/01/82 NO2:04/17/81	10/23/09	01/24/99
Operation schedule	Continuous	Continuous	Continuous	Continuous	Jan-Mar, Oct: 1 in 3 * Apr-Sep: 1 in 6
Sampling season	All year	All year	All year	All year	All year
Probe height (AGL)	10.7 m	10.7 m	10.7 m	8.1 m	7.5m
Probe height above roof	5.2 m	5.2 m	5.2 m	2.0 m	2.0m
Distance from obstructions on roof	None	None	None	None	None
Distance from obstructions not on roof	21 m	21 m	21 m	21 m	21m
Distance from tree (DL)	13.7 m	13.7 m	13.7 m	13.7 m	12.5m
Distance to furnace or incinerator flue	4.7 m	4.7 m	4.7 m	5.7 m	4.9m
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A
Unrestricted airflow	360°	360°	360°	360°	360°
Probe material	Teflon	Teflon	Teflon	N/A	N/A
Residence time	7 s	8 s	9 s	N/A	N/A
Will there be changes within the next 18 mos?	No	No	No	No	N/A*
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	Yes	Yes
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	Every two weeks	Monthly
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Daily	Daily	Daily	N/A	N/A
Last Annual Performance Evaluation (gaseous)	12/23/09	12/23/09	12/23/09	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	12/23/09 09/24/09	09/24/09 06/23/09

* FRM PM2.5 discontinued on 10/22/09; replaced by continuous PM2.5 FEM BAM on 10/23/09

Vallejo

Site Name	Vallejo - 8004
AQS ID	06-095-0004
GIS coordinates	38.1025° N, 122.2380° W
Location	One story commercial building
Address	304 Tuolumne St, Vallejo CA 94590
County	Solano
Dist. to road from probe	Tuolumne St: 18 meters Capitol St: 30 meters Solano Ave: 33 meters Interstate 80: 700 meters
Traffic count	Tuolumne St: 5,100 ADT (2008) Capitol St: 500 ADT est. (2008) Solano Ave: 8,600 ADT (2008) Interstate 80: 142,000 ADT (2006)
Groundcover	Paved
Representative Area	Vallejo-Fairfield MSA

Vallejo was chosen for an air monitoring site because it is the largest city in Solano County with a 2009 population estimate of 121,435. Vallejo's climate is influenced by marine air flow through the Carquinez Strait that typically keeps pollution levels low. However, Vallejo has the potential to be impacted by pollution from three directions: daytime southwest winds bringing ozone and ozone precursors from the San Francisco Bay Area, nighttime north winds bringing particulates from the Napa Valley, and east winds bringing ozone and particulates from the Central Valley.

The monitoring site is located in a mixed commercial and residential neighborhood one mile east of downtown and 0.5 miles west of Interstate 80. Ozone and NO/NO_2 are measured because southerly winds can transport ozone and its precursors into Vallejo from the heavily populated central Bay Area. Easterly winds can transport ozone from the Central Valley through the Carquinez Strait.

$PM_{2.5}$ is measured because high concentrations typically occur during the winter when nighttime valley drainage winds, wood burning, and shallow temperature inversions trap pollutants from local sources and the Napa Valley to the north. East winds can also transport particulate into Vallejo through the Carquinez Strait from the Central Valley.

Carbon monoxide is measured because Interstate 80 passes through the middle of the urban area east of the monitoring site. SO_2 is measured at Vallejo to monitor general population exposure and because refineries located to the south and east can be significant sources of SO_2.

VOC toxic compounds are also sampled at Vallejo on a 1 in 12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

During the most recent 3 years, this site recorded four exceedances of the California 8-hour ozone standard and the national 24-hour $PM_{2.5}$ standard was exceeded on sixteen days. There were no exceedances of any NO_2, SO_2, or carbon monoxide standards during the most recent 3 years.

Vallejo Monitor Information

Pollutant	**O3**	**CO**	**NO/NO2**	**SO2**
Monitoring Objective	Population oriented	Population oriented	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling method	TECO 49i	TECO 48A	TECO 42i	TECO 43C
PM Filter Analysis method	N/A	N/A	N/A	N/A
Start date	07/01/76	07/01/76	07/01/76	07/01/76
Operation schedule	Continuous	Continuous	Continuous	Continuous
Sampling season	All year	All year	All year	All year
Probe height (AGL)	9.6 m	9.6 m	9.6 m	9.6 m
Probe height above roof	4.3 m	4.3 m	4.3 m	4.3 m
Distance from obstructions on roof	None	None	None	None
Distance from obstructions not on roof	None	None	None	None
Distance from tree (DL)	N/A	N/A	N/A	N/A
Distance to furnace or incinerator flue	3.7 m	3.7 m	3.7 m	3.7 m
Distance between collocated monitors	N/A	N/A	N/A	N/A
Unrestricted airflow	360°	360°	360°	360°
Probe material	Teflon	Teflon	Teflon	Teflon
Residence time	11 s	12 s	13 s	12 s
Will there be changes within the next 18 mos?	No	No	No	No
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	N/A
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Daily	Daily	Daily	Daily
Last Annual Performance Evaluation (gaseous)	11/17/09	11/17/09	11/17/09	11/17/09
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	N/A

Vallejo Monitor Information

Pollutant	FRM PM2.5	Continuous PM2.5 BAM	Speciated PM2.5
Monitoring Objective	Population oriented	Population oriented	Population oriented
Spatial scale	Neighborhood	Neighborhood	Neighborhood
Sampling method	Partisol Plus 2025 w/VSCC	Met One BAM 1020	Met One SASS
PM Filter Analysis method	Weighed by Air District	N/A	Weighed by DRI
Start date	03/10/99	01/01/04	6/11/08
Operation schedule	Apr-Sep: 1in 6 Oct-Mar: daily	Continuous	1 in 6
Sampling season	All year	All year	All Year
Probe height (AGL)	6.5 m	5.8 m	6.6 m
Probe height above roof	2.3 m	1.9 m	2.3 m
Distance from obstructions on roof	None	None	None
Distance from obstructions not on roof	None	None	None
Distance from tree (DL)	N/A	N/A	N/A
Distance to furnace or incinerator flue	6.3m	2.5 m	5.4m
Distance between collocated monitors	N/A	N/A	N/A
Distance between SASS and PM2.5 samplers	PM2.5 to BAM: 3.7 m PM2.5 to SASS: 3.1 m	BAM to PM2.5: 3.7 m BAM to SASS: 2.9 m	SASS to PM2.5: 3.1 m SASS to BAM: 2.9 m
Unrestricted airflow	360°	360°	360°
Probe material	N/A	N/A	N/A
Residence time	N/A	N/A	N/A
Will there be changes within the next 18 mos?	No	No	No
Is it suitable for comparison against the annual PM2.5?	Yes	No – not reference or equivalent method	No
Frequency of flow rate verification for manual PM samplers	Monthly	N/A	Monthly
Frequency of flow rate verification for automated PM analyzers	N/A	Every two weeks	N/A
Frequency of one-point QC check (gaseous)	N/A	N/A	N/A
Last Annual Performance Evaluation (gaseous)	N/A	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	11/16/09 06/02/09	11/16/09 06/02/09	11/16/09 06/02/09

Detailed Site Information for SPM Stations

Berkeley

Site Name	Berkeley - 1026
AQS ID	06-001-2004
GIS coordinates	38.8778° N, 122.3013° W
Location	Trailer in parking lot
Address	1398 6th St., Berkeley CA 94710
County	Alameda
Distance to road from gaseous probe	Camelia Street: 27 meters 6th Street: 34 meters Gilman Street: 164 meters Interstate 80: 484 meters
Traffic count	Camelia Street: 500 ADT est. (2009) 6th Street: 1,500 ADT est. (2009) Gilman Street: 21,700 (2000) Interstate 80: 266,500 (2008)
Groundcover	Paved
Representative Area	San Francisco-Oakland-Fremont MSA

The Air District began a three year ambient air monitoring study in Berkeley in December 2007. The purpose of the study is to determine the pollution impacts to local residents from vehicular traffic and industry along the Highway 80 corridor. The City of Berkeley has a 2009 population estimate of 108,119 and the west side of Berkeley has the highest pollutant emission density within the city.

Traffic levels are extremely high on Highway 80, with frequent traffic slowdowns during morning and evening commute times, which can produce significant amounts of hydrocarbons and particulates. Industrial sources along the highway, particularly Pacific Steel Casting (PSC), have made local residents concerned about possible exposure to particulates and toxic compounds. These sources, located on the west side of Berkeley, commonly transport pollutants downwind into Berkeley due to prevailing westerly winds.

The mobile air monitoring station is sited in West Berkeley because this area is expected to have the highest impacts due to close proximity to the sources. The trailer is located 0.30 miles east of Highway 80 and 0.25 miles downwind from PSC in a residential neighborhood. Although the purpose of the study is primarily source-oriented exposure from the highway and local industry emissions, the Air District is also monitoring population exposure to criteria pollutants including ozone, NO_2, SO_2, carbon monoxide, PM_{10}, and $PM_{2.5}$.

Gaseous toxic compounds and metals are sampled at Berkeley by the Air District on a 1 in 6 day schedule. In 2009, gaseous toxic compounds were analyzed at the Air District laboratory and metals were analyzed by CARB. Information about toxics monitoring by the Air District can be found in the Toxics Program section of this report.

Pollutant concentrations measured at Berkeley did not exceed any ozone, NO_2, SO_2, carbon monoxide, or PM_{10} air quality standards since the site opened in December 2007. The continuous $PM_{2.5}$ (BAM) monitor recorded concentrations above the national 24-hour $PM_{2.5}$ standard on two days in 2008 and one day in 2009. However, this monitor is not a recognized FRM or FEM method, and the data cannot be used to determine violations of the national $PM_{2.5}$ standards, or its attainment status. Only FRM or FEM based $PM_{2.5}$ measurements may be used for comparison with national $PM_{2.5}$ standards.

Hourly gaseous concentrations are available real-time on the Air District web site. Pollutant summaries for all measurements from this study will be made available to local community groups and the City of Berkeley. The site is expected to be closed at the end of 2010.

