

2011
Ambient Air Monitoring Network Plan

Pima County Department of Environmental Quality
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AQ 379



2011 Ambient Air Monitoring Network Plan

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I. INTRODUCTION

2011 Ambient Air Monitoring Network Plan

This document constitutes the 2011 Ambient Air Monitoring Network Plan for the Pima County air monitoring network. The Pima County Department of Environmental Quality (PDEQ) has prepared this document to be submitted to the U.S. Environmental Protection Agency (USEPA), Region IX. The purpose of the Ambient Air Monitoring Network Plan is to determine if the network is achieving the air monitoring objectives specified in 40 CFR Part 58 Appendix D, which mandate adherence to certain number, type and location requirements of monitoring sites and specific site criteria such as monitoring inlet height. The review should also determine if modifications should be made to the network (e.g. through the termination or relocation of unnecessary stations or addition of new stations). In addition, the review is necessary in order to ensure that the residents of Pima County are provided adequate, representative and useful air quality data, and to provide adequate protection to public health.

The designated ambient air pollutants that are monitored and reported by PDEQ are carbon monoxide (CO), ozone (O₃), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), and particulate matter with an aerodynamic diameter of 10 micrometers or less in size (PM₁₀) and particulate matter with aerodynamic diameter of 2.5 micrometers or less in size (PM_{2.5}). This pollutant data is submitted to the EPA Air Quality System (AQS) database for determination of compliance with National Ambient Air Quality Standards (NAAQS). This report contains statistical data summaries for the 2011 calendar year and provides a site by site assessment of the monitoring network with respect to EPA site criteria.

Pima County monitoring network includes both State or Local Air Monitoring Stations (SLAMS) and Special Purpose monitors (SP). SLAMS monitors comprise the required network monitors that are used for NAAQS comparisons and follow the monitoring objectives listed on page 6. SP monitors are used to conduct special purpose studies and to enhance the network coverage of air quality monitoring data.

Pima County has a designated NCore site at the Children's Park location, which also monitors for reactive oxides of nitrogen (NO_y), particulate matter coarse (PM_{10-2.5}), speciated particulate matter and lead.

Schedule of EPA's review of criteria pollutants:

Primary SO₂ NAAQS - final ruling June 22, 2010
Primary NO₂ NAAQS - final ruling February 9, 2010
O₃ NAAQS- review and proposed rule scheduled for October, 2013
Secondary NO₂ and SO₂ NAAQS- proposal August 1, 2011
Primary CO NAAQS final ruling August 15, 2011
Lead –revised monitoring requirements December 14, 2010
Particulate Matter NAAQS- under review

PDEQ made the following network modifications in 2011:

- ◆ Began reporting data from PM_{2.5} continuous Particulate Matter monitor and Relative Humidity sensor at the Children's Park NCore site.
- ◆ Began NO₂ one - point precision checks conforming to 40CFR58 App. A, Section 3.2.1 at the 22nd and Craycroft site.
- ◆ 22nd and Craycroft SO₂ monitoring was discontinued December 31, 2010 and replaced by SO₂ monitoring at the Children's Park NCore site.

PDEQ's anticipated modifications to network in 2012:

- ◆ Begin lead analysis at the Children's Park NCore site.
- ◆ Install a digital data acquisition loggers at the 22nd and Craycroft and the 22nd and Alvernon sites.
- ◆ Install a dilution calibration system at the 22nd and Alvernon site to facilitate CO one - point precision check concentrations contained in 40CFR58 App. A, Section 3.2.1
- ◆ Begin CO one – point precision checks conforming to 40CFR58 App. A, Section 3.2.1 at the 22nd and Craycroft site.

II. BACKGROUND

Pima County Air Quality Control District met all the National Ambient Air Quality Standards (NAAQS) in 2011. Concentrations of the criteria pollutants have been stable over the past few years with ozone and particulate matter (PM₁₀) being the major concern for Pima County. Ozone has been very close to the standard, often within 95% of the standard. Particulate Matter (PM₁₀) levels are elevated during drought conditions and high winds which have caused exceedances of the NAAQS in previous years.

Regional Evaluation

In order to evaluate existing and proposed monitoring stations and their stated objectives, regional information is used. The regional information consists of the most current values for population, major urban developments and directions of growth, traffic and highway data, major industries and aerial photographs showing topography. Population (census tract) data can act as a guide in evaluation of the representativeness of a site for determining population exposure. The 2010 census shows Pima County population at 980,263 and the city of Tucson population at 520,116. **Figure 1** on page 8 illustrates the Eastern Pima County Tucson Air Planning Area. The various incorporated areas and other agency lands are shown, as well as the named mountain peaks that define the planning area for Eastern Pima County, which includes the Tucson Metropolitan area.

Average Daily Traffic (ADT)

Traffic data is necessary for site evaluations since a large portion of air pollutants in the Tucson basin are caused by vehicular traffic. Traffic volumes and density maps are used in evaluating the monitoring network. This data is routinely compiled and used by local transportation and planning agencies. An analysis of the most current traffic data indicates that the network continues to meet the requirements for the monitoring site type and corresponding spatial scales as initially established. The Average Daily Traffic (ADT) numbers are 24 - hour, two - way volume of averaged weekday traffic.

Latitude and Longitude

Latitude and Longitude data is also provided for the monitoring sites using Datum WGS84 AZ Central in Decimal.Degrees.

Local Geography and Meteorology

Tucson, Arizona is a major metropolitan area situated in the Santa Cruz river valley, which is encompassed by the Sonoran Desert at an elevation between 2300 and 2800 feet. Basin and range topography characterizes the region with rugged mountain ranges encircling the valley floor with mountain peak elevations in excess of 9000 feet, thus delineating the Tucson Air Planning Area. The flat or gently rolling valley terrain slopes from the higher south and southeast toward the lower northwest following the Santa Cruz river drainage.

2011 Ambient Air Monitoring Network Plan

The climate of Tucson is characterized by a hot season normally starting in April and ending in October, and a generally mild winter. Maximum daily temperatures from May through September are usually above 90 degrees Fahrenheit. The average rainfall is around eleven inches per year.

Tucson International Airport records show an average of 240 clear days a year (days with less than 50% total cloud cover). The remaining periods include the winter prefrontal situations more common in the north and the prolonged seasons of convective summer storms. Wind velocity and direction changes, associated with the large scale pressure systems, frequently result in localized dust storms.

The mountain-valley circulation, along with surface heating during the day and radiational cooling at night, create a predominantly southeast to northwest wind path in the basin. Airflows generally tend to be downvalley (from the southeast) at night and early morning hours, reversing to the upvalley direction (from the northwest) during the day. These downvalley / upvalley flows are strongly influenced by localized upslope / downslope terrain. The normal upvalley airflow is from the northwest, and parallels the Santa Cruz River, but decays well before sunset. This is followed by an hour of light, erratic flows which turn into the downvalley flow from the southeast, and reach their maximum and stabilized speed in four to six hours. The air temperature drops steadily during this interval until the sun rises. The downvalley direction continues for two to five hours past sunrise and then transforms into a short calm period prior to the change to upvalley flows.

The southeasterly “monsoon” regime that occurs primarily in the months of July and August is a large scale synoptic feature with considerable yearly variation both in intensity and timing. At the Tucson International Airport, the winds become strong, gusty and southeasterly with high relative humidity, cloud cover and frequent thunderstorms. The mountain – valley circulation tends to be suppressed during this time period.

Atmospheric temperature inversions occur almost daily in the Tucson air basin. During the winter months these inversions may become severe with particulate and other pollutants becoming concentrated, remaining near the ground level causing haze. When the sun sets, the ground and surface air cools faster than the air several hundred feet above the surface. Since air temperature normally decreases with increasing altitude, the warm and cool layers are reversed or “inverted”, hence the name ‘temperature inversion’. These temperature inversions are usually strongest on cold, clear winter nights, where there is an absence of cloud cover. Consequently, the inversions “lock” the pollutants near the surface. As the sun causes the cool air layer close to the ground to warm up, vertical mixing and horizontal transport disperse the air pollutants. In the early evening, the low level air inversion begins to form again and often coincides with the evening traffic rush hour.

2011 Ambient Air Monitoring Network Plan

Definition of Monitoring Objectives, Site Types and Spatial Scales

The Pima County ambient air monitoring network is designed to meet three basic monitoring objectives. These objectives listed in **Appendix D, 1.1 of 40 CFR 58** are:

- ◆ To provide in a timely matter air pollution data to the general public;
- ◆ To comply with ambient air quality protocols and standards in order for data to be used for comparison to the NAAQS;
- ◆ To support research studies.

The monitoring stations which comprise the Pima County network are designed to meet at least one of six basic monitoring site types. As listed in **Appendix D, 1.1.1 of 40 CFR 58**, the site types:

- ◆ Determine the area of highest concentrations expected to occur in the network;
- ◆ Determine representative concentrations in areas of high population density;
- ◆ Determine the impact on ambient pollution levels of significant sources or source categories;
- ◆ Determine general background concentration levels;
- ◆ Determine the extent of regional pollution transport among populated areas;
- ◆ Determine the welfare – related impact in more rural and remote areas.

The link between general monitoring objectives, site types and the geographical location of a monitoring station is defined as the spatial scale of representativeness, and the relationship is indicated in **Table 1** (next page). The goal of each station is to represent a specific air parcel throughout which actual pollution concentrations are reasonably homogeneous. The spatial scales are defined in **Appendix D, 1.2 of 40 CFR 58** as follows:



- ◆ *Microscale* defines concentrations in air volumes associated with area dimensions from 1 meter to 100 meters;
- ◆ *Middle Scale* defines concentrations typical of areas from 100 meters to 500 meters;
- ◆ *Neighborhood Scale* defines concentrations typical of areas with dimensions in the 0.5 to 4.0 kilometer range;
- ◆ *Urban Scale* defines the overall, city – wide conditions with dimensions in the 4 to 50 kilometer range;
- ◆ *Regional Scale* usually defines a rural area with dimensions as much as hundreds of kilometers;
- ◆ *National and Global Scales* represent concentrations which characterize nations and the globe as a whole (Pima County does not employ stations under this category).

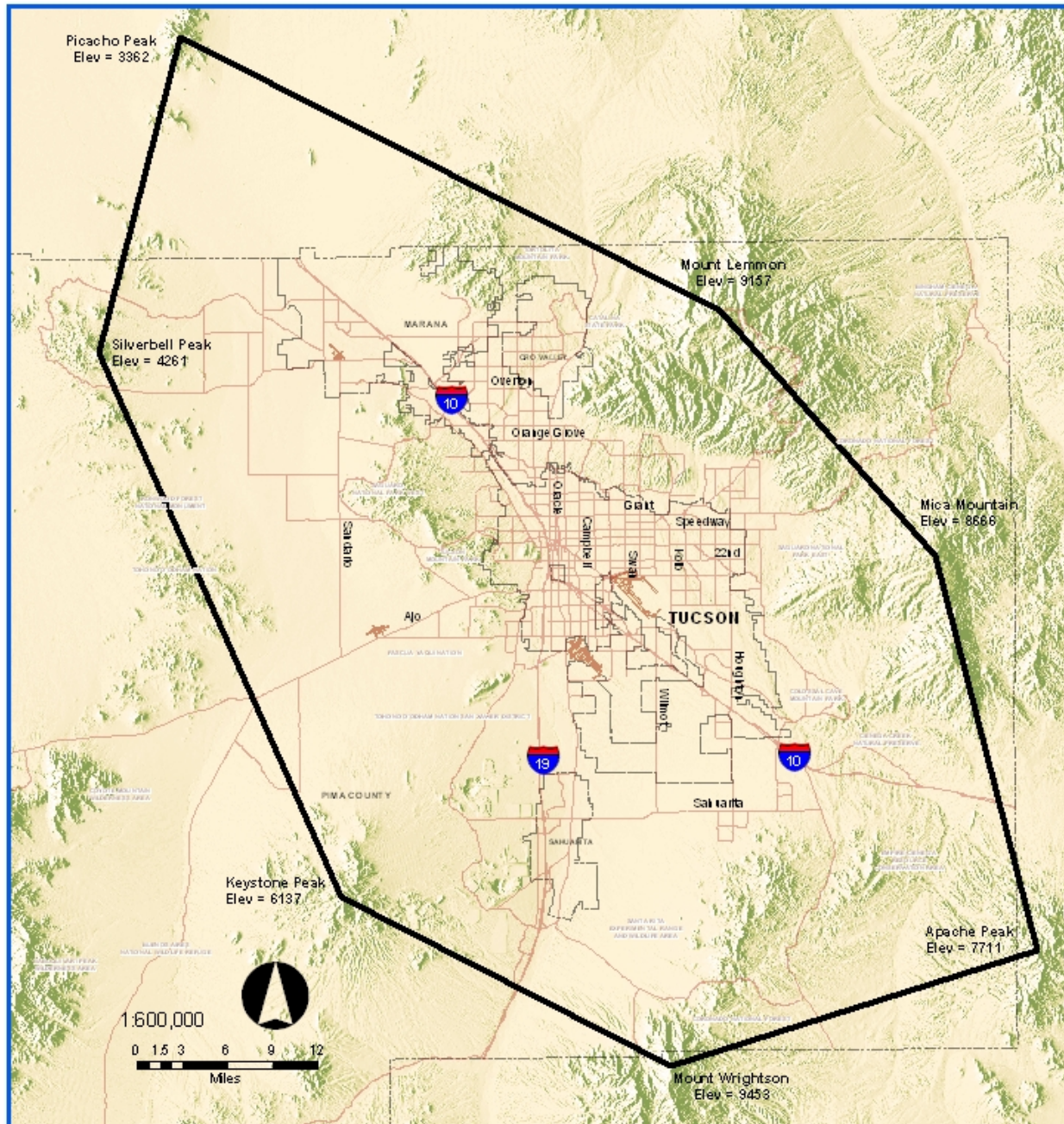
Table 1

Monitoring Site Types	Appropriate Spatial Scales
Highest Concentration	Micro, Middle, Neighborhood, sometimes Urban
Population	Neighborhood, Urban
Source Impact	Micro, Middle, Neighborhood
General / Background	Urban, Regional
Regional Transport	Urban, Regional
Welfare-Related Impacts	Urban, Regional

Eastern Pima Co. Tucson Air Planning Area

The portion of Pima County within
the geographical coordinate boundary

-  TAPA Boundary
-  Major Streets



Revised: March 2012

Comments
All information is provided as is, with all faults, and without warranty of any kind, expressed or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.



