2014 Ambient Air Monitoring
Five Year Network Assessment & Plan

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AQ 388

2014 Ambient Air Monitoring
Five Year Network Assessment & Plan

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I. INTRODUCTION

This document constitutes the 2014 Ambient Air Monitoring 5 Year Network Assessment and 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 5Year Network Assessment and 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 monitored and reported by PDEQ are carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead (pb) and particulate matter with an aerodynamic diameter of 10 micrometers or less in size (PM_{10}) 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 2014 calendar year and provides a site by site assessment of the monitoring network with respect to EPA site criteria.

The 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 fraction ($PM_{10-2.5}$), speciated $PM_{2.5}$ particulate matter and lead.

Pima County does not share monitoring responsibilities with Arizona Department of Environmental Quality at this time.

Schedule of EPA's review of criteria pollutants:

December, 2014 – EPA chooses to retain current Lead standard
November, 2014 – EPA proposes strengthening Ozone standard
April, 2014 – EPA proposes options to asses Sulfur Dioxide

PDEQ made the following network modifications in 2014:

Installed a Met One Super SASS sequential speciation sampler and an upgraded URG carbon sampler at the Children's Park NCore station, to more easily operate the samplers on a 1in 3 day schedule

Closed the Prince Road PM_{10} microscale monitoring station for logistical reasons, namely due to an extended period without electricity to operate the sampler, and exceedingly unsanitary conditions caused by a pigeon infestation. A letter requesting approval of this closure has been sent to EPA, too late for inclusion in this report, and we are awaiting EPA's response.

PDEQ's anticipated network modifications in 2015:

Continue impact analysis of development near the Tangerine ozone and PM_{10} monitoring station, and if necessary change the station spatial scale and site type to correspond with changes to area development.

Begin preliminary site analysis and selection for the NO_2 near roadway monitoring station.

Install R & P 2000 at Santa Clara to meet designation collocate requirements.

Based on the findings from the Technical System Audit in 2014, Pima County will be requesting the classification change of Special Purpose monitors to SLAMS for the monitors listed below.
Carbon Monoxide: Children's Park NCore, Cherry & Glenn and Golf Links & Kolb
Nitrogen Dioxide: Children's Park NCore
Ozone: Green Valley, Tangerine, Rose Elementary, Coachline and Fairgrounds
PM_{10} : Geronimo, Santa Clara, Green Valley and Tangerine

Based on the findings from the Technical System Audit in 2014, Pima County will be requesting the classification change of Special Purpose monitors to OTHER for the monitors listed below.
$PM_{2.5}$: Geronimo, GreenValley, Rose Elementary, Coachline

General comment regarding monitoring station siting criteria:

The locations of monitoring stations in the PDEQ network require considerable planning to conform to all of the siting requirements specified in 40 CFR 58 Appendix E. Locations are chosen only after carefully considering the intent and installation logistics of each station. Some stations remain static, and easily maintain all siting criteria, and others fall victim to urban evolution and nature. Development happens and trees grow, modifying the original circumstances. Development can change those circumstances to the point that relocation or designation change of a station is required. Tree growth is more forgivable in that it can be modified by removal or trimming, but sometimes this is not possible for a number of reasons. Going to the effort of relocating a station because of tree growth is not generally practical. Modifying the station information to categorize trees as an obstruction is preferable, as long as siting criteria still meets the minimum requirements for obstructions. Most of the trees near PDEQ monitoring stations are typical of Sonoran Desert indigenous species, namely mesquite and palo verde, both of which have small, relatively sparse leaves, and in most cases do not totally block airflow, or provide large surfaces for particulate

deposition. However, PDEQ has several stations that have been compromised by substantial tree growth, and in each section for those stations, the category for degrees of unrestricted airflow will reflect the reality of tree growth at those stations, and the obstructed airflow will be identified by direction in degrees.

II. BACKGROUND

Pima County Air Quality Control District met all the National Ambient Air Quality Standards (NAAQS) in 2014. Concentrations of the criteria pollutants have been stable over the past few years with ozone and particulate matter (PM_{10}) being the major concern for Pima County. Ozone has been very close to the standard, often within 95% of the standard. Particulate Matter (PM_{10}) levels are elevated during drought conditions and high winds which have caused exceedances of the NAAQS. There was one day that Pima County DEQ monitors exceeded the PM_{10} standard in 2014.

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. The Pima County MSA has incurred a population increase of approximately 2.5% since the 2010 census, based on 2014 estimates by the US Census Bureau. **Figure 2** on page 10 depicts the areas of population increase between 2010 and 2015, as well as the two previous consecutive ten year periods.

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.

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.

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 air pollution data to the general public in a timely matter;
- 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

Figure 1

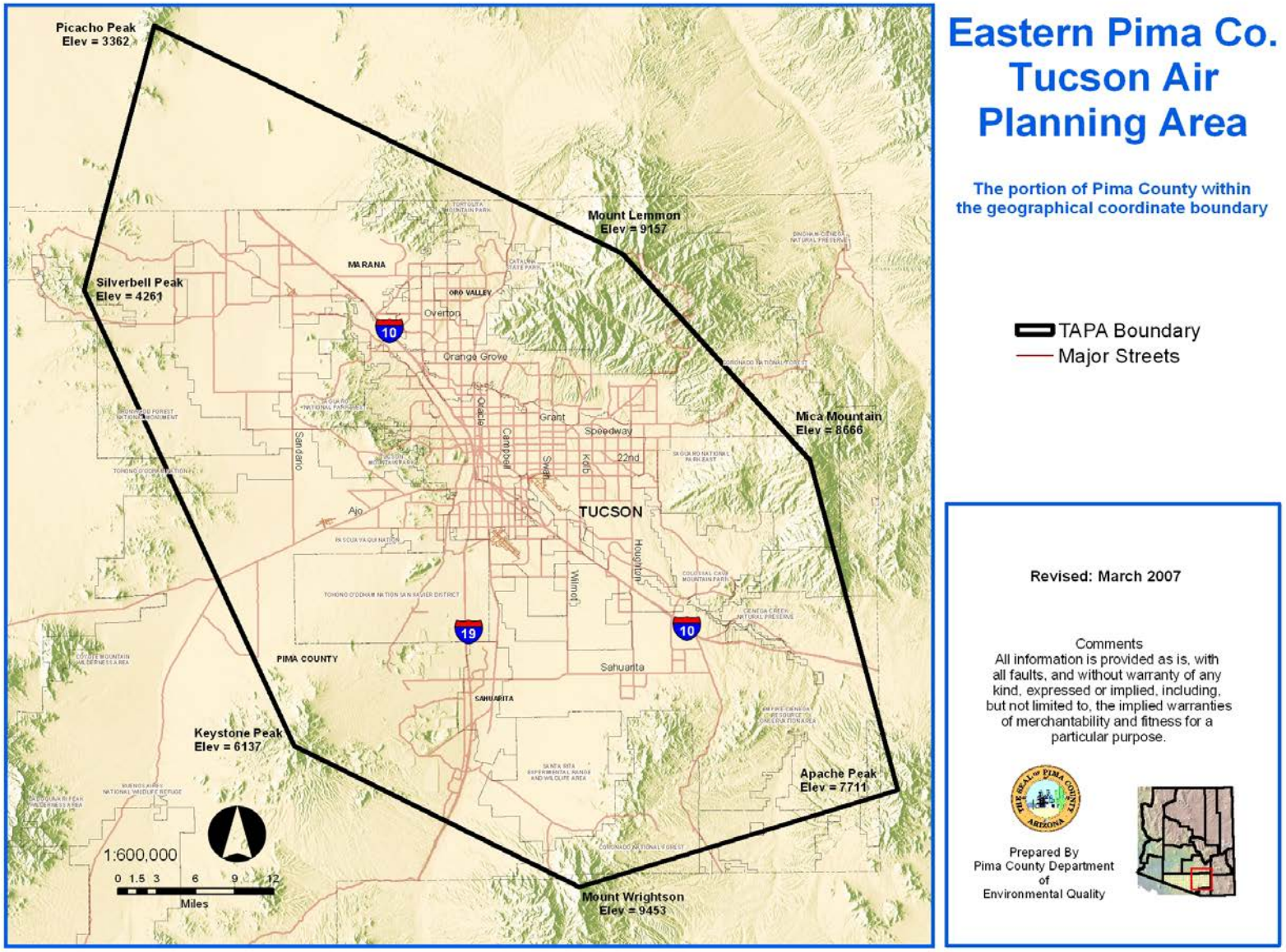
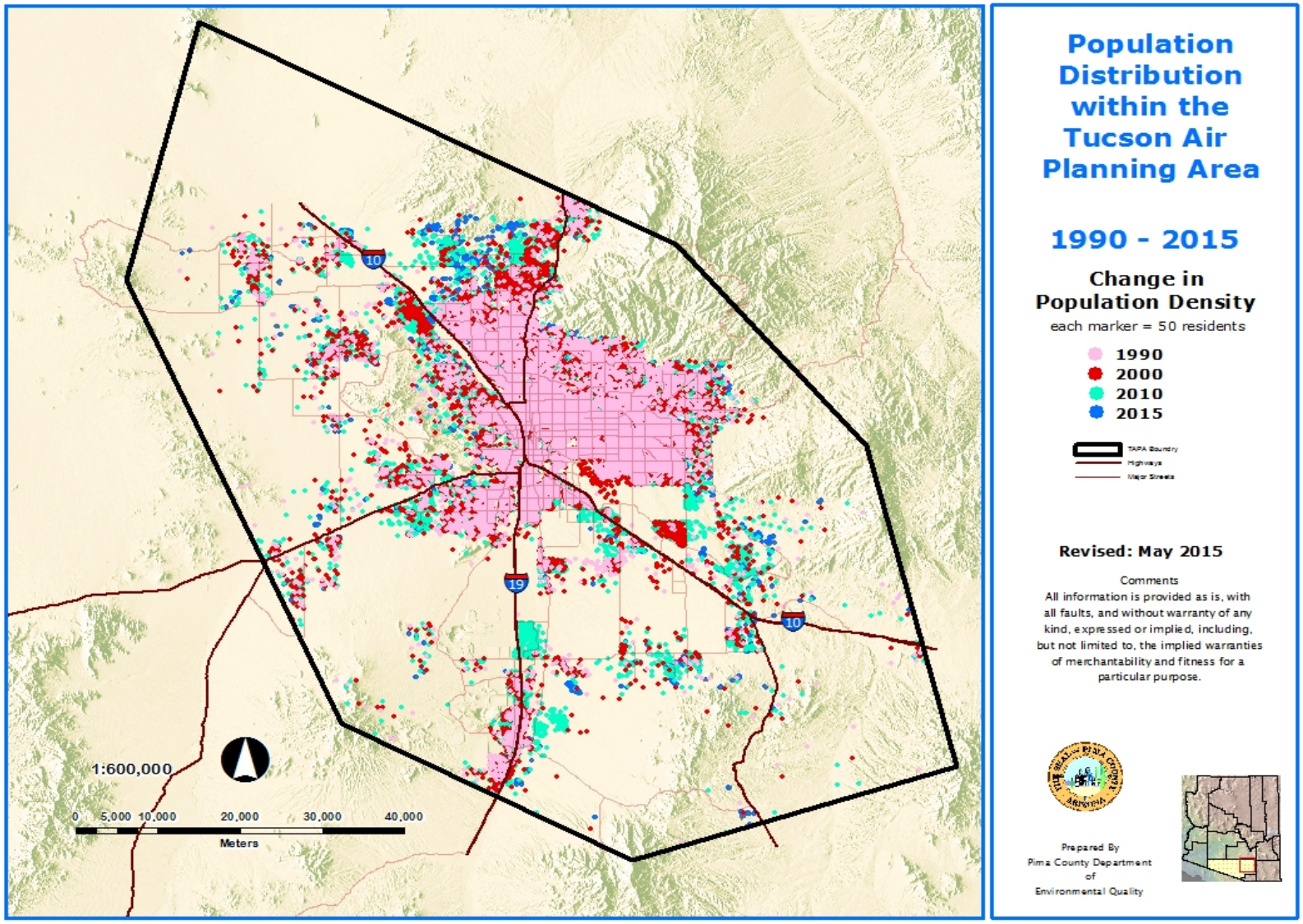

Picacho Peak
Elev = 3362
Mount Lemmon
Elev = 9157
Silverbell Peak
Elev = 4261
MARANA
ORO VALLEY
Overton
Orange Grove
Mica Mountain
Elev = 8666
Grant
Speedway
22nd
Sandario
Oracle
Campbell
Swan
Kolb
TUCSON
Ajo
Houghton
Wilmot
PIMA COUNTY
Sahuarita
SAHUARITA
Keystone Peak
Elev = 6137
Apache Peak
Elev = 7711
Mount Wrightson
Elev = 9453
1:600,000
0 1.5 3 6 9 12
Miles
Eastern Pima Co.
Tucson Air
Planning Area
The portion of Pima County within
the geographical coordinate boundary
TAPA Boundary
Major Streets
Revised: March 2007
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
TAPA 2007

Figure 2


Population Distribution within the Tucson Air Planning Area
1990 - 2015
Change in Population Density
each marker = 50 residents
1990
2000
2010
2015
TAPA Boundry
Highways
Major Streets
Revised: May 2015
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
1:600,000
0 5,000 10,000 20,000 30,000 40,000
Meters
10
19
10

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

Active Particulate and Lead Monitoring Sites for 2014

Table 2

Map #	Pollutant			Address	Site Name
4	PM_{10}	$PM_{2.5}$		2498 N. Geronimo	Geronimo
5	PM_{10}			1601 S. 6th 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		$PM_{2.5}$	Pb	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