Berkeley Monitor Information

Pollutant	O3	CO	NO/NO2	SO2	CH4/NMOC
Monitoring Objective	Population Oriented & Source Impact	Population Oriented & Source Impact	Population Oriented & Source Impact	Population Oriented & Source Impact	Population Oriented & Source Impact
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling method	TECO 49C	API 300E	TECO 42C	TECO 43C	TECO 55C
PM filter analysis method	N/A	N/A	N/A	N/A	N/A
Start date	12/13/07	12/13/07	12/13/07	12/13/07	CH4: 12/13/07 NMOC: 12/13/07
Operation schedule	Continuous	Continuous	Continuous	Continuous	Continuous
Sampling season	All year	All year	All year	All year	All year
Probe height (AGL)	5.1 m	5.1 m	5.1 m	5.1 m	5.1 m
Probe height above roof	2.5 m	2.5 m	2.5 m	2.5 m	2.5 m
Distance from obstructions on roof	None	None	None	None	None
Distance from obstructions not on roof	None	None	None	None	None
Distance from tree (DL)	18 m	18 m	18 m	18 m	18 m
Distance to furnace or incinerator flue	17 m	17 m	17 m	17 m	17 m
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A
Unrestricted airflow	360°	360°	360°	360°	360°
Probe material	Teflon	Teflon	Teflon	Teflon	Teflon
Residence time	9 s	9 s	10 s	9 s	9 s
Will there be changes within the next 18 mos?	Yes	Yes	Yes	Yes	Yes
Is it suitable for comparison against the annual PM2.5?	N/A	N/A	N/A	N/A	N/A
Frequency of flow rate verification for manual PM samplers	N/A	N/A	N/A	N/A	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	N/A	N/A	N/A	N/A
Frequency of one-point QC check (gaseous)	Daily	Daily	Daily	Daily	Daily
Last Annual Performance Evaluation (gaseous)	10/27/09	10/27/09	10/27/09	10/27/09	10/27/09
Last two semi-annual flow rate audits for PM monitors	N/A	N/A	N/A	N/A	N/A

Berkeley Monitor Information

Pollutant	PM10	Continuous PM2.5 BAM
Monitoring Objective	Population Oriented & Source Impact	Population Oriented & Source Impact
Spatial scale	Neighborhood	Neighborhood
Sampling method	Tisch Env. HiVol TE-6000	Met One BAM 1020
PM Filter Analysis method	Weighed by Air District	N/A
Start date	12/14/07	12/18/07
Operation schedule	1 in 6	Continuous
Sampling season	All year	All year
Probe height (AGL)	4.3 m	4.8 m
Probe height above roof	1.5 m	2.2 m
Distance from obstructions on roof	None	None
Distance from obstructions not on roof	None	None
Distance from tree (DL)	20 m	17 m
Distance to furnace or incinerator flue	20 m	18 m
Distance between collocated monitors	N/A	N/A
Distance between PM10 and PM2.5 samplers	PM10 to BAM: 2.7 m	BAM to PM10: 2.7 m
Unrestricted airflow	360°	360°
Probe material	N/A	N/A
Residence time	N/A	N/A
Will there be changes within the next 18 mos?	Yes	Yes
Is it suitable for comparison against the annual PM2.5?	N/A	No – not reference or equivalent method
Frequency of flow rate verification for manual PM samplers	Weekly	N/A
Frequency of flow rate verification for automated PM analyzers	N/A	Every two weeks
Frequency of one-point QC check (gaseous)	N/A	N/A
Last Annual Performance Evaluation (gaseous)	N/A	N/A
Last two semi-annual flow rate audits for PM monitors	05/27/09 10/26/09	05/27/09 10/26/09

Crockett

Site Name	Crockett - 2017
AQS ID	06-013-1001
GIS Coordinates	38.0549º N, 122.23328º W
Location	Pump house
Address	End of Kendall Avenue, Crockett CA 94525
County	Contra Costa
Distance to road from gaseous probe	San Pablo Ave: 68.4 meters
Traffic count	San Pablo Ave: 8,763 ADT (2007)
Groundcover	Vegetative
Representative Area	San Francisco-Oakland-Fremont MSA

Crockett was chosen for SO_2 source impact monitoring because it is downwind of the ConocoPhillips Refinery. Prevailing winds in the area are from the west, which transport SO_2 emissions from the refinery over the town of Crockett, a predominately residential community with a 2000 estimated population of 3,194. The monitoring site is located on the west side of Crockett 0.9 miles northeast of the refinery boundary. The only other major industry near Crockett is C&H Sugar, which is not a significant source of SO_2 emissions.

VOC toxic compounds are also sampled at Crockett on a 1 in 12 day schedule and analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

There were no exceedances of any State or national SO_2 standards measured in the most recent 3 years at this site.

Crockett is classified as an SPM site. EPA siting criteria specifies that the probe be located at least 10 meters from the drip line of all trees. The closest tree drip line to the probe is 1.2 meters away, but since the tree is located outside of the required 180 degree arc of unrestricted airflow for source impact monitoring as determined by the predominant wind direction and the direction of the refinery, the close proximity of that tree is irrelevant. The closest tree drip line within the 180 degree arc is 4.9 meters from the probe, which does not meet siting criteria. The Air District has been unable to negotiate with the local homeowner's association for the removal of this tree. Even though one of the siting criteria for a SLAMS site cannot be met, the site is still suitable for source impact monitoring as an SPM site.

Crockett Monitor Information

Pollutant	**SO2**
Monitor Objective	Source impact
Spatial scale	Neighborhood
Sampling method	TECO 43C
PM filter analysis method	N/A
Start date	01/01/79
Operation schedule	Continuous
Sampling season	All year
Probe height (AGL)	6.2 m
Probe height above roof	2.4 m
Distance from obstructions on roof	None
Distance from obstructions not on roof	None
Distance from tree (DL)	4.9 m*
Distance to furnace or incinerator flue (m)	N/A
Distance between collocated monitors	N/A
Unrestricted airflow	270°
Probe material	Teflon
Residence time	10 s
Will there be changes within the next 18 mos?	Yes
Is it suitable for comparison against the annual PM2.5?	N/A
Frequency of flow rate verification for manual PM samplers audit	N/A
Frequency of flow rate verification for automated PM analyzers audit	N/A
Frequency of one-point QC check (gaseous)	Weekly
Last Annual Performance Evaluation (gaseous)	10/21/09
Last two semi-annual flow rate audits for PM monitors	N/A

* Closest tree within the 180 degree arc of unrestricted air flow for source impact monitoring.

Cupertino

Site Name	Cupertino - 7034
AQS ID	N/A
GIS coordinates	37.3216° N, 122.0713° W
Location	One story building
Address	22638 Stevens Creek Blvd. Cupertino, CA 95014
County	Santa Clara
Distance to road from monitor	Stevens Creek Blvd: 40.2 m Prado Vista Drive: 36.6 m Foothill Blvd: 228.6 m Silver Oak Lane: 152.4 m
Traffic count	Stevens Creek Blvd: 4030 ADT (2009) Prado Vista Drive: 200 ADT est. (2008) Foothill Blvd: 8960 ADT (2009) Silver Oak Lane: 500 ADT est. (2008)
Groundcover	Gravel
Representative Area	San Jose-Sunnyvale-Santa Clara MSA

The Air District is conducting a particulate study in Cupertino to determine if emissions from the nearby Lehigh Cement Plant and its associated diesel truck traffic could be producing elevated particulate concentrations in nearby neighborhoods. The City of Cupertino had a 2009 population estimate of 56,431 and the present monitoring site is in a residential area just east of Permanente Canyon where the Lehigh Cement Plant is located. It is also adjacent to Stevens Creek Boulevard which is the main route for truck traffic using the plant.

PM_{10} monitoring at the site began in October 2008. Because of public concern about air quality in the area, the Air District has decided to enhance the monitoring study by adding more monitors this summer, and to continue the study for an additional year.

Because cement plant and diesel truck emissions tend to produce larger-sized particles, a PM_{10} monitor was being used to measure the impacts. A continuous monitor was used so as to correlate concentrations with the hourly emissions from the plant and the truck traffic.

To date, there have been no measured PM_{10} concentrations above the national 24-hour PM_{10} standard of 150 $\mu g/m^3$. The monitor has measured concentrations over the California 24-hour standard of 50 $\mu g/m^3$ on two days in 2008 and on one day in January 2010. However, particulate concentrations at most locations in the Bay Area were high those days, so the high values may be due to basin-wide sources rather than local sources. Hourly particulate concentrations and wind data for the Cupertino site can be viewed real-time on the Air District web site.

In summer 2010, the air monitoring equipment will be placed in an instrumented trailer and moved to a new site at Monte Vista Park in Cupertino. Ozone and its precursors

(CH_4/NMOC and NO/NO_2) will be measured because the area is downwind of precursor sources during the warmer months. Carbon monoxide will be measured because of car and truck traffic on residential streets and because two freeways pass through Cupertino. SO_2 will be measured because the cement plant uses petroleum coke as fuel to heat the cement kiln. Continuous $PM_{2.5}$ and filter based PM_{10} will be measured because light winds combined with surface-based inversions during the winter months may cause elevated particulate levels. A meteorological system will also be located nearby. Hourly data collected will continue to be posted real-time on the Air District web site.

Toxic compounds will also be sampled at Cupertino by the Air District on a 1 in 6 day schedule in 2010 because of the closeness of the Lehigh Cement Plant to residential areas. The compounds measured at Cupertino will be the same as those measured at Berkeley in 2009. For details about toxics measurements done at Berkeley, see the Toxics Program section of this report.

Cupertino Monitor Information

Pollutant	Continuous PM10 BAM
Monitoring Objective	Population Oriented & Source Impact
Spatial scale	Neighborhood
Sampling method	Met One E-BAM
PM Filter Analysis method	N/A
Start date	10/29/08
Operation schedule	Continuous
Sampling season	All year
Probe height (AGL)	5.0 m
Probe height above roof	2.2 m
Distance from obstructions on roof	5.1 m
Distance from obstructions not on roof	32.3 m
Distance from tree (DL)	24.3 m
Distance to furnace or incinerator flue	15.9 m
Distance between collocated monitors	N/A
Distance between PM10 and PM2.5 samplers	N/A
Unrestricted airflow	360°
Probe material	N/A
Residence time	N/A
Will there be changes within the next 18 mos?	Yes
Is it suitable for comparison against the annual PM2.5?	N/A
Frequency of flow rate verification for manual PM samplers	N/A
Frequency of flow rate verification for automated PM analyzers	Every two weeks
Frequency of one-point QC check (gaseous)	N/A
Last Annual Performance Evaluation (gaseous)	N/A
Last two semi-annual flow rate audits for PM monitors	10/08/09 12/10/08

Fort Cronkhite

Site Name	Fort Cronkhite
AQS ID	06-041-0004
GIS coordinates	37.832650° N, 122.527690° W
Location	At ground level behind a ranger residence
Address	Building 1111, Bunker Road, Fort Cronkhite GGNRA
County	Marin
Distance to road from probe	Bunker Road: 16 meters
Traffic count	Bunker Road: 948 ADT (2006)
Groundcover	Vegetative
Representative Area	San Francisco-Oakland-Fremont MSA

Fort Cronkhite was chosen for an air toxics monitoring site because it is representative of ambient levels of toxics compounds transported into the Bay Area along its western boundary. The site is ½ mile east of the Pacific Ocean, on the north side of the Golden Gate gap which opens into the San Francisco Bay. The monitor is located within the Golden Gate National Recreation Area (GGNRA) near the visitor center at Fort Cronkhite. Because winds in the Bay Area are generally from the west, this site is intended to be representative of local background toxics concentrations originating from the Pacific Ocean. The low concentrations from this site provide a baseline to which other toxics measurements in the Bay Area can be compared.