Prepared By
Pima County Department
of
Environmental Quality



**III. PIMA COUNTY AIR QUALITY MONITORING NETWORK
SUMMARY TABLES AND MAP**

2011 Ambient Air Monitoring Network Plan

Active Particulate Monitoring Sites for 2011

Table 2

Map #	Pollutant		Address	Site Name
4	PM ₁₀	PM _{2.5}	2498 N. Geronimo	Geronimo
5	PM ₁₀		1601 S. 6 th Ave.	South Tucson
6	PM ₁₀		1016 W. Prince Rd.	Prince Road
8	PM ₁₀		22000 S. Houghton Rd.	Corona de Tucson
9	PM ₁₀		6910 S. Santa Clara Ave.	Santa Clara School
10	PM ₁₀	PM _{2.5}	601 N. La Canada Dr.	Green Valley
11		PM _{2.5}	400 W. River Rd.	Children's Park NCore
12	PM ₁₀	PM _{2.5}	3401 W. Orange Grove Rd.	Orange Grove
13	PM ₁₀		12101 N. Camino de Oeste	Tangerine
14		PM _{2.5}	710 W. Michigan	Rose Elementary
15		PM _{2.5}	9597 N. Coachline Blvd.	Coachline
	PM ₁₀	PM _{2.5}	as studies require	Mobile 2

Map located on Page 11

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Active Gaseous Pollutant Monitoring Sites for 2011

Table 3

Map #	Pollutant					Address	Site Name
	CO	O ₃	SO ₂	NO ₂	NO _y		
2	CO	O ₃		NO ₂		1237 S. Beverly Ave.	22 nd & Craycroft
3	CO					3895 E. 22 nd St.	22 nd & Alvernon
10		O ₃				601 N. La Canada Dr.	Green Valley
11	CO	O ₃	SO ₂	NO ₂	NO _y	400 W. River Rd.	Children's Park NCore
13		O ₃				12101 N. Camino de Oeste	Tangerine
14		O ₃				710 W. Michigan	Rose Elementary
15		O ₃				9597 N. Coachline Blvd.	Coachline
16	CO					2745 N. Cherry Ave.	Cherry & Glenn
17		O ₃				11330 S. Houghton Rd.	Fairgrounds
18		O ₃				3905 S. Old Spanish Trail	Saguaro National Park, East
23	CO					2601 S. Kolb Rd.	Golf Links & Kolb
	CO	O ₃				as studies require	Mobile 1 & 2

Map located on page 11

Pima County Monitoring Sites



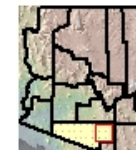
- 2 - 22nd / Craycroft
- 3 - 22nd / Alvemon
- 4 - Geronimo
- 5 - South Tucson
- 6 - Prince Road
- 8 - Corona de Tucson
- 9 - Santa Clara
- 10 - Green Valley
- 11 - Children's Park NCore
- 12 - Orange Grove
- 13 - Tangerine
- 14 - Rose Elementary
- 15 - Coachline
- 16 - Cherry / Glenn
- 17 - Fairgrounds
- 18 - Saguaro National Park East
- 23 - Golf Links / Kolb
- 24 - Green Valley Fire District

- PDEQ Monitoring Sites
- Green Valley Community Site
- Major Streets

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Comments
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 of
 Environmental Quality



2011 Ambient Air Monitoring Network Summary Table

Table 4

CARBON MONOXIDE - PIMA COUNTY MONITORING NETWORK

SITE NAME AND LOCATION	SITE ID (a)	PARAMETER (b)	CLASSIFICATION (c)	DATES (d)	METHOD (e)	ELEV. FEET (f)	SMPL HEIGHT (M) (g)	SPATIAL SCALE (h)	SMPL FREQ (i)	POC (j)	MONITORING SITE TYPE (h)
22ND & CRAYCROFT 1237 S. BEVERLY AVE.	004-019-1011	42101	SLAMS	Jul-73 PRESENT	54	2582	4.1	NEIGHBORHOOD	CONTINUOUS	1	POPULATION EXPOSURE
22ND & ALVERNON 3895 E.22ND STREET	004-019-1014	42101	SLAMS	Mar-75 PRESENT	54	2516	3.4	MICROSCALE	CONTINUOUS	1	HIGHEST CONCENTRATION
CHILDREN'S PARK NCore 400 W. RIVER ROAD	004-019-1028	42101	SP NCore	Oct-98 PRESENT	554	2286	4.25	NEIGHBORHOOD	CONTINUOUS	1	POPULATION EXPOSURE
CHERRY & GLENN 2745 N. CHERRY AVE.	004-019-1021	42101	SP	Feb-89 PRESENT	54	2400	4.9	NEIGHBORHOOD	Cont/Seasonal Jan. 1 – March 31 Oct. 1- Dec. 31	1	POPULATION EXPOSURE
GOLF LINKS & KOLB 2601 SOUTH KOLB	004-019-1031	42101	SP	Sept-02 PRESENT	093	2661	3	MICROSCALE	Cont/Seasonal Jan. 1 – March31 Oct. 1- Dec. 31	1	HIGHEST CONCENTRATION

NITROGEN DIOXIDE - PIMA COUNTY MONITORING NETWORK

SITE NAME AND LOCATION	SITE ID (a)	PARAMETER (b)	CLASSIFICATION (c)	DATES (d)	METHOD (e)	ELEV. FEET (f)	SMPL HEIGHT (M) (g)	SPATIAL SCALE (h)	SMPL FREQ (i)	POC (j)	MONITORING SITE TYPE (h)
22ND & CRAYCROFT 1237 S. BEVERLY AVE.	004-019-1011	42602	SLAMS	Jan-73 PRESENT	74	2582	4.1	NEIGHBORHOOD	CONTINUOUS	1	POPULATION EXPOSURE
CHILDREN'S PARK NCore 400 W. RIVER ROAD	004-019-1028	42602	Proposed NCore	May-98 PRESENT	099/090	2286	4.25	NEIGHBORHOOD	CONTINUOUS	1	HIGHEST CONCENTRATION

REACTIVE OXIDES OF NITROGEN - PIMA COUNTY MONITORING NETWORK

CHILDREN'S PARK NCore 400 W. RIVER ROAD	004-019-1028	42600	Proposed NCore	Oct-10 PRESENT	574	2286	4.25	NEIGHBORHOOD	CONTINUOUS	1	POPULATION EXPOSURE
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Key located on page 15

**2011 Ambient Air Monitoring Network Summary Table
SULFUR DIOXIDE -PIMA COUNTY MONITORING NETWORK**

SITE NAME AND LOCATION	SITE ID (a)	PARAMETER (b)	CLASSIFICATION (c)	DATES (d)	METHOD (e)	ELEV. FEET (f)	SMPL HEIGHT (M) (g)	SPATIAL SCALE (h)	SMPL FREQ (i)	POC (j)	MONITORING SITE TYPE (h)
CHILDREN'S PARK NCore 400 W. RIVER ROAD	004-019-1028	42401	Proposed NCore	Oct-10 PRESENT	560	2286	4.25	NEIGHBORHOOD	CONTINUOUS	1	POPULATION EXPOSURE

OZONE -PIMA COUNTY MONITORING NETWORK

SITE NAME AND LOCATION	SITE ID (a)	PARAMETER (b)	CLASSIFICATION (c)	DATES (d)	METHOD (e)	ELEV. FEET (f)	SMPL HEIGHT (M) (g)	SPATIAL SCALE (h)	SMPL FREQ (i)	POC (j)	MONITORING SITE TYPE (h)
22ND & CRAYCROFT 1237 S. BEVERLY AVE.	004-019-1011	44201	SLAMS	Jul-73 PRESENT	087	2582	4.1	NEIGHBORHOOD	CONTINUOUS	1	POPULATION EXPOSURE
GREEN VALLEY 601 N. LA CANADA DR.	004-019-1030	44201	SP	July-03 PRESENT	047	2910	3.1	NEIGHBORHOOD	CONTINUOUS	1	POPULATION EXPOSURE
CHILDREN'S PARK NCore 400 W. RIVER ROAD	004-019-1028	44201	SLAMS NCore	Sep-97 PRESENT	047	2286	4.25	NEIGHBORHOOD	CONTINUOUS	1	POPULATION EXPOSURE
TANGERINE 12101 N. CAMINO DE OESTE	004-019-1018	44201	SP	Oct-89 PRESENT	047	2638	3.75	URBAN	CONTINUOUS	1	HIGHEST CONCENTRATION
ROSE ELEMENTARY 710 W. MICHIGAN	004-019-1032	44201	SP	July-03 PRESENT	087	2387	4.1	NEIGHBORHOOD	CONTINUOUS	1	POPULATION EXPOSURE
COACHLINE 9597 N. COACHLINE BLVD	004-019-1034	44201	SP	July-03 PRESENT	087	2110	3.1	NEIGHBORHOOD	CONTINUOUS	1	POPULATION EXPOSURE
FAIRGROUNDS 11330 S. HOUGHTON RD.	004-019-1020	44201	SP	Oct-89 PRESENT	047/087	3078	3.6	URBAN	CONTINUOUS	1	NATURAL BACKGROUND
SAGUARO NATIONAL PARK 3905 S. OLD SPANISH TRAIL	004-019-0021	44201	SLAMS	Jun-82 PRESENT	047	3089	4.1	NEIGHBORHOOD	CONTINUOUS	1	HIGHEST CONCENTRATION

Key located on page 15

**2011 Ambient Air Monitoring Network Summary Table
PM10- PIMA COUNTY MONITORING NETWORK**

SITE NAME AND LOCATION	SITE ID (a)	PARAMETER (b)	CLASSIFICATION (c)	DATES (d)	METHOD (e)	ELEV. FEET (f)	SMPL HEIGHT (M) (g)	SPATIAL SCALE (h)	SMPL FREQ (i)	POC (j)	MONITORING SITE TYPE (h)
GERONIMO 2498 N. GERONIMO	04-019-1113	81102	SP	June-07 PRESENT	079	2452	4.6	NEIGHBORHOOD	CONTINUOUS	1	POPULATION EXPOSURE
SOUTH TUCSON 1601 S. 6TH AVE.	04-019-1001	81102	SLAMS	Sep-88 PRESENT	127	2420	6.9	NEIGHBORHOOD	1 DAY collocated every 6 day	1	POPULATION EXPOSURE
PRINCE ROAD 1016 W. PRINCE RD.	04-019-1009	81102	SLAMS	Jul-87 PRESENT	126	2315	4.6	MICROSCALE	6 DAY	1	SOURCE IMPACT
CORONA DE TUCSON 22000 S. HOUGHTON RD.	04-019-0008	81102	SLAMS	Mar-87 PRESENT	126	3078	2.1	REGIONAL	6 DAY	1	BACKGROUND
SANTA CLARA 6910 S. SANTA CLARA AVE.	04-019-1026	81102	SP	Jul-94 PRESENT	126	2540	6.45	NEIGHBORHOOD	6 DAY	1	POPULATION EXPOSURE
GREEN VALLEY 601 N. LA CANADA DR.	04-019-1030	81102	SP	Feb-01 PRESENT	079	2910	4.8	NEIGHBORHOOD	CONTINUOUS	1	POPULATION EXPOSURE
ORANGE GROVE 3401 W. ORANGE GROVE RD.	04-019-0011	81102	SLAMS	Jan-85 PRESENT	127	2234	2.65	NEIGHBORHOOD	1 DAY collocated every 6 day	2	HIGHEST CONCENTRATION
TANGERINE 12101 N. CAMINO DE OESTE	04-019-1018	81102	SP	Jan-94 PRESENT	126	2638	4.5	URBAN	6 DAY	1	BACKGROUND
CHILDREN'S PARK NCore 400 W. RIVER ROAD	004-019-1028	86101	Proposed NCore PM10-2.5	Jan-11 PRESENT	176	2286	3.1	NEIGHBORHOOD	3 DAY	1	POPULATION EXPOSURE
Key located on page 15											

2011 Ambient Air Monitoring Network Summary Table PM2.5- PIMA COUNTY MONITORING NETWORK

SITE NAME AND LOCATION	SITE ID (a)	PARAMETER (b)	CLASSIFICATION (c)	DATES (d)	METHOD (e)	ELEV. FEET (f)	SMPL HEIGHT (M) (g)	SPATIAL SCALE (h)	SMPL FREQ (i)	POC (j)	MONITORING SITE TYPE (h)
GERONIMO 2498 N. GERONIMO	004-019-1113	88501	SP	July-03 PRESENT	733	2452	4.6	NEIGHBORHOOD	CONTINUOUS	3	POPULATION EXPOSURE
GREEN VALLEY 601 N. LA CANADA DR.	004-019-1030	88501	SP	July-03 PRESENT	733	2910	4.8	NEIGHBORHOOD	CONTINUOUS	3	POPULATION EXPOSURE
CHILDREN'S PARK NCore 400 W. RIVER ROAD	004-019-1028	88101	SLAMS NCore	Jan-99 PRESENT	118	2286	3.1	NEIGHBORHOOD	3 DAY collocated every 12 day	1	POPULATION EXPOSURE
CHILDREN'S PARK NCore 400 W. RIVER ROAD	004-019-1028	88502	NCore SPECIATION	Feb-02 PRESENT	810	2286	3.0		3 DAY	5	POPULATION EXPOSURE
CHILDREN'S PARK NCore 400 W. RIVER ROAD	004-019-1028	88101	Proposed NCore	Jan-11 PRESENT	170	2286	3.1	NEIGHBORHOOD	CONTINUOUS	3	POPULATION EXPOSURE
ORANGE GROVE 3401 W. ORANGE GROVE RD.	004-019-0011	88101	SLAMS	Jan-99 PRESENT	118	2234	2.65	NEIGHBORHOOD	3 DAY	1	POPULATION EXPOSURE
ROSE ELEMENTARY 710 W. MICHIGAN	004-019-1032	88501	SP	July-03 PRESENT	733	2387	4.9	NEIGHBORHOOD	CONTINUOUS	3	POPULATION EXPOSURE
COACHLINE 9597 N. COACHLINE BLVD	004-019-1034	88501	SP	July-03 PRESENT	733	2100	4.9	NEIGHBORHOOD	CONTINUOUS	3	POPULATION EXPOSURE

Key:

- a - Site ID - site identification code used in the AQS database
- b - Parameter - code used in the AQS database to describe the pollutant monitored
- c - Classification – described on page 2
- d - Dates - dates sampling began and ended
- e - Method - code used in the AQS database indicating the type of instrument used
- f - Elev. feet - site elevation in feet
- g - SPL (M) Height - sample inlet height in meters, specific height range required for uniform collection
- h - Spatial Scale and Monitoring site type - described on page 6
- i - SMPL Freq - frequency of sampling days
- j - POC - parameter occurrence code used to distinguish between two or more instruments measuring the same parameter at the same time

Information provided based on EPA'S 2011 Air Quality System (AQS) data.

IV. CURRENT MONITORING NETWORK EVALUATIONS

PM₁₀ MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

The PDEQ PM₁₀ network consists of nine monitoring sites in eastern Pima County, Arizona. The 2011 network used several different types of PM₁₀ samplers: R& P Partisol 2000, R& P Partisol-Plus 2025 Sequential, and TEOM 1400. **40 CFR 58, app. D, 4.6** Particulate matter (PM₁₀) design criteria, provided guidance in determining the minimum number of required PM₁₀ SLAMS sites for 2011.

2011 PM₁₀ Design Criteria

Table 5

Population Pima County 2010 Census	MSA Tucson Population Category	Design Value (2009-2011)	PM ₁₀ Monitors # Required	PM ₁₀ Monitors # Operating	Max Concentration site	Max Concentration (µg/m ³)
980,263	500,000 – 1,000,000	0.3	Requires 2-4 SLAMS monitors	4 SLAMS monitors	Orange Grove 040190011	270
					South Tucson 040191001	184
					Geronimo 040191113	237
			No requirement for SP	4 SP monitors		

Considering Flagged Exceptional Events

Population Pima County 2010 Census	MSA Tucson Population Category	Design Value (2009-2011)	PM ₁₀ Monitors # Required	PM ₁₀ Monitors # Operating	Max Concentration site	Max Concentration (µg/m ³)
980,263	500,000 – 1,000,000	0	Requires 2-4 SLAMS monitors	4 SLAMS monitors	South Tucson 040191001	127

Violation History

The PM₁₀ 24 hour standard remains at 150 µg/m³. Since the promulgation of the PM₁₀ standard, July 31, 1987, exceedances of the 24 hour standard have been recorded at monitoring sites in the PDEQ PM₁₀ network. The Orange Grove site recorded two exceedances of the NAAQS during the 4th quarter of 1988 and the Downtown site recorded three during the 2nd quarter of 1989 (Downtown site was discontinued, September 1999). In 1999, the PM₁₀ standard was violated with four recorded exceedances at the Orange Grove location and two exceedances at the South Tucson location. Subsequently, the monitoring schedules for the Orange Grove and South Tucson locations have been changed from every six day sampling to every day sampling, as indicated in **40 CFR 50, app. K** and **40 CFR 58.13**. In 2002 and 2003 there were a total of two exceedances at the Orange Grove location and two exceedances at the South Tucson location. These exceedances do not constitute a violation of the standard. In 2008, there was one exceedance of the standard at the Santa Clara site, which is in the process of an Exceptional Event designation dependant on approval from EPA. In 2009 there was one exceedance at the Orange

PM₁₀ MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Grove, South Tucson and Geronimo locations on July 22nd, these exceedances may also be considered as an Exceptional Event dependant on approval from EPA.

Quality Assurance for Particulate Matter PM₁₀

All data quality assessment requirements, as outlined in **40 CFR 58, app. A**, have been met for 2011. The precision of PM₁₀ data is derived from the co-located PM₁₀ samplers at the South Tucson and Orange Grove sites; the difference in concentration between the two samplers running side-by-side is used to calculate the precision of the data. At the end of each calendar quarter, a combined precision probability interval for monitors is calculated by EPA.

The accuracy of PM₁₀ sampling is assessed by auditing the flow rate of at least 25% of the samplers each calendar quarter, such that each sampler is audited at least once per year. The difference in the flow rate between the audit flow measurement and the flow indicated by the sampler is used to calculate accuracy.

A combined accuracy probability interval is calculated for PM₁₀ along with separate probability limits for each audit concentration level for automated analyzers, and reported to EPA quarterly.