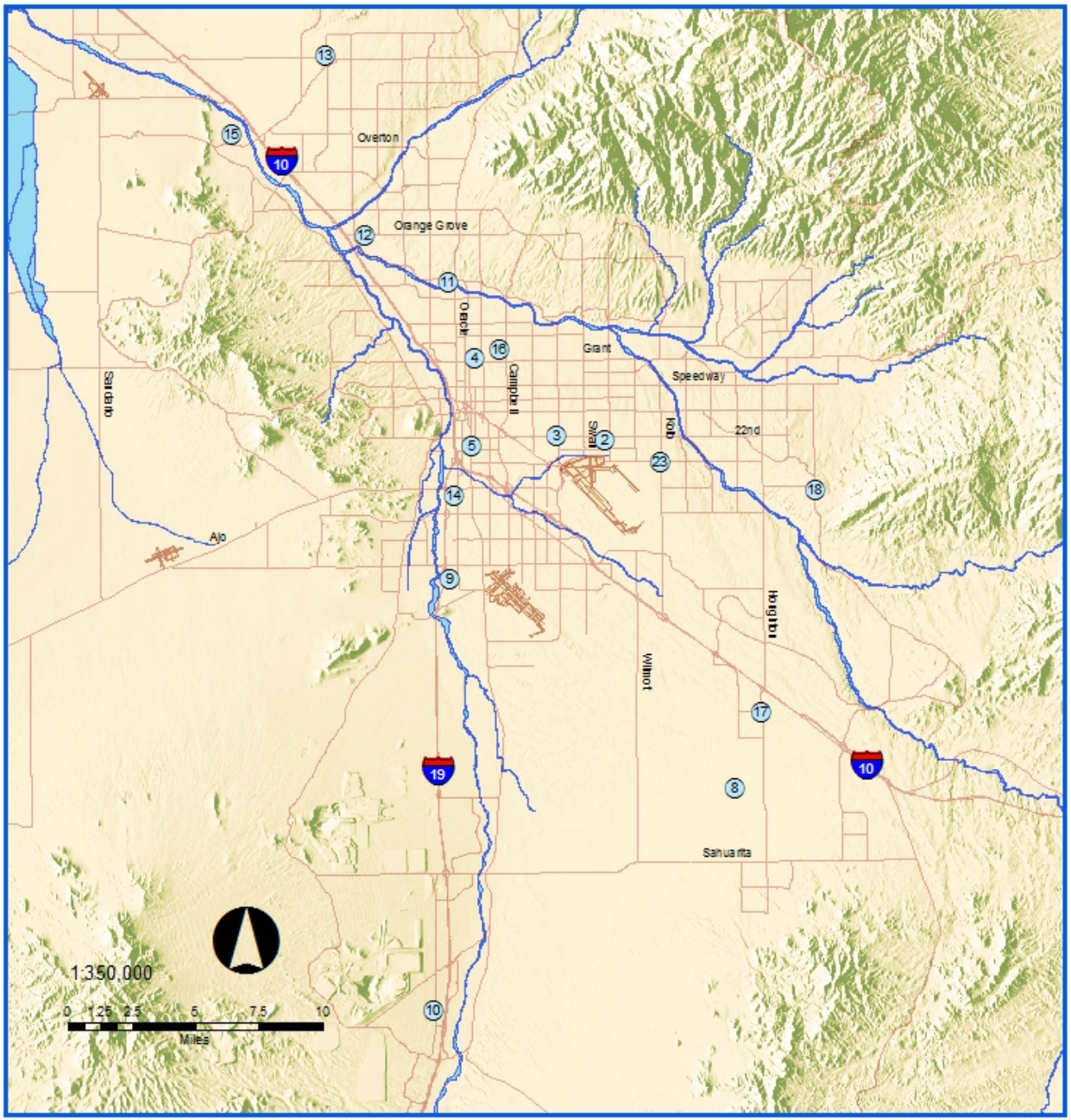
Map located on Page 12

Active Gaseous Pollutant Monitoring Sites for 2014

Table 3

Map #	Pollutant					Address	Site Name
2	CO	O_3		NO_2		1237 S. Beverly Ave.	22nd & Craycroft
3	CO					3895 E. 22nd St.	22nd & 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

Map located on page 12



Pima County Monitoring Sites

2 - 22nd / Craycroft
3 - 22nd / Alvernon
4 - Geronimo
5 - South Tucson
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

PDEQ Monitoring Sites
Major Streets

Revised: January 2015

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

PIMA MONITORING SITES 2015

2014 Ambient Air Monitoring Network Summary Table
Table 4
CARBON MONOXIDE - PIMA COUNTY MONITORING NETWORK

SITE NAME AND LOCATION	SITE ID (a)	PARAMETER (b)	CLASSI-FICATION (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	158	2582	4.1	NEIGHBORHOOD	CONTINUOUS	1	POPULATION EXPOSURE
22ND & ALVERNON 3895 E.22ND STREET	004-019-1014	42101	SLAMS	Mar-75 PRESENT	174	2516	3.4	MICROSCALE	CONTINUOUS	1	HIGHEST CONCENTRATION
CHILDREN'S PARK NCore 400 W. RIVER ROAD	004-019-1028	42101	SP	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 –March31 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)	CLASSI-FICATION (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	157	2582	4.1	NEIGHBORHOOD	CONTINUOUS	1	POPULATION EXPOSURE
CHILDREN'S PARK NCore 400 W. RIVER ROAD	004-019-1028	42602	SP	May-98 PRESENT	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	SLAMS	Oct-10 PRESENT	674	2286	10.0	NEIGHBORHOOD	CONTINUOUS	1	POPULATION EXPOSURE

Key located on page 16

2014 Ambient Air Monitoring Network Summary Table

SULFUR DIOXIDE -PIMA COUNTY MONITORING NETWORK

SITE NAME AND LOCATION	SITE ID (a)	PARAMETER (b)	CLASSI-FICATION (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	SLAMS	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)	CLASSI-FICATION (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	047	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	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	047	2387	4.1	NEIGHBORHOOD	CONTINUOUS	1	POPULATION EXPOSURE
COACHLINE 9597 N. COACHLINE BLVD	004-019-1034	44201	SP	July-03 PRESENT	047	2110	3.1	NEIGHBORHOOD	CONTINUOUS	1	POPULATION EXPOSURE
FAIRGROUNDS 11330 S. HOUGHTON RD.	004-019-1020	44201	SP	Oct-89 PRESENT	047	3078	3.6	URBAN	CONTINUOUS	1	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

2014 Ambient Air Monitoring Network Summary Table

PM10- PIMA COUNTY MONITORING NETWORK

SITE NAME AND LOCATION	SITE ID (a)	PARAMETER (b)	CLASSI-FICATION (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	122	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 **Closed Mar - 14**	126	2315	4.6	MICROSCALE	6 DAY	1	SOURCE ORIENTED
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	4.25	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	SLAMS	Jan-11 PRESENT	176	2286	3.1	NEIGHBORHOOD	3 DAY	1	POPULATION EXPOSURE

LEAD -PIMA COUNTY MONITORING NETWORK

CHILDREN'S PARK NCore 400 W. RIVER ROAD	004-019-1028	14129	SLAMS	Feb-12 PRESENT	110	2286	2.0	NEIGHBORHOOD	6DAY Collocated every 12days	1	POPULATION EXPOSURE

2014 Ambient Air Monitoring Network Summary Table
PM2.5- PIMA COUNTY MONITORING NETWORK

SITE NAME AND LOCATION	SITE ID (a)	PARAMETER (b)	CLASSI-FICATION (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	Jan-99 PRESENT	118	2286	3.1	NEIGHBORHOOD	3 DAY collocated every 6 day	1	POPULATION EXPOSURE
CHILDREN'S PARK NCore 400 W. RIVER ROAD	004-019-1028	88502	SLAMS	Feb-02 PRESENT	810	2286	3.0		3 DAY	5	POPULATION EXPOSURE
CHILDREN'S PARK NCore 400 W. RIVER ROAD	004-019-1028	88101	SLAMS	Jan-11 PRESENT	170	2286	4.3	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 2014 Air Quality System (AQS) data.

IV. CURRENT MONITORING NETWORK EVALUATIONS

PM_{10} MONITORING NETWORK REQUIREMENTS

The PDEQ PM_{10} network consists of nine monitoring sites in eastern Pima County, Arizona, with MSA 8520. The 2014 network used several different types of PM_{10} samplers: R& P Partisol 2000, R& P Partisol-Plus 2025 Sequential, BAM 1020 and TEOM 1400. **40 CFR 58, app. D, 4.6** Particulate Matter (PM_{10}) design criteria, provided guidance in determining the minimum number of required PM_{10} SLAMS sites for 2014.

2014 PM_{10} Design Criteria
Table 5

Population Pima County 2010 Census	**MSA 8520 Tucson Population Category**	**Design Value** (2012-2014)	**PM_{10} Sites # Required**	**PM_{10} Sites # Operating**	**Max Concentration site**	**Max Concentration** ($\mu g/m^3$)
980,263	500,000 – 1,000,000	0.7 (South Tucson) Including flagged exceptional event	Requires 4-8 SLAMS monitors	4 SLAMS monitors- 3 SLAMS as of March, 2014	Geronimo	174
			No requirement for SP	4 SP monitors		
			No requirement	1 NCore for PMCoarse		
		0.0 (all SLAMS sites)Excluding flagged exceptional events	Medium concentration requires 2-4 SLAMS monitors	4 SLAMS monitors- 3 SLAMS as of March, 2014	South Tucson	149

Violation History

The PM_{10} 24 hour standard remains at 150 $\mu g/m^3$. Since the promulgation of the PM_{10} standard, July 31, 1987, exceedances of the 24 hour standard have been recorded at monitoring sites in the PDEQ PM_{10} 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 PM_{10} 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 dependent on approval from EPA. In 2009 there was one exceedance at the Orange Grove, South Tucson and Geronimo locations on July 22nd, these exceedances may also be considered as an Exceptional Event dependant on approval from EPA. In 2013, one exceedance on April 8 at the South

Tucson location and on April 9th there was one exceedance each at the South Tucson, Geronimo, and Green Valley stations. These exceedances may also be considered as an Exceptional Event dependent on approval from EPA. In 2014, there was three exceedances on July 25 at the Green Valley, Geronimo, Orange Grove monitoring sites. These exceedances may also be considered as an Exceptional Event dependent on approval from EPA.

Quality Assurance for Particulate Matter PM_{10}

All data quality assessment requirements, as outlined in **40 CFR 58, app. A**, have been met for 2014. The precision of PM_{10} data is derived from the co-located PM_{10} 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 PM_{10} 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.

Table 6

Protocol	**Instrument**	**Frequency**	**Date Completed 2014**
Flow rate verification	Met One BAM 1020 R&P TEOM 1400	Weekly	
Flow Rate Audit	TEOM 1400AB Bam 1020	Quarterly	Green Valley 03/20, 06/10, 09/24, 11/24 Geronimo 03/04, 06/02, 09/24, 12/08
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 03/07,06/06, 09/24, 11/26 Santa Clara 03/20, 06/06, 09/25, 11/26 Prince Road 03/04 Tangerine 03/13, 06/02, 09/25, 11/26 South Tucson 03/12, 06/06, 09/24,11/24 South Tucson (co-located) 03/12, 06/06, 09/24, 11/24 Orange Grove 03/04, 06/02, 09/25, 11/26 Orange Grove (co-located) 03/04, 06/02, 09/25, 11/26 Children's Park NCore 03/11, 06/06, 09/25, 12/08
NPAP Audit			None for 2014

Table 7

Collocated PM_{10} Monitors			
Method	# Required Collocation Monitors	# Primary Monitors	# Collocated Monitors
81102	1	8	**2**

Table 8
Annual summary statistics: NAAQS: 150 μg/m^3 24- Hour Average.

Year 2014 Site	Highest 24- Hr Value	2nd Highest 24-Hour Value	Annual Average
Orange Grove 0011	**158**	**117**	**27.0**
Corona de Tucson 0008	**82**	**57**	**16.8**
Santa Clara 1026	**108**	**69**	**25.4**
Green Valley 1030	**170**	**104**	**13.7**
Geronimo 1113	**174**	**143**	**27.1**
Prince Road 1009	*	*	*
Tangerine 1018	**95**	**53**	**18.8**
South Tucson 1001	**149**	**101**	**27.7**

*site closed March, 2014

Particulate Matter Weigh Lab

Pima County Department of Environmental Quality operates a filter weigh lab for the processing of Pima County's PM_{10} 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.**

Sampling Schedule Calculation

The design value for the Tucson area network was determined using the PM_{10} SIP Development Guideline, Section 6.3.1 "Table look-up" procedure. Three years of sampling data, 2012 – 2014, were used. For that period, the Geronimo monitoring location was determined to have the highest design value (including possible exceptional events). That value was 174μg/m^3. The ration of this value to the 24 hour standard of 150 μg/m^3, 1.2, was then compared to the brackets in Figure 1 from 40 CFR 58.12(e) to arrive at a minimum PM_{10} sampling frequency of every day.