Toxics concentrations measured at this site should not be considered to be at pristine natural background levels. There are toxics contributions from emissions transported across the Pacific Ocean from Asia, from ships headed to and from Bay Area and Central Valley ports, and from ships sailing up and down the coast. Additionally, there can be a small contribution from vehicle traffic in areas upwind of the site within the GGNRA. In spite of these contributions, when winds are from the west, the toxics levels at this site reflect the lowest levels in the Bay Area.

The closest industrial sources are in San Francisco about 8 miles southeast of the site. The closest towns are Sausalito, 3 miles to the east northeast with a 2009 population of 7,596, and Marin City, 3 miles to the northeast with a 2000 population estimate of 2,560. Sausalito and Marin City have little impact on the monitoring site because winds are typically from the west so the site is upwind of these towns, and the towns have no significant industrial sources.

This site is operated as part of the Air District's Toxics Program on a 1 in 12 day schedule. Samples are collected using a Xontech canister and later analyzed in the Air District laboratory. More information about the toxics monitoring program can be found in the Toxics Program section of this report.

Fort Cronkhite Monitor Information

Pollutant	Canister Toxics
Monitoring Objective	General Background
Spatial scale	Regional
Sampling method	Xontech 910A
PM filter analysis method	N/A
Start date	3/26/87
Operation schedule	1 in 12
Sampling season	All year
Probe height (AGL)	7.3 m
Probe height above roof	0.9 m
Distance from obstructions on roof	None
Distance from obstructions not on roof	None
Distance from tree (DL)	20 m
Distance to furnace or incinerator flue	N/A
Distance between collocated monitors	N/A
Unrestricted airflow	360°
Probe material	Teflon
Residence time	N/A
Will there be changes within the next 18 mos?	No
Is it suitable for comparison against the annual PM2.5?	N/A
Frequency of flow rate verification for manual PM samplers	N/A
Frequency of flow rate verification for automated PM analyzers	N/A
Frequency of one-point QC check (gaseous)	N/A
Last Annual Performance Evaluation (gaseous)	N/A

Special Monitoring Programs Conducted in 2009

EPA School Air Toxics Monitoring Program

EPA established the School Air Toxics Monitoring Program (SATMP) in 2009 to understand whether outdoor toxic air pollution poses health concerns to schoolchildren. The program was planned on a national level and the field monitoring activities are being carried out by experienced state and local air monitoring agencies like the Air District under the supervision of EPA Regional Offices. The Program seeks to determine if an air toxics exposure problem exists at schools and if so, pursue risk reduction activities and consider longer-term monitoring efforts where more information is needed. All samples were to be collected during a two-month period from July to September 2009. Sites that showed high toxic levels would have additional monitoring.

EPA developed a list of priority areas for an initial round of toxics monitoring. The priority areas were selected based on proximity to sources having a high toxicity potential. In the Bay Area, EPA had concerns about the impacts on nearby school children of hexavalent chromium emitted from the Lehigh Southwest Cement Plant in Cupertino. Studies in other parts of the country had shown that hexavalent chromium could be a significant air toxic released during cement manufacturing.

Daytime winds in Cupertino are generally from the north or northwest, which means the community is frequently upwind and away from impacts from the plant. However, there is potential for hexavalent chromium to reach the community whenever winds are from the south. There is also a local down-canyon wind pattern, which can occur at night, when surface winds travel from the plant down the Permanente Canyon toward Cupertino. The Stevens Creek Elementary School was chosen as a monitoring site because it is close to the Lehigh cement plant (1.6 km) and the entrance to Permanent Canyon. Figure 2 is a map showing the location of the school and the cement plant.

Chromium is a naturally occurring element found in rocks, animals, plants, and soil. It commonly exists in trivalent (chromium III) or hexavalent (chromium VI) forms. While trivalent chromium is an essential nutrient that helps the body use fat, sugars, and protein, hexavalent chromium is a highly reactive, colorless, and odorless air toxic that can damage the respiratory system and cause cancer when inhaled at high concentrations.

Hexavalent chromium exists in the atmosphere as tiny particles or aerosols that are measured by drawing ambient air through a special filter for 24 hours on a 1-in-6 day schedule. Exposed filters are removed from the sampler by Air District staff and sent to ERG, a laboratory under contract to EPA/SATMP, for analysis within 30 days of collection. All sampling equipment, technician training, Standard Operating Procedures (SOPs), filters, and laboratory analysis services and procedures are provided directly by SATMP to maintain measurement uniformity and quality across the entire program.

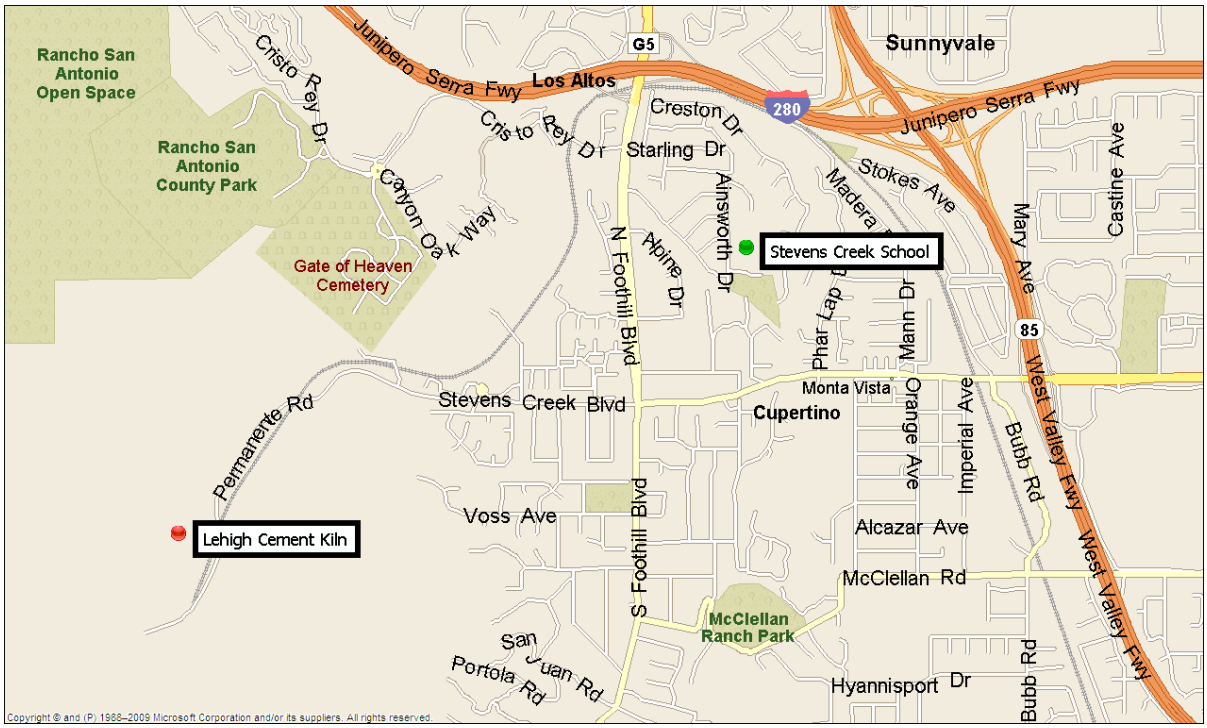

Figure 2. Map of Stevens Creek Elementary School in Cupertino.

The SATMP Project sampling at Stevens Creek Elementary School began in July 2009 and was completed in September 2009. As required by the project, ten primary samples were collected during the two months. An additional three samples were also collected in case of possible primary sample invalidation. For the Cupertino site, all 13 samples were analyzed and validated, and all had concentrations that were well below levels of concern for cancer risk and respiratory exposure. Results and technical information for all SATMP monitoring locations are available at http://www.epa.gov/schoolair/schools.html. (Follow the navigation link to Stevens Creek Elementary School to view the most current monitoring data available for the school and an explanation of the results.)

Although the EPA sponsored SATMP sampling project ended in September 2009, the Air District elected to extend the project at Stevens Creek School for an additional ten months. The additional samples will provide a more complete picture of hexavalent chromium concentrations at the school for the entire year. The extended sampling program is performed by Air District staff, and the Air District has contracted with ERG to analyze the filters through the end of the project. After the sampling, analysis, and final data review is complete, results of the extended Air District sampling will be made available on the Air District web site and submitted to the EPA AQS database (AQS site number 06-085-5506).

Meteorology Program

The Air District operates a meteorological monitoring program to provide accurate measurements of ambient meteorological parameters to meet the requirements of many programs within the Air District, and to make these data available to the public. Air District programs which use meteorological data are: air quality forecasting, photochemical modeling, source modeling, and data analysis. The Air District is not required to perform meteorological monitoring by State or national air monitoring regulations because there are no Photochemical Assessment Monitoring Stations (PAMS) in the network. However, to obtain high quality data that can be used for regulatory applications, the Air District follows EPA recommendations for siting, instrumentation, data accuracy, and quality assurance of the meteorological network.

The placement of meteorological stations depends on the use of the data. Sites chosen for air quality forecasting are located in areas that show the general wind and temperature patterns within the Air District. Photochemical modeling sites are chosen to show boundary conditions, general conditions, and upper air measurements. Source modeling sites are chosen to be representative of the source and receptor domain to be modeled. Sites used for data analysis are usually located near high pollution areas to determine the trajectories between source areas and downwind high concentration areas, as well as the general atmospheric conditions occurring during the episodes.

Because most Air District air monitoring stations are located in urban or suburban neighborhoods where multistory buildings and trees are nearby, it has not been possible to place meteorological systems at many of the Air District's air monitoring stations and still meet EPA meteorological siting recommendations. EPA recommends that wind systems be located at a height of 10 meters or at plume height if the use is source oriented modeling. In addition, the distance between the wind instrument and any obstruction should be at least 10 times the height of the obstruction.

The current meteorological network has 22 sites. Figure 3 shows the locations of the sites in 2009. Seven of these sites are located at or adjacent to air monitoring stations (Bethel Island, Suisun, Concord, Vallejo, Livermore, Gilroy, and San Martin). The other air monitoring stations have obstructions to air flow nearby, necessitating placement of the meteorological sites further away. Additionally, to meet forecasting or photochemical modeling needs, some meteorological sites have been placed on ridges or mountain tops, such as at Chabot, Mt. Tamalpais, and Kregor Peak.

Sensors used in the Air District's meteorological network are:

- Wind speed and direction (cup and vane).
- Temperature.
- Relative humidity (at some sites).
- Solar radiation (at some sites).
- Rainfall (at some sites).
- Ambient pressure (at one site).