Table 6

Protocol	Instrument	Frequency	Date Completed 2011
Flow rate verification	Met One BAM 1020 R&P TEOM 1400	Weekly	
Flow Rate Audit	TEOM 1400AB	Quarterly	Green Valley 03/09, 06/27, 09/28,12/20 Geronimo 03/10, 06/29, 09/28,12/29
Flow rate verification	R& P Partisol 2000, R& P Partisol-Plus 2025 Sequential	Monthly	
Flow Rate Audit	R& P Partisol 2000, R& P Partisol-Plus 2025 Sequential	Quarterly	Corona de Tucson 03/23, 06/17, 09/25, 12/14 Santa Clara 03/09, 06/10, 09/22, 12/15 Prince Road 03/08, 06/09, 09/21,12/15 Tangerine 03/08, 06/09, 09/21,12/15 South Tucson 03/09, 06/10, 09/22, 12/27 South Tucson (co-located) 03/09, 06/10, 09/22, 12/27 Orange Grove 03/08, 06/09, 09/21, 12/15 Orange Grove (co-located) 03/08, 06/09, 09/21, 12/15 Children's Park NCore 03/08, 06/09, 09/22, 12/22
NPAP Audit			None for 2011

PM₁₀ MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Table 7

Collocated PM ₁₀ Monitors			
Method	# Required Collocation Monitors	# Primary Monitors	# Collocated Monitors
81102	1	8	2

Particulate Matter Weigh Lab

Pima County Department of Environmental Quality operates a filter weigh lab for the processing of Pima County's PM₁₀ and PM_{2.5} network filters, excluding PM_{2.5} speciation filters. This weigh lab follows all requirements set forth in **Appendix L of 40 CFR 50**.

PM₁₀ MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	GREEN VALLEY	
AQS ID / POC	040191030 / 1	
Address	601 N. La Canada Drive, Green Valley, AZ	
Latitude/ Longitude	31.87952 / -110.996440	
Elevation	2910	
Method Code	079	
Number of monitors	1	
Parameter code	81102	
Basic monitoring objective	NAAQS Comparison	
Site Type	Population Exposure	
Instrument Manufacturer and model	Thermo Scientific TEOM 1400AB	
FRM/FEM/ARM/other	FEM	
Collecting agency / Reporting agency	PDEQ / PDEQ	
Analytical Lab	PDEQ	
Monitor Type	Special Purpose	
Scale	Neighborhood	
Number of daily observations	363	
Annual arithmetic mean	17.9 µg/m ³	
Number /dates of 24-hour standard exceedances in 2011	0	
Historical exceedances		
Current Sampling frequency/ season	Every day	
Probe height	4.25 meters above the ground of the Pima County Government Center.	
Surrounding landscape	Dirt, sparse desert vegetation	
Degrees of unrestricted air flow	360	
Location description	This site is situated in a residential / commercial area. Open pit copper mines and tailings ponds are located four kilometers to the west of the community.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	n/a	
Distance from trees	7.0 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	100 meters west of La Canada /2010 ADT of 11,000
	2	0.5 kilometers west of Interstate 19 /2008 ADT of 31,000
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

PM₁₀ MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

GREEN VALLEY: AIRS # 040191030



Annual summary statistics: NAAQS: 150 µg/m³ 24- Hour Average.

Year	Annual Average	24-Hour Max. Value	24-Hour 2 nd Max. Value
2011	17.9	75	70

Comments: This site is fifty kilometers south of Downtown Tucson in the retirement community of Green Valley. PM₁₀ monitoring commenced in September 1989 at the established TSP site there. ASARCO and Freeport-McMoRan operate several open pit mines and tailings ponds just west of the community. The monitoring objective is to monitor the population exposure to this potentially significant source of airborne particulates. The monitor was relocated in February 2001, approximately 1 kilometer north of the original Esperanza site, to the Pima County Government Center at 601 N. La Canada Drive. The new site is considered a continuation of the original site. PM₁₀ levels were below the health standards in the years 1989 through 2011.

PM₁₀ MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	CORONA de TUCSON	
AQS ID / POC	040190008 / 1	
Address	22001 S. Houghton Road, Tucson, AZ	
Latitude/ Longitude	32.00474 / -110.79260	
Elevation	3078	
Method Code	126	
Number of monitors	1	
Parameter code	81102	
Basic monitoring objective	NAAQS Comparison	
Site Type	Upwind Background	
Instrument Manufacturer and model	R&P 2000	
FRM/FEM/ARM/other	FRM	
Collecting agency / Reporting agency	PDEQ / PDEQ	
Analytical Lab	PDEQ	
Monitor Type	SLAMS	
Scale	Regional	
Number of daily observations	58	
Annual arithmetic mean	15.5 µg/m ³	
Number /dates of 24-hour standard exceedances in 2011	0	
Historical exceedances		
Current Sampling frequency/ season	Every sixth day	
Probe height	2.1 meters	
Surrounding landscape	Gravel within enclosure; dirt, sparse desert vegetation surrounding	
Degrees of unrestricted air flow	360	
Location description	This site is situated in an undisturbed natural desert area.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	5.0 meters	
Distance from trees	23.4 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	1.6 kilometers west of Houghton Road with a 2010 ADT of 9,000.
	2	
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

PM₁₀ MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

CORONA de TUCSON: AIRS # 040190008



Annual summary statistics: NAAQS: 150 $\mu\text{g}/\text{m}^3$ 24- Hour Average.

Year	Annual Average	24-Hour Max. Value	24-Hour 2 nd Max. Value
2011	15.5	42	38

Comments: This site is the only regional scale monitor in the network. PM₁₀ sampling was started here in September 1988, in conjunction with existing total suspended particulates (TSP) sampling. This site exhibits the lowest network concentrations. TSP sampling was discontinued in May 1989. Hi - Vol sampling for PM₁₀ was substituted with dichotomous sampling during the last quarter of 1989 in support of the state sponsored Tucson PM₁₀ Source Apportionment Study. Hi - Vol PM₁₀ sampling resumed in January 1990. Low -Vol PM₁₀ R& P 2000 sampling began in March, 2006.

PM₁₀ MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name:	ORANGE GROVE
AQS ID / POC	040190011 / 2
Address	3401 W. Orange Grove Road, Tucson, AZ
Latitude/ Longitude	32.32255 / -111.037700
Elevation	2234
Method Code	127
Number of monitors	2
Parameter code	81102
Basic monitoring objective	NAAQS Comparison
Site Type	Highest Concentration
Instrument Manufacturer and model	R&P 2025 Sequential
FRM/FEM/ARM/other	FRM
Collecting agency / Reporting agency	PDEQ /PDEQ
Analytical Lab	PDEQ
Monitor Type	SLAMS
Scale	Neighborhood
Number of daily observations	362
Annual arithmetic mean	26.3 µg/m ³
Number /dates of 24-hour standard exceedances in 2011	0
Historical exceedances	Exceedances of the 24 – hour standard: two in 1988, four in 1999, one in 2002, one in 2003, one in 2009
Current Sampling frequency/ season	The sampling frequency started out with every other day sampling. It was changed to daily after the exceedance in July 1985. The sampling frequency remained as daily until the end of 1986. Every other day sampling was resumed until the two exceedances were recorded in the fourth quarter 1988. Every day sampling was immediately initiated and continued until April 1991 when every other day sampling was resumed. The site was placed on every sixth day sampling in October 1993. The exceedances of the NAAQS in 1999 commenced everyday sampling on September 9, 1999.
Probe height	2.65 meters above the ground in a city water well site
Surrounding landscape	Gravel in fenced compound, dirt road shoulders, weeds
Degrees of unrestricted air flow	270
Location description	This site is situated in a residential area with light commerce and industry. There is an asphalt batch plant with a large gravel pit less than three kilometers to the west of the site in the Santa Cruz River bed area.
Distance from supporting structure	n/a
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	21.9 meters
Distance from trees	19.2 meters
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors/ Frequency /collocated monitor type	1.2 meters /Every day ; reported every 6 th day/ R& P 2025 Sequential

Nearest roads distance & direction to monitor /ADT	1	37 meters west of Camino de la Tierra and 70 meters south of Orange Grove Road with a 2010 ADT of 37,000
	2	2 kilometers east of Interstate 10 with a 2008 ADT of 104,000
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	



Annual summary statistics: NAAQS:150 $\mu\text{g}/\text{m}^3$ 24- Hour Average.

Year	Annual Average	24-Hour Max. Value	24-Hour 2 nd Max. Value
2011	26.3	100	89

Comments: Established in February 1985, this site is the oldest of the PM₁₀ monitoring sites in the network. Orange Grove was chosen as the initial PM₁₀ monitoring site and the design value site for Group II in the Tucson air planning area based on historically high TSP data. This neighborhood scale site is located near the confluence of the Santa Cruz, Rillito, and Canada del Oro Rivers in the Tucson Valley. This site is situated near the freeway and railway tracks, and in the vicinity of major construction projects, therefore high PM₁₀ values are expected here. Dichotomous sampling was started at this site in July of 1993. The dichotomous ran in co-location with a HI-VOL- SA/1200 model from 1993 to 1996. The site was converted to dichotomous only operations on October 1, 1996 continuing until December 1998. Hi-Vol sampling resumed in January 1999, but was replaced with co-located low volume sequential samplers in 2004.

PM₁₀ MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name:	SOUTH TUCSON	
AQS ID / POC	040191001 / 1	
Address	1601 S. 6 th Avenue, South Tucson, AZ	
Latitude/ Longitude	32.20195 / -110.967900	
Elevation	2420	
Method Code	127	
Number of monitors	2	
Parameter code	81102	
Basic monitoring objective	NAAQS comparison	
Site Type	Population Exposure	
Instrument Manufacturer and model	R&P 2025 Sequential	
FRM/FEM/ARM/other	FRM	
Collecting agency / Reporting agency	PDEQ/ PDEQ	
Analytical Lab	PDEQ	
Monitor Type	SLAMS	
Scale	Neighborhood	
Number of daily observations	363	
Annual arithmetic mean	29.9 µg/m ³	
Number /dates of 24-hour standard exceedances in 2011	0	
Historical exceedances	Exceedances of the 24 – hour standard: two in 1999; two in 2002; one in 2009	
Current Sampling frequency/ season	The exceedances of the NAAQS in 1999 commenced everyday sampling on June 23, 1999.	
Probe height	6.9 meters above the ground on the roof of the South Tucson Governmental Complex Building.	
Surrounding landscape	Roof, gravel and desert landscaping surrounding building	
Degrees of unrestricted air flow	360	
Location description	This site is situated in a dense residential / commercial area. There are numerous unpaved alleys and lots in the vicinity.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	n/a	
Distance from trees	6.7 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	Every day; reported every 6 th day/ R&P 2025 Sequential	
Nearest roads distance & direction to monitor /ADT	1.7 meters	
	1	41 meters east of South 6 th Avenue with a 2010 ADT of 15,000
	2	south of 22 nd Street with a 2010 ADT of 32,000
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

PM₁₀ MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

SOUTH TUCSON: AIRS # 040191001



Annual summary statistics: NAAQS: 150 µg/m³ 24- Hour Average.

Year	Annual Average	24-Hour Max. Value	24-Hour 2 nd Max. Value
2011	29.9	119	87

Comments: From January 1985 to September 1988 this site approached or exceeded TSP standards. PM₁₀ sampling began here in September 1988. On March 8, 1993, the samplers were relocated from the original site to the new South Tucson Governmental Complex, which is less than two blocks north and across S. 6th Avenue. Levels at this location are representative of area - wide emissions patterns with high population exposure. The annual means for 1989 through 1999 were below the health standard. The 24 - hour NAAQS was exceeded twice in 1999 and 2002. Two co-located PM₁₀ samplers have been operational at this site from June 1991 to June 1999. Co-location of the PM₁₀ samplers was discontinued when a third sampler was added and everyday sampling began on June 23, 1999. In March, 2004, the Hi - Vol samplers were replaced with co-located Low -Vol sequential samplers.

PM₁₀ MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	PRINCE ROAD	
AQS ID / POC	040191009 / 1	
Address	1016 W. Prince Road, Tucson, AZ	
Latitude/ Longitude	32.272300 / -110.989100	
Elevation	2315	
Method Code	126	
Number of monitors	1	
Parameter code	81102	
Basic monitoring objective	NAAQS comparison	
Site Type	Source Impact	
Instrument Manufacturer and model	R&P 2000	
FRM/FEM/ARM/other	FRM	
Collecting agency / Reporting agency	PDEQ / PDEQ	
Analytical Lab	PDEQ	
Monitor Type	SLAMS	
Scale	Microscale	
Number of daily observations	60	
Annual arithmetic mean	31.0 µg/m ³	
Number /dates of 24-hour standard exceedances in 2011	0	
Historical exceedances		
Current Sampling frequency/ season	Every sixth day	
Probe height	4.6 meters above the ground on the roof of a small commercial building.	
Surrounding landscape	Roof, paved parking lots street surrounding building	
Degrees of unrestricted air flow	360	
Location description	This site is situated in a dense residential / commercial area. Numerous unpaved alleys and lots are in the vicinity.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	n/a	
Distance from trees	19.8 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	14.1 meters north of Prince Road with a 2010 ADT of 23,000
	2	
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

PM₁₀ MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

PRINCE ROAD: AIRS # 040191009

Annual summary statistics: NAAQS: 150 µg/m³ 24- Hour Average.

Year	Annual Average	24-Hour Max. Value	24-Hour 2 nd Max. Value
2011	31.0	55	55



Comments: This site is located in a homogenous, dense, residential / commercial area in north central Tucson. PM₁₀ sampling began here in August 1987. The microscale site is representative in the north central region of the air planning area where particulate levels are generally higher due to the low altitude and the prevailing southeasterly winds. The annual standard was exceeded in 1989. Power problems within the building resulted in an unusually low data recovery during the fourth quarter of 1990. Data recovery was again compromised by power problems in the 1st and 3rd quarters of 1997 and by damage to the sampler due to a storm in July, 2005. In March, 2006, the Hi -Vol sampler was replaced with a Low – Vol PM₁₀ R& P 2000 sampler.

PM₁₀ MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	SANTA CLARA SCHOOL	
AQS ID / POC	040191026 / 1	
Address	6910 S. Santa Clara Avenue, Tucson, AZ	
Latitude/ Longitude	32.125950 / -110.982600	
Elevation	2540	
Method Code	126	
Number of monitors	1	
Parameter code	81102	
Basic monitoring objective	NAAQS Comparison	
Site Type	Population Exposure	
Instrument Manufacturer and model	R&P 2000	
FRM/FEM/ARM/other	FRM	
Collecting agency / Reporting agency	PDEQ/ PDEQ	
Analytical Lab	PDEQ	
Monitor Type	Special Purpose	
Scale	Neighborhood	
Number of daily observations	60	
Annual arithmetic mean	26.3 µg/m ³	
Number /dates of 24-hour standard exceedances in 2011	0	
Historical exceedances	Exceedances of the 24 – hour standard: One on 10/27/2008	
Current Sampling frequency/ season	Every sixth day	
Probe height	6.45 meters above the ground on the roof of the Santa Clara Elementary School.	
Surrounding landscape	Roof, paved parking lots and streets, grass playground	
Degrees of unrestricted air flow	360	
Location description	This site is situated in a Southwest Tucson residential district.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	25.6 meters	
Distance from obstruction not on roof	n/a	
Distance from trees	23.9 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	450 meters east of Interstate 19 with a 2008 ADT of 35,000
	2	800 meters south of Valencia Road with a 2010 ADT of 53,000
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

PM₁₀ MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

SANTA CLARA SCHOOL: AIRS # 040191026

Annual summary statistics: NAAQS: 150 µg/m³ 24-Hour Average.

Year	Annual Average	24-Hour Max. Value	24-Hour 2 nd Max. Value
2011	26.3	73	68



Comments: This site is located south of Interstate 10 and east of Interstate 19 and provides a representative neighborhood scale site on Tucson's south side. Being near the fringe of the city limits, this site should track transport values that develop with a southerly wind from a combination of desert, agricultural land, and silt flood plain that is found on the Tohono O'Odham Indian Reservation (San Xavier district) 500 meters south of the site. The Hi- Vol sampler was replaced in April, 2006, with a Low- Vol sampler.

PM₁₀ MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	TANGERINE	
AQS ID / POC	040191018 /1	
Address	12101 N. Camino de Oeste, Tucson, AZ	
Latitude/ Longitude	32.425250 / -111.063500	
Elevation	2638	
Method Code	126	
Number of monitors	1	
Parameter code	81102	
Basic monitoring objective	NAAQS Comparison	
Site Type	General Background	
Instrument Manufacturer and model	R&P 2000	
FRM/FEM/ARM/other	FRM	
Collecting agency / Reporting agency	PDEQ/ PDEQ	
Analytical Lab	PDEQ	
Monitor Type	Special Purpose	
Scale	Urban	
Number of daily observations	58	
Annual arithmetic mean	18.0 µg/m ³	
Number /dates of 24-hour standard exceedances in 2011	0	
Historical exceedances		
Current Sampling frequency/ season	Every sixth day	
Probe height	4.5 meters above the ground on a shelter on Tucson's far northwest side	
Surrounding landscape	Dirt, sparse desert vegetation	
Degrees of unrestricted air flow	360	
Location description	This site has been situated in a relatively undisturbed natural desert area for most of it's existence, but residential development in recent years have been built to within 2 kilometers to the northwest, and low density residential developments are encroaching from the south, east and north to within 3 kilometers to 5 kilometers.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	n/a	
Distance from trees	6.4 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	Tangerine Road runs approximately east – west 70 meters south of the site with a 2010 ADT of 9,000
	2	
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

PM₁₀ MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

TANGERINE: AIRS # 040191018



Annual summary statistics: NAAQS: 150 $\mu\text{g}/\text{m}^3$ 24- Hour Average.