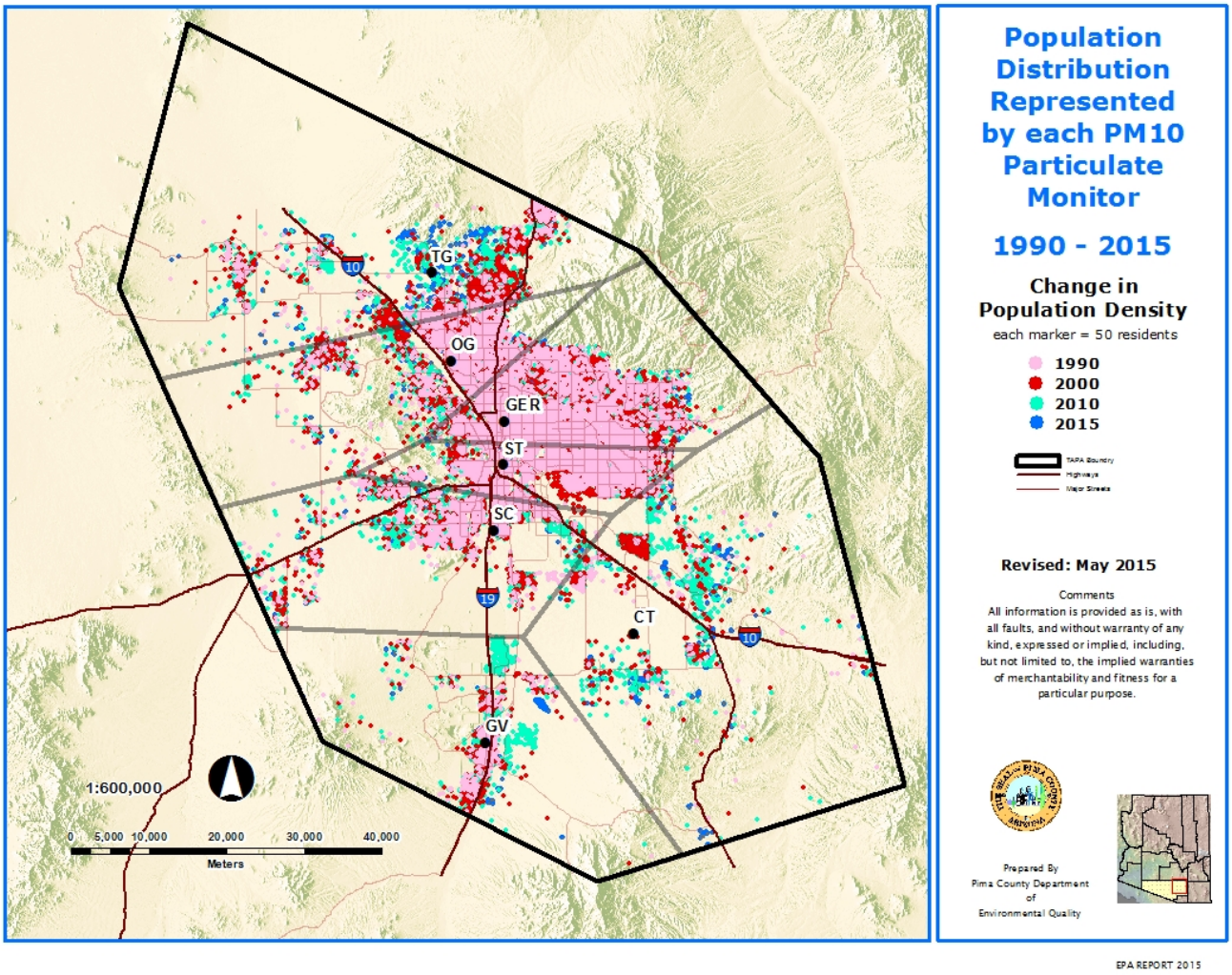
Population Growth and Distribution in the PM_{10} Network

Figure 4 (next page) represents a Thiessen Polygon analysis showing 1990 population distribution, and population distribution and growth for the years 2000, 2010 and 2015. Each polygonal area shows population distribution and growth represented by the PM_{10} monitor in that area. 2015 data demonstrates a slowdown in growth compared to previous years, with most of the growth surrounding the Tangerine monitor in the northwest portion of the TAPA, and areas to the south and east represented by the Green Valley and Corona de Tucson monitors.

All current PM_{10} monitors are fulfilling their intended purposes, with the exception of the Tangerine monitor, but as the analysis shows, there are two areas that do not have representation. The northeast area of the MSA has incurred less overall growth in the past fifteen years compared to other areas, but is populated with similar density to other areas, and is somewhat isolated from the predominant down valley air flow. The other area without representation is the Avra Valley area, which is separated by the Tucson Mountains from the airshed over most of the TAPA. These shortcomings were pointed out in the previous network assessment, and to date, funding and available staffing are still the limiting factors to addressing these concerns.

The Tangerine monitor is currently classified as Urban Scale, Background site type, which is no longer appropriate. Developments in recent years have encroached on the site to within 50 meters to the west, and low-density housing is being built 150 meters to the south. Other development along the Tangerine Road corridor will surely follow, particularly after the Tangerine Road widening project, projected to begin construction in 2016, is completed. This station has been in continuous operation since 1994 for PM_{10}. Despite the increases in construction, population density and resultant traffic, concentrations remain fairly low under normal meteorological circumstances. To more closely conform to appropriate classification, PDEQ will be submitting a request to re-designate the site to a Neighborhood spatial scale, and Population Exposure site type.

Figure 4


TG
OG
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1:600,000
0 5,000 10,000 20,000 30,000 40,000
Meters
Population Distribution Represented by each PM10 Particulate Monitor
1990 - 2015
Change in Population Density
each marker = 50 residents
1990
2000
2010
2015
TAPA Boundry
Highways
Major Streets
Revised: May 2015
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
EPA REPORT 2015

$PM_{2.5}$ MONITORING NETWORK REQUIREMENTS

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. Each $PM_{2.5}$ monitor MSA is Tucson, AZ 8520 except for the Green Valley monitors with a CBSA 46060.

2014 $PM_{2.5}$ Design Criteria
Table 9
PM2.5 SLAMS (FRM and FEM)

Population Pima County 2010 Census	**MSA 8520 Tucson Population Category**	**Design Value Site**	**Annual Design Value Years 2012-2014**	**Daily Design Value Years 2012-2014**	**$PM_{2.5}$ Sites # Required**	**$PM_{2.5}$ Sites # Operating**
980,263	500,000 – 1,000,000	Orange Grove	5.8μg/m^3	14μg/m^3	Requires 1 SLAMS Monitor	2 SLAMS Monitors
					<85% of NAAQS	

Table 10

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	1[A]

[A] BAM 1020 FEM at Children's Park NCore site is collocated with a PM2.5 FRM , that does not meet inlet separation requirements at this time.

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.

Regional Transport or Background:
ADEQ operates an FEM monitor at their Alamo Lake site for regional background, and an FEM monitor at their Yuma Supersite for regional transport.
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 6 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.

Pima County Department of Environmental Quality operates a filter weigh lab for the processing of Pima County's PM_{10} 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 2014 is included in this report.

Violation History

The old $PM_{2.5}$ standard (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/m^3 and the 24 hour standard is met when the three year average of the 98^{th} percentile value at each site is less than or equal to 35ug/m^3.
The new $PM_{2.5}$ standard (December 14, 2012): 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 12ug/m^3 and the 24 hour standard is met when the three year average of the 98^{th} percentile value at each site is less than or equal to 35ug/m^3.
No exceedances of the annual or 24 - hour NAAQS were recorded in Tucson in 2014.

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 2014, 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 11

Protocol	Instrument	Frequency	Date Completed 2014
Flow rate verification	Met One BAM 1020	Weekly	
Flow Rate Audit	Met One BAM 1020	Quarterly	Green Valley 03/20, 06/10, 09/24, 11/24 Geronimo 03/04, 06/02, 09/24, 12/08 Rose Elementary 03/20, 06/10, 09/24, 11/24 Coachline 03/13, 06/02, 09/25, 11/26 Children's Park 03/11, 06/05, 09/25, 12/08
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 03/04, 06/02, 09/25, 11/16 Children's Park 03/11, 06/05, 09/25, 12/08 Children's Park (Co-located) 03/11, 06/05, 09/25,12/08 Children's Park (Speciation, SASS) 06/05, 05/29, 09/26, 12/08 Children's Park (Speciation, URG) 03/11, 06/05, 09/26, 12/08
NPAP Audit			None

Table 12

Annual summary statistics: NAAQS $PM_{2.5}$: 15 μg/m^3 Annual Average, 35 μg/m^3 24 Hour Average.

Year 2014 Site	Highest 24 Hr Value	2nd Highest Value	98th % Value	Annual Average
Orange Grove	**21.0**	**20.3**	**16.7**	**6.27**
Children's Park (Meth. 118)	**16.9**	**15.8**	**14.3**	**5.58**
Children's Park (Meth. 170)	**29.8**	**20.4**	**11.9**	**5.57**
Green Valley	**30.2**	**12.7**	**9.4**	**3.01**
Geronimo	**34.7**	**23.9**	**16.1**	**7.36**
Rose Elementary	**24.9**	**24.1**	**15.8**	**6.68**
Coachline	**25.2**	**24.3**	**12.6**	**6.15**

Population Growth and Distribution in the $PM_{2.5}$ Network

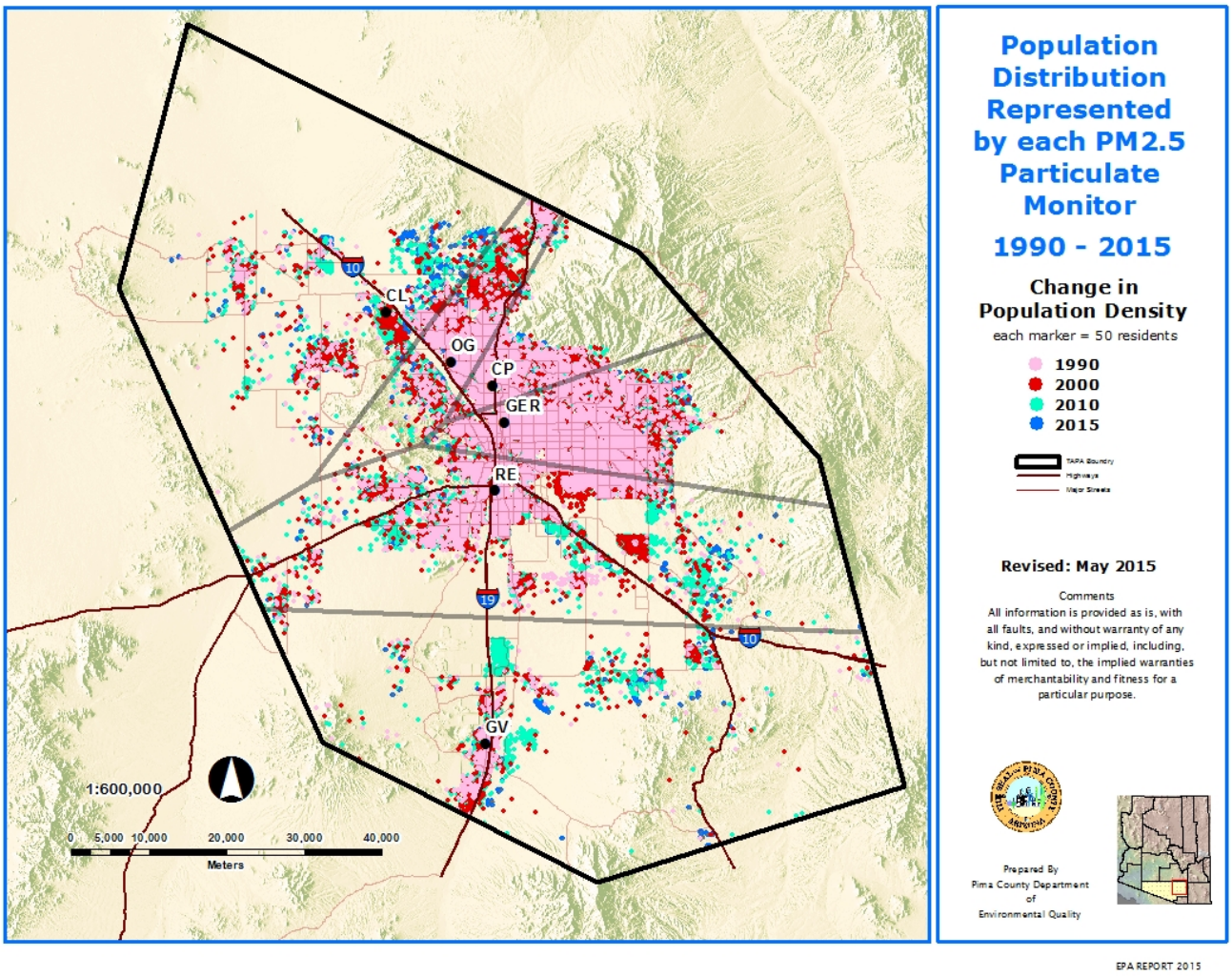
Figure 5 (next page) represents a Thiessen Polygon analysis showing 1990 population distribution, and population distribution and growth for the years 2000, 2010 and 2015. Each polygonal area shows population distribution and growth represented by the $PM_{2.5}$ monitor in that area. 2015 data demonstrates a slowdown in growth compared to previous years, with most of the growth in the northwest portion of the TAPA, and areas to the south and east.

All current $PM_{2.5}$ monitors are fulfilling their intended purposes, but as the analysis shows, there are some areas that do not have representation. The northeast area of the MSA has incurred less overall growth in the past fifteen years compared to other areas, but is populated with similar density to other areas, and is somewhat isolated from the normal down valley air flow. Considering the fairly high traffic volumes of arterial roadways in this area and the potential for stagnation due to the topography, $PM_{2.5}$ monitoring in this area would be appropriate.

The other areas without representation are the Avra Valley area, which is separated by the Tucson Mountains from the airshed over most of the TAPA, and the east side of the TAPA. The Avra Valley area is less of a concern for $PM_{2.5}$, considering the more rural aspect of the area, and the abundance of unpaved roads in the mostly wildcat development, and agricultural activity contributing more to PM_{10} particulate matter from crustal origins. The east side of the TAPA is the prevailing upwind section of the MSA, and is also less likely to incur significant $PM_{2.5}$ concentrations. This was demonstrated by operating a $PM_{2.5}$ BAM for smoke monitoring due to wildfires for an 18 month period at the Golf Links / Kolb carbon monoxide station in 2011 and 2012.

Therefore, the only area under consideration for additional $PM_{2.5}$ monitoring is the northeast area, and this would be contingent on funding and staffing.

Figure 5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Meters
Population Distribution Represented by each PM2.5 Particulate Monitor
1990 - 2015
Change in Population Density
each marker = 50 residents
1990
2000
2010
2015
TAPA Boundry
Highways
Major Streets
Revised: May 2015
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$PM_{10-2.5}$ (PM-Coarse) MONITORING NETWORK REQUIREMENTS

2013 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 arithmetic difference between separate but concurrent collocated measurements of PM_{10} 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 collocation for $PM_{10-2.5}$ is fulfilled by the national NCore Network.

The $PM_{2.5}$ portion of this method is the monitor described on page 46. The PM_{10} monitor is described on page 50.

Table 13
Annual summary statistics

Year 2014	Highest 24- Hr Value	2nd Highest 24-Hour Value	Annual Average
Children's Park NCore PM_{10} - $PM_{2.5}$ (86101)	49.0	47.0	13.77

OZONE MONITORING NETWORK REQUIREMENTS

Ozone (O_3) is currently being monitored at seven locations in Tucson and one location in Green Valley. Pima County monitors year round for ozone. 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**. Ozone monitors have MSA 8520.