Hourly-averaged data are made available to District staff and the public on the Air District's web page, http://gate1.baaqmd.gov/aqmet/met.aspx, and are archived in the Technical Service Division's database. An electronic report is generated daily that checks for out of range values, constant values, missing values, or rate of change problems. If problems are seen, a technician visits the site to investigate. As part of the quality assurance program, each site is visited four times per year, twice for calibrations and twice for audits, and reports are generated for management review. At the end of each quarter, the data are reviewed and edited as needed. After editing, the data are uploaded into the EPA AQS database, and the preliminary data on the web page are overwritten with final data.

Data measured at airports and reported by the National Weather Service, as well as data from refineries as required under Air District regulations, from sewage treatment plants, from universities, and from private companies are also included in the Technical Services Division database as long as they meet EPA recommended siting and maintenance specifications. If requested by organizations, Air District staff will advised them where to best place their meteorological stations and how to operate the equipment such that the data can be used for regulatory purposes.

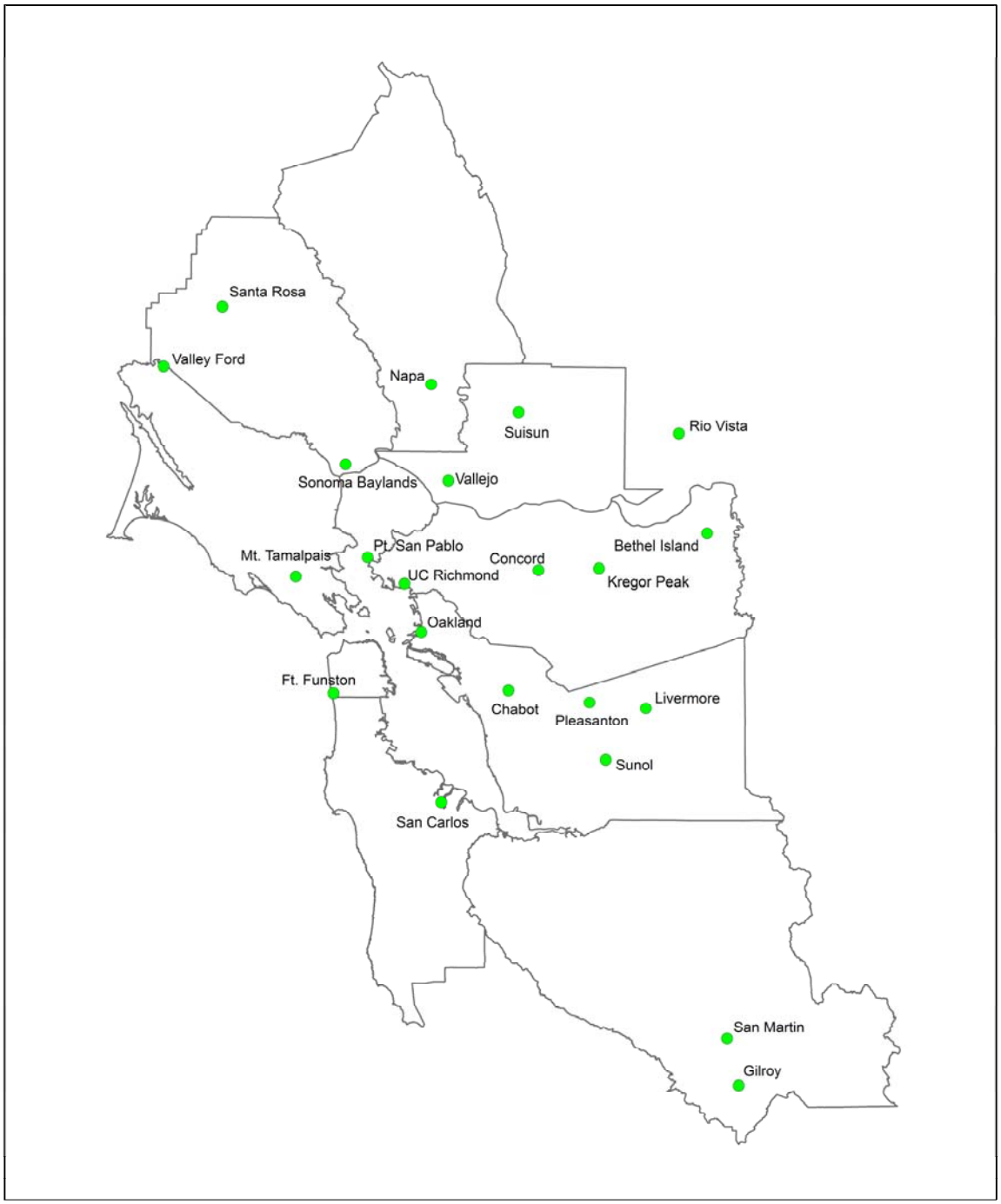

Figure 3. Map of Air District Meteorological Monitoring Sites for 2009.

National Air Toxics Trends Station (NATTS) at San Jose

EPA established the National Air Toxics Trends Stations (NATTS) network in 2003. NATTS was created to expand and improve national toxics monitoring with the major goal of identifying toxics trends in urban and rural settings throughout the United States. EPA and the Air District agreed to include San Jose in the NATTS network because of it's history of high quality air toxics data back to 1991 (when canister sampling at San Jose began), and because San Jose is the largest city in Northern California with a 2009 population of 1,023,083. The Air District began operating a NATTS site at the San Jose air monitoring station on January 1, 2003. NATTS pollutants can be grouped into three categories: hazardous air pollutants, continuous measurements, and polycyclic aromatic hydrocarbons.

Hazardous Air Pollutants (HAPs) Measurements

The Clean Air Act Amendments of 1990 listed 188 HAPs of interest. Of these, EPA selected fifteen HAPs for trends analysis in the original 2003 NATTS monitoring program. These selections were based on toxicity, available measurement methods, cost of measurement, correlation with other important HAPs, and anticipated concentration levels. Table 9 lists the NATTS HAPs measured by the Air District along with the year NATTS measurements began. Hexavalent chromium is the only required NATTS airborne toxic compound that the Air District does not directly measure, because the current sampling methodology allows significant deterioration of the compound before the analysis can be performed. Chromium is measured instead as an estimate of hexavalent chromium concentrations. In the future, the Air District may sample for hexavalent chromium when better sampling techniques are developed.

Table 9. List of the 15 NATTS HAPs Monitored by the Air District.

Hazardous Air Pollutant or Species	Year NATTS Measurements Began	Parameter Type	Sample Source	Analyzing Lab	Analysis equipment
Benzene	2003	VOC	SUMMA canister	BAAQMD	GC
1, 3 Butadiene	2003	VOC	SUMMA canister	BAAQMD	GC
Carbon tetrachloride	2003	VOC	SUMMA canister	BAAQMD	GC
Chloroform	2003	VOC	SUMMA canister	BAAQMD	GC
Tetrachloroethylene	2003	VOC	SUMMA canister	BAAQMD	GC
Trichloroethylene	2003	VOC	SUMMA canister	BAAQMD	GC
Acrolein	2008	Carbonyl	SUMMA canister	BAAQMD	GC/MS
Formaldehyde	2006	Carbonyl	cartridge	BAAQMD	HPLC
Acetaldehyde	2006	Carbonyl	cartridge	BAAQMD	HPLC
Antimony	2008	metal	¼ PM10 filter	ERG	XRF
Arsenic	2008	metal	¼ PM10 filter	ERG	XRF
Cadmium	2008	metal	¼ PM10 filter	ERG	XRF
Manganese	2008	metal	¼ PM10 filter	ERG	XRF
Nickel	2008	metal	¼ PM10 filter	ERG	XRF
Chromium[1]	2008	metal	¼ PM10 filter	ERG	XRF

[1] Chromium is measured as an estimate of hexavalent chromium.

Emission sources of the NATTS HAPs in Table 9 above:

- Benzene and 1, 3 butadiene are emitted by mobile sources (cars and trucks).
- Carbon tetrachloride, tetrachloroethylene and trichloroethylene are used for cleaning, but Air District regulations have significantly reduced their use.
- Chloroform is produced in the chlorination of water.
- Acrolein is generated by diesel and jet engines.
- Formaldehyde and acetaldehyde are formed during combustion processes. Formaldehyde is also created during the manufacture of some building materials and household products, and continues to off gas after manufacturing.
- Antimony comes from the soil.
- Arsenic compounds originate from soil and the smelting of metals.
- Nickel and cadmium compounds are naturally found in some soils and can be emitted from fossil fuel combustion, cement manufacturing and electroplating. Also, cadmium comes from tire wear.
- Manganese compounds naturally occur in some soils and can be emitted from steel plants, power plants and coke ovens.
- Hexavalent chromium is emitted during chrome plating operations, and is believed to be a byproduct of the cement-making process.

The Air District samples for the 14 NATTS pollutants and chromium on a 1 in 6 day schedule. Benzene; 1, 3 butadiene; acrolein; trichloroethylene; carbon tetrachloride; chloroform; and trichloroethylene are collected in canisters over a 24-hour period using a Xontec 910a sampler. The canister contents are then analyzed in the Air District laboratory using a Gas Chromatograph (GC) or a Gas Chromatograph/Mass Spectrometer (GC/MS). Formaldehyde and acetaldehyde (carbonyls) are collected using a cartridge on one sampling channel of a Xontec 924 toxics sampler. In the Air District laboratory, exposed cartridges are analyzed for carbonyls using High Performance Liquid Chromatograph (HPLC). Metals are collected on a standard PM_{10} filter. A quarter section of each filter is sent to ERG (EPA's designated contract laboratory) for analysis using X-Ray Fluorescence (XRF).

In late 2009, the Air District laboratory was remodeled to improve workplace safety. Consequently, the primary 1 in 6 day analysis for gaseous toxic compounds collected in canisters stopped after the October 29th canister samples were measured and resumed with the samples taken on December 27th. However, 1 in 12 day collocated measurements of these gaseous toxic compounds conducted by CARB continued during this period. Sampling of carbonyls using cartridges and of metals using quarter section PM_{10} filters was not interrupted.

Continuous Measurements

As part of the NATTS program, the Air District makes continuous measurements of carbon monoxide and black carbon. High sensitivity carbon monoxide is measured as an analysis tool because of correlation to benzene and 1, 3 butadiene, two of the largest contributors to air toxic exposure. Black carbon is measured because it is correlated to diesel emissions, which is identified by EPA as a mobile source air toxic.

Polycyclic Aromatic Hydrocarbons (PAHs) Measurements

In May 2008, the Air District began sampling for a number of PAHs under the NATTS program. PAHs are products of incomplete combustion, and are found primarily in soil, sediment and oily substances, as opposed to in water or air. However, they are also a component of concern in particulate matter in air and have probable human carcinogenic (cancer), mutagenic (genetic mutation), and taratogenic (birth defects) properties. The PAH compounds that the Air District measures are listed in Table 10.

Table 10. List of 22 NATTS PAH Compounds Measured by the Air District.