Year	Annual Average	24-Hour Max. Value	24-Hour 2 nd Max. Value
2011	18.0	66	65

Comments: The primary objective of this site is to assess background concentrations and to assess transport impact from outlying sources during exceptional wind events. As part of the urban haze/visibility study, dichotomous samplers were installed at this site in July 1993. PM₁₀ data from these samplers was used to supplement the existing PM₁₀ network from October 1996 to December 1998, when the dichotomous samplers were relocated and a Hi-Vol sampler was installed to continue PM₁₀ monitoring. In 2005, the Hi-Vol PM₁₀ sampler was replaced with a Low -Vol R& P 2000 sampler.

PM₁₀ MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	GERONIMO	
AQS ID / POC	040191113 /1	
Address	2498 N. Geronimo Tucson, AZ	
Latitude/ Longitude	32.251840 / -110.965300	
Elevation	2452	
Method Code	079	
Number of monitors	1	
Parameter code	81102	
Basic monitoring objective	NAAQS Comparison	
Site Type	Population Exposure	
Instrument Manufacturer and model	R & P TEOM	
FRM/FEM/ARM/other	FEM	
Collecting agency / Reporting agency	PDEQ / PDEQ	
Analytical Lab	n/a	
Monitor Type	Special Purpose	
Scale	Neighborhood	
Number of daily observations	356	
Annual arithmetic mean	29.1 µg/m ³	
Number /dates of 24-hour standard exceedances in 2011	0	
Historical exceedances	One exceedance on 7/22/2009	
Current Sampling frequency/ season	Every day; Hourly	
Probe height	4.6m	
Surrounding landscape	Dirt, dead shrubs, unpaved road shoulders	
Degrees of unrestricted air flow	360	
Location description	This site is situated in a residential area in a City of Tucson water well site.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	n/a	
Distance from trees	9.3 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	one block south of Grant Road (2010 ADT 40,000)
	2	three blocks east of Stone Avenue (2010 ADT 21,000)
	3	two blocks west of North 1 st Avenue (2009 ADT 35,000)
Site meets 40 CFR 58, Appx. A,C,D,E		

PM₁₀ MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

GERONIMO: AIRS # 040191113

Annual summary statistics: NAAQS: 150 $\mu\text{g}/\text{m}^3$ 24- Hour Average.

Year	Annual Average	24-Hour Max. Value	24-Hour 2 nd Max. Value
2011	29.1	116	85



Comments: This monitor was initially installed in July 1, 2007 for Air Quality Index reporting using a continuous monitor. This is a Special Purpose site situated in a residential area, monitoring for population exposure.

PM₁₀ - 2.5 (PM-Coarse) MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Pima County is monitoring for PM- Coarse at the Children’s Park NCore station as part of the monitoring requirements for an NCore station. PM-Coarse is the difference between PM₁₀ and PM_{2.5}, also referred to as PM_{10-2.5}. Pima County is following the requirements set forth in **40 CFR Part 50, App O**.

The PM_{2.5} portion of this method is the monitor described on page 40. The PM₁₀ monitor is described below.

Site Name	CHILDREN’S PARK NCore
AQS ID / POC	040191028 /1
Address	400 W. River Road, Tucson, AZ
Latitude/ Longitude	32.295150 / -110.982300
Elevation	2286
Method Code	176
Number of monitors	2
Parameter code	86101
Basic monitoring objective	NCore
Site Type	Population exposure
Instrument Manufacturer and model	R& P Partisol-Plus 2025 Sampler Pair
FRM/FEM/ARM/other	FRM
Collecting agency / Reporting agency	PDEQ/ PDEQ
Analytical Lab	PDEQ
Monitor type	Proposed NCore
Scale	Neighborhood
Annual arithmetic mean	15.8 µg/m ³
Current Sampling frequency/ season	Every three days
Probe height	3.1 meters above the ground on a platform located in a city water well site.
Surrounding landscape	Gravel in walled compound, dirt parking lot, dry river bed
Degrees of unrestricted air flow	270
Location description	This site is located at the confluence of the Rillito River and Pima Wash, a natural low spot in the local topography. Single - family residences and a popular county park with exercise trails extend to the north, northwest, and west, respectively. Heavy commercial usage dominates to the south and east, including large shopping malls and automobile dealerships.
Distance from supporting structure	n/a
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	13.1 meters
Distance from trees	8.0 meters
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors/ collocated monitor type	same

Nearest roads distance & direction to monitor /ADT	1.2 meters	
	1	Arizona State Route 77 runs north - south 0.5 kilometers to the east, providing six lanes of heavily used arterial routing with a 2008 ADT of 43,000.
	2	River Road runs east – west 0.5 kilometers to the north, with a 2010 ADT of 38,000.
Suitable for comparison to NAAQS	No	
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	



Comments: The subtraction method for determining the coarse PM fraction was initiated in 2011, using a matched pair of Partisol- Plus samplers.

Annual summary statistics:

Year	Annual Average	24-Hour Max. Value	24-Hour 2 nd Max. Value
2011	15.8	73.0	35.2

PM_{2.5} MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

The PDEQ PM_{2.5} network consists of six monitoring sites in eastern Pima County, Arizona. **40 CFR 58.20, App. D. 4.7** PM_{2.5} design criteria, provided guidance on the required number of SLAMS monitors. Two SLAMS Federal Reference Method (FRM) monitors were initiated in January, 1999 at the Orange Grove and Children's Park sites. In addition to two SLAMS monitors, Pima County has four Special Purpose hourly monitors.

2011 PM_{2.5} Design Criteria

Table 8

PM_{2.5} SLAMS (FRM and FEM)

Population Pima County 2010 Census	MSA Tucson Population Category	Design Value Site	Annual Design Value Years 2009-2011	Daily Design Value Years 2009-2011	PM _{2.5} Monitors # Required	PM _{2.5} Monitors # Operating
980,263	500,000 – 1,000,000	Children's Park NCore 040191028 method 118	5.4 µg/m ³	12 µg/m ³	Requires 1 SLAMS Monitor	2 SLAMS Monitors
					<85% of NAAQS	

PM_{2.5} Continuous (FEM and non-FEM)

Design Value Site	Annual Design Value Years 2009-2011	Daily Design Value Years 2009-2011	PM _{2.5} Monitors # Required	PM _{2.5} Monitors # Operating
Geronimo 040191113	8.3 µg/m ³	17 µg/m ³	No requirement for SP 1- Proposed NCore	4 SP Monitors 1- Proposed NCore

Table 9

Collocated PM_{2.5} Monitors

Method	# Required Collocation Monitors	# Primary Monitors	# Collocated Monitors
88101 Method 118	1	2	1
88101 POC 3 Method 170	1	1	0 ^A

^A See comment on next page.

^A BAM 1020 FEM at Children's Park NCore site is collocated with a PM_{2.5} FRM also at that site, that does not meet inlet separation requirements at this time, and is not being reported, pending clarification.

General Statement regarding changes to the PM_{2.5} network:

PDEQ does not have any violating monitors or proposals to move or change any monitors at this time. In the event of changes to the PM_{2.5} network or violating monitors, PDEQ would detail all information and present it to the public for comment and would forward all comments and information to EPA for approval. After approval, PDEQ would then initiate any changes.

The SLAMS FRM monitors are filter-based low-volume samplers that collect a sample for 24 hours on a 1 in 3 day cycle. A co-located sampler at the Children's Park NCore site runs on a 1 in 12 day cycle for precision assessment.

Continuous PM_{2.5} monitoring was initiated in May, 2000 at the Green Valley site using Beta Mass Attenuation and a very sharp-cut cyclone. This installation was a pilot project and was followed by similar installations at the Rose Elementary and Coachline monitoring sites. All three sites were a part of the EMPACT project (Environmental Monitoring for Public Access and Community Tracking), designed to provide near real-time data to the public via the internet and PDEQ web pages. A fourth monitor was added at the Geronimo site to provide fine particulate data for AQI reporting. The Met One BAM 1020 monitors provide automatic concentration measurement on an hourly basis, and output the reading to the site data logger, which is then polled every hour, and the data posted on the PDEQ website. The data obtained by both FRM and continuous PM_{2.5} monitors in Tucson are submitted quarterly to the EPA's Air Quality System (AQS) database. We are currently reviewing our parameter codes for the BAM 1020's as we transition from non-FEM BAM's to newer FEM BAM's.

Pima County Department of Environmental Quality operates a filter weigh lab for the processing of Pima County's PM₁₀ and PM_{2.5} network filters, excluding PM_{2.5} speciation filters. This weigh lab follows all requirements set forth in **40 CFR 50, App. L**.

The PM_{2.5} Chemical Speciation Trends Network was established by EPA in 1999 to determine the chemical speciation of fine particulates. PM_{2.5} speciation monitoring began in Pima County at the Children's Park location in February, 2002. The samples are analyzed for total mass, forty eight elements, cations, nitrate, sulfate, organic and elemental carbon. Analysis and reporting is completed by RTI International. Summary PM_{2.5} data for 2011 is included in this report.

Violation History

The PM_{2.5} standards (effective December 17, 2006): the annual PM_{2.5} standard is met when the three year average of the spatially averaged annual mean is less than or equal to 15ug/m³ and the 24 hour standard is met when the three year average of the 98th percentile value at each site is less than or equal to 35ug/m³. No exceedances of the annual or 24 - hour NAAQS were recorded in Tucson in 2011.

Quality Assurance for Particulate Matter PM_{2.5}

All data quality assessment requirements as outlined in **40 CFR 58, app. A** have been met in 2011, and include both internal and EPA PEP audits, and the co-located sampler at the Children's Park NCore site.

The accuracy of PM_{2.5} sampling is assessed by auditing the flow rate each calendar quarter. The difference in the flow rate between the audit flow measurement and the flow indicated by the sampler is used to calculate accuracy. A combined accuracy probability interval is calculated for PM_{2.5} along with separate probability limits for each audit concentration level for automated analyzers. Pima County reports the results of all valid precision and accuracy tests on a quarterly basis to the Air Quality System (AQS) database.

Table 10

Protocol	Instrument	Frequency	Date Completed 2010
Flow rate verification	Met One BAM 1020	Weekly	
Flow Rate Audit	Met One BAM 1020	Quarterly	Green Valley 03/09, 06/27, 09/28, 12/20 Geronimo 03/10, 06/29, 09/28, 12/29 Rose Elementary 03/09, 06/30, 09/22, 12/15 Coachline 03/08, 06/09, 09/20, 12/15 Children’s Park 06/09, 09/20, 12/29
Flow rate verification	R& P Partisol-Plus 2025 Sequential R & P 2000	Monthly	
Flow Rate Audit	R& P Partisol-Plus 2025 Sequential R& P 2000 (Co- located) Met One SASS (Speciation) URG – 3000N (Speciation)	Quarterly	Orange Grove 03/08, 06/09, 09/22, 12/15 Children’s Park 03/08, 06/09, 09/25, 12/22 Children’s Park (Co-located) 03/08, 06/09, 09/21, 12/22 Children’s Park (Speciation, SASS) 03/23, 06/09, 09/20, 12/22 Children’s Park (Speciation,URG) 03/23, 06/09, 09/20, 12/22
NPAP Audit			None

PM_{2.5} MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	ORANGE GROVE	
AQS ID / POC	040190011 / POC1	
Address	4301 West Orange Grove Road, Tucson, AZ	
Latitude/ Longitude	32.322550 / -111.037700	
Elevation	2234	
Method Code	118	
Number of monitors	1	
Parameter code	88101	
Basic monitoring objective	NAAQS Comparison	
Site Type	Population Exposure	
Instrument Manufacturer and model	R&P Partisol-Plus 2025	
FRM/FEM/ARM/other	FRM	
Collecting agency / Reporting agency	PDEQ / PDEQ	
Analytical Lab	PDEQ	
Monitor Type	SLAMS	
Scale	Neighborhood	
Number of daily observations	118	
Annual arithmetic mean	5.69 µg/m ³	
Number /dates of 24-hour standard exceedances in 2011	0	
Historical exceedances		
Current Sampling frequency/ season	Every three days sampling	
Probe height	2.65 meters above the ground in a city water well site	
Surrounding landscape	Gravel in fenced compound, dirt road shoulders, weeds	
Degrees of unrestricted air flow	270	
Location description	This site is situated in a residential area with light commerce and industry. There is an asphalt batch plant with a large gravel pit less than three kilometers to the west of the site in the Santa Cruz River bed area.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	18.6 meters	
Distance from trees	20.3 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	37 meters west of Camino de la Tierra and 70 meters south of Orange Grove Road with a 2010 ADT of 37,000
	2	2 kilometers east of Interstate 10 with a 2008 ADT of 104,000
Suitable for comparison to NAAQS:	Yes	
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

PM_{2.5} MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

ORANGE GROVE: AIRS # 040190011



Comments: PM_{2.5} sampling began at this neighborhood scale site in January, 1999. It is located near the confluence of the Santa Cruz, Rillito and Canada del Oro Rivers in the Tucson Valley, toward the northwest end of the air planning area. The site is situated near a freeway and railroad tracks.

Annual summary statistics: NAAQS: 15 $\mu\text{g}/\text{m}^3$ Annual Average, 35 $\mu\text{g}/\text{m}^3$ 24 Hour Average.

Year	Highest 24 Hr Value	2 nd Highest Value	3 rd Highest Value	4 th Highest Value	98 th % Value	Annual Average
2011	13.8	12.4	12.0	11.5	12.0	5.69

PM_{2.5} MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	CHILDREN'S PARK NCore
AQS ID / POC	040191028/ POC2
Address	400 W. River Road, Tucson, AZ
Latitude/ Longitude	32.295150 / -110.982300
Elevation	2286
Method Code	118
Number of monitors	2
Parameter code	88101
Basic monitoring objective	NAAQS Comparison
Site Type	Population Exposure
Instrument Manufacturer and model	R& P Partisol-Plus 2025
FRM/FEM/ARM/other	FRM
Collecting agency / Reporting agency	PDEQ / PDEQ
Analytical Lab	PDEQ
Monitor Type	SLAMS NCore
Scale	Neighborhood
Number of daily observations	116
Annual arithmetic mean	5.41 µg/m ³
Number /dates of 24-hour standard exceedances in 2011	0
Historical exceedances	
Current Sampling frequency/ season	Every three days
Probe height	3.1 meters above the ground on a platform located in a city water well site.
Surrounding landscape	Gravel in walled compound, dirt parking lot, dry river bed
Degrees of unrestricted air flow	360
Location description	This site is located at the confluence of the Rillito River and Pima Wash, a natural low spot in the local topography. Single - family residences and a popular county park with exercise trails extend to the north, northwest, and west, respectively. Heavy commercial usage dominates to the south and east, including large shopping malls and automobile dealerships.
Distance from supporting structure	n/a
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	13.1 meters
Distance from trees	8.0 meters
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors/ collocated monitor type	Every twelve days / R&P 2000

PM_{2.5} MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

CHILDREN'S PARK NCore: AIRS # 040191028

Nearest roads distance & direction to monitor /ADT	1.2 meters	
	1	Arizona State Route 77 runs north - south 0.5 kilometers to the east, providing six lanes of heavily used arterial routing with a 2008 ADT of 43,000.
	2	River Road runs east – west 0.5 kilometers to the north, with a 2010 ADT of 38,000.
Suitable for comparison to NAAQS	Yes	
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	



Comments: Continuous PM_{2.5} sampling began at this neighborhood scale site in January, 1999.

Annual summary statistics: NAAQS: 15 µg/m³ Annual Average, 35 µg/m³ 24 Hour Average.