Table 14
2014 O_3 Design Criteria

Population Pima County 2010 Census	MSA 8520 Tucson Population Category	Design Value Site	8- Hour Design Value (2012-2014)	O_3 Sites # Required	O_3 Sites # Operating
980,263	500,000 – 1,000,000	Saguaro Park 040190021	.071 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 2014. The requirements include precision checks a minimum of 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, 0.055ppm, and 0.085ppm. Pima County maintains an ozone primary standard which is verified annually for accuracy by the California Air Resources Board in Sacramento. Pima County passed the NPAP Ozone TTP Audit for 22nd and Craycroft. All valid precision and accuracy tests are reported to the Air Quality System (AQS) database on a quarterly basis.

OZONE MONITORING NETWORK REQUIREMENTS

Table 15

Ozone Audit Dates 2014
22nd St. & Craycroft 06/26, 12/16 Children's Park 03/25, 09/19 Fairgrounds 06/23, 12/29 Tangerine 03/13, 09/17 Saguaro Park 06/23, 12/29 Coachline 03/13, 09/17 Rose Elementary 06/10, 12/30 Green Valley 06/10, 11/24
NPAP Ozone TTP Audit Dates 2014
Tangerine 05/13, Children's Park 05/14

Table 16

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

Year 2014 Site	1st Max. 1-HR Avg (ppm)	1st Max. 8- HR Avg (ppm)	4th Max. 8- HR Avg (ppm)
22nd St. & Craycroft 1011	**.071**	**.066**	**.062**
Children's Park 1028	**.082**	**.077**	**.066**
Fairgrounds 1020	**.075**	**.073**	**.064**
Tangerine 1018	**.081**	**.078**	**.063**
Saguaro Park 0021	**.082**	**.079**	**.069**
Coachline 1034	**.071**	**.070**	**.062**
Rose Elementary 1032	**.075**	**.071**	**.061**
Green Valley 1030	**.073**	**.067**	**.065**

Population Growth and Distribution in the Ozone Network

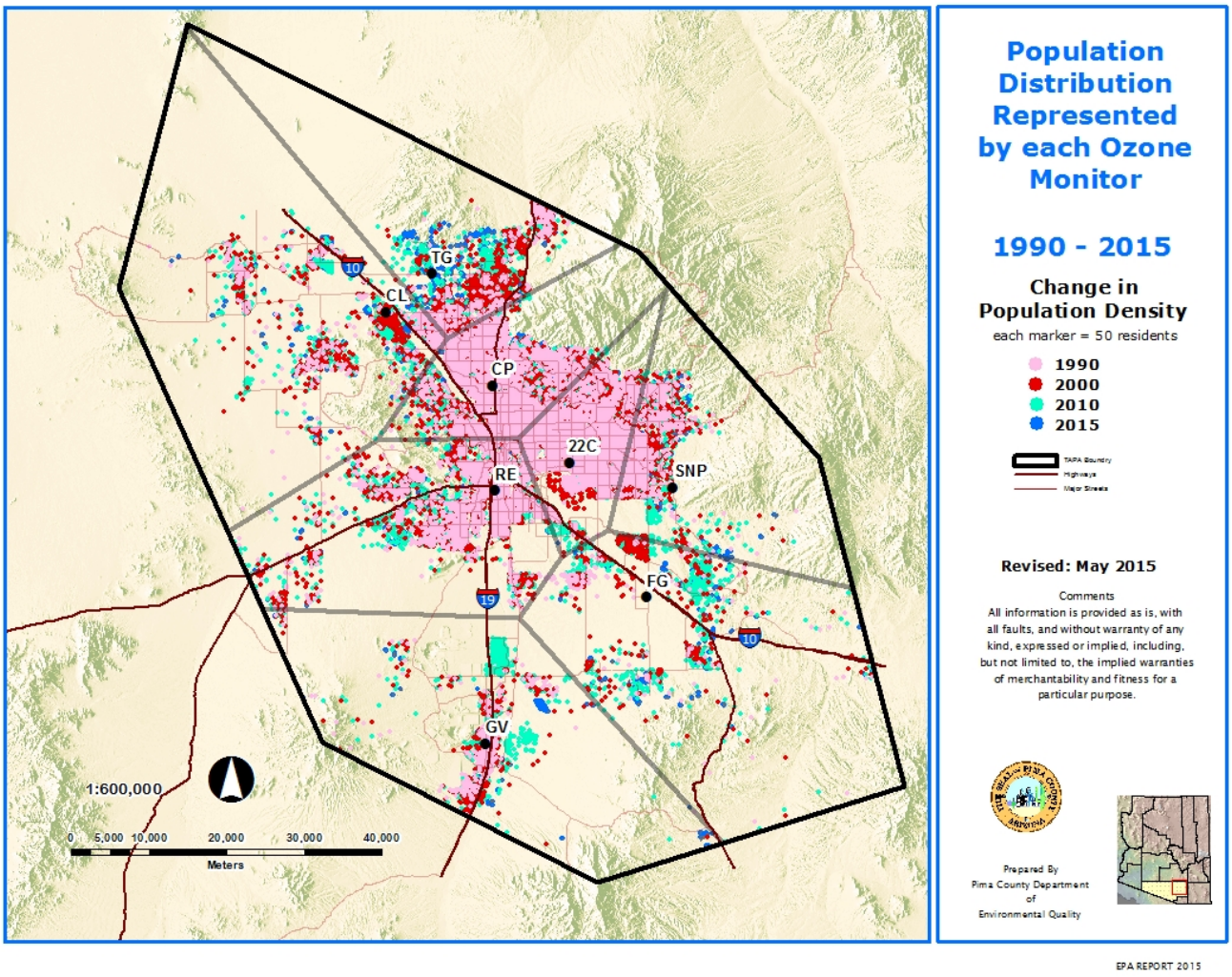
Figure 6 (next page) represents a Thiessen Polygon analysis showing 1990 population distribution, and population distribution and growth for the years 2000, 2010 and 2015. Each polygonal area shows population distribution and growth represented by the ozone monitor in that area. 2015 data demonstrates a slowdown in growth compared to previous years, with most of the growth in the northwest portion of the TAPA, and areas to the south and southeast.

With ozone being one of the two primary pollutants of concern in Pima County, most of the TAPA has representation, considering the relatively homogenous nature of peak ozone concentrations throughout the area. Based on the population of the MSA and the most recent design value for ozone, two SLAMS monitors are required, and there is no requirement for additional monitors. PDEQ currently operates three SLAMS monitors, and will be requesting approval for re-designation of the remaining five Special Purpose monitors, for a total of eight SLAMS ozone monitors, four times the required minimum. Appropriate representation for ozone in Pima County has always been a priority, and current monitor locations provide widespread coverage of the populated portions of the TAPA, including areas with the most growth in the past 15 years, primarily the northwest area, represented by the Tangerine and Coachline monitors, and the southeast area, represented by the Fairgrounds and Green Valley monitors.

Two monitors are located in areas that in the past were identified as having higher than normal pediatric asthma hospital admission rates. The Rose Elementary and Coachline monitors were installed in these areas to provide representation for these sensitive groups, and are located to provide an upwind / downwind component serving both a concentrated minority population and an area of newer subdivisions in the northwest portion of the MSA.

No changes to the ozone monitoring network are proposed at this time.

Figure 6


TG
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0 5,000 10,000 20,000 30,000 40,000
Meters
Population Distribution Represented by each Ozone Monitor
1990 - 2015
Change in Population Density
each marker = 50 residents
1990
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TAPA Boundry
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Comments
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Pima County Department of Environmental Quality
EPA REPORT 2015

CARBON MONOXIDE MONITORING NETWORK REQUIREMENTS

Motor vehicles are the primary source of carbon monoxide (CO) in the Tucson area. The latest reports from the Arizona Department of Transportation (MVD) show that there were 940,571 vehicles registered in Pima County in 2012, compared with 923,271 in 2008 and 611,398 in 1998. 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 with MSA 8520. 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.

2014 CO Design Criteria
Table 17

Population Pima County 2010 Census	**MSA 8520 Tucson Population Category**	**1- Hour Design Value 2013-2014**	**CO Monitors # Required**	**CO Monitors # Operating**
980,263	500,000 – 1,000,000	1.8 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 2014. 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.

CARBON MONOXIDE MONITORING NETWORK REQUIREMENTS

Quality Assurance for Carbon Monoxide

All data quality assessment requirements as outlined in **40 CFR 58, app. A,** have been met in 2014. The precision of SLAMS automated analyzers is based on one-point precision QC checks with a minimum frequency of every two weeks, when each analyzer is challenged by a known concentration of a check gas. For CO the concentrations are between 1.0 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 0.900 -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 18

Carbon Monoxide Audit Dates 2014
Craycroft & 22nd St. 06/26, 12/16 Children's Park 03/25, 09/19 Cherry & Glenn; Seasonal 03/31, 12/31 Alvernon & 22nd St. 03/19, 09/17 Golf Links & Kolb; Seasonal 03/31, 12/26
NPAP Carbon Monoxide TTP Audit Dates 2014
Alvernon & 22nd St. 05/13, Children's Park 05/14

Table 19

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

Year 2014 Site	1st Max. 1- HR Avg	2nd Max. 1- HR Avg	1st Max. 8- HR Avg	2nd Max. 8- HR Avg
Craycroft & 22nd St 1011	**1.9**	**1.6**	**0.9**	**0.8**
Children's Park 1028	**1.0**	**0.9**	**0.8**	**0.7**
Cherry & Glenn 1021	**1.8**	**1.6**	**1.1**	**1.1**
Alvernon & 22nd St. 1014	**1.9**	**1.8**	**1.2**	**1.0**
Golf Links & Kolb 1031	**1.3**	**1.2**	**1.0**	**0.9**

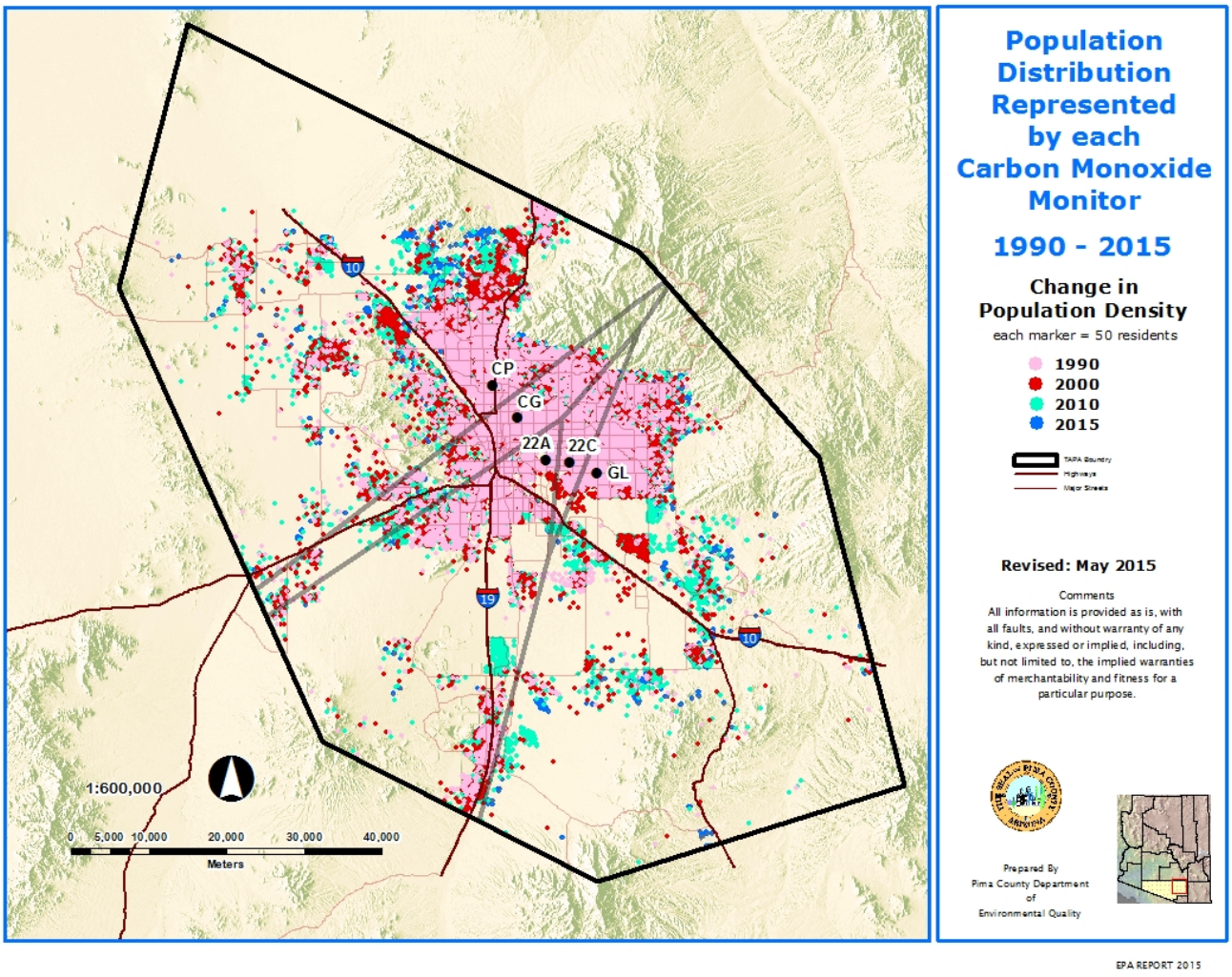
Population Growth and Distribution in the Carbon Monoxide Network

Figure 7 (next page) represents a Thiessen Polygon analysis showing 1990 population distribution, and population distribution and growth for the years 2000, 2010 and 2015. Each polygonal area shows population distribution and growth represented by the carbon monoxide monitor in that area. 2015 data demonstrates a slowdown in growth compared to previous years, with most of the growth in the northwest portion of the TAPA, and areas to the south and east.