9-Fluorenone	Coronene
Acenaphthene	Cyclopenta(cd)pyrene
Acenaphthylene	Dibenz(a,h)anthracene
Anthracene	Fluoranthene
Benzo(a)anthracene	Fluorene
Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene
Benzo(b)fluoranthene	Naphthalene
Benzo(e)pyrene	Perylene
Benzo(g,h,i)perylene	Phenanthrene
Benzo(k)fluoranthene	Pyrene
Chrysene	Retene

The Air District does not have the equipment to meet the specific requirements to perform the analysis for these compounds, so ERG (EPA's designated contract laboratory) provides the filter media and analysis. PAH compounds are collected on a filter for a 24-hour period using a standard Hi-Vol Polyurethane Foam (PUF) sampler on the NATTS 1 in 6 day sampling schedule. Filters are then sent to the ERG laboratory for analysis.

Summary NATTS data are available from the EPA's AirData web site at http://www.epa.gov/oar/data/index.html. These data may also be found on the BAAQMD web site in the Toxic Air Contaminant Control Program Annual Report at http://www.baaqmd.gov/Divisions/Engineering/Air-Toxics/Toxic-Air-Contaminant-Control-Program-Annual-Report.aspx.

In addition to the NATTS analytes discussed in this section, the Air District also samples for other toxics compounds at San Jose. These are discussed in the Toxics Program section of this report.

NCore Program

In October 2006 the United States Environmental Protection Agency (EPA) revised 40 CFR Parts 53 and 58 to enhance ambient air quality monitoring to improve air quality measurements. One of the most significant changes in the regulations was the requirement to establish National Core (NCore) multi-pollutant monitoring stations. These stations will provide data on several pollutants at lower detection limits and replace the National Air Monitoring Station (NAMS) networks that have existed for several years. NCore stations will also be used to monitor trends of pollutants already in attainment. EPA recognized that pollutants already in attainment, and likely to remain so, did not need to be measured at all sites in a monitoring network. NCore stations are to be located in areas which represent the highest pollution levels for both attainment and non-attainment pollutants within an agency's boundaries. By reducing the number of monitors needed in a network, agencies can allocate scarce resources to other monitoring programs.

NCore stations are intended to:

- Report data to the public in a timely manner through AirNOW, air quality forecasting, and other public reporting mechanisms.
- Support development of emissions control strategies through air quality model evaluation and other observational methods.
- Track long-term trends for accountability of emissions control programs and health assessments that contribute to ongoing reviews and attainment of the National Ambient Air Quality Standards (NAAQS).
- Support scientific studies ranging across technological, health, and atmospheric disciplines including ecosystem assessments.

EPA designed the national NCore network to have a mixture of urban and rural sites. In Northern California, EPA desired a monitoring station that would represent a large urban area. Recommendations for locating NCore urban sites are found in 40 CFR Part 58 Appendix D and other EPA publications:

- Urban NCore stations are to be located at neighborhood or urban scale to provide representative exposure levels throughout the metropolitan area population.
- Urban NCore stations should be located where significant pollution levels exist.
- Population oriented monitoring is highly recommended.
- No biasing local pollutant emission sources should be within 500 meters at urban stations.
- Collocation with other network programs (such as NATTS, STN, CASTNET, IMPROVE, NADP, PAMS) is encouraged.
- Siting of monitors at NCore sites must meet SLAMS requirements as specified in 40 CFR Part 58.

EPA and the Air District cooperatively agreed to establish the Northern California NCore station in San Jose. EPA will provide funding and the Air District will operate the station. The station must be operational by January 1, 2011. The city of San Jose was chosen as the NCore site because it is the largest city in the Bay Area with over 1 million residents.

Exceedances of both the ozone and 24-hour PM2.5 national standards have been measured in San Jose. Consequently, operating an NCore station in the San Jose area would meet the requirement of being in an urban area with significant air pollution problems.

San Jose is located in the southern part of the Bay Area, and lies within the Santa Clara Valley. Wind patterns in the Santa Clara Valley are influenced greatly by the terrain, resulting in a prevailing flow roughly parallel to the valley's northwest-southeast orientation. During the daytime a sea breeze commonly carries pollutants from San Francisco, San Mateo and Alameda counties southward into the Santa Clara Valley, while a drainage flow carrying pollutants toward the bay, in the opposite direction, occurs during the nighttime hours. This diurnal up valley and down valley air flow mixes pollutants throughout the valley, making San Jose representative of a large part of the Bay Area.

The monitoring objective for the current San Jose air quality monitoring station is population exposure. Monitoring at a population-oriented station is intended to represent air quality levels over a large area having a high population density. Consequently, the site can not be too close to large emission sources such as industrial sources or highways, and the surrounding land use should be relatively uniform. EPA has defined neighborhood or urban scale as the appropriate area of representativeness for population oriented monitoring. Neighborhood scale has dimensions of 4 km around the monitoring station, and urban scale has a 50 km radius. Figure 4 shows the location of the current San Jose monitoring station (as a blue balloon), and a 4 km circle around the site representing a neighborhood scale area.

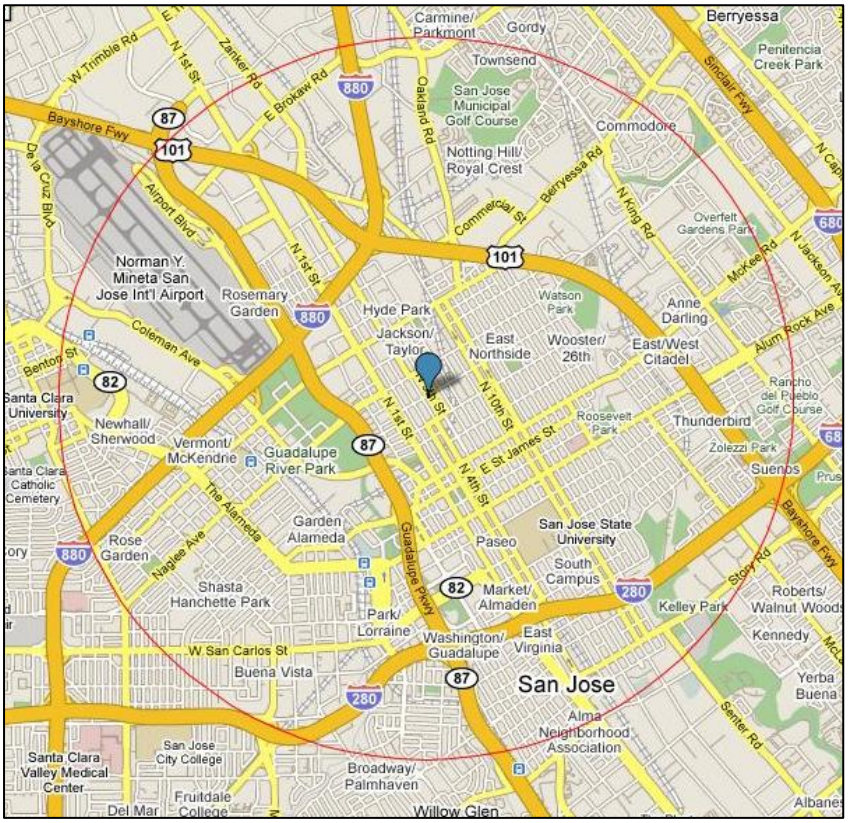

Figure 4. Map showing area of Neighborhood Scale at proposed San Jose NCore station.

The map shows that the current station is located in a residential/commercial area of San Jose. The station is located on Jackson Street, 1.6 km NW of the downtown core. The Air District has operated air monitoring stations at various locations near downtown San Jose since 1968, and current station has been in operation since 2002. The downtown area is encircled by freeways, but the closest freeway to the air monitoring station is 800 meters to the WSW, which is sufficiently distant to prevent vehicular emissions from dominating the general air quality at the San Jose station. The San Jose Airport is 2 to 4 km from the air monitoring station, distant enough that impacts from airport emissions would be relatively low at the monitoring station. There are no large point sources within 500 meters of the station. The only significant emission sources within a 4 km radius of the San Jose air monitoring station are:

- The Norman Y. Mineta San José International Airport, located from 2-4 km NW of the site, is a significant source. The airport averaged 256 commercial and 141 general aviation departures and landings per day in 2008.
- Reed & Graham, Inc (an asphalt batch plant) - located 3.7 km SSW of the site.
- Central Concrete Supply Company, Inc - located 1.9 km SSW of the site.
- San Jose State University Cogeneration Plant - located 2.6 km SSE of the site.

The San Jose air monitoring station was located to provide air quality data representative of neighborhood scale monitoring. The station currently monitors all criteria pollutants, toxics, and is part of the EPA NATTS and STN programs. This existing station meets all the site selection criteria for an NCore station.

NCore Monitors

Table 11 lists the monitors currently operating at the San Jose station, and Table 12 lists the proposed monitors to be added for NCore. The tables also list the sampling methodology, sampling frequency and spatial scale for current and proposed measurements required for NCore sites in 40 CFR Part 58, Appendix D Section 3(b). Because ambient concentrations of the criteria pollutants CO and SO_2 are well below the NAAQS at population oriented sites across the U.S., EPA requires NCore sites to use higher sensitivity instruments than conventional instruments for these pollutants (note the use of TLE type instruments for carbon monoxide and sulfur dioxide, meaning Trace Level-Enhanced). Proposed monitors will be installed prior to the official NCore start date of January 1, 2011.

Table 11. Current NCore Monitors

Monitor Type	Sampling Method	Sampling Frequency	Spatial Scale
Carbon Monoxide (CO)	TECO 48i TLE	Continuously	Neighborhood
Nitrogen Oxide (NO_x)	TECO 42C	Continuously	Neighborhood
Ozone (O_3)	TECO 49i	Continuously	Neighborhood
Sulfur Dioxide (SO_2)	TECO 43i TLE	Continuously	Neighborhood
FRM $PM_{2.5}$	Partisol-Plus 2025 w/VSCC	Apr-Sep: 1 in 3 day Oct-Mar: Daily	Neighborhood
BAM $PM_{2.5}$	Met One Model 1020	Continuously	Neighborhood
$PM_{2.5}$ Speciation	Met One SASS	1 in 3 day	Neighborhood

Table 12. Proposed NCore Monitors.

Monitor Type	Sampling Method	Sampling Frequency	Status as of June 1, 2010
Total Reactive Nitrogen (NO_y)	TECO 42i TL	Continuously	Will be installed summer 2010.
$PM_{10-2.5}$ and $PM_{10-2.5}$ speciation	EPA-approved sampling method will not be fully developed before the 01/01/2011 start date	1 in 3 day	Will implement when EPA-approved sampling method is fully developed.
Meteorological	Air quality measurements approved instrumentation for wind speed, wind direction, humidity, barometric pressure, temperature, rainfall, and solar radiation	Continuously	EPA approved a waiver for 10-meter tower on-site, though siting criteria are not fully met. Will be operational within 18 months.