Year	Highest 24 Hr Value	2 nd Highest Value	3 rd Highest Value	4 th Highest Value	98 th % Value	Annual Average
2011	12.2	11.5	11.3	11.1	11.3	5.41

PM_{2.5} MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

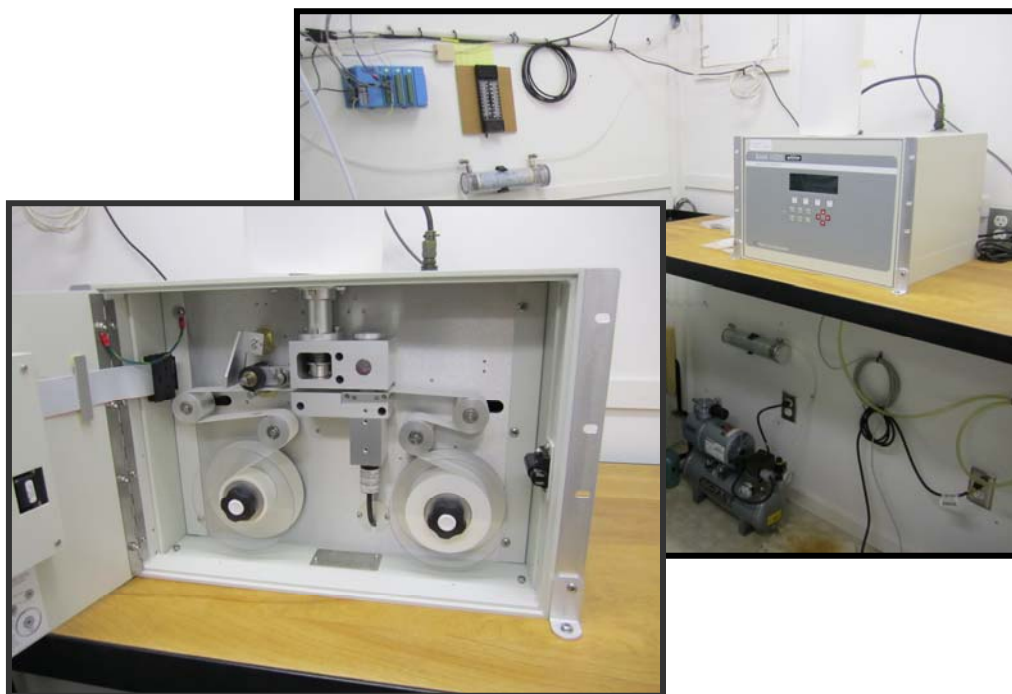
Site Name	CHILDREN'S PARK NCore
AQS ID / POC	040191028 / POC 3
Address	400 W. River Road, Tucson, AZ
Latitude/ Longitude	32.295150 / -110.982300
Elevation	2286
Method Code	170
Number of monitors	1
Parameter code	88101
Basic monitoring objective	NAAQS Comparison
Site Type	Population Exposure
Instrument Manufacturer and model	Met One Beta Attenuation 1020
FRM/FEM/ARM/other	FEM
Collecting agency / Reporting agency	PDEQ/ PDEQ
Analytical Lab	n/a
Monitor Type	Proposed NCore
Scale	Neighborhood
Number of daily observations	343
Annual arithmetic mean	5.77 µg/m ³
Number /dates of 24-hour standard exceedances in 2011	0
Historical exceedances	
Current Sampling frequency/ season	Continuous
Probe height	3.1 meters above the ground on a platform located in a city water well site.
Surrounding landscape	Gravel in walled compound, dirt parking lot, dry river bed
Degrees of unrestricted air flow	360
Location description	This site is located at the confluence of the Rillito River and Pima Wash, a natural low spot in the local topography. Single - family residences and a popular county park with exercise trails extend to the north, northwest, and west, respectively. Heavy commercial usage dominates to the south and east, including large shopping malls and automobile dealerships.
Distance from supporting structure	n/a
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	13.1 meters
Distance from trees	8.0 meters
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors/ collocated monitor type	Every twelve days / R&P 2000

PM_{2.5} MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

CHILDREN'S PARK NCore: AIRS # 040191028

Nearest roads distance & direction to monitor /ADT		1.2 meters
	1	Arizona State Route 77 runs north - south 0.5 kilometers to the east, providing six lanes of heavily used arterial routing with a 2008 ADT of 43,000.
	2	River Road runs east – west 0.5 kilometers to the north, with a 2010 ADT of 38,000.
Suitable for comparison to NAAQS:		Yes
Site meets 40 CFR 58, Appx. A,C,D,E		Yes



Comments: PM_{2.5} sampling began at this neighborhood scale site in January 23, 2011

Annual summary statistics: NAAQS: 15 µg/m³ Annual Average, 35 µg/m³ 24 Hour Average.

Year	Highest 24 Hr Value	2 nd Highest Value	3 rd Highest Value	4 th Highest Value	98 th % Value	Annual Average
2011	18.7	17.0	16.5	16.1	14.1	5.77

PM_{2.5} MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	ROSE ELEMENTARY	
AQS ID / POC	040191032 / POC 3	
Address	710 W. Michigan, Tucson, AZ	
Latitude/ Longitude	32.172950 / -110.980050	
Elevation	2387	
Method Code	733	
Number of monitors	1	
Parameter code	88501	
Basic monitoring objective	Public Information	
Site Type	Population Exposure	
Instrument Manufacturer and model	Met-One Beta Attenuation 1020	
FRM/FEM/ARM/other	Other	
Collecting agency / Reporting agency	PDEQ / PDEQ	
Analytical Lab	n/a	
Monitor Type	Special Purpose	
Scale	Neighborhood	
Number of daily observations	360	
Annual arithmetic mean	8.68 µg/m ³	
Number /dates of 24-hour standard exceedances in 2011	0	
Historical exceedances	0	
Current Sampling frequency/ season	Continuous	
Probe height	4.9 meters above the ground on the roof of a shelter located on the grounds of Rose Elementary School	
Surrounding landscape	Grass playground	
Degrees of unrestricted air flow	360	
Location description	The site is located in a residential neighborhood with light commercial enterprises. The Santa Cruz River, with several sand and gravel operations, parallels the interstate one kilometer to the west.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	n/a	
Distance from trees	11.8 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	12 th Avenue to the east with a 2009 ADT of 22,000
	2	Ajo Way to the north with a 2010 ADT of 28,000
	3	Interstate 19 runs north-south half a kilometer to the west with a 2008 ADT 76,000
Suitable for comparison to NAAQS:	No	
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

PM_{2.5} MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

ROSE ELEMENTARY: AIRS # 040191032



Comments: This monitor was initially installed in October of 2000 as part of the Environmental Monitoring for Public Access and Community Tracking (EMPACT) program. This area was identified as having higher than normal number of pediatric asthma cases. Pima County began reporting the PM_{2.5} data to EPA July, 2003.

Annual summary statistics: NAAQS: 15 µg/m³ Annual Average, 35 µg/m³ 24 Hour Average.

Year	Highest 24 Hr Value	2 nd Highest Value	3 rd Highest Value	4 th Highest Value	98 th % Value	Annual Average
2011	33.3	25.6	23.0	21.2	18.0	8.68

PM_{2.5} MONITORING NETWORK
2011 Ambient Air Monitoring Network Plan

Site Name	COACHLINE	
AQS ID / POC	040191034 / POC3	
Address	9597 N. Coachline, Tucson, AZ	
Latitude/ Longitude	32.380820 / -111.127160	
Elevation	2228	
Method Code	733	
Number of monitors	1	
Parameter code	88501	
Basic monitoring objective	Public Information	
Site Type	Population Exposure	
Instrument Manufacturer and model	Met-One Beta Attenuation 1020	
FRM/FEM/ARM/other	Other	
Collecting agency / Reporting agency	PDEQ / PDEQ	
Analytical Lab	n/a	
Monitor Type	Special Purpose	
Scale	Neighborhood	
Number of daily observations	354	
Annual arithmetic mean	8.06 µg/m ³	
Number /dates of 24-hour standard exceedances in 2011	0	
Historical exceedances	0	
Current Sampling frequency/ season	Continuous	
Probe height	4.9 meters above the ground on a shelter on Tucson's far northwest side	
Surrounding landscape	Dirt within walled compound, residential neighborhood	
Degrees of unrestricted air flow	270	
Location description	The site is situated in a residential neighborhood. The normally dry Santa Cruz River runs northwest between the Interstate and the neighborhood and contributes to airborne dust through previous deposition of fine clay soils throughout the floodplain. This area has previously been used for farming and ranching, and sand and gravel operations are still in operation five to ten kilometers upstream to the southwest. Considerable new construction of roads, homes and businesses throughout this burgeoning area exacerbate entrainment of the fine soils.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	9.41 meters	
Distance from trees	3.0 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	approximately 1.25 kilometers west of Interstate 10 with a 2008 ADT of 72,000
	2	.5 kilometer north of Silverbell Road 2010 ADT of 26,000
Suitable for comparison to NAAQS	No	
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

PM_{2.5} MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

COACHLINE: AIRS # 040191034



Annual summary statistics: NAAQS: 15 $\mu\text{g}/\text{m}^3$ Annual Average, 35 $\mu\text{g}/\text{m}^3$ 24 Hour Average.

Year	Highest 24 Hr Value	2 nd Highest Value	3 rd Highest Value	4 th Highest Value	98 th % Value	Annual Average
2011	33.7	25.9	19.2	17.1	15.0	8.06

Comments: This monitor was initially installed in March of 2001 as part of the Environmental Monitoring for Public Access and Community Tracking (EMPACT) program. This area was identified as having higher than normal number of pediatric asthma cases. Pima County began reporting the PM_{2.5} data to EPA July, 2003.

PM_{2.5} MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	GREEN VALLEY	
AQS ID / POC	040191030	
Address	601 N. La Canada Drive, Green Valley, AZ	
Latitude/ Longitude	31.87952 / -110.996440	
Elevation	2638	
Method Code	733	
Number of monitors	1	
Parameter code	88501	
Basic monitoring objective	Public Information	
Site Type	Population Exposure	
Instrument Manufacturer and model	Met-One Beta Attenuation 1020	
FRM/FEM/ARM/other	Other	
Collecting agency / Reporting agency	PDEQ / PDEQ	
Analytical Lab	n/a	
Monitor Type	Special Purpose	
Scale	Neighborhood	
Number of daily observations	350	
Annual arithmetic mean	4.90 µg/m ³	
Number /dates of 24-hour standard exceedances in 2011	0	
Historical exceedances	0	
Current Sampling frequency/ season	Continuous	
Probe height	4.8 meters above the ground on a shelter	
Surrounding landscape	Dirt, sparse desert vegetation	
Degrees of unrestricted air flow	360	
Location description	This site is situated in a residential / commercial area. Open pit copper mines and tailings ponds are located four kilometers to the west of the community.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	n/a	
Distance from trees	7.5 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	100 meters west of La Canada (2010 ADT of 11,000)
	2	0.5 kilometers west of Interstate 19 (2008 ADT of 31,000)
Suitable for comparison to NAAQS	No	
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

PM_{2.5} MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

GREEN VALLEY: AIRS # 040191030



Annual summary statistics: NAAQS: 15 $\mu\text{g}/\text{m}^3$ Annual Average, 35 $\mu\text{g}/\text{m}^3$ 24 Hour Average.

Year	Highest 24 Hr Value	2 nd Highest Value	3 rd Highest Value	4 th Highest Value	98 th % Value	Annual Average
2011	18.8	16.2	15.4	14.8	14.0	4.90

Comments: This site is fifty kilometers south of Downtown Tucson in the retirement community of Green Valley. This monitor was initially installed in May of 2000 as part of the Environmental Monitoring for Public Access and Community Tracking (EMPACT) program. Pima County began reporting the PM_{2.5} data to EPA July, 2003.

PM_{2.5} MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	GERONIMO	
AQS ID / POC	040191113 / POC3	
Address	2498 N. Geronimo, Tucson, AZ	
Latitude/ Longitude	32.251840 / -110.965300	
Elevation	2452	
Method Code	733	
Number of monitors	1	
Parameter code	88501	
Basic monitoring objective	Public Information	
Site Type	Population Exposure	
Instrument Manufacturer and model	Met-One Beta Attenuation 1020	
FRM/FEM/ARM/other	Other	
Collecting agency / Reporting agency	PDEQ/ PDEQ	
Analytical Lab	n/a	
Monitor Type	Special Purpose	
Scale	Neighborhood	
Number of daily observations	357	
Annual arithmetic mean	9.48 µg/m ³	
Number /dates of 24-hour standard exceedances in 2011	0	
Historical exceedances		
Current Sampling frequency/ season	Continuous	
Probe height	4.6 meters	
Surrounding landscape	Dirt, dead shrubs, unpaved road shoulder	
Degrees of unrestricted air flow	360	
Location description	This site is situated in a residential area in a City of Tucson water well site.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	n/a	
Distance from trees	9.4 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	one block south of Grant Road (2010 ADT 40,000)
	2	three blocks east of Stone Avenue (2010ADT 21,000)
	3	two blocks west of North 1 st Avenue (2009 ADT 35,000)
Suitable for comparison to NAAQS	No	
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

PM_{2.5} MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

GERONIMO: AIRS # 040191113

Annual summary statistics: NAAQS: 15 µg/m³ Annual Average, 35 µg/m³ 24 Hour Average.

Year	Highest 24 Hr Value	2 nd Highest Value	3 rd Highest Value	4 th Highest Value	98 th % Value	Annual Average
2011	24.7	22.5	20.4	20.1	18.0	9.48



Comments: This monitor was initially installed in July of 2001 for Air Quality Index reporting using a continuous monitor. Pima County began reporting the PM_{2.5} data to EPA July, 2003. This is a Special Purpose site situated in a residential area, monitoring for population exposure.

PM_{2.5} SPECIATION
2011 Ambient Air Monitoring Network Plan

Site Name		CHILDREN'S PARK NCore (Speciation)
AQS ID		040191028 / POC 5
Address		400 W. River Road, Tucson, AZ
Latitude/ Longitude		32.295150 / -110.982300
Elevation		2286
Method		810
Number of monitors		1
Parameter code		88502
Basic monitoring objective		Research
Site Type		Population Exposure
Instrument Manufacturer and model		Met One SASS with URG 3000N
FRM/FEM/ARM/other		Other
Monitor Type		NCore PM _{2.5} Speciation
Scale		
Analyzing & Reporting Org		RTP
Collecting Org		Pima County Department of Environmental Quality
Number of daily observations		92
Annual arithmetic mean		6.96 µg/m ³
Number /dates of 24-hour standard exceedances in 2011		0
Historical exceedances		
Sampling frequency/ season		Every 3 rd day
Probe height		3 meters above the ground on a platform located in a city water well site.
Surrounding landscape	This site is located at the confluence of the Rillito River and Pima Wash, a natural low spot in the local topography. Single - family residences and a popular county park with exercise trails extend to the north, northwest, and west, respectively. Heavy commercial usage dominates to the south and east, including large shopping malls and automobile dealerships.	
Degrees of unrestricted air flow		270
Location description		Gravel in walled compound, dirt parking lot, dry river bed
Distance from supporting structure		n/aRe
Distance from obstruction on roof		n/a
Distance from obstruction not on roof		SASS 15.8 meters
Distance from trees		SASS 5.2 meters
Distance to furnace or incinerator flue		n/a
Distance between collocated monitors/ collocated monitor type		n/a
Nearest roads distance & direction to monitor /ADT	1	Arizona State Route 77 runs north - south 0.5 kilometers to the east, providing six lanes of heavily used arterial routing with a 2008 ADT of 43,000.
	2	River Road runs east – west 0.5 kilometers to the north, with a 2010 ADT of 38,000.
Suitable for comparison to NAAQS:		No
Site meets 40 CFR 58, Appx. A,C,D,E		Yes

PM_{2.5} SPECIATION
2011 Ambient Air Monitoring Network Plan

Annual summary statistics: NAAQS: 15 µg/m³ Annual Average, 35 µg/m³ 24 Hour Average.

Year	Highest 24 Hr Value	2 nd Highest Value	3 rd Highest Value	4 th Highest Value	Annual Average
2011	24.0	16.3	15.5	14.1	6.96

CARBON MONOXIDE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Motor vehicles are the primary source of carbon monoxide (CO) in the Tucson area. Data and reports from the Arizona Department of Transportation (MVD) show that there were 942,202 vehicles registered in Pima County in 2011, an increase of 8,584 more than last year and compared with 585,636 in 2000. In spite of increased vehicular traffic, CO levels have dropped considerably since the county began monitoring in 1973. The dramatic decrease can primarily be contributed to the progress made by automobile manufacturers in meeting federally mandated tailpipe emissions standards and to the state vehicle inspection / maintenance programs.

Carbon Monoxide is monitored at five locations throughout the Pima County air quality control district. The revised requirements for Carbon Monoxide **40 CFR 58, app. D, 4.2** state that there is no minimum number of CO monitoring sites required. Pima County is operating under the auspices of the CO Limited Maintenance Plan (LMP) and has maintained the same number of sites in order to meet and exceed the requirements of the LMP.

**2011 CO Design Criteria
Table 11**

Population Pima County 2010 Census	MSA Tucson Population Category	1- Hour Design Value 2009-2010	CO Monitors # Required	CO Monitors # Operating
980,263	500,000 – 1,000,000	2.5 ppm	No Specific Requirement	2 SLAMS Monitors
				3 SP Monitors

Violation History

No exceedances of the National Ambient Air Quality Standards for CO were recorded in Tucson in 1989 through 2011. In January 1988, the eight - hour health standard of nine parts per million was exceeded once at two monitoring sites on the same day. The last exceedance of the eight - hour standard prior to 1988 occurred in December 1986 at a special purpose microscale location (Broadway / Craycroft). Pima County's status for CO was reclassified to attainment with the implementation of a Limited Maintenance Plan on April 25, 2000 by the EPA. The Carbon Monoxide Limited Maintenance Plan was developed in conjunction with Pima Association of Governments and approved by EPA to help mitigate any future violations. The plan allows for additional mobile monitoring of CO at high volume intersections, and a microscale site located at Golf Links & Kolb was established, September, 2002.