Despite the distinguishing category of being the only gaseous criteria pollutant in Pima County to achieve non-attainment status, carbon monoxide levels have steadily declined from the levels of the 1980's to current wintertime inversion measurements approximately one tenth of the standard. Current concentrations challenge the low-level measurement capabilities of instrumentation unless it has enhanced trace-level configuration with three decimal place accuracy. Two of the five CO monitors in Pima County are currently operated on a 0 to 5 ppm range (previously 0 to 50 ppm), and one of those monitors is located downwind of a busy intersection, designated as a highest concentration site type with a microscale spatial scale.

This would seem a clear indicator that carbon monoxide is not a serious concern in Pima County, and a reduction in monitoring would be reasonable. However, due to the State Implementation Plan (SIP) 2008 revision under the Limited Maintenance Plan (LMP) option for Carbon Monoxide, in place to ensure continued compliance with the NAAQS, discontinuation of any CO monitors would require a comprehensive review and modification of the SIP, an endeavor significantly more involved than simply operating the two seasonal stations in the existing network that may qualify for discontinuation. The termination of the SIP/LMP coincides with the next network assessment, scheduled for 2020, and at that time the effective representation and operating costs of the CO network will be re-evaluated.

Figure 7


Population Distribution Represented by each Carbon Monoxide Monitor
1990 - 2015
Change in Population Density
each marker = 50 residents
1990
2000
2010
2015
TAPA Boundary
Highways
Major Streets
Revised: May 2015
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
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Meters
EPA REPORT 2015

NITROGEN DIOXIDE MONITORING NETWORK REQUIREMENTS

Nitrogen dioxide (NO_2) is currently measured at two locations in Tucson with MSA 8520. The Environmental Protection Agency has revised the NO_2 requirements. The **40 CFR 58, app. D, 4.3**, design criteria document states that there are no minimum requirements for the number of NO_2 monitoring sites in Pima County. Pima County is included in phase three near road implementation and will not be required to install a monitoring station for this project until 2017.

2014 NO_2 Design Criteria
Table 20

Population Pima County 2010 Census	MSA 8520 Tucson Population Category	Annual Design Value	1- Hour 98th Percentile Design Value	# of Required NO_2 Monitors	# of NO_2 Monitors
980,263	500,000 – 1,000,000	11.2 ppb	45 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 NO_2 concentrations. Much of the data has been used in studies measuring the effects of NO_2 as a precursor to ozone formation.

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

NITROGEN DIOXIDE MONITORING NETWORK REQUIREMENTS

Quality Assurance for NO_2

All data quality assessment requirements outlined in **40 CFR 58, app. A**, have been met for 2014. The requirements include precision QC checks with a minimum frequency of every other week with a check gas range between 0.01 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. 2014 precision and accuracy tests will be reported in ppb.

Table 21

Nitrogen Dioxide Audit Dates 2014
Craycroft & 22nd St. 06/26, 12/16 Children's Park 03/25, 09/19
Nitrogen Dioxide TTP Audit Dates 2014
None

Table 22

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

Year 2014 Site	1st Max. 1- Hour Avg	1 - Hour 98th Percentile	Annual Mean
Craycroft & 22nd St 1011	**47.6**	**42.8**	**9.64**
Children's Park 1028	**42.2**	**40.0**	**11.2**

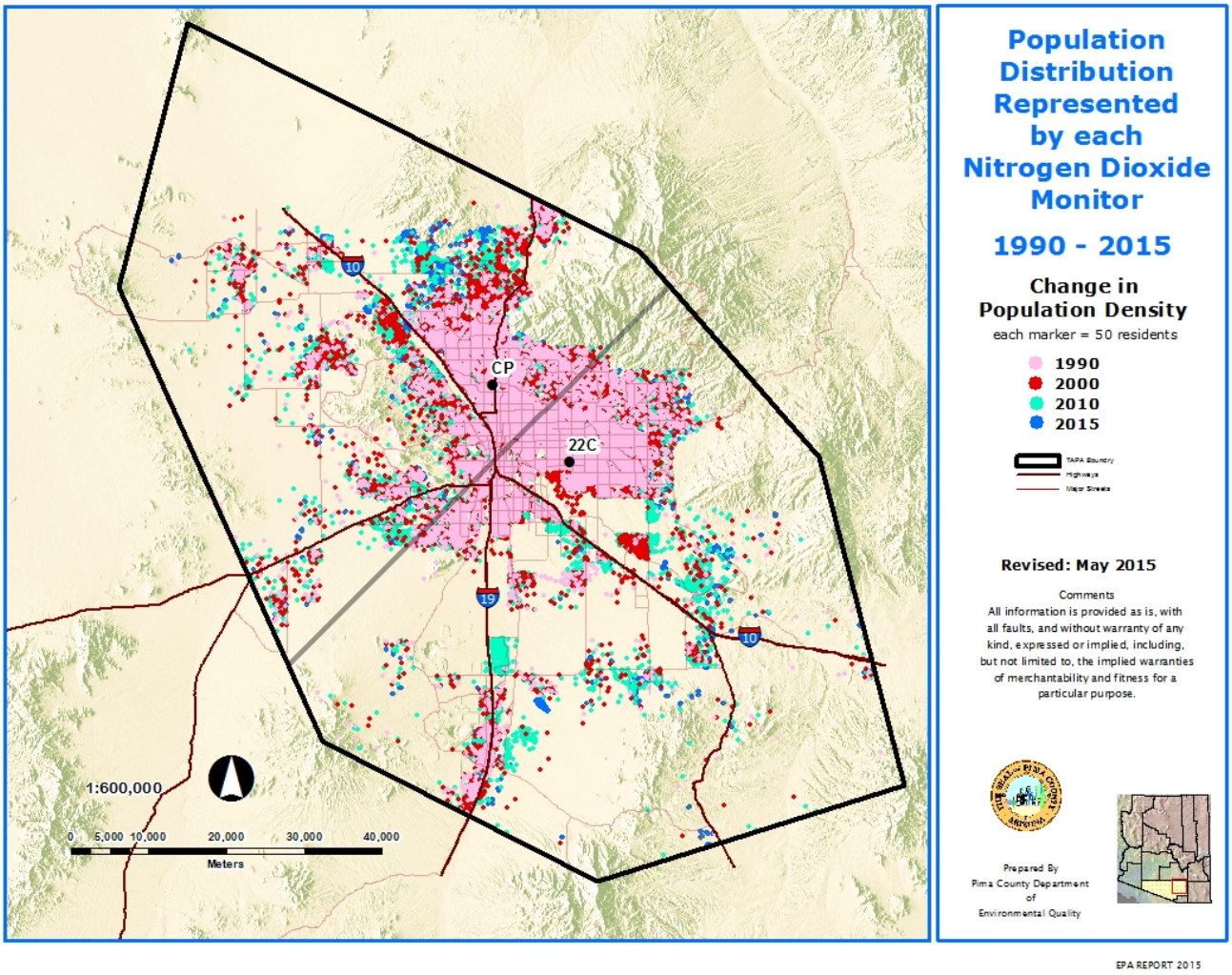
Population Growth and Distribution in the Nitrogen Dioxide Network

Figure 8 represents a Thiessen Polygon analysis showing 1990 population distribution, and population distribution and growth for the years 2000, 2010 and 2015. Each polygonal area shows population distribution and growth represented by the nitrogen dioxide monitor in that area. 2015 data demonstrates a slowdown in growth compared to previous years, with most of the growth in the northwest portion of the TAPA, and areas to the south and east.

Nitrogen Dioxide monitoring has been ongoing in Pima County since 1975, at the 22nd/Craycroft station, and various other locations through the years. The Children's Park monitor was added in 1998 as a permanent site, bringing the currently operational total to two. This neatly divides the TAPA, with upwind and downwind representation within the core of the MSA.

As with carbon monoxide, NO_2 concentrations have steadily decreased from the levels recorded in the 1970's and 1980's. Unlike CO, however, NO_2 monitoring remains important in view of the ozone precursor aspect of this pollutant, and no reduction of monitors will occur. Instead, the number of monitors will increase to three when Tier III NO_2 Near-road monitoring is implemented in Pima County beginning in 2017. This will add a highest concentration site somewhere along the Interstate 10 corridor, and redefine the areas of representation.

Figure 8


Population Distribution Represented by each Nitrogen Dioxide Monitor
1990 - 2015
Change in Population Density
each marker = 50 residents
1990
2000
2010
2015
TAPA Boundry
Highways
Major Streets
Revised: May 2015
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
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Meters
EPA REPORT 2015

REACTIVE OXIDES OF NITROGEN (NO_Y) MONITORING NETWORK REQUIREMENTS

Reactive Oxides of Nitrogen is currently monitored at one location in Pima County with MSA 8520 fulfilling the NCore site requirement.

Quality Assurance for NO_y

All data quality assessment requirements outlined in **40 CFR 58, app. A**, have been met for 2014. The requirements include precision QC checks with a minimum frequency of every other week with a check gas range between 0.01 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. 2014 precision and accuracy tests will be reported in ppb.

Table 23

Reactive Oxides of Nitrogen Audit Dates 2014
Children's Park NCore 03/25, 09/22
Reactive Oxides of Nitrogen TTP Audit Dates 2014
None
NPAP Audit Dates 2014
None

Table 24
Annual summary statistics: reported in ppb

Year 2014 Site	1st Max. 1- Hour Avg	Annual Mean
Children's Park 1028	**134.2**	**12.3**

SULFUR DIOXIDE MONITORING NETWORK REQUIREMENTS

Sulfur Dioxide (SO_2) is currently monitored at one location in Pima County with MSA 8520. On October 1, 2010, an SO_2 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 SO_2 requirements. The design criteria indicated in **40 CFR 58, app. D, 4.4**, states that there are no minimum requirements for the number of SO_2 monitoring sites.

2014 SO_2 Design Criteria
Table 25

Population Pima County 2010 Census	**MSA 8520 Tucson Population Category**	**Total SO_2 [tons/year] Based on 2008 NEI**	**Population Weighted Emissions Index [million persons- tons per year]**	**1- Hour Design Value**	**# of Required SO_2 Monitors**	**# of SO_2 Monitors**
980,263	500,000 – 1,000,000	4850	4754	6.0 ppb	No Requirement	1 NCore SLAMS

Historical Sulfur Dioxide Monitoring

Ambient concentrations of sulfur dioxide (SO_2) in Tucson have historically remained well below all federal standards, and in recent years have been extremely low. With new trace SO_2 monitoring we can now get more accurate readings at very low levels. The only major stationary sources of SO_2 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, which are scheduled to be converted to natural gas in the future.

Quality Assurance for SO_2

All data quality assessment requirements outlined in **40 CFR 58, app. A**, have been met for 2014. The requirements include precision checks every other week with a check gas range between 0.01 and 0.10 ppm and annual internal audits for accuracy with three point check levels between 0.00038 - 0.0029 ppm, 0.0030 – 0.0049 ppm and 0.005 – 0.0079ppm . All valid precision and accuracy tests are reported to the Air Quality System (AQS) database on a quarterly basis.

Table 26

Sulfur Dioxide Audit Dates 2014
Children's Park NCore 03/26, 09/22
Sulfur Dioxide TTP Audit Dates 2014
Children's Park NCore 05/14

Table 27

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

Year 2014 Site	1st Max. 1- Hour Avg	1–Hour 99th Percentile	Annual Mean
Children's Park NCore 1028	**9.6**	**5.6**	**0.20**

Population Growth and Distribution in the Sulfur Dioxide Network

No Thiessen Polygon analysis for sulfur dioxide was performed for the simple reason that there is only one SO_2 monitor in the TAPA, so the entire TAPA is the effective area of representation.

SO_2 monitoring has a long history in Pima County at various locations, but with the closure of copper smelters in the region decades past, SO_2 concentrations have dropped to near zero, with an occasional spike up to a one hour reading at or below one tenth of the current standard. This will be further reduced when the only local significant source of SO_2, at the Tucson Electric Power Sundt Generating Station, will be fully converted to natural gas in 2017. This will reduce the necessity of SO_2 monitoring to fulfilling the NCore requirement to operate a monitor at the Children's Park station.

LEAD MONITORING NETWORK REQUIREMENTS

Lead is currently monitored at the Children's Park NCore location in Pima County with MSA 8520.

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 is required to perform area monitoring only, which is done at the Children's Park NCore location. Monitoring and reporting began in February 27, 2012.

The sampling schedule for lead is based on the 2014 EPA's monitoring sampling schedule with a one in six day schedule for the primary monitor and a one in twelve day schedule for the collocated lead monitor.

The design criteria indicated in **40 CFR 58, app. D, 4.5**, states that there is one required lead monitor.

2014 Lead Design Criteria
Table 28

NCore Site	MSA 8520 Tucson Population Category	Population Pima County 2010 Census	Lead Design Value	# Required monitors	# of Pb Monitors
Children's Park 040191028	500,000 – 1,000,000	980,263	0.00	1	1- NCore 1- Collocated

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.

Quality Assurance for Lead

All data quality assessment requirements outlined in **40 CFR 58, app. A**, have been met for 2014. The requirements include quarterly flow rate verification and audits. All valid precision and accuracy tests are reported to the Air Quality System (AQS) database on a quarterly basis.

Table 29

Protocol	**Instrument**	**Frequency**	**Date Completed 2014**
Flow rate verification	Tisch Hi Vol with Brushless Motor	Quarterly	01/16,03/25 ,4/16, 6/24, 8/28, 11/20, 12/10 Collocated: 01/16, 03/25 ,4/16, 5/22, 6/24, 8/28, 11/20, 12/10
Flow Rate Audit		Quarterly	03/11, 06/05, 09/25, 12/08 Collocated: 03/11, 06/05, 09/25, 12/08
NPAP Audit			none

Table 30

Annual summary statistics: NAAQS Lead: 0.15 μg/m^3 three month average

Year 2014 Site	1st Max. 24- Hour Avg	2nd Max. 24- HR Avg	Annual Mean
Children's Park 1028	**.007**	**.007**	**.0032**

V. DETAILED SITE AND MONITOR INFORMATION

CHILDREN'S PARK NCore: AQS # 040191028

Site Description	
Site Name	**CHILDREN'S PARK NCore**
AQS ID	040191028
Address	400 W. River Road, Tucson, AZ
Latitude / Longitude	32.295150 / -110.982300
Elevation	2286
Surrounding landscape	Gravel in walled compound, dirt parking lot, dry river bed
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.