$PM_{2.5}$ Speciation Sampling Programs

EPA established a fine particulate ($PM_{2.5}$) standard in 1997 and required States to install and operate new $PM_{2.5}$ samplers to determine where the national ambient $PM_{2.5}$ air standards are not being met. As part of the $PM_{2.5}$ monitoring program, EPA also established a network of speciation monitors at sites expected to exceed the $PM_{2.5}$ standard. The primary purpose of the speciation monitors is to provide a chemical composition of the particulate matter which will point to the emission sources. This network is known as the Speciation Trends Network (STN).

A $PM_{2.5}$ sampler was installed at the San Jose air monitoring station in January 1999 and the first year of data showed exceedances of the national standard. Consequently, EPA requested that a Met One Spiral Ambient Speciation Sampler (SASS) sampler be installed at San Jose in early 2000 as part of the STN network. Exceedances of the $PM_{2.5}$ national standard have also been recorded at other Bay Area sites, and in 2008 the Air District added SASS samplers at Vallejo and Livermore. In 2009 the Air District added a SASS sampler at the new Oakland West air monitoring station. Knowing the chemical composition of particulates on days over the standard at four Bay Area sites will help determine which emission reduction strategies will most likely lead to attainment of the national standard.

Speciation Trends Network (STN) Program

STN sites have the primary objective of defining long-term concentration trends of the elements, ions, and organic and elemental carbon components that make up $PM_{2.5}$ particles. San Jose with a 2009 population 1,023,083 was chosen as an STN station because it was already collecting $PM_{2.5}$ mass, has recorded exceedances of the $PM_{2.5}$ standard, and is the largest city in Northern California.

$PM_{2.5}$ samples are collected using a SASS sampler. The sampler operates from midnight to midnight of the next day, and samples are on a 1 in 3 day schedule. Collocated with the SASS is a $PM_{2.5}$ filter sampler which is used to measure the total mass of $PM_{2.5}$ and to determine when exceedances of the standard occur. Filter sampling is on a 1 in 3 day schedule in the summer and daily in the winter. SASS sampling is scheduled to coincide with filter sampling days so that speciation information can be used to help identify sources and develop effective control strategies.

The SASS samplers draw air through size-selective nozzles that exclude particles greater than 2.5 microns. SASS samplers uses Teflon, nylon and quartz filters upon which to collect the samples, which are later weighed using a mass balance and analyzed using energy-dispersive X-ray fluorescence, ion chromatography, and thermal/optical analysis techniques to measure the components. The San Jose filter analysis is done by RTI, an EPA contract laboratory in North Carolina. Sixty-three chemical species listed in Table 13 are measured from each SASS filter sample at RTI. The San Jose data are then submitted to the EPA AQS database by RTI, and can be viewed on the EPA's AirData web site at http://www.epa.gov/oar/data/index.html.

BAAQMD Supplemental Speciation Network Program

The Air District also operates SASS samplers at its stations in Vallejo, Livermore, and Oakland West. Vallejo and Livermore were selected for sampling because there was an interest in determining the source of $PM_{2.5}$ particles on days that exceed the standard at those sites. These sites may have a different $PM_{2.5}$ composition from that of San Jose because exceedances often occur on days when the air flow is from the Central Valley. Oakland West was selected because it is downwind of the Port of Oakland, a major source of diesel particulate matter. The samplers, sampling procedures, analysis techniques and species analyzed are the same as for the STN program with the following exceptions: the collection frequency is 1 in 6 days; DRI provides the filters, does the analysis and submits the data to AQS; and filters from these sites also are analyzed for palladium, thallium and uranium. Data from the 66 chemical species listed in Table 13 can be viewed on the EPA's AirData web site at http://www.epa.gov/oar/data/index.html.

The table is color coded with green (the first 13 rows) listing elements, blue (the next 2 rows) listing anions and cations, and yellow (the next 8 rows) listing organic and elemental carbon types.

Table 13. $PM_{2.5}$ Speciation Measurements at Air District Sites.

Antimony	Cesium	Magnesium	Sodium
Arsenic	Europium	Mercury	Strontium
Aluminum	Gallium	Nickel	Sulfur
Barium	Gold	Niobium	Tantalum
Bromine	Hafnium	Phosphorous	Terbium
Cadmium	Iron	Potassium	Tin
Calcium	Indium	Rubidium	Titanium
Chromium	Iridium	Samarium	Tungsten
Cobalt	Lanthanum	Scandium	Vanadium
Copper	Lead	Selenium	Yttrium
Chlorine	Manganese	Silicon	Zinc
Cerium	Molybdenum	Silver	Zirconium
Palladium[1]	Thallium[1]	Uranium[1]	
Ammonium Cation	Chloride Anion	Potassium Cation	Nitrate Anion
Sodium Cation	Sulfate Anion		
Total Organic Carbon (sum of the OC Fractions below)			
Elemental Carbon Fraction 1 (carbon released at 550ºC in 10% oxygen/90% helium gas)			
Elemental Carbon Fraction 2 (carbon released at 700ºC in 10% oxygen/90% helium gas)			
Elemental Carbon Fraction 3 (carbon released at 800ºC in 10% oxygen/90% helium gas)			
Organic Carbon Fraction 1 (carbon released at 120ºC in helium gas)			
Organic Carbon Fraction 2 (carbon released at 250ºC in helium gas)			
Organic Carbon Fraction 3 (carbon released at 450ºC in helium gas)			
Organic Carbon Fraction 4 (carbon released at 550ºC in helium gas)			

[1] Elements measured only at Vallejo, San Francisco, and Oakland West.

Toxics Program

The Clean Air Act Amendments of 1990 required EPA to set emission standards for major sources of Hazardous Air Pollutants (HAPs). The Act also required EPA to assess the risks to human health from HAPs. By 2009 EPA had listed 187 compounds as HAPs. All HAPs listed by EPA are known to cause or are suspected of causing cancer, birth defects, reproduction problems, and other serious illnesses. Exposure to certain levels of some HAPs can cause difficulty in breathing, nausea or other illnesses. Exposure to certain HAPs can even cause death.

Toxic pollutants (HAPs) are emitted daily by industrial and chemical manufacturing processes, commercial activities, refinery operations, gasoline marketing and motor vehicles within the Bay Area. Ambient concentrations vary by proximity to sources and current meteorological conditions.

The Air District has established an ambient air toxics monitoring program with the objectives of:

- Establishing trends and evaluating the effectiveness of HAP reduction strategies.
- Characterizing ambient concentrations in local areas.
- Providing data to support and evaluate dispersion and deposition models.
- Providing data to the scientific community to support studies to reduce uncertainty about the relationships between ambient levels of HAPs, actual human exposure to air toxics, and health effects from such exposures.

Figure 5 is a map of the 19 toxics monitoring sites operating in 2009. Locations are at existing Air District SLAMS and SPM monitoring stations and were selected to obtain a wide geographical coverage of contaminant levels throughout the Bay Area. The sites are generally located in major population centers or downwind of major industrial sources such as refineries. There is also an ambient background site at Fort Cronkhite. The toxics data collected at San Jose are also reported to EPA as part of the NATTS program.

Air samples are collected at Air District toxics monitoring sites for a 24 hour period on a 1 in 12 day schedule except at special study sites such as Berkeley and Cupertino, and at San Jose where the required NATTS sampling schedule is 1 in 6 days. A 1 in 12 day schedule allows samples to be taken on a different day of the week over the course of months. This is the same schedule EPA and CARB use for their toxics monitoring program, thereby allowing Bay Area toxics concentrations to be compared to concentrations measured elsewhere across the country.

Gaseous (VOC) toxics are collected the 6-liter SUMMA stainless steel canisters using Xontech 910 samplers. The canister continuously collects ambient air for 24-hours to ensure capturing transient and intermittent toxic releases. All canisters are analyzed within 30 days of sample collection using capillary gas chromatography employing photoionization and electron capture detectors.

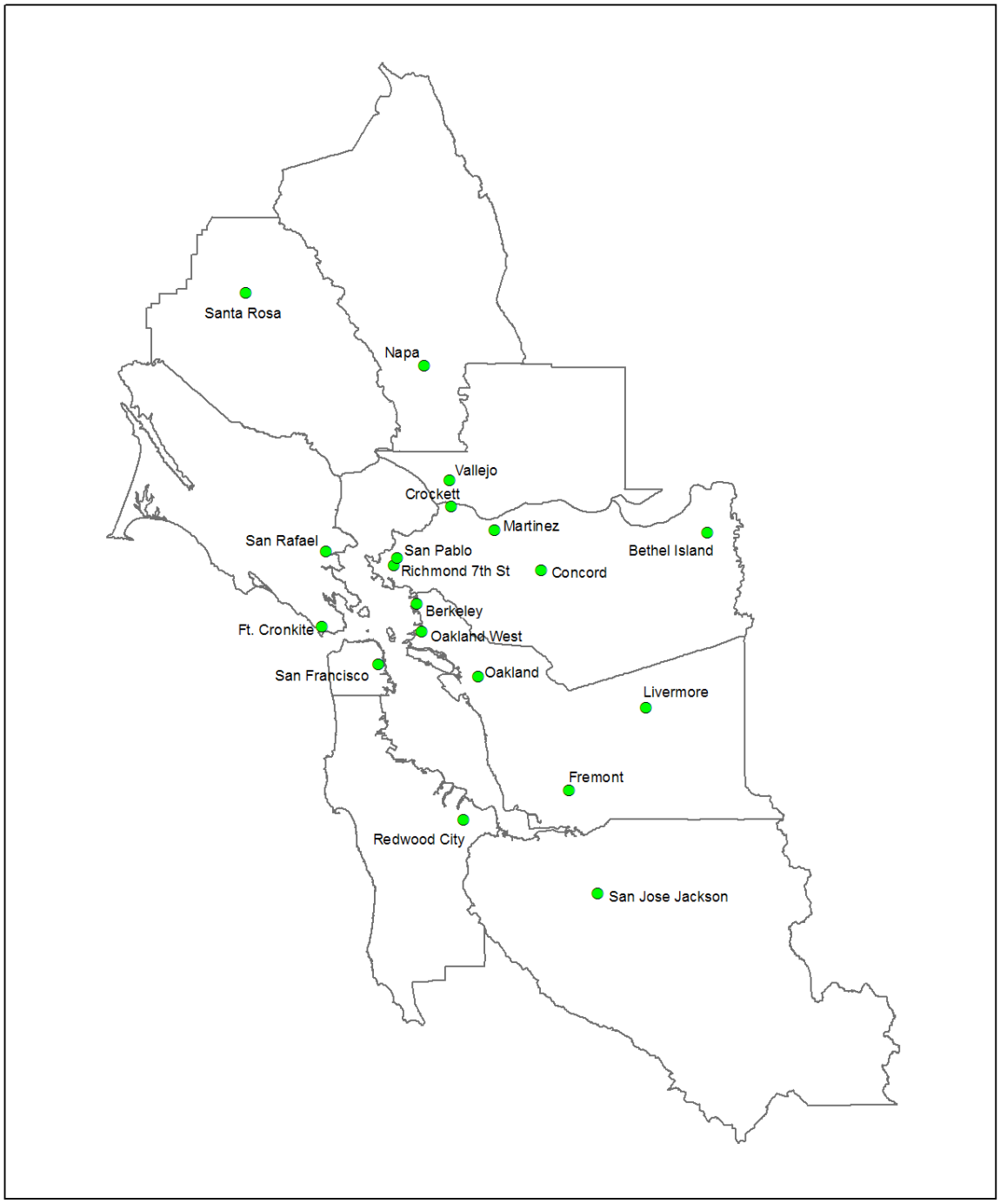

Figure 5. Map of Air District Toxics Monitoring Sites for 2009.