Quality Assurance for Carbon Monoxide

All data quality assessment requirements as outlined in **40 CFR 58, app. A**, have been met in 2011. The precision of SLAMS automated analyzers is based on one-point precision checks conducted every two weeks, when each analyzer is challenged by a known concentration of a check gas. For CO the concentrations are between 8.0 and 10.0 ppm. The requirements include annual audits performed in-house for accuracy. Three levels are reported of the four audit point levels that are used for CO. The audit levels are: level two at .900 -2.99 ppm, level three at 3.0-7.99 ppm, level four at 8.0-15.99 ppm and level five at 16.0-30.99 ppm. All valid precision and accuracy tests are reported to the Air Quality System (AQS) database on a quarterly basis.

Table 12

Carbon Monoxide Audit Dates 2011	
Craycroft & 22 nd St.	06/20, 12/19
Children's Park	03/24, 09/19
Cherry & Glenn; Seasonal	03/31, 12/20
Alvernon & 22 nd St.	03/22, 09/16
Golf Links & Kolb; Seasonal	03/31, 12/19
NPAP Carbon Monoxide TTP Audit Dates 2011	
Golf Links & Kolb	10/25/2011
Cherry & Glenn	10/25/2011

CARBON MONOXIDE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	22ND STREET & CRAYCROFT	
AQS ID	040191011	
Address	1237 S. Beverly Avenue, Tucson, AZ	
Latitude/ Longitude	32.204420 / -110.878150	
Elevation	2582	
Method	054	
Number of monitors	1	
Type of monitor	Instrumental non-dispersive infrared	
Site type	Population Exposure	
Monitor type	SLAMS	
Scale	Neighborhood	
Number of hourly observations	8708	
Number of exceedances in 2011	0	
Historical exceedances		
Sampling frequency/ season	Continuous	
Probe height	4.1 meters above the ground on the roof of a shelter located in a city water well site.	
Probe material / Residence time	FEP Teflon / 2.5 seconds	
Surrounding landscape	Dirt, ephemeral weeds	
Degrees of unrestricted air flow	360	
Location description	This site is situated in a predominately residential eastside area with commercial activity lining nearby arterial routes. There is a large covered water reservoir north of the location.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	n/a	
Distance from trees	22.0 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	260 meters west is Craycroft Road with 2010 ADT of 30,000
	2	260 meters north is 22 nd Street with a 2010 ADT of 46,000
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

Comments: This site is one of the oldest in the monitoring network, originally established in 1973, and has operated continuously to the present.

CARBON MONOXIDE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

22ND STREET & CRAYCROFT: AIRS # 040191011



Annual summary statistics: NAAQS: 35ppm 1-Hour Average, 9ppm 8- Hour Average

One – hour average concentrations	ppm	Date	Hour
Highest	2.1	01/01	2200
Second Highest	2.0	01/14	0700

Eight – hour average concentrations	ppm	Date	Hour
Highest	0.9	01/06	0900
Second Highest	0.9	12/24	2300

CARBON MONOXIDE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	22ND STREET & ALVERNON	
AQS ID	040191014	
Address	3895 E. 22 nd Street, Tucson, AZ	
Latitude/ Longitude	32.207390 / -110.910650	
Elevation	2516	
Method	054	
Number of monitors	1	
Type of monitor	Instrumental non-dispersive infrared	
Site type	Highest Concentration	
Monitor type	SLAMS	
Scale	Microscale	
Number of hourly observations	8705	
Number of exceedances in 2011	0	
Historical exceedances	Years: 1975 - 1986 and 1988	
Sampling frequency/ season	Continuous	
Probe height	3.4 meters above the ground attached to a wall near 22 nd Street at a Tucson Water well site	
Probe material / Residence time	FEP Teflon / 19.4 seconds	
Surrounding landscape	Gravel in walled compound, paved streets and sidewalks	
Degrees of unrestricted air flow	270	
Location description	This site is situated in a commercial area near a high traffic count intersection. A large regional park is located to the northwest of the site.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	2.0 meters	
Distance from trees	3.0 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	60 meters west of Alvernon Way with a 2010 ADT of 33,000
	2	10 meters north of 22 nd Street with a 2010 ADT of 38,000
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

Comments: The site was relocated in October, 2001 to a Tucson Water well site 50 meters west of the original location. The move was necessitated by an intersection improvement project and anticipated construction on the northwest corner. The shelter was moved again in January, 2004, to a different corner within the well site, and the probe was attached to a wall in virtually the same location as before the shelter was moved, so airflow from the intersection would remain unrestricted. 22nd & Alvernon continues to measure the highest CO concentrations in the network. The prevailing morning- hour southeasterly winds usually disperse CO generated in the intersection. During stagnant conditions,

CARBON MONOXIDE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

22ND STREET & ALVERNON: AIRS # 040191014

especially during the winter inversion formation, CO generated in the intersection has a longer residence time. Although population exposure is limited at this location, 22nd & Alvernon is representative of worst-case intersections in Tucson. This site has been operating continuously since 1975. No exceedances of the eight-hour health standard were recorded in 1989 through 2011.



Annual summary statistics: NAAQS: 35ppm 1-Hour Average, 9ppm 8- Hour Average

One – hour average concentrations	ppm	Date	Hour
Highest	3.1	12/15	1500
Second Highest	2.5	12/15	1100

Eight – hour average concentrations	ppm	Date	Hour
Highest	1.8	12/15	1600
Second Highest	1.6	12/14	1600

CARBON MONOXIDE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	CHERRY & GLENN	
AQS ID	040191021	
Address	2745 N. Cherry Avenue, Tucson, AZ	
Latitude/ Longitude	32.25658 / -110.948650	
Elevation	2400	
Method	054	
Number of monitors	1	
Type of monitor	Instrumental non-dispersive infrared	
Site type	Population Exposure	
Monitor type	Special Purpose	
Scale	Neighborhood	
Number of hourly observations	4348; Seasonal monitor operation from Jan 1- March 31 and Oct.1 – Dec. 31	
Number of exceedances in 2011	0	
Historical exceedances		
Sampling frequency/ season	Continuous	
Probe height	4.9 meters above the ground on a shelter in a city water well site.	
Probe material / Residence time	FEP Teflon / 2.7 seconds	
Surrounding landscape	Gravel in fenced compound, paved parking lot, streets	
Degrees of unrestricted air flow	360	
Location description	This site is located in a predominately residential neighborhood, approximately 0.8 km northwest of a high traffic count intersection. Directly south and west of the site is a private High School enrolling approximately 1200 students.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	n/a	
Distance from trees	8.7 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	0.8 kilometers north of Grant Road with a 2010 ADT of 43,000
	2	0.5 kilometers west of Campbell Avenue with a 2009 ADT of 41,000.
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

Comments: Cherry & Glenn was established as a special purpose site in February 1989, in order to assess the CO levels at a distance (less than 1 kilometer) from a typical high-volume intersection. This site has historically recorded very low levels of CO during the summer months. Consequently, in 2001, seasonal monitoring began with sampling from October through March.

CARBON MONOXIDE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

CHERRY & GLENN: AIRS # 040191021



Annual summary statistics: NAAQS: 35ppm 1-Hour Average, 9ppm 8- Hour Average

One – hour average concentrations	ppm	Date	Hour
Highest	1.8	12/24	2300
Second Highest	1.7	01/02	0000

Eight – hour average concentrations	ppm	Date	Hour
Highest	1.3	01/03	0300
Second Highest	1.2	01/01	0500

CARBON MONOXIDE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	CHILDREN'S PARK NCore	
AQS ID	040191028	
Address	400 W. River Road, Tucson, AZ	
Latitude/ Longitude	32.295150 / -110.982300	
Elevation	2286	
Method	054 / 554	
Number of monitors	1	
Type of monitor	Instrumental non-dispersive infrared	
Site type	Population Exposure	
Monitor type	Special Purpose	
Scale	Neighborhood	
Number of hourly observations	8666	
Number of exceedances in 2011	0	
Historical exceedances		
Sampling frequency/ season	Continuous	
Probe height	4.25 meters above the ground on a shelter in a city water well site	
Probe material / Residence time	FEP Teflon/ 3.1 seconds	
Surrounding landscape	Gravel in walled compound, dirt parking lot, dry river bed	
Degrees of unrestricted air flow	360	
Location description	This site is located at the confluence of the Rillito River and Pima Wash, a natural low spot in the local topography. Single - family residences and a popular county park with exercise trails extend to the north, northwest, and west, respectively. Heavy commercial usage dominates to the south and east, including large shopping malls and automobile dealerships.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	n/a	
Distance from trees	12.8 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	Arizona State Route 77 runs north - south 0.5 kilometers to the east, providing six lanes of heavily used arterial routing with a 2008 ADT of 43,000.
	2	River Road runs east – west 0.5 kilometers to the north, with a 2010 ADT of 38,000.
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

Comments: This site began monitoring for Carbon Monoxide in October, 1998.

CARBON MONOXIDE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

CHILDREN'S PARK NCore: AIRS # 040191028



Annual summary statistics: NAAQS: 35ppm 1-Hour Average, 9ppm 8- Hour Average

One – hour average concentrations	ppm	Date	Hour
Highest	1.1	12/07	0900
Second Highest	1.1	12/07	1000

Eight – hour average concentrations	ppm	Date	Hour
Highest	0.7	02/04	0400
Second Highest	0.6	01/02	0100

CARBON MONOXIDE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	GOLF LINKS & KOLB	
AQS ID	040191031	
Address	2601 South Kolb Road	
Latitude/ Longitude	32.191180 / -110.840550	
Elevation	2661	
Method	093/ 054	
Number of monitors	1	
Type of monitor	Instrumental non-dispersive infrared	
Site type	Highest Concentration	
Monitor type	Special Purpose	
Scale	Microscale	
Number of hourly observations	4333 ; Seasonal Monitor operating Jan. 1- March 31 and Oct. 1 – Dec. 31	
Number of exceedances in 2011	0	
Historical exceedances		
Sampling frequency/ season	Continuous	
Probe height	3.0 meters above the ground on a pole located next to Kolb road	
Probe material / Residence time	FEP Teflon / 34.9 seconds	
Surrounding landscape	Dirt lot and easement, paved street	
Degrees of unrestricted air flow	360	
Location description	This site is located near the southeast corner of Golf Links and Kolb roads in a City of Tucson water reservoir site. Light commercial enterprises occupy all four corners and separate the intersection from residential neighborhoods.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	36.3 meters	
Distance from trees	2.7 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	100 meters south of Golf Links, with a 2010 ADT of 40,000
	2	2 meters east of Kolb Road, with a 2009 ADT of 47,000.
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

Comments: Golf Links & Kolb was established as a special purpose site in September 2002, as part of the Carbon Monoxide Limited Maintenance Plan. Inlet placement qualifies it as a microscale site, and sighting it on the southeastern quarter of the intersection provides an opposite wind direction compliment to the 22/Alvernon site. This site is operated seasonally, from October through March.

CARBON MONOXIDE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

GOLF LINKS & KOLB: AIRS # 040191031



Annual summary statistics: NAAQS: 35ppm 1-Hour Average, 9ppm 8- Hour Average

One – hour average concentrations	ppm	Date	Hour
Highest	1.7	01/25	1800
Second Highest	1.6	01/05	1700

Eight – hour average concentrations	ppm	Date	Hour
Highest	1.1	01/05	2000
Second Highest	1.1	01/06	2000

OZONE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Ozone (O₃) is currently being monitored at seven locations in Tucson and one location in Green Valley. EPA has revised the minimum monitoring requirements for ozone. The design criteria for ozone monitoring is described in **40 CFR 58, app. D, Table D-2**.

**2011 O₃ Design Criteria
Table 13**

Population Pima County 2010 Census	MSA Tucson Population Category	Design Value Site	8- Hour Design Value (2009-2011)	O₃ Monitors # Required	O₃ Monitors # Operating
980,263	500,000 – 1,000,000	Saguaro Park 040190021	.070 ppm	Requires 2 SLAMS Monitors	3 SLAMS Monitors
				No Requirement for SP	5 SP Monitors

Violation History

On March 12, 2008, EPA strengthened the ground level ozone standard, effective May 27, 2008. The primary standard of 0.08 ppm has been lowered to 0.075 ppm, keeping the form of the standard as the three year average of the fourth –highest daily maximum eight hour average ozone concentration. The secondary standard is identical to the primary standard. While higher maximum one - hour and second high one - hour ozone values tend to be measured near the urban core, the more suburban and rural sites measure higher overall average ozone concentrations. In general the east side (Saguaro National Park East) is the area with the highest average ozone levels. The situation may be caused by the topography of the valley and the way air flows within it. The precursor pollutants are emitted, and in conjunction with sunlight and heat, will form ozone, which is typically transported by air currents to outlying areas.

Quality Assurance for Ozone

All data quality assessment requirements outlined in **40 CFR 58, app. A**, have been met in 2011. The requirements include precision checks every other week with a check gas range between 0.01 and 0.10 ppm with Pima County performing the precision check at 0.075 ppm, representing the highest level we are likely to achieve. The annual internal audits for accuracy are performed with four point check levels at zero, 0.035ppm, 0.065ppm, and 0.085ppm. Pima County maintains an ozone primary standard which is verified for accuracy by the California Air Resources Board in Sacramento. Pima County passed the two NPAP Ozone TTP Audits for Green Valley and Rose Elementary. All valid precision and accuracy tests are reported to the Air Quality System (AQS) database on a quarterly basis.

Table 14

Ozone Audit Dates 2011
Craycroft & 22 nd St. 06/20, 12/19
Children's Park 03/24, 09/19
Fairgrounds 06/17, 12/14
Tangerine 03/08, 09/08
Saguaro Park 06/17, 12/14
Coachline 03/08, 09/20
Rose Elementary 06/30, 12/15
Green Valley 06/27, 12/20
NPAP Ozone TTP Audit Dates 2011
Saguaro Park 5/18/2011

OZONE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	SAGUARO PARK EAST	
AQS ID	040190021	
Address	3905 South Old Spanish Trail, Tucson, AZ	
Latitude/ Longitude	32.174520 / -110.737160	
Elevation	3089	
Method	047	
Number of monitors	1	
Type of monitor	Instrumental ultra violet radiation absorption	
Site type	Highest Concentration	
Monitor type	SLAMS	
Scale	Neighborhood	
Number of hourly observations	8729	
Number of 8- hour average exceedances in 2011	3	
Sampling frequency/ season	Continuous	
Probe height	4.1 meters above the ground in Saguaro National Park East on the roof of a shelter that is one kilometer south of the administration building.	
Probe material / Residence time	FEP Teflon / 3.5 seconds	
Surrounding landscape	Natural desert	
Degrees of unrestricted air flow	360	
Location description	This site is situated in the National Park. The nearby light residential area has no significant local sources of ozone precursors.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	14.9 meters	
Distance from trees	8.0 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	80 meters east to Old Spanish Trail with a 2009 ADT of 7,000
	2	105 meters south of Escalante with a 2006 ADT of 4,000
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

Comments: The Saguaro National Park site has been active since 1982. The operation of the site was taken over by the National Park Service in 1987. The Park Service returned operation of the site to Pima County in 1993. Geographically, Saguaro National Park is on the eastern edge of the Tucson metropolitan area. Ozone data from this site has been used to study how the levels of ozone affect natural vegetation.

OZONE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

SAGUARO PARK EAST: AIRS # 040190021



Annual summary statistics: NAAQS: 0.075 ppm 4th highest 8- Hour Average

One – hour average concentrations	ppm	Date	Hour
Highest	.098	05/30	1600
Second Highest	.086	07/06	1500

Eight – hour average concentrations	ppm	Date	Hour (begin)
Highest	.080	05/30	1100
Second Highest	.078	07/06	1100
Third Highest	.078	07/08	1100
Fourth Highest	.075	06/21	1000

OZONE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	22ND STREET & CRAYCROFT	
AQS ID	040191011	
Address	1237 S. Beverly Avenue, Tucson, AZ.	
Latitude/ Longitude	32.204420 / -110878150	
Elevation	2582	
Method	087	
Number of monitors	1	
Type of monitor	Instrumental ultra violet radiation absorption	
Site type	Population Exposure	
Monitor type	SLAMS	
Scale	Neighborhood	
Number of hourly observations	8749	
Number of 8- hour average exceedances in 2011	1	
Sampling frequency/ season	Continuous	
Probe height	4.1 meters above the ground on the roof of a shelter located in a city water well site.	
Probe material / Residence time	FEP Teflon / 4.3 seconds	
Surrounding landscape	Dirt, ephemeral weeds	
Degrees of unrestricted air flow	360	
Location description	This site is situated in a predominately residential eastside area with commercial activity lining nearby arterial routes. There is a large covered water reservoir north of the location.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	n/a	
Distance from trees	22.0 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	260 meters west is Craycroft Road with 2010 ADT of 30,000
	2	260 meters north is 22 nd Street with a 2010 ADT of 46,000
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

Comments: This site is one of the oldest in the monitoring network, originally established in 1973, and operated continuously to the present.