Monitoring Information

Site Name	CHILDREN'S PARK NCore
Pollutant	**$PM_{2.5}$**
Method Code	170
Number of monitors	1
Parameter code / POC	88101 / 3
Basic monitoring objective / Statement of Purpose	NAAQS Comparison / Population Exposure
Site Type	Population Exposure
Instrument Manufacturer / Model	Met One / Bam 1020
FRM/FEM/ARM/other	FEM
Collecting agency / Reporting agency	PDEQ / PDEQ
Analytical Lab	n/a
Monitor type	SLAMS
Monitor Network Affiliation	NCore
Scale	Neighborhood
Number of daily observations	359
Number / Dates of 24-hour standard exceedances in 2014	0
Historical exceedances	0
Current Sampling frequency / Season	Continuous
Probe height	4.3 meters
Degrees of unrestricted air flow	360
Distance from supporting structure	1.73 meters
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	n/a
Distance from trees	14.3 meters
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors/ Schedule / Collocated monitor type	16.3 m / every 3 days / R&P 2025 ** see comments below
Nearest roads distance & direction to monitor / ADT	Arizona State Route 77 runs north - south 0.5 kilometers to the east, providing six lanes of heavily used arterial routing with a 2012 ADT of 44,000.
	River Road runs east – west 0.5 kilometers to the north, with a 2010 ADT of 38,000.
Suitable for comparison to $PM_{2.5}$ 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 on January 23, 2011. Co-location of the BAM 2.5 continuous monitor is currently limited to the FRM $_{2.5}$ sampler located on a platform near the shelter.

Site Name	CHILDREN'S PARK NCore
Pollutant	**$PM_{2.5}$ Primary**
Method Code	118
Number of monitors	1
Parameter code/ POC	88101 /1
Basic monitoring objective / Statement of Purpose	NAAQS Comparison / Population Exposure
Site Type	Population Exposure
Instrument Manufacturer / Model	R& P Partisol-Plus 2025
FRM/FEM/ARM/other	FRM
Collecting agency / Reporting agency	PDEQ / PDEQ
Analytical Lab	PDEQ
Monitor type	SLAMS
Monitor Network Affiliation	NCore
Scale	Neighborhood
Number of daily observations	119
Number / Dates of 24-hour standard exceedances in 2014	0
Historical exceedances	0
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.
Degrees of unrestricted air flow	290, from 280 to 210, includes predominant wind direction from 135 (SE)
Distance from supporting structure	2.08 meters
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/ Schedule / Collocated monitor type	1.2 meters /Every twelve days (after April 27, 2013 every six days) / R&P 2000 then R& P 2025 after Sept. 15, 2014
Nearest roads distance & direction to monitor / ADT	Arizona State Route 77 runs north - south 0.5 kilometers to the east, providing six lanes of heavily used arterial routing with a 2012 ADT of 44,000.
	River Road runs east – west 0.5 kilometers to the north, with a 2010 ADT of 38,000.
Suitable for comparison to $PM_{2.5}$ NAAQS	Yes
Site meets 40 CFR 58, Appx. A,C,D,E	Yes

Comments: Sampling began in 1999.

Site Name	**CHILDREN'S PARK NCore**
Pollutant	**$PM_{2.5}$ Collocated**
Method Code	118
Number of monitors	1
Parameter code/ POC	88101 (POC 2 as of March, 2014)
Basic monitoring objective / Statement of Purpose	Collocated monitor / Requirement
Site Type	Population Exposure
Instrument Manufacturer / Model	R& P Partisol-Plus 2025
FRM/FEM/ARM/other	FRM
Collecting agency / Reporting agency	PDEQ / PDEQ
Analytical Lab	PDEQ
Monitor type	SLAMS
Monitor Network Affiliation	NCore
Scale	Neighborhood
Number of daily observations	30
Number / Dates of 24-hour standard exceedances in 2014	0
Historical exceedances	0
Current Sampling frequency / Season	Every twelve days; after April 27, 2013 every six days
Probe height	3.1 meters above the ground on a platform located in a city water well site.
Degrees of unrestricted air flow	270, from 290 to 200, includes predominant wind direction from 135 (SE)
Distance from supporting structure	2.08 meters
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/ Schedule / Collocated monitor type	1.2 meters /Every twelve days (after April 27, 2013 every six days) / R&P 2000 then R& P 2025 after Sept. 15, 2014
Nearest roads distance & direction to monitor / ADT	Arizona State Route 77 runs north - south 0.5 kilometers to the east, providing six lanes of heavily used arterial routing with a 2012 ADT of 44,000.
	River Road runs east – west 0.5 kilometers to the north, with a 2010 ADT of 38,000.
Suitable for comparison to $PM_{2.5}$ NAAQS	Yes
Site meets 40 CFR 58, Appx. A,C,D,E	Yes

Comments: This is the collocated monitor for Children's Park NCore $PM_{2.5}$.

Site Name	CHILDREN'S PARK NCore
Pollutant	**PM Coarse PM_{10}-$PM_{2.5}$ (Other)**
Method Code	176
Number of monitors	2
Parameter code / POC	86101/ 1
Basic monitoring objective / Statement of Purpose	Research support / NCore requirement
Site Type	Population exposure
Instrument Manufacturer / Model	R& P Partisol-Plus 2025 Sampler Pair
FRM/FEM/ARM/other	FRM
Collecting agency / Reporting agency	PDEQ/ PDEQ
Analytical Lab	PDEQ
Monitor type	SLAMS
Monitor Network Affiliation	NCore
Scale	Neighborhood
Number of daily observations	111
Number / Dates of exceedances in 2014	0
Historical exceedances	0
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.
Degrees of unrestricted air flow	290, from 280 to 210, includes predominant wind direction from 135 (SE)
Distance from supporting structure	2.08 meters
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/ schedule / Collocated monitor type	1.2 m / 1 in 3 days / n/a
Nearest roads distance & direction to monitor /ADT	Arizona State Route 77 runs north - south 0.5 kilometers to the east, providing six lanes of heavily used arterial routing with a 2012 ADT of 44,000.
	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: The subtraction method for determining the coarse PM fraction was initiated in 2011, using a matched pair of Partisol- Plus samplers.

Site Name	CHILDREN'S PARK NCore
Pollutant	**$PM_{2.5}$ SPECIATION**
Method code	810
Number of monitors	1
Parameter code / POC	88502/ 5
Basic monitoring objective / Statement of purpose	Research support for the Chemical Speciation Network (CSN)
Site type	Population Exposure
Instrument Manufacturer / Model	Met One Super SASS with URG 3000N / Super SASS on 6/26/14
FRM/FEM/ARM/other	Other
Collecting agency / Reporting agency	**Pima County Department of Environmental Quality/ RTP**
Analytical lab	**RTP**
Monitor type	SLAMS
Monitor Network Affiliation	CSN Supplemental ; NCore
Scale	Neighborhood
Number of daily observations	90
Number / Dates of exceedances in 2014	0
Historical exceedances	0
Current Sampling frequency / Season	Every 3rd day
Probe height	3 meters above the ground on a platform located in a city water well site.
Degrees of unrestricted air flow	290, from 290 to 200, includes predominant wind direction from 135 (SE)
Distance from supporting structure	1.83 meters
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	n/a
Distance from trees	SASS 5.2 meters
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors/ Schedule / Collocated monitor type	Collocation is fulfilled by the National NCore network.
Nearest roads distance & direction to monitor / ADT	Arizona State Route 77 runs north - south 0.5 kilometers to the east, providing six lanes of heavily used arterial routing with a 2012 ADT of 44,000.
	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: Sampling began for $PM_{2.5}$ Speciation in 2000.

Site Name	CHILDREN'S PARK NCore
Pollutant	**CARBON MONOXIDE**
Method code	554
Number of monitors	1
Parameter code / POC	42101/ 1
Basic monitoring objective / Statement of purpose	NAAQS comparison / NCore requirement
Site type	Population Exposure
Instrument Manufacturer / Model	Thermo Scientific / 48i -TLE
FRM/FEM/ARM/other	FRM
Collecting agency / Reporting agency	PDEQ / PDEQ
Analytical lab	n/a
Monitor type	Special Purpose Monitor
Monitor Network Affiliation	NCore
Scale	Neighborhood
Number of houly observations	8150
Number / Dates of standard exceedances in 2014	0
Historical exceedances	0
Current 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/ 11.84 seconds
Degrees of unrestricted air flow	360
Distance from supporting structure	1.70 meters
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	n/a
Distance from trees	14.0 meters
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors/ Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	Arizona State Route 77 runs north - south 0.5 kilometers to the east, providing six lanes of heavily used arterial routing with a 2012 ADT of 44,000.
	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.

Site Name	CHILDREN'S PARK NCore
Pollutant	**OZONE**
Method code	047
Number of monitors	1
Parameter code / POC	44201/ 1
Basic monitoring objective / Statement of purpose	NAAQS comparison / Maintenance of long term ozone monitoring at this location
Site type	Population Exposure
Instrument Manufacturer / Model	Thermo Scientific / 49i
FRM/FEM/ARM/other	FEM
Collecting agency / Reporting agency	PDEQ/ PDEQ
Analytical lab	n/a
Monitor type	SLAMS
Monitor Network Affiliation	NCore
Scale	Neighborhood
Number of daily observations	365
Number / Dates of 8-hour standard exceedances in 2014	One exceedance on June 6, 2014.
Historical exceedances	One in 1999; One in 2002
Current 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 / 5.9 seconds
Degrees of unrestricted air flow	360
Distance from supporting structure	1.73 meters
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/ schedule/collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	Arizona State Route 77 runs north - south 0.5 kilometers to the east, providing six lanes of heavily used arterial routing with a 2012 ADT of 44,000.
	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 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.

Site Name	CHILDREN'S PARK NCore
Pollutant	NITROGEN DIOXIDE
Method code	090
Number of monitors	1
Parameter code / POC	42602/ 1
Basic monitoring objective / Statement of purpose	NAAQS comparison / Maintenance of long term monitoring at this location
Site type	Highest Concentration
Instrument Manufacturer / Model	Ecotech / 9841 T
FRM/FEM/ARM/other	FRM
Collecting agency / Reporting agency	PDEQ / PDEQ
Analytical lab	n/a
Monitor type	Special Purpose
Monitor Network Affiliation	Proposed NCore
Scale	Neighborhood
Number of hourly observations	7285
Number / Dates of standard exceedances in 2014	0
Historical exceedances	0
Current 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 / 9.19 seconds
Degrees of unrestricted air flow	360
Distance from supporting structure	1.70 meters
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/ schedule/collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	Arizona State Route 77 runs north - south 0.5 kilometers to the east, providing six lanes of heavily used arterial routing with a 2012 ADT of 44,000.
	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: The site began monitoring for Nitrogen Dioxide in May, 1998, and is a relocation (1.5 kilometers, northeast) of the Pomona site.

Site Name	CHILDREN'S PARK NCore
Pollutant	**REACTIVE OXIDES OF NITROGEN (NO_Y)**
Method code	574/ 674
Number of monitors	1
Parameter code / POC	42600/ 1
Basic monitoring objective / Statement of purpose	Research support / Comply with NCore requirements
Site type	Population Exposure
Instrument Manufacturer / Model	Thermo Scientific / 42i - Y
FRM/FEM/ARM/other	n/a
Collecting agency / Reporting agency	PDEQ / PDEQ
Analytical lab	n/a
Monitor type	SLAMS
Monitor Network Affiliation	NCore
Scale	neighborhood
Number of daily observations	8562
Number / Dates of standard exceedances in 2014	0
Historical exceedances	0
Current 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 / 0.6 seconds to converter; 6.1 seconds from converter to analyzer.
Degrees of unrestricted air flow	360
Distance from supporting structure	0.36 meters probe to mast; 7.31 meters probe to shelter
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	n/a
Distance from trees	12.8 meters, horizontal, inlet well above tree tops
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors/ schedule/collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	Arizona State Route 77 runs north - south 0.5 kilometers to the east, providing six lanes of heavily used arterial routing with a 2012 ADT of 44,000.
	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: 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.

Site Name	CHILDREN'S PARK NCore
Pollutant	SULFUR DIOXIDE
Method code	560
Number of monitors	1
Parameter code / POC	42401/ 1
Basic monitoring objective / Statement of purpose	NAAQS comparison / Comply with NCore requirements
Site type	Population Exposure
Instrument Manufacturer / Model	Thermo Scientific / 43i - TLE
FRM/FEM/ARM/other	FEM
Collecting agency / Reporting agency	PDEQ / PDEQ
Analytical lab	n/a
Monitor type	SLAMS
Monitor Network Affiliation	NCore
Scale	neighborhood
Number of daily observations	8180
Number / Dates of 1-hour standard exceedances in 2014	0
Historical exceedances	0
Current 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 / 12.1 seconds
Degrees of unrestricted air flow	360
Distance from supporting structure	1.70 meters
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	n/a
Distance from trees	14.0 meters
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors/ Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	Arizona State Route 77 runs north - south 0.5 kilometers to the east, providing six lanes of heavily used arterial routing with a 2012 ADT of 44,000.
	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: Sulfur Dioxide sampling began October 1, 2010 to conform to NCore site requirements.