In 1986, the toxics monitoring network used Tedlar bags to collect the ambient air samples, which were filled using an Air District designed and constructed sampler. This methodology had several problems including leaks, contamination, and the requirement to perform the laboratory analysis within 48 hours of sample collection. Between 1991 and 1997, the Air District phased in an improved sampling methodology, using a 6-liter SUMMA stainless steel canister to replace the Tedlar bags, and replacing the Air District sampler with a commercially available Xontech sampler. This was the same system that CARB had been successfully using for a few years. This method also allowed canisters to be analyzed up to 30 days after sample collection. It also provided more flexibility in scheduling sample days, conducting the laboratory analysis, and for transportation of the samples. The data collected after the switch to SUMMA canisters is considered to be of higher quality than data collected with Tedlar bags.

Both the Air District and CARB have toxic monitoring programs in the Bay Area. CARB conducts toxic monitoring on a 1 in 12 day schedule at three sites: San Francisco, San Jose, and Fremont. CARB supplies the canisters and performs the laboratory analyses, while Air District staff operates the CARB sampler and ships the canisters to CARB. Because the Air District also does toxics monitoring at San Francisco and San Jose, the two sets of data allow calculation of the measurement precision at these sites, and by extrapolation, an estimate of the precision of the toxics measurement program.

Once a quarter at San Francisco, an additional canister sample is taken on a scheduled sample day using a collocated sampler. Both samples are analyzed by the Air District laboratory, and the results allow an additional measure of precision.

The Air District laboratory analyzes for the 19 gaseous toxic compounds listed in Table 14. Compounds selected for analysis were those that had either high emissions or high toxicity, or some high combination of the two. Another consideration was whether the current methodology could accurately detect a compound at reasonable expense, based on previous CARB studies.

Table 14. List of Toxic Compounds Measured by the Air District in 2009.

Acetone	Methyl Ethyl Ketone
Benzene	Methylene Chloride
1, 3 Butadiene	M/P Xylene
Carbon Tetrachloride	Perchloroethylene
Chloroform	1,1,2 Trichlorotrifluoroethane
Ethylbenzene	Trichloroethylene
Ethylene Dibromide	Trichlorofluoromethane
Ethylene Dichloride	Toluene
O-Xylene	Vinyl Chloride
Methyl Chloroform	

In addition to the gaseous toxics monitoring done across the Bay Area, the Air District does monitoring for polycyclic aromatic hydrocarbons, metals, and aldehydes at San Jose for the NATTS program. See the NATTS section of this document for more information about the NATTS program.

Toxics Monitoring at Berkeley

In 2009, the Air District operated a Xontech 910 sampler to collect toxic samples in canisters at the SPM monitoring site in Berkeley. In addition to the compounds listed in Table 14, there was interest in measuring formaldehyde and acetaldehyde in Berkeley. These compounds are highly reactive and cannot be accurately measured using a canister sample. Instead, they are collected on a chemically treated cartridge using a Xontech 924 sampler, operated on the same 1 in 6 day schedule. Samples are analyzed at the Air District laboratory using High Performance Liquid Chromatography.

The Xontech 924 sampler was also used to collect metals on Teflon filters at Berkeley on a 1 in 6 day schedule. Samples are analyzed by CARB using Inductively Coupled Plasma Mass Spectrometry (ICP-MS). The metals analyzed for are listed in Table 15.

Table 15. Metals measured at Berkeley using ICP-MS

Antimony	Nickel
Arsenic	Platinum
Cadmium	Selenium
Chromium	Strontium
Cobalt	Sulfur
Copper	Tin
Iron	Titanium
Lead	Vanadium
Manganese	Zinc
Molybdenum	Zirconium

Additional Gaseous Toxics Measured at San Jose

At San Jose the Air District measured additional gaseous toxics compounds from the canisters. Acrolein is measured because San Jose is a NATTS program monitoring site and the NATTS program requires acrolein to be measured. The Air District uses a gas chromatography mass spectrometry method to measure acrolein. This method allows detection of 3 other toxic compounds: acetonitrile, acrylonitrile, and ethanol. Acrylonitrile is measured because CARB wanted measurements to compare with other parts of the State. Ethanol is measured because researchers at UC Berkeley wanted to compare ethanol measurements taken near the Caldecott Tunnel with those taken from other areas of the Bay Area. Finally, acetonitrile is measured because it is a related compound and there were no other measurements of this compound in the Bay Area.

Additional Gaseous Toxics monitoring in 2010 at all sites

A modern gas chromatography mass spectrometry instrument was purchased by the Air District in late 2009. By mid-2010 the Air District intends to measure Acrolein, Acetonitrile, Acroylonitrile, and Ethanol from all canister samples taken in the Bay Area.

In late 2009, the Air District laboratory was remodeled to improve workplace safety. Consequently, analysis for gaseous toxic compounds stopped after the October 29th canister samples were measured and resumed with the samples taken on December 27th. However, 1 in 12 day collocated measurements of these gaseous toxic compounds conducted by CARB at San Francisco, San Jose, and Fremont continued during this period. Sampling of carbonyls using cartridges and of metals using TSP Teflon filters was not interrupted at San Jose and Berkeley.

Summary toxics data are available from the EPA's AirData web site at http://www.epa.gov/oar/data/index.html. These data may also be found on the BAAQMD web site in the Toxic Air Contaminant Control Program Annual Report at http://www.baaqmd.gov/Divisions/Engineering/Air-Toxics/Toxic-Air-Contaminant-Control-Program-Annual-Report.aspx.

West Oakland CASS Study

The Air District is conducting an ambient air sampling and modeling study in the area near the Custom Alloy Scrap Sales (CASS) metals recycling facility in West Oakland. The purpose of the study is to determine if there are elevated concentrations of PM and toxic metals in the vicinity of the CASS facility. Near CASS is a mix of residential and light and heavy industrial use, and two schools are located a few blocks east of the CASS fence line.

Initially, the Air District performed a health risk analysis of impacts from the CASS facility on the surrounding neighborhoods. Inputs to the modeling included stack emissions from CASS determined from a recent stack test, and meteorology from the nearby East Bay Municipal Utility District (EBMUD) meteorological station. The modeling showed that the highest concentrations of metals occurred east of the facility. Modeling results were then used to calculate cancer risk for West Oakland residents. The analysis showed that the CASS emissions increased cancer risk by less than one in a million (0.35 per million) and that the increased chronic hazard risk index was significantly less than one (0.002). Fugitive emissions were not included in the analysis. Following that, modeling results were compared with ambient concentrations.

The objectives of the sampling part of the study are to:

- Measure PM and metals concentrations near the CASS recycling facility.
- Determine whether PM or toxic metals measurements near CASS are elevated relative to West Oakland and Bay Area backgrounds.
- Compare measurements collected during this study with prior health risk assessment modeling conducted by the Air District.
- Estimate contributions from CASS.
- Use annual data to assess health risk, applying methods, unit risk factors, and reference exposure levels from the Office of Environmental Health Hazard Assessment.
- Compile a report synthesizing all available information and summarizing findings.

Measurements began in August of 2009 at three sites near CASS and will continue for one year. One site is located west—predominantly upwind—of the facility, another site will be east—downwind—nearer to the CASS facility at the ASA Academy school, and the third site is further east at EXCEL High School. CASS also funded a second upwind site for the first three month period in 2009. Samples are collected using MiniVol sampler, operated for 24-hours on a 1 in 6 day schedule. After collection, samples are sent to the Desert Research Institute (DRI) at the University of Nevada, Reno for analysis. The elements which are analyzed are listed in Table 16.

Table 16. Elements Measured for the West Oakland CASS Study.

Elements Measured			
Antimony	Europium	Nickel	Sulfur
Arsenic	Gallium	Niobium	Tantalum
Aluminum	Gold	Palladium	Terbium
Barium	Hafnium	Phosphorous	Thallium
Bromine	Iron	Potassium	Tin
Cadmium	Indium	Rubidium	Titanium
Calcium	Iridium	Samarium	Tungsten
Chromium	Lanthanum	Scandium	Uranium
Cobalt	Lead	Selenium	Vanadium
Copper	Manganese	Silicon	Yttrium
Chlorine	Molybdenum	Silver	Zinc
Cerium	Magnesium	Sodium	Zirconium
Cesium	Mercury	Strontium	

Data from the three sites near CASS, plus the 3-month CASS site, will be compared with data from seven additional sites operated as part of the West Oakland Monitoring Study (see description of the West Oakland Monitoring Study). CASS data will also be compared with data from the West Oakland, Livermore, Vallejo, and San Jose monitoring sites where similar metals analyses are available.

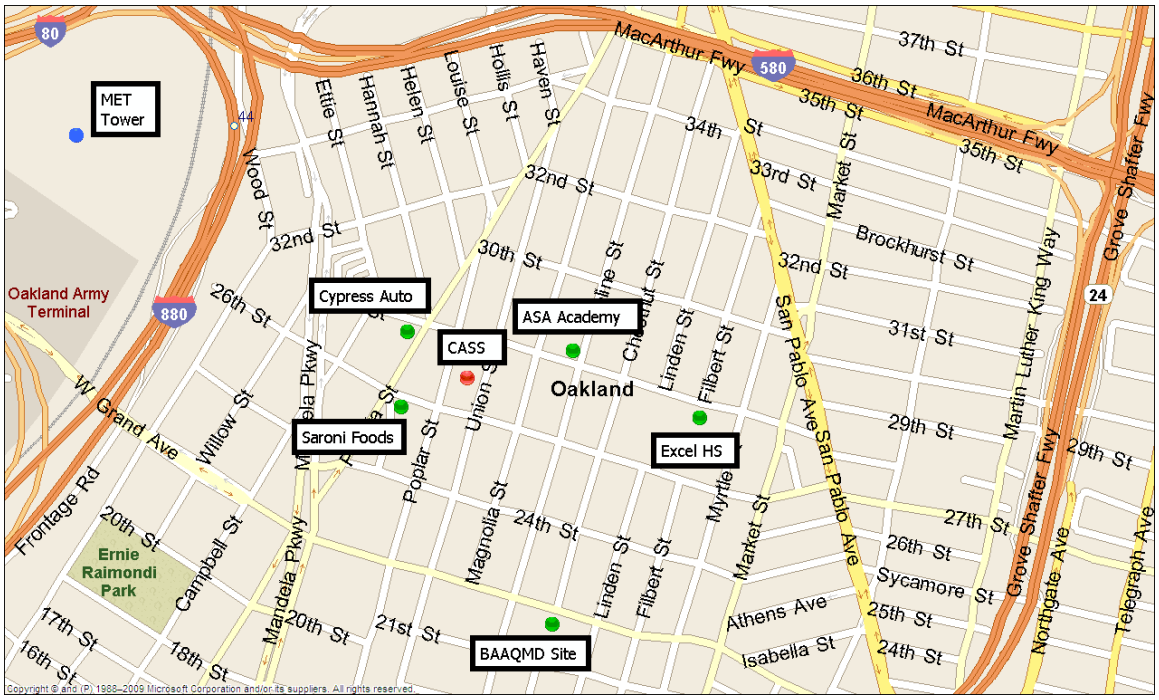

Figure 6. Map of CASS Site with Monitoring Locations and Meteorological Station.