OZONE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

22ND STREET & CRAYCROFT: AIRS # 040191011



Annual summary statistics: NAAQS: 0.075 ppm 4th highest 8- Hour Average

One – hour average concentrations	ppm	Date	Hour
Highest	.090	05/30	1600
Second Highest	.082	09/01	1500

Eight – hour average concentrations	ppm	Date	Hour (begin)
Highest	.077	05/30	1200
Second Highest	.072	09/01	1000
Third Highest	.071	07/08	1100
Fourth Highest	.070	05/25	0900

OZONE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	TANGERINE	
AQS ID	040191018	
Address	12101 N. Camino de Oeste, Tucson, AZ	
Latitude/ Longitude	32.425250 / -111.063500	
Elevation	2638	
Method	047	
Number of monitors	1	
Type of monitor	Instrumental ultra violet radiation absorption	
Site type	Highest Concentration	
Monitor type	Special Purpose	
Scale	Urban	
Number of hourly observations	8698	
Number of 8- hour average exceedances in 2011	0	
Sampling frequency/ season	Continuous	
Probe height	3.75 meters above the ground on a shelter on Tucson's far northwest side.	
Probe material / Residence time	FEP Teflon / 4.2 seconds	
Surrounding landscape	Dirt, sparse desert vegetation	
Degrees of unrestricted air flow	360	
Location description	This site has been situated in a relatively undisturbed natural desert area for most of it's existence, but residential developments in recent years have been built to within 2 kilometers to the north west, and low density residential developments are encroaching from the south, east and north to within 3 kilometers to 5 kilometers.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	n/a	
Distance from trees	8.3 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	Tangerine Road runs approximately east – west 70 meters south of the site with a 2010 ADT of 9,000
	2	
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

OZONE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

TANGERINE: AIRS # 040191018



Comments: Tangerine was established in November 1989. Ozone concentrations at this site have been the highest in the network on occasion. This may be due to the prevailing southeasterly winds transporting ozone from the urban area. Concentrations remain high well into the night and early morning.

Annual summary statistics: NAAQS: 0.075 ppm 4th highest 8- Hour Average

One – hour average concentrations	ppm	Date	Hour
Highest	.076	6/10	1500
Second Highest	.075	07/08	1400

Eight – hour average concentrations	ppm	Date	Hour (begin)
Highest	.070	06/10	1100
Second Highest	.070	07/06	1200
Third Highest	.070	0708	1100
Fourth Highest	.069	05/25	1000

OZONE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	FAIRGROUNDS	
AQS ID	040191020	
Address	11330 S. Houghton Road, Tucson, AZ	
Latitude/ Longitude	32.047650 / -110.774350	
Elevation	3078	
Method	047	
Number of monitors	1	
Type of monitor	Instrumental ultra violet radiation absorption	
Site type	General /Background	
Monitor type	Special Purpose	
Scale	Urban	
Number of hourly observations	8512	
Number of 8- hour average exceedances in 2011	1	
Sampling frequency/ season	Continuous	
Probe height	3.6 meters above the ground on a shelter on Tucson's far southeast side	
Probe material / Residence time	FEP Teflon / 3.5 seconds	
Surrounding landscape	Natural desert vegetation on lag gravel	
Degrees of unrestricted air flow	360	
Location description	This site is situated in an undisturbed natural desert area to the north and east. The Pima County Fairgrounds and drag strip are located directly southwest of the site.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	n/a	
Distance from trees	n/a	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	53 meters west of Houghton road with a 2010 ADT of 9,000
	2	
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

Comments: Fairgrounds was established in October 1989. Ozone concentrations at this site have been the highest in the network on occasion. This may be due to the afternoon wind shift that takes place almost daily in the Tucson basin. The wind may be transporting urban ozone precursors or stable ozone to the far east end of the Tucson air planning area.

OZONE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

FAIRGROUNDS: AIRS # 040191020



Annual summary statistics: NAAQS: 0.075 ppm 4th highest 8- Hour Average

One – hour average concentrations	ppm	Date	Hour
Highest	.085	05/30	1600
Second Highest	.084	08/24	1500

Eight – hour average concentrations	ppm	Date	Hour (begin)
Highest	.077	05/30	1200
Second Highest	.074	06/21	1100
Third Highest	.073	06/10	1100
Fourth Highest	.073	07/06	1100

OZONE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	CHILDREN'S PARK NCore	
AQS ID	040191028	
Address	400 W. River Road, Tucson, AZ	
Latitude/ Longitude	32.295150 / -110.982300	
Elevation	2286	
Method	047	
Number of monitors	1	
Type of monitor	Instrumental ultra violet radiation absorption	
Site type	Population Exposure	
Monitor type	NCore	
Scale	Neighborhood	
Number of hourly observations	8725	
Number of 8- hour average exceedances in 2011	0	
Sampling frequency/ season	Continuous	
Probe height	4.25 meters above the ground on a shelter located in a city water well site.	
Probe material / Residence time	FEP Teflon / 5.3 seconds	
Surrounding landscape	Gravel in walled compound, dirt parking lot, dry river bed	
Degrees of unrestricted air flow	360	
Location description	This site is located at the confluence of the Rillito River and Pima Wash, a natural low spot in the local topography. Single - family residences and a popular county park with exercise trails extend to the north, northwest, and west, respectively. Heavy commercial usage dominates to the south and east, including large shopping malls and automobile dealerships.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	n/a	
Distance from trees	16.4 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	Arizona State Route 77 runs north - south 0.5 kilometers to the east, providing six lanes of heavily used arterial routing with a 2008 ADT of 43,000.
	2	River Road runs east – west 0.5 kilometers to the north, with a 2010 ADT of 38,000.
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

OZONE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

CHILDREN'S PARK NCore: AIRS # 040191028



Comments: This site began August of 1997 and is a relocation (1.5 kilometers, northeast) of the Pomona site. This site is representative of a neighborhood scale in the north central region of the air planning area where ozone levels are generally expected to be high due to the low altitude and the prevailing southeasterly winds.

Annual summary statistics: NAAQS: 0.075 ppm 4th highest 8- Hour Average

One – hour average concentrations	ppm	Date	Hour
Highest	.082	05/30	1400
Second Highest	.076	06/10	1400

Eight – hour average concentrations	ppm	Date	Hour (begin)
Highest	.073	05/30	1100
Second Highest	.069	06/21	1100
Third Highest	.069	07/08	1100
Fourth Highest	.068	05/25	1000

OZONE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	ROSE ELEMENTARY	
AQS ID	040191032	
Address	710 W. Michigan, Tucson, AZ	
Latitude/ Longitude	32.172950 / -110.980050	
Elevation	2387	
Method	087	
Number of monitors	1	
Type of monitor	Instrumental ultra violet radiation absorption	
Site type	Population Exposure	
Monitor type	Special Purpose	
Scale	Neighborhood	
Number of hourly observations	8645	
Number of 8- hour average exceedances in 2011	0	
Sampling frequency/ season	Continuous	
Probe height	4.1 meters above the ground on the roof of a shelter located on the grounds of Rose Elementary School.	
Probe material / Residence time	FEP Teflon / 4.6 seconds	
Surrounding landscape	Grass playground	
Degrees of unrestricted air flow	360	
Location description	The site is located in a residential neighborhood with light commercial enterprises bordering to the east, and the Santa Cruz River, with several sand and gravel operations, parallels the interstate another half kilometer to the west.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	n/a	
Distance from trees	9.4 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	12 th Avenue to the east with a 2009 ADT of 22,000
	2	Ajo Way to the north with a 2010 ADT of 28, 000
	3	Interstate 19 runs north-south half a kilometer to the west with a 2008 ADT 76,000
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

Comments: This site was initially established in October of 2000 as part of the Environmental Monitoring for Public Access and Community Tracking (EMPACT) program. This area was identified as having higher than normal number of pediatric asthma cases. Pima County began reporting the ozone data to EPA July, 2003.

OZONE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

ROSE ELEMENTARY: AIRS # 040191032



Annual summary statistics: NAAQS: 0.075 ppm 4th highest 8- Hour Average

One – hour average concentrations	ppm	Date	Hour
Highest	.078	05/30	1500
Second Highest	.075	05/04	1400

Eight – hour average concentrations	ppm	Date	Hour (begin)
Highest	.073	05/30	1200
Second Highest	.068	07/06	1100
Third Highest	.066	05/05	1000
Fourth Highest	.066	05/25	1000

OZONE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	COACHLINE	
AQS ID	040191034	
Address	9597 N. Coachline Blvd. Tucson, AZ	
Latitude/ Longitude	32.380820 / -111.127160	
Elevation	2228	
Method	087	
Number of monitors	1	
Type of monitor	Instrumental ultra violet radiation absorption	
Site type	Population Exposure	
Monitor type	Special Purpose	
Scale	Neighborhood	
Number of hourly observations	8699	
Number of 8- hour average exceedances in 2011	0	
Sampling frequency/ season	Continuous	
Probe height	3.1 meters above the ground on a shelter on Tucson's far northwest side	
Probe material / Residence time	FEP Teflon / 4.6 seconds	
Surrounding landscape	Dirt within walled compound, residential neighborhood	
Degrees of unrestricted air flow	270	
Location description	The site is situated in a residential neighborhood.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	10.73 meters	
Distance from trees	4.5 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	approximately 1.25 kilometers west of Interstate 10 with a 2008 ADT of 72,000
	2	.5 kilometer north of Silverbell Road 2010 ADT of 26,000
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

Comments: This site was initially established in April of 2001 as part of the Environmental Monitoring for Public Access and Community Tracking (EMPACT) program. This area was identified as having higher than normal number of pediatric asthma cases. Pima County began reporting the ozone data to EPA July, 2003.

OZONE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

COACHLINE: AIRS # 040191034



Annual summary statistics: NAAQS: 0.075 ppm 4th highest 8- Hour Average

One – hour average concentrations	ppm	Date	Hour
Highest	.072	05/25	1300
Second Highest	.072	05/30	1300

Eight – hour average concentrations	ppm	Date	Hour (begin)
Highest	.069	05/30	1100
Second Highest	.067	05/25	1000
Third Highest	.066	06/10	1100
Fourth Highest	.065	04/12	1100

OZONE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	GREEN VALLEY	
AQS ID	040191030	
Address	601 N. La Canada Drive	
Latitude/ Longitude	31.87952 / -110.996440	
Elevation	2638	
Method	047	
Number of monitors	1	
Type of monitor	Instrumental ultra violet radiation absorption	
Site type	Population Exposure	
Monitor type	Special Purpose	
Scale	Neighborhood	
Number of hourly observations	8690	
Number of 8- hour average exceedances in 2011	0	
Sampling frequency/ season	Continuous	
Probe height	3.1 meters above the ground on a shelter	
Probe material / Residence time	FEP Teflon / 3.5 seconds	
Surrounding landscape	Dirt, sparse desert vegetation	
Degrees of unrestricted air flow	360	
Location description	This site is situated in a residential / commercial area. Open pit copper mines and tailings ponds are located four kilometers to the west of the community.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	n/a	
Distance from trees	8.0 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	100 meters west of La Canada /2010 ADT of 11,000
	2	0.5 kilometers west of Interstate 19 /2008 ADT of 31,000
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

Comments: This site is fifty kilometers south of Downtown Tucson in the retirement community of Green Valley. This site was initially established in April of 2002 as part of the Environmental Monitoring for Public Access and Community Tracking (EMPACT) program. Pima County began reporting the ozone data to EPA July, 2003.

OZONE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

GREEN VALLEY: AIRS # 040191030



Annual summary statistics: NAAQS: 0.075 ppm 4th highest 8- Hour Average

One – hour average concentrations	ppm	Date	Hour
Highest	.079	06/10	1800
Second Highest	.076	05/25	1500

Eight – hour average concentrations	ppm	Date	Hour (begin)
Highest	.073	06/10	1100
Second Highest	.072	07/06	1200
Third Highest	.071	05/24	1000
Fourth Highest	.071	05/25	0800

NITROGEN DIOXIDE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Nitrogen dioxide (NO₂) is currently measured at two locations in Tucson. The Environmental Protection Agency has revised the NO₂ requirements. **40 CFR 58, app. D, 4.3**, design criteria states that there are no minimum requirements for the number of NO₂ monitoring sites. Please see **Appendix A** for Pima County's plan for near-road monitoring.

**2011 NO₂ Design Criteria
Table 15**

Population Pima County 2010 Census	MSA Tucson Population Category	Annual Design Value	1- Hour 98th Percentile Design Value	# of Required NO₂ Monitors	# of NO₂ Monitors
980,263	500,000 – 1,000,000	12.06 ppb	46 ppb	No Requirement	1 SLAMS Monitor
				No Requirement	1 SP Monitor

Historical Nitrogen Dioxide Monitoring

Nitrogen dioxide levels remain well within federal standards. The Craycroft and 22nd St. monitor has been operational since 1973, measuring typical neighborhood NO₂ concentrations. Much of the data has been used in studies measuring the effects of NO₂ as a precursor to ozone formation.

A NO_x analyzer was operating at the Pomona site from 1988 until 1996, when the site was closed. The re-establishment of the site at the Children's Park location in May, 1998, allows for monitoring on the north side of Tucson and in the lower valley area.

A NO_x analyzer was operating at the Downtown site until early 1989. From 1995 to December 2001, NO_x monitoring was conducted at Saguaro National Park East to establish baseline conditions in a Class I Wilderness Area.

Quality Assurance for NO₂

All data quality assessment requirements outlined in **40 CFR 58, app. A**, have been met for 2011. The requirements include precision checks every other week with a check gas range between 0.08 and 0.10 ppm and annual internal audits for accuracy with three point check levels between 0.008 - 0.019 ppm, 0.02 – 0.049 ppm and 0.05 – 0.099 ppm . All valid precision and accuracy tests are reported to the Air Quality System (AQS) database on a quarterly basis. 2011 precision and accuracy tests will be reported in ppb.

Table 16

Nitrogen Dioxide Audit Dates 2011
Craycroft & 22 nd St. 06/20, 12/19
Children's Park 03/25, 09/19
Nitrogen Dioxide TTP Audit Dates 2011
None

NITROGEN DIOXIDE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	22ND STREET & CRAYCROFT	
AQS ID	040191011	
Address	1237 S. Beverly Avenue, Tucson, AZ.	
Latitude/ Longitude	32.204420 / -110878150	
Elevation	2582	
Method	074	
Number of monitors	1	
Type of monitor	Instrumental chemiluminescence	
Site type	Population Exposure	
Monitor type	SLAMS	
Scale	Neighborhood	
Number of hourly observations	8659	
Annual arithmetic mean	12. 06 ppb	
Number of exceedances in 2011	0	
Sampling frequency/ season	Continuous	
Probe height	4.1 meters above the ground on the roof of a shelter located in a city water well site	
Probe material / Residence time	FEP Teflon / 4.4 seconds	
Surrounding landscape	Dirt, ephemeral weeds	
Degrees of unrestricted air flow	360	
Location description	This site is situated in a predominately residential eastside area with commercial activity lining nearby arterial routes. There is a large covered water reservoir north of the location.	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	n/a	
Distance from trees	22.0 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	260 meters west is Craycroft Road with 2010 ADT of 30,000
	2	260 meters north is 22 nd Street with a 2010 ADT of 46,000
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

Comments: This site is one of the oldest in the monitoring network, originally established in 1973, and operated continuously to the present.