Site Name	**CHILDREN'S PARK NCore**
Pollutant	**LEAD Primary**
Method Code	110 ICAP spectra (ICP-MS)
Number of monitors	2
Parameter code / POC	14129/ 1
Basic monitoring objective/ Statement of Purpose	NAAQS comparison / Comply with NCore requirements
Site Type	Population exposure
Instrument Manufacturer / Model	Tisch Hi –Vol Plus
FRM/FEM/ARM/other	n/a
Collecting agency / Reporting agency	PDEQ/ PDEQ
Analytical Lab	Pima County Regional Wastewater Reclamation Department (CRAO)
Analytical Instrument / Method	ICAP Spectra (ICP-MS) / EQL-0510-191
Monitor type	SLAMS
Monitor Network Affiliation	Proposed NCore
Scale	Neighborhood
Number of daily observations	58
Number / Dates of rolling three month average standard exceedances in 2014	0
Historical exceedances	0
Current Sampling frequency / Season	Every six days
Probe height	2.0 meters
Degrees of unrestricted air flow	300, from 270 to 210, includes predominant wind direction from 135 (SE)
Distance from supporting structure	n/a
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	n/a
Distance from trees	8.4 meters
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors/ Schedule / Collocated monitor type	2.3 m / 12 days/ Tisch Hi –Vol Plus
Nearest roads distance & direction to monitor / ADT	Arizona State Route 77 runs north - south 0.5 kilometers to the east, providing six lanes of heavily used arterial routing with a 2012 ADT of 44,000. 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

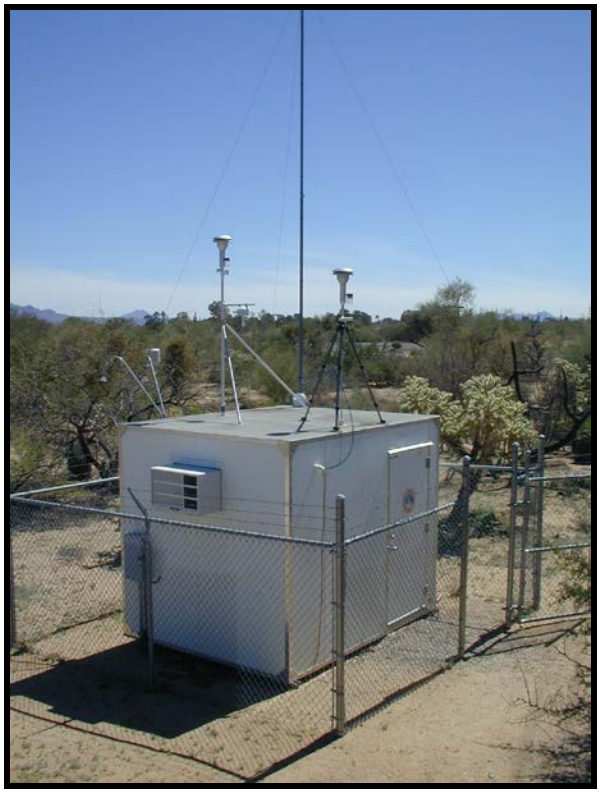
Comments: Lead sampling began February 27, 2012.

Site Name	**CHILDREN'S PARK NCore**
Pollutant	**LEAD QA Collocated**
Method Code	110 ICAP spectra (ICP-MS)
Number of monitors	2
Parameter code / POC	14129 (POC 2 as of March, 2014)
Basic monitoring objective/ Statement of Purpose	Collocated monitor / Comply with NCore requirements
Site Type	Population exposure
Instrument Manufacturer / Model	Tisch Hi –Vol Plus
FRM/FEM/ARM/other	n/a
Collecting agency / Reporting agency	PDEQ/ PDEQ
Analytical Lab	Pima County Regional Wastewater Reclamation Department (CRAO)
Analytical Instrument / Method	ICAP Spectra (ICP-MS) / EQL -0510-191
Monitor type	SLAMS
Monitor Network Affiliation	Proposed NCore
Scale	Neighborhood
Number of daily observations	26
Number / Dates of rolling three month average standard exceedances in 2014	0
Historical exceedances	0
Current Sampling frequency / Season	Every 12 days
Probe height	2.0 m
Degrees of unrestricted air flow	290, from 270 to 200, includes predominant wind direction from 135 (SE)
Distance from supporting structure	n/a
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	n/a
Distance from trees	6.6 meters
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors/ Schedule / Collocated monitor type	2.3 m / 12 days/ Tisch Hi –Vol Plus
Nearest roads distance & direction to monitor / ADT	Arizona State Route 77 runs north - south 0.5 kilometers to the east, providing six lanes of heavily used arterial routing with a 2012 ADT of 44,000.
	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: Lead sampling began February 27, 2012.

Site Name	CHILDREN'S PARK NCore
Pollutant	METEOROLOGICAL DATA
Method code	061, 040, 011
Number of monitors	4
Parameter code / POC	61103, 61104, 62101, 62201
Basic monitoring objective / Statement of purpose	Research support / Source determination for criteria pollutants
Site type	n/a
Instrument Manufacturer / Model	WD/WS –MET ONE 50.5; Temp/RH – VAISALA HMP45
FRM/FEM/ARM/other	n/a
Collecting agency / Reporting agency	PDEQ, PDEQ
Analytical lab	n/a
Monitor type	n/a
Scale	n/a
Number of daily observations	365
Number / Dates of 24-hour standard exceedances in 2014	n/a
Historical exceedances	n/a
Current Sampling frequency / Season	continuous
Probe height	WD/WS – 10m ; Temp/RH – 4.25m
Degrees of unrestricted air flow	360
Distance from supporting structure	n/a
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	n/a
Distance from trees	WD/WS – 16.5m ; Temp/RH – 12.8m
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors / Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	Arizona State Route 77 runs north - south 0.5 kilometers to the east, providing six lanes of heavily used arterial routing with a 2012 ADT of 44,000.
	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

GREEN VALLEY: AQS # 040191030



Site Description	
Site Name	**GREEN VALLEY**
AQS ID	040191030
Address	601 N. La Canada Drive, Green Valley, AZ
Latitude / Longitude	31.87952 / -110.996440
Elevation	2910
Surrounding landscape	Dirt, sparse desert vegetation
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.

Monitoring Information

Site Name	GREEN VALLEY
Pollutant	**PM_{10}**
Method code	079
Number of monitors	1
Parameter code / POC	81102/1
Basic monitoring objective / Statement of purpose	NAAQS comparison / Provide air pollution data to the public in a timely matter
Site type	Population Exposure
Instrument Manufacturer / Model	Thermo Scientific TEOM 1400AB
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	336
Number / Dates of 24-hour standard exceedances in 2014	One exceedance on July 25, 2014.
Historical exceedances	April 9, 2013
Current Sampling frequency / Season	Continuous
Probe height	4.25 meters above the ground of the Pima County Government Center.
Degrees of unrestricted air flow	360
Distance from supporting structure	1.63 meters
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	n/a
Distance from trees	12.5 meters
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors / Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	100 meters west of La Canada with a 2010 ADT of 11,000
	0.5 kilometers west of Interstate 19 with a 2011 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. PM_{10} 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. PM_{10} levels were below the health standards in the years 1989 through 2012. In 2013, there was one exceedance that may be considered as an Exceptional Event, dependent on approval from EPA.

Site Name	GREEN VALLEY
Pollutant	**$PM_{2.5}$**
Method code	733
Number of monitors	1
Parameter code / POC	88501/3
Basic monitoring objective / Statement of purpose	Provide air pollution data to the public in a timely matter / Population Exposure
Site type	Population Exposure
Instrument Manufacturer / 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	347
Number / Dates of 24-hour standard exceedances in 2014	0
Historical exceedances	0
Current Sampling frequency / Season	Continuous
Probe height	4.8 meters above the ground on a shelter
Degrees of unrestricted air flow	360
Distance from supporting structure	2.03 meters
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	n/a
Distance from trees	10.7 meters
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors / Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	100 meters west of La Canada with a 2010 ADT of 11,000
	0.5 kilometers west of Interstate 19 with a 2011 ADT of 31,000
Suitable for comparison to $PM_{2.5}$ NAAQS	No
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 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.

Site Name	GREEN VALLEY
Pollutant	**OZONE**
Method code	047
Number of monitors	1
Parameter code / POC	44201/1
Basic monitoring objective / Statement of purpose	NAAQS comparison / Provide air pollution data to the public in a timely matter
Site type	Population Exposure
Instrument Manufacturer / Model	Thermo Scientific / 49c then 49i October 6, 2014
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	365
Number / Dates of 8-hour standard exceedances in 2014	0
Historical exceedances	0
Current Sampling frequency / Season	Continuous
Probe height	3.1 meters above the ground on a shelter
Probe material / Residence time	FEP Teflon / 7.95 seconds
Degrees of unrestricted air flow	360
Distance from supporting structure	0.81 meters
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	n/a
Distance from trees	8.5 meters
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors/ Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	100 meters west of La Canada with a 2010 ADT of 11,000
	0.5 kilometers west of Interstate 19 with a 2011 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.

CORONA de TUCSON: AQS # 040190008

Site Description	
Site Name	**CORONA de TUCSON**
AQS ID	040190008
Address	22001 S. Houghton Road, Tucson, AZ
Latitude / Longitude	32.00474 / -110.79260
Elevation	3078
Surrounding landscape	Gravel within enclosure; dirt, sparse desert vegetation surrounding
Location description	This site is situated in an undisturbed natural desert area.

Monitoring Information

Site Name	CORONA de TUCSON
Pollutant	PM_{10}
Method code	126
Number of monitors	1
Parameter code / POC	81102/ 1
Basic monitoring objective / Statement of purpose	NAAQS comparison / Upwind Background
Site type	Upwind Background
Instrument Manufacturer/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	60
Number / Dates of 24-hour standard exceedances in 2014	0
Historical exceedances	0
Current Sampling frequency / Season	Every sixth day
Probe height	2.08 meters
Degrees of unrestricted air flow	360
Distance from supporting structure	n/a
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	n/a
Distance from trees	23.4 meters
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors/ Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	1.6 kilometers west of Houghton Road with a 2010 ADT of 9,000.
Site meets 40 CFR 58, Appx. A,C,D,E	Yes

Comments: This site is the only regional scale monitor in the network. PM_{10} 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 PM_{10} was substituted with dichotomous sampling during the last quarter of 1989 in support of the state sponsored Tucson PM_{10} Source Apportionment Study. Hi - Vol PM_{10} sampling resumed in January 1990. Low -Vol PM_{10} R& P 2000 sampling began in March, 2006.

ORANGE GROVE: AQS # 040190011

Site Description	
Site Name	**ORANGE GROVE**
AQS ID	040190011
Address	3401 W. Orange Grove Road, Tucson, AZ
Latitude / Longitude	32.32255 / -111.037700
Elevation	2234
Surrounding landscape	Gravel in fenced compound, dirt road shoulders
Location description	This site is situated in a residential area with light commerce and industry. There is an asphalt batch plant and redi-mix concrete operations with a large gravel pit less than three kilometers to the west of the site in the Santa Cruz River bed area.

Monitoring Information

Site Name	ORANGE GROVE
Pollutant	PM_{10} Primary
Method code	127
Number of monitors	2
Parameter code / POC	81102/ 2
Basic monitoring objective / Statement of purpose	NAAQS Comparison / Highest Concentration
Site type	Highest Concentration
Instrument Manufacturer/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	348
Number / Dates of 24-hour standard exceedances in 2014	One exceedance on July 25, 2014
Historical exceedances	Exceedances of the 24 – hour standard: two in 1988, four in 1999, one in 2002, one in 2003, one in 2009 ; one in 2014
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	2.2 meters above the ground in a city water well site
Degrees of unrestricted air flow	360
Distance from supporting structure	n/a
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	n/a
Distance from trees	19.2 meters
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors / Schedule / Collocated monitor type	1.2 meters /Every day ; reported every 6th day/ R& P 2025 Sequential
Nearest roads distance & direction to monitor / ADT	37 meters west of Camino de la Tierra with a 2010 ADT of 3000 and 70 meters south of Orange Grove Road with a 2010 ADT of 37,000
	2 kilometers east of Interstate 10 with a 2012 ADT of 110,000
Site meets 40 CFR 58, Appx. A,C,D,E	Yes

Comments: Established in February 1985, this site is the oldest of the PM_{10} monitoring sites in the network. Orange Grove was chosen as the initial PM_{10} 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 PM_{10} 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.

Site Name	**ORANGE GROVE**
Pollutant	PM_{10} Collocated
Method code	127
Number of monitors	2
Parameter code / POC	81102 (POC 4 as of March, 2014)
Basic monitoring objective / Statement of purpose	Collocation information
Site type	Highest Concentration
Instrument Manufacturer/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	350
Number / Dates of 24-hour standard exceedances in 2014	One exceedance July 25, 2014
Historical exceedances	One in 2002; one in 2009; one in 2014
Current Sampling frequency / Season	Every 6th day
Probe height	2.2 meters above the ground in a city water well site
Degrees of unrestricted air flow	360
Distance from supporting structure	n/a
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	n/a
Distance from trees	19.2 meters
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors / Schedule / Collocated monitor type	1.2 meters /Every day ; reported every 6th day/ R& P 2025 Sequential
Nearest roads distance & direction to monitor / ADT	37 meters west of Camino de la Tierra with a2010 ADT of 3000 and 70 meters south of Orange Grove Road with a 2010 ADT of 37,000
	2 kilometers east of Interstate 10 with a 2012 ADT of 110,000
Site meets 40 CFR 58, Appx. A,C,D,E	Yes

Site Name	**ORANGE GROVE**
Pollutant	**$PM_{2.5}$**
Method code	118
Number of monitors	1
Parameter code / POC	88101/ 1
Basic monitoring objective / Statement of purpose	NAAQS Comparison / Highest expected concentration
Site type	Population Exposure
Instrument Manufacturer / 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	120
Number / Dates of 24-hour standard exceedances in 2014	0
Historical exceedances	0
Current Sampling frequency / Season	Every three days sampling
Probe height	2.1 meters above the ground in a city water well site
Degrees of unrestricted air flow	360
Distance from supporting structure	n/a
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	n/a
Distance from trees	20.3 meters
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors / Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	37 meters west of Camino de la Tierra with a 2010 ADT of 3000 and 70 meters south of Orange Grove Road with a 2010 ADT of 37,000
	2 kilometers east of Interstate 10 with a 2012 ADT of 110,000
Suitable for comparison to $PM_{2.5}$ 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, 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.

SOUTH TUCSON: AQS # 040191001

Site Description	
Site Name	**SOUTH TUCSON**
AQS ID	040191001
Address	1601 S. 6th Avenue, South Tucson, AZ
Latitude / Longitude	32.20195 / -110.967900
Elevation	2420
Surrounding landscape	Primarily paved parking lots; gravel and desert landscaping surrounding building.
Location description	This site is situated in a dense residential / commercial area. There are numerous unpaved alleys and lots in the vicinity.