Attributing air pollutants collected from ambient samples to specific sources can be a challenging task. The success of source attribution will depend on how unique emissions from the CASS facility are relative to surrounding sources. The Air District will examine the relative amounts of metals collected on filters during upwind and downwind periods, using wind data from the Oakland sewage treatment plant.

If there is a statistically significant difference in the relative concentrations of toxic metals between upwind and downwind samples, then further analysis will be undertaken to determine if the downwind sample resembles the stack source samples collected from CASS in 2007. Other facilities, such as Central Concrete and a nearby art studio that operates ceramic kilns, could also be a source of metals but presumably with a distinguishable source mix.

West Oakland Measurement Study

In 2009-10, the Air District and the Desert Research Institute (DRI) conducted the West Oakland Measurement Study (WOMS) to measure diesel emissions and other toxic air contaminants within the West Oakland area. The Air District invited Desert Research Institute (DRI) to collaborate on the project due to DRI's experience in a similar study in Los Angeles. Although the principal focus of the study was the measurement of emissions from the Port of Oakland, other significant toxic sources in West Oakland were also included in this study. The study is part of the Air District's Community Air Risk Evaluation (CARE) program which evaluates and reduces health risks associated with exposures to outdoor toxic air contaminants in the Bay Area.

West Oakland was selected for the study because a Health Risk Assessment (HRA)[1] produced jointly by the Air District and the California Air Resources Board concluded that ambient concentrations of diesel particulate matter in the West Oakland area were almost three times higher than typical levels in the Bay Area. High diesel emissions in that area were also confirmed by the Air District's emission inventory. Diesel particulate accounts for 80% of the cancer risk from airborne toxics based on findings from the CARE Program. The primary diesel sources include large ships that dock at the Port of Oakland, service trucks that move shipping containers and other freight around at the port, passenger and freight train service, the Union Pacific and Joint-Intermodal rail yards, the Amtrak passenger service maintenance yard, and concentrated heavy duty trucks that transports goods to or from the port and other industries in or near West Oakland.

Currently, there is no method to directly measure ambient concentrations of diesel particulate. However, black carbon (soot) and organic/elemental carbon measurements can be used as a surrogate to approximate diesel concentrations. Other toxics compounds associated with diesel combustion including criteria gases such as NO_2 (and NO_x) and SO_2 were also measured.

To build a complete and representative 'snapshot' of the air toxic exposure in West Oakland, the Air District and DRI set up a dense monitoring network which was operated over relatively short periods of time. The three main objectives of the study were to:

- Evaluate spatial and seasonal variations of toxic air contaminants and particulate matter concentrations within West Oakland based on their proximity to known sources including the Port of Oakland, arterial roadways, and California state highways.
- Analyze the particulate composition and determine the source contribution of gasoline and diesel vehicles to ambient particulate concentrations.
- Evaluate community exposure to toxic air contaminants and identify emissions hotspots.

[1] California Air Resources Board. (2008). "Diesel Particulate Matter Health Risk Assessment for the West Oakland Community." Available on-line at: http://www.arb.ca.gov/ch/communities/ra/westoakland/documents/westoaklandreport.pdf

Local wind data showed that there are seasonal changes in the wind pattern. To evaluate the seasonal variations, four weeks of sampling were collected to characterize summer conditions from July to August 2009 and winter time conditions from December 2009 to January 2010. Figure 7 shows the West Oakland sampling locations that were used during both seasonal sampling periods.

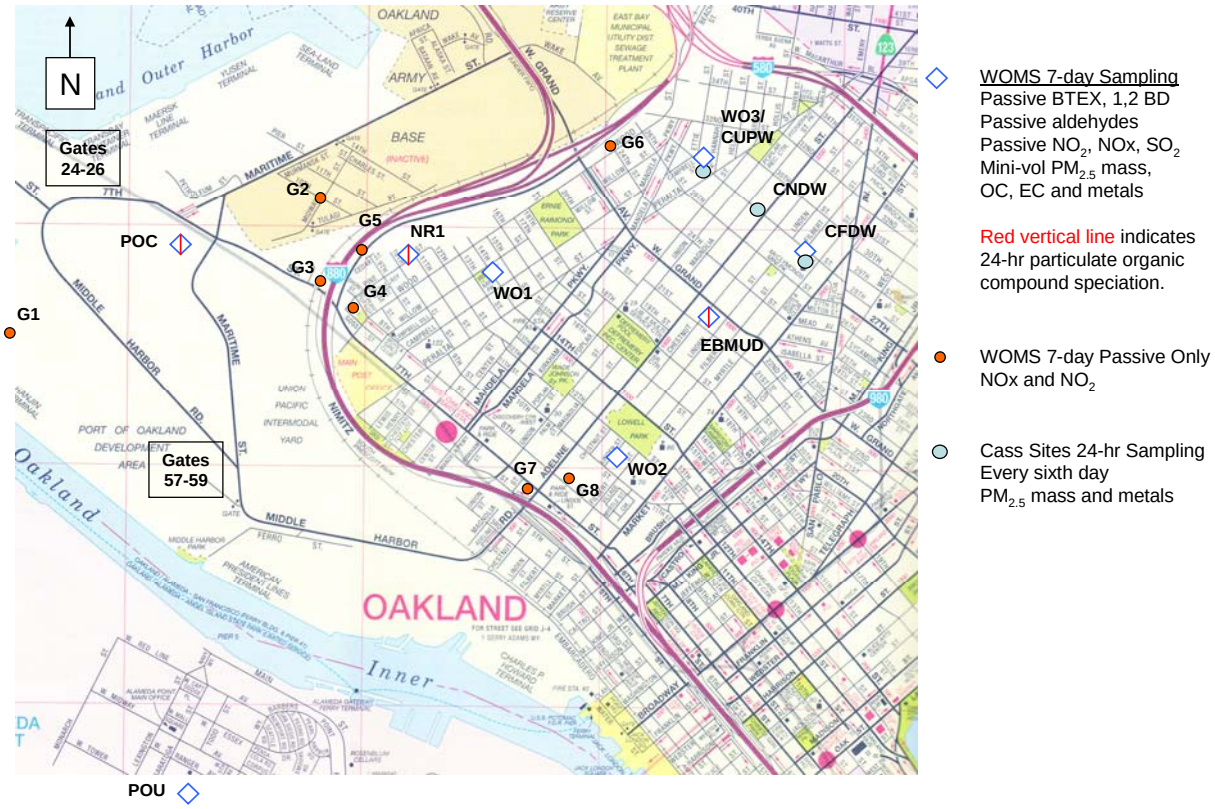

Figure 7. West Oakland Measurement Study Sampling Locations.

The WOMS included measurements with continuous, 24-hour, and 7-day sampling durations. Continuous measurements were made using a mobile monitoring van that moved from place to place within West Oakland, recording a set of pollutant concentrations at specific locations and times along a fixed route. The measurement route was preselected based on the preliminary pilot study and driven twice per day in the morning and afternoon on selected days of interest. The van measurements included O_3, NO/NO_2, CO, volatile organic carbon (VOC) estimates , black carbon, $PM_{2.5}$ mass, particle size distributions and ultrafine particle number concentrations. The study used the data from the monitoring station at EBMUD as a reference for comparison to measurements collected from the saturation monitoring. West Oakland concentrations were also compared with data from the Air District's toxic network and $PM_{2.5}$ Speciation Sampling Program to determine how West Oakland compares with the rest of the Bay Area.

At three WOMS sites (one at the EBMUD Air District station), 24-hour Teflon and quartz filters collected particulate samples on preselected days over the course of the four week study using sequential filter samplers. The filters were analyzed for daily concentrations of $PM_{2.5}$ mass, organic and elemental carbon, and organic carbon species. Another set of 24-hour glass filters and resin cartridges were exposed on the same days to measure polycyclic aromatic hydrocarbons, alkanes, hopanes, steranes, and polar compounds. The Chemical Mass Balance receptor model will be applied to these speciated particulate data to estimate the source contributions of diesel particulate matter, gasoline combustion, wood smoke, and cooking emissions.

Long-term exposure (7-day composite) measurements were made at 15 WOMS locations plus an additional site that was part of a supplemental study being conducted at Custom Alloy Scrap Sales (CASS). These measurements were designed to estimate the exposure of local populations to the different pollutants and show the concentration gradients of these contaminants throughout West Oakland. Active sampling methods were used at eight measurement sites where ambient air flow was drawn through quartz or Teflon filters. The quartz filters were analyzed for total $PM_{2.5}$ mass, and for organic and elemental carbon concentrations. The Teflon filters were analyzed for $PM_{2.5}$ mass as well as metals using X-ray fluorescence. The CASS study is a separate year-long metals exposure measurement study that was conducted at the same time in West Oakland and provides supplemental metals data.

Passive (diffusion) samplers were employed at 16 study area sites to measure 7-day integrated samples of NO_x, and NO_2. SO_2, BTEX (benzene, toluene, ethylbenzene, and xylenes), and carbonyl compounds (formaldehyde, acetaldehyde and acrolein) were also measured using passive samplers at the same eight sites where 7-day composite samples were collected. After each 7-day exposure period ended, passive samplers were analyzed by a laboratory and average pollutant concentrations estimated over the exposure period. Passive sampler performance was evaluated against the co-located 24-hour filter samplers during times both sampler methods were used.

Meteorological data for WOMS was provided by the Air District's meteorological station located at the East Bay Municipal Utility District sewage treatment plant approximately one mile northeast of the study area near the Bay Bridge toll plaza. The station provided high quality hourly wind speed, wind direction, and ambient temperature data representative of the entire WOMS area.

Validation of the WOMS data is still in progress, and the final results will be available by fall 2010. The final report for the study will determine the spatial variations and source contributions of toxic air contaminants and particulate matter concentrations relative to high emissions sources, quantify the relative contribution of diesel to ambient concentrations of particulate matter, and verify hot spot emission sources such that effective mitigations may be explored.