NITROGEN DIOXIDE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

22ND STREET & CRAYCROFT: AIRS # 040191011



Annual summary statistics: NAAQS: 100 ppb 1- Hour Average (98th percentile of the 1-hour concentrations averaged over three years); 53 ppb Annual Average

1 – Hour Average Concentrations	ppb	Date	Hour	1–Hour 98 th Percentile	Annual Mean
Highest	50.5	10/21	1900	47.0	12.06
Second Highest	50.2	11/30	1800		

NITROGEN DIOXIDE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	CHILDREN'S PARK NCore	
AQS ID	040191028	
Address	400 W. River Road, Tucson, AZ	
Latitude/ Longitude	32.295150 / -110.982300	
Elevation	2286	
Method	099	
Number of monitors	1	
Type of monitor	Instrumental chemiluminescence	
Site type	Highest Concentration	
Monitor type	Special Purpose / Proposed NCore	
Scale	neighborhood	
Number of hourly observations	8545	
Annual arithmetic mean	11.67 ppb	
Number of exceedances in 2011	0	
Sampling frequency/ season	Continuous	
Probe height	4.25 meters above the ground on a shelter located in a city water well site	
Probe material / Residence time	FEP Teflon / 5.1 seconds	
Surrounding landscape	Gravel in walled compound, dirt parking lot, dry river bed	
Degrees of unrestricted air flow	360	
Location description	This site is located at the confluence of the Rillito River and Pima Wash, a natural low spot in the local topography. Single - family residences and a popular county park with exercise trails extend to the north, northwest, and west, respectively. Heavy commercial usage dominates to the south and east, including large shopping malls and automobile dealerships	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	n/a	
Distance from trees	12.8 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	Arizona State Route 77 runs north - south 0.5 kilometers to the east, providing six lanes of heavily used arterial routing with a 2008 ADT of 43,000.
	2	River Road runs east – west 0.5 kilometers to the north, with a 2010 ADT of 38,000.
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

NITROGEN DIOXIDE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

CHILDREN'S PARK NCore: AIRS # 040191028



Comments: The site began monitoring for Nitrogen Dioxide in May, 1998, and is a relocation (1.5 kilometers, northeast) of the Pomona site.

Annual summary statistics: NAAQS: 100 ppb 1- Hour Average (98th percentile of the 1-hour concentrations averaged over three years); 53 ppb Annual Average

1 – Hour Average Concentrations	ppb	Date	Hour	1–Hour 98 th Percentile	Annual Mean
Highest	46.1	10/14	2000	42.2	11.67
Second Highest	45.6	10/13	2000		

REACTIVE OXIDES OF NITROGEN (NO_x) MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	CHILDREN'S PARK NCore	
AQS ID	040191028	
Address	400 W. River Road, Tucson, AZ	
Latitude/ Longitude	32.295150 / -110.982300	
Elevation	2286	
Method	574	
Number of monitors	1	
Type of monitor	Instrumental Chemiluminescence	
Site type	Population Exposure	
Monitor type	Special Purpose / Proposed NCore	
Scale	neighborhood	
Number of hourly observations	8601	
Annual arithmetic mean	15.7	
Sampling frequency/ season	Continuous	
Probe height	10.0 meters above the ground on a shelter located in a city water well site	
Probe material / Residence time	FEP Teflon / <3.0 seconds	
Surrounding landscape	Gravel in walled compound, dirt parking lot, dry river bed	
Degrees of unrestricted air flow	360	
Location description	This site is located at the confluence of the Rillito River and Pima Wash, a natural low spot in the local topography. Single - family residences and a popular county park with exercise trails extend to the north, northwest, and west, respectively. Heavy commercial usage dominates to the south and east, including large shopping malls and automobile dealerships	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	n/a	
Distance from trees	12.8 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	Arizona State Route 77 runs north - south 0.5 kilometers to the east, providing six lanes of heavily used arterial routing with a 2008 ADT of 43,000.
	2	River Road runs east – west 0.5 kilometers to the north, with a 2010 ADT of 38,000.
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

REACTIVE OXIDES OF NITROGEN (NO_y) MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

CHILDREN'S PARK NCore: AIRS # 040191028



Comments: The site began monitoring for reactive oxides of nitrogen in October, 2010 for the NCore site requirements, using a Thermo 42i-y instrument with remote converter mounted at the requisite 10 meters (see photo, mast left).

Annual summary statistics:

1 – Hour Average Concentrations	ppb	Date	Hour	Annual Mean
Highest	156.2	12/07	0800	15.7
Second Highest	129.3	12/07	0900	

SULFUR DIOXIDE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Sulfur Dioxide (SO₂) is currently monitored at one location in Pima County. On October 1, 2010, an SO₂ trace monitor was added at the Children’s Park NCore location as required for an NCore site. The SO₂ monitor at the 22nd and Craycroft was discontinued on December 31, 2010.

The Environmental Protection Agency has revised the SO₂ requirements. The design criteria indicated in **40 CFR 58, app. D, 4.4**, states that there are no minimum requirements for the number of SO₂ monitoring sites.

**2011 SO₂ Design Criteria
Table 17**

Population Pima County 2010 Census	MSA Tucson Population Category	Total SO₂ [tons/year] Based on 2008 NEI	Population Weighted Emissions Index [million persons- tons per year]	1- Hour Design Value	# of Required SO₂ Monitors	# of SO₂ Monitors
980,263	500,000 – 1,000,000	4850	4754	4.0 ppb*	No Requirement	1 proposed NCore

* The design value is based on a limited number of samples. Sampling began 10/1/2010.

Historical Sulfur Dioxide Monitoring

Ambient concentrations of sulfur dioxide (SO₂) in Tucson have historically remained well below all federal standards, and in recent years have been extremely low. With new trace SO₂ monitoring we can now get more accurate readings at very low levels. The only major stationary sources of SO₂ possibly affecting ambient concentrations in the Tucson air planning area are the coal burning generators at the Irvington Road power plant operated by Tucson Electric Power.

Quality Assurance for SO₂

All data quality assessment requirements outlined in **40 CFR 58, app. A**, have been met for 2011. The requirements include precision checks every other week with a check gas range between 0.08 and 0.10 ppm and annual internal audits for accuracy with three point check levels between 0.008 - 0.019 ppm, 0.02 – 0.049 ppm and 0.05 – 0.099ppm . All valid precision and accuracy tests are reported to the Air Quality System (AQS) database on a quarterly basis.

Table 18

Sulfure Dioxide Audit Dates 2011
Children’s Park NCore 03/25, 09/19
Sulfure Dioxide TTP Audit Dates 2011
None

SULFUR DIOXIDE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Site Name	CHILDREN PARK NCore	
AQS ID	040191028	
Address	400 W. River Road, Tucson, AZ	
Latitude/ Longitude	32.295150 / -110.982300	
Elevation	2286	
Method	560	
Number of monitors	1	
Type of monitor	Instrumental Pulsed Fluorescent	
Site type	Population Exposure	
Monitor type	Proposed NCore	
Scale	Neighborhood	
Number of hourly observations	8542	
Annual arithmetic mean	0.28 ppb	
Number /dates of 24-hour standard exceedances in 2011	0	
Sampling frequency/ season	Continuous	
Probe height	4.25 meters above the ground on a shelter located in a city water well site	
Probe material / Residence time	FEP Teflon / 5.1 seconds	
Surrounding landscape	Gravel in walled compound, dirt parking lot, dry river bed	
Degrees of unrestricted air flow	360	
Location description	This site is located at the confluence of the Rillito River and Pima Wash, a natural low spot in the local topography. Single - family residences and a popular county park with exercise trails extend to the north, northwest, and west, respectively. Heavy commercial usage dominates to the south and east, including large shopping malls and automobile dealerships	
Distance from supporting structure	n/a	
Distance from obstruction on roof	n/a	
Distance from obstruction not on roof	n/a	
Distance from trees	12.8 meters	
Distance to furnace or incinerator flue	n/a	
Distance between collocated monitors/ collocated monitor type	n/a	
Nearest roads distance & direction to monitor /ADT	1	Arizona State Route 77 runs north - south 0.5 kilometers to the east, providing six lanes of heavily used arterial routing with a 2008 ADT of 43,000.
	2	River Road runs east – west 0.5 kilometers to the north, with a 2010 ADT of 38,000.
Site meets 40 CFR 58, Appx. A,C,D,E	Yes	

SULFUR DIOXIDE MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

CHILDREN'S PARK NCore: AIRS # 040191028



Annual summary statistics: NAAQS: 75 ppb 1- Hour Average (99th percentile of the 1- hour daily maximum concentrations, averaged over 3 years)

1 – Hour Average Concentrations	ppb	Date	Hour	1- Hour 99 th Percentile
Highest	12.4	06/10	0800	5.9 ppb
Second Highest	7.8	06/21	0800	

LEAD MONITORING NETWORK

2011 Ambient Air Monitoring Network Plan

Lead sampling and analysis was discontinued at the end of March, 1997, in Pima County. The Environmental Protection Agency regulations allowing for the cessation of ambient lead monitoring in most areas of the country, except in areas with stationary sources of lead. Most urban areas have seen a dramatic decrease in ambient lead levels since the phase out and ban of lead in gasoline.

On October 15, 2008 EPA strengthened the lead standard. Research and technology has shown that adverse health effects occur at much lower levels of lead in blood than previously thought. Children are particularly vulnerable to the effects of lead. The primary standard of 1.5 ug/m³ has been lowered to 0.15ug/m³, measured as total suspended particles (TSP). The secondary standard is identical to the primary standard. According to the 2005 National Air Emissions Inventory (NEI) from EPA, Pima County has no sources of lead of one ton or more. This means that Pima County will be required to perform area monitoring only, which will be done at the Children’s Park NCore location. Monitoring and reporting is anticipated to commence in January, 2012.

Table 19

NCore Site	MSA Tucson Population Category	Population Pima County 2010 Census	# Required Monitors	# Monitors Anticipated	# Additional Monitors Needed
Children’s Park 040191028	500,000 – 1,000,000	980,263	1	1 –primary 1- colocated	0

Historical Lead Monitoring

Lead concentrations are extremely low in Tucson. Lead monitoring began in Pima County in 1975 at eight TSP sampling locations. In August, 1978, lead analyses were discontinued at all but two sites. Magnetic Observatory (University of Arizona) and Prince Road were selected to represent a neighborhood site and roadway site, respectively. Lead sampling was started at a third site (Broadway & Swan) in January 1983.

Lead analysis at Magnetic Observatory was discontinued in 1983 due to lack of detectable levels of lead. A TSP sampler was installed at South Tucson in 1991 for purposes of lead analysis. This site, along with the other two remaining sites, (Prince Road and Broadway & Swan) adequately fulfilled the siting criteria for measuring potential highest urban concentrations of lead in the particulate monitoring network.

In March of 1992 the Broadway & Swan lead analysis was discontinued and the TSP samplers from the South Tucson and the Magnetic Observatory sites were moved to the 22nd & Craycroft site. 22nd & Craycroft and Prince Road sites remained until March of 1997.

2011 Ambient Air Monitoring Network Plan

Appendix A

Pima County Ambient Air Monitoring Work Plan For Near-Road Nitrogen Dioxide Monitoring Station

Pima County Department of Environmental Quality
33 N. Stone Ave., Suite 700
Tucson, Arizona 85701

On February 9, 2010, new minimum monitoring requirements for the nitrogen dioxide (NO₂) monitoring network were promulgated (75 FR 6474) in support of a revised National Ambient Air Quality Standard (NAAQS) for NO₂. The NO₂ NAAQS was revised to include a 1-hour standard with a 98th percentile form and a level of 100 ppb, reflecting the maximum allowable NO₂ concentration anywhere in an area, while retaining the annual standard of 53 ppb. In the latest NO₂ Risk and Exposure Assessment created during the NAAQS revision process, and as reiterated in the preambles to the Notice of Proposed Rulemaking (NPR for NO₂) (74 FR 34404) and the Notice of Final Rulemaking (NFR for NO₂) (75 FR 6474) on the Primary NAAQS for NO₂, the EPA recognized that roadway-associated exposures account for a majority of ambient exposures to peak NO₂ concentrations.

In the NPR, the EPA states that the populations included in that assessment were people who live, work, play, or go to school near major roads, as well as those people who spend time commuting on major roads (74 FR 34419).

Requirements for near-road monitors are based upon population levels and a specific traffic metric within Core Based Statistical Areas (CBSAs). State and local ambient air monitoring agencies are required (per 40 CFR Part 58 Appendix D, Section 4.3.2.a) to use the latest available census figures (e.g., census counts and/or estimates) and available traffic data in assessing what may be required of them under this new rule. Further, state and local air agencies are required to consider traffic volumes, fleet mix, roadway design, traffic congestion patterns, local terrain or topography, and meteorology in determining where a required near-road NO₂ monitor should be placed.

The required near-road NO₂ monitoring network is to be implemented and operational by January 1, 2014. State and local ambient air monitoring agencies are required to submit their plans for any required near-road NO₂ monitoring stations in their annual monitoring network plans due July 1, 2012.

With a population in the Pima County CBSA greater than 500,000, but less than 2,500,000, and no roadway segments carrying traffic volumes of 250,000 or more vehicles (as measured by annual average daily traffic [AADT] counts), Pima County meets the criteria for operating one near-road NO₂ station. Implementation is divided into three phases, with Phase One originally set to be operational by January 1, 2013, but due to logistical difficulties, this date has been pushed to 2014. Pima County is not included in Phase One, and therefore, is only required to submit plans for a station installation at some point in the future, when funding becomes available, and if Phases Two and Three reach implementation in 2015 and 2017, respectfully.

To arrive at an appropriate combination of the aforementioned physical considerations, and population representation, site selection in Pima County defaults to locations along Interstates 10 and 19, both controlled access roads representing the highest traffic volumes available in the CBSA, and becomes a process more of where *can* a station be installed, and not so much where a station *should* be installed. For a variety of logistical reasons, those locations meeting most of the physical considerations and representing very nearby populations, are simply not achievable. Therefore, site selection evolved to those roadway segments where a station would both successfully fulfill the requirements, and be logistically possible.

Pima County DEQ Air Monitoring and Analysis staff examined available traffic data, satellite imagery, meteorology, local topography and roadway design, and located several candidate

locations. Two of those locations are presented here. All aerial photographs are oriented with north at the top of the photo.

The first location represents the highest probable NO₂ concentrations likely to occur within the Pima County CBSA. This location is near Interstate 10 and Sweetwater Drive, and places the probe within 50 meters of the inside traffic lane. There is no grade separation between the traffic lanes and probe, and there is no sound barrier or safety barrier between opposing traffic lanes. Both sides of the roadway have two-lane frontage roads, and the westbound lanes have an on-ramp merge lane. Traffic volume is listed at 153,000 AADT. Fleet mix data indicates that 3.1% of traffic volume is heavy truck, 2.2% is non-articulated truck, for a combined T Factor of 5.3% heavy-duty vehicles (Arizona DOT, 2010). Not shown in the photo are the Southern Pacific railroad tracks, which run parallel to the interstate, on the side opposite the shelter location. In the aerial photo below, the red square represents the shelter location, the red line represents the distance between probe and inside traffic lane, and the blue line represents probe to shelter distance. The trees between the frontage road and main roadway are typical of manicured desert vegetation and do not pose significant blockage to air flow, maintaining a relatively open fetch. Similarly, the white-roofed structures are chain-link enclosures with shade covers.



Location 1

The photo below shows the first potential location (within the red box) in an area-wide aerial photo, with low-income housing throughout most of the photo, to the northeast of the interstate.



Location 1

The second location is also along Interstate 10 on the opposite side of the city of Tucson, between Kino Parkway and Country Club Road. The probe would be within 50 meters of the inside traffic lane. There is approximately three meters of grade separation between the traffic lanes and probe location, which would be negated by probe height, and there is no sound barrier or safety barrier between opposing traffic lanes. There is no frontage road, or on /off ramps at this location. Traffic volume is listed at 57,500 AADT. Fleet mix data indicates that 3.1% of traffic volume is heavy truck, 2.2% is non-articulated truck, for a combined T Factor of 5.3% (Arizona DOT, 2010). In the aerial photo below, the red square represents the shelter location and the red line represents the distance between probe and inside traffic lane. There are some scraggly bushes and a shallow drainage channel between the shelter location and the traffic lanes, but neither is of sufficient significance to compromise an open fetch.



Location 2

The photo below shows the second potential location (within the red box) in an area-wide aerial photo, with Tucson Electric Park ball fields directly to the northwest.



Location 2

There are road segments along Interstate 10 with higher traffic counts, but these segments are all significantly fill elevated, with multi-lane frontage roads on both sides of the Interstate, and commercial enterprises along the frontage roads. Fleet mix is the same on all of Interstate 10 through Tucson, so that is not a factor in the deliberation process. Establishing a monitoring station on these higher-traffic count segments would be inappropriate due to the elevated roadway, safety barriers, sound walls and probe distance from traffic lanes.

Traffic counts on Interstate 19 on road segments near the I-10 / I-19 interchange are similar to Interstate 10 at the second location, as is fleet mix. Because of this, and increased difficulty with the logistics of station installation, Interstate 19 was not included in the final site selection process beyond identifying the aforementioned similarities to the second location on I-10.

In conclusion, Pima County DEQ Air Monitoring and Analysis staff is confident that either of the two locations identified in this Appendix would satisfy the requirements for near-road NO₂ monitoring, and both would be logistically possible. Both locations are on property owned by Pima County, which would minimize inter-agency involvement and complication. Power and communications are easily available, and it may be possible to improve probe to roadway distance at either location.