Comments: From January 1985 to September 1988 this site approached or exceeded TSP standards. PM_{10} 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 PM_{10} samplers have been operational at this site from June 1991 to June 1999. Co-location of the PM_{10} 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.

Monitoring Information

Site Name	SOUTH TUCSON
Pollutant	**PM_{10}** Primary
Method code	127
Number of monitors	2
Parameter code / POC	81102 /1
Basic monitoring objective / Statement of purpose	NAAQS Comparison / Population Exposure
Site type	Population Exposure
Instrument Manufacturer / 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	351
Number / Dates of 24-hour standard exceedances in 2014	0
Historical exceedances	Exceedances of the 24 – hour standard: two in 1999; two in 2002; one in 2009; two in 2013
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.
Degrees of unrestricted air flow	360
Distance from supporting structure	2.2 meters
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/ Schedule / Collocated monitor type	1.7 meters/ Every day; reported every 6th day/ R&P 2025 Sequential
Nearest roads distance & direction to monitor / ADT	41 meters east of South 6th Avenue with a 2012 ADT of 15,000
	528 meters south of 22nd Street with a 2012 ADT of 34,000
Site meets 40 CFR 58, Appx. A,C,D,E	Yes

Site Name	**SOUTH TUCSON**
Pollutant	**PM_{10}** Collocated
Method code	127
Number of monitors	2
Parameter code / POC	81102 (POC 2 as of March, 2014)
Basic monitoring objective / Statement of purpose	Collocation sampling information
Site type	Population Exposure
Instrument Manufacturer / 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	361
Number / Dates of 24-hour standard exceedances in 2014	One exceedance: July 25, 2014
Historical exceedances	One in 1999; one in 2013; one in 2014
Current Sampling frequency / Season	Every 6th day
Probe height	6.9 meters above the ground on the roof of the South Tucson Governmental Complex Building.
Degrees of unrestricted air flow	360
Distance from supporting structure	2.2 meters
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/ Schedule / Collocated monitor type	1.7 meters/ Every day; reported every 6th day/ R&P 2025 Sequential
Nearest roads distance & direction to monitor / ADT	41 meters east of South 6th Avenue with a 2012 ADT of 15,000
	528 meters south of 22nd Street with a 2012 ADT of 34,000
Site meets 40 CFR 58, Appx. A,C,D,E	Yes

PRINCE ROAD: AQS # 040191009

Site Description	
Site Name	**PRINCE ROAD**
AQS ID	040191009
Address	1016 W. Prince Road, Tucson, AZ
Latitude / Longitude	32.272300 / -110.989100
Elevation	2315
Surrounding landscape	Primarily paved parking lots, buildings and streets surrounding building.
Location description	This site is situated in a dense residential / commercial area. Numerous unpaved alleys and lots are in the vicinity, from about 70 to 250 meters away from the sampler.

Monitoring Information

Site Name	PRINCE ROAD
Pollutant	**PM_{10}**
Method code	126
Number of monitors	1
Parameter code / POC	81102/ 1
Basic monitoring objective / Statement of purpose	NAAQS Comparison / Source Impact
Site type	Source Impact
Instrument Manufacturer / 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	10
Number / Dates of 24-hour standard exceedances in 2014	0
Historical exceedances	0
Current Sampling frequency / Season	Every sixth day
Probe height	4.6 meters above the ground on the roof of a small commercial building.
Degrees of unrestricted air flow	360
Distance from supporting structure	2.01 meters
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 / Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	14.1 meters north of Prince Road with a 2010 ADT of 23,000
Site meets 40 CFR 58, Appx. A,C,D,E	Yes

Comments: This site is located in a homogenous, dense, residential / commercial area in north central Tucson. PM_{10} 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 PM_{10} R& P 2000 sampler. **This site was discontinued March, 2014.**

SANTA CLARA SCHOOL: AQS# 040191026

Site Description	
Site Name	**SANTA CLARA SCHOOL**
AQS ID	040191026
Address	6910 S. Santa Clara Avenue, Tucson, AZ
Latitude / Longitude	32.125950 / -110.982600
Elevation	2540
Surrounding landscape	Large flat roof, paved parking lots and streets, grass playground.
Location description	This site is situated in a Southwest Tucson residential district.

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.

Monitoring Information

Site Name	**SANTA CLARA SCHOOL**
Pollutant	**PM_{10}**
Method code	126
Number of monitors	1
Parameter code / POC	81102 /1
Basic monitoring objective / Statement of purpose	NAAQS Comparison / Population Exposure
Site type	Population Exposure
Instrument Manufacturer / 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	59
Number / Dates of 24-hour standard exceedances in 2014	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.
Degrees of unrestricted air flow	360
Distance from supporting structure	2.01 meters (to roof)
Distance from obstruction on roof	n/a
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 / Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	450 meters east of Interstate 19 with a 2012 ADT of 38,000
	800 meters south of Valencia Road with a 2010 ADT of 53,000
Site meets 40 CFR 58, Appx. A,C,D,E	Yes

TANGERINE: AQS # 040191018

Site Description	
Site Name	**TANGERINE**
AQS ID	040191018
Address	12101 N. Camino de Oeste, Tucson, AZ
Latitude / Longitude	32.425250 / -111.063500
Elevation	2638
Surrounding landscape	Dirt, sparse desert vegetation to the east; high density, tri –level multi – unit apartments directly west of station.
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 35 meters to the west, and low density residential developments are encroaching from the south, east and north to within 3 kilometers to 5 kilometers.

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Monitoring Information

Site Name	TANGERINE
Pollutant	**PM_{10}**
Method code	126
Number of monitors	1
Parameter code / POC	81102/ 1
Basic monitoring objective / Statement of purpose	NAAQS Comparison / General Background *
Site type	General Background
Instrument Manufacturer / 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	61
Number / Dates of 24-hour standard exceedances in 2014	0
Historical exceedances	0
Current Sampling frequency / Season	Every sixth day
Probe height	4.5 meters above the ground on a shelter on Tucson's far northwest side
Degrees of unrestricted air flow	360
Distance from supporting structure	2.01 meters (to roof)
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 / schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	Tangerine Road runs approximately east – west 70 meters south of the site with a 2011 ADT of 5,000
Site meets 40 CFR 58, Appx. A,C,D,E	Yes

* See comment on page 3, PDEQ's anticipated modifications to network in 2015

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. PM_{10} data from these samplers was used to supplement the existing PM_{10} network from October 1996 to December 1998, when the dichotomous samplers were relocated and a Hi-Vol sampler was installed to continue PM_{10} monitoring. In 2005, the Hi-Vol PM_{10} sampler was replaced with a Low –Vol R& P 2000 sampler.

Site Name	**TANGERINE**
Pollutant	**OZONE**
Method code	047
Number of monitors	1
Parameter code / POC	44201 / 1
Basic monitoring objective / Statement of purpose	NAAQS comparison / Highest Concentration *
Site type	Highest Concentration
Instrument Manufacturer / Model	Thermo Scientific / 49c
FRM/FEM/ARM/other	FEM
Collecting agency / Reporting agency	PDEQ/ PDEQ
Analytical lab	n/a
Monitor type	Special Purpose
Scale	Urban
Number of daily observations	365
Number / Dates of 8-hour standard exceedances in 2014	One exceedance on June 6, 2014
Historical exceedances	One in 2002; One in 2009; one in 2014
Current 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 / 8.5 seconds
Degrees of unrestricted air flow	360
Distance from supporting structure	1.24 meters
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/ Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	Tangerine Road runs approximately east – west 70 meters south of the site with a 2011 ADT of 5,000
Site meets 40 CFR 58, Appx. A,C,D,E	Yes

* See comment on page 3, PDEQ's anticipated modifications to network in 2015

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.

GERONIMO: AQS # 040191113

Site Description	
Site Name	**GERONIMO**
AQS ID	040191113
Address	2498 N. Geronimo Tucson, AZ
Latitude / Longitude	32.251840 / -110.965300
Elevation	2398
Surrounding landscape	Dirt, dead shrubs, unpaved road shoulders
Location description	This site is situated in a residential area in a City of Tucson water well site.

Monitoring Information

Site Name	**GERONIMO**
Pollutant	**PM_{10}**
Method code	122
Number of monitors	1
Parameter code / POC	81102 / 1
Basic monitoring objective / Statement of purpose	NAAQS Comparison / Provide air pollution data to the public in a timely matter
Site type	Population Exposure
Instrument Manufacturer / Model	Met One BAM 1020
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	354
Number / Dates of 24-hour standard exceedances in 2014	One exceedance July 25, 2014
Historical exceedances	One on 7/22/2009; one on 04/09/2013; one on 07/25/2014
Current Sampling frequency / Season	Every day; Hourly
Probe height	4.6m
Degrees of unrestricted air flow	360
Distance from supporting structure	1.83 meters
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/ Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	154.8 meters north of Grant Road with a 2012 ADT 32,000
	617.6 meters east of Stone Avenue with a 2012 ADT 21,000
	397.5 meters west of North 1st Avenue with a 2011 ADT 34,000
Site meets 40 CFR 58, Appx. A,C,D,E	Yes

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. There was one exceedance on April 9, 2013 that may be considered as an Exceptional Event dependant on approval from EPA.

Site Name	GERONIMO
Pollutant	**$PM_{2.5}$**
Method code	733
Number of monitors	1
Parameter code / POC	88501 /3
Basic monitoring objective / Statement of purpose	Provide air pollution data to the public in a timely matter / Population Exposure
Site type	Population Exposure
Instrument Manufacturer / 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	343
Number / Dates of 24-hour standard exceedances in 2014	0
Historical exceedances	0
Current Sampling frequency / Season	Continuous
Probe height	4.6 meters
Degrees of unrestricted air flow	360
Distance from supporting structure	1.98 meters
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/ Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	154.8 meters north of Grant Road with a 2012 ADT 32,000
	617.6 meters east of Stone Avenue with a 2012 ADT 21,000
	397.5 meters west of North 1st Avenue with a 2011 ADT 34,000
Suitable for comparison to $PM_{2.5}$ NAAQS	No
Site meets 40 CFR 58, Appx. A,C,D,E	Yes

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.

ROSE ELEMENTARY: AQS # 040191032

Site Description	
Site Name	**ROSE ELEMENTARY**
AQS ID	040191032
Address	710 W. Michigan, Tucson, AZ
Latitude / Longitude	32.173 / -110.980115
Elevation	2438
Surrounding landscape	Grass playground
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.

Monitoring Information

Site Name	ROSE ELEMENTARY
Pollutant	**$PM_{2.5}$**
Method code	733
Number of monitors	1
Parameter code / POC	88501 /3
Basic monitoring objective / Statement of purpose	Provide air pollution data to the public in a timely matter / Population Exposure
Site type	Population Exposure
Instrument Manufacturer / 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	336
Number / Dates of 24-hour standard exceedances in 2014	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
Degrees of unrestricted air flow	360
Distance from supporting structure	2.39 meters
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/ Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	12^{th} Avenue 235 meters to the east with a 2011 ADT of 22,000
	Ajo Way 528 meters to the north with a 2012 ADT of 28, 000
	Interstate 19 runs north-south half a kilometer to the west with a 2012 ADT 80,000
Suitable for comparison to $PM_{2.5}$ NAAQS	No
Site meets 40 CFR 58, Appx. A,C,D,E	Yes

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.

Site Name	ROSE ELEMENTARY
Pollutant	**OZONE**
Method code	047
Number of monitors	1
Parameter code / POC	44201/ 1
Basic monitoring objective / Statement of purpose	NAAQS comparison / Provide air pollution data to the public in a timely matter
Site type	Population Exposure
Instrument Manufacturer / Model	Thermo Scientific / 49i
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	365
Number / Dates of 8-hour standard exceedances in 2014	0
Historical exceedances	0
Current 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 / 9.5 seconds
Degrees of unrestricted air flow	360
Distance from supporting structure	1.63 meters
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/ Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	12th Avenue 235 meters to the east with a 2011 ADT of 22,000
	Ajo Way 528 meters to the north with a 2012 ADT of 28, 000
	Interstate 19 runs north-south half a kilometer to the west with a 2012 ADT 80,000
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.

COACHLINE: AQS # 040191034

Site Description	
Site Name	**COACHLINE**
AQS ID	040191034
Address	9597 N. Coachline, Tucson, AZ
Latitude / Longitude	32.380820 / -111.127160
Elevation	2104
Surrounding landscape	Dirt within walled compound, residential neighborhood
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.

Monitoring Information

Site Name	**COACHLINE**
Pollutant	**$PM_{2.5}$**
Method code	733
Number of monitors	1
Parameter code / POC	88501/ 3
Basic monitoring objective / Statement of purpose	Provide air pollution data to the public in a timely matter / Population Exposure
Site type	Population Exposure
Instrument Manufacturer / 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	351
Number / Dates of 24-hour standard exceedances in 2014	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
Degrees of unrestricted air flow	270, from 260 to 170, includes predominant wind direction from 135 (SE)
Distance from supporting structure	2.39 meters
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	9.41 meters
Distance from trees	5.0 meters
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors/ Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	approximately 1.25 kilometers west of Interstate 10 with a 2012 ADT of 77,000
	.5 kilometer north of Silverbell Road 2010 ADT of 26,000
Suitable for comparison to $PM_{2.5}$ NAAQS	No
Site meets 40 CFR 58, Appx. A,C,D,E	Yes

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.

Site Name	COACHLINE
Pollutant	**OZONE**
Method code	047
Number of monitors	1
Parameter code / POC	44201 / 1
Basic monitoring objective / Statement of purpose	NAAQS comparison / Provide air pollution data to the public in a timely matter
Site type	Population Exposure
Instrument Manufacturer/Model	Thermo Scientific / 49i
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	365
Number / Dates of 8-hour standard exceedances in 2014	0
Historical exceedances	0
Current 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 / 9.3 seconds
Degrees of unrestricted air flow	290, from 250 to 170, includes predominant wind direction from 135 (SE)
Distance from supporting structure	0.91 meters
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	n/a
Distance from trees	5.3 meters
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors/ Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	approximately 1.25 kilometers west of Interstate 10 with a 2012 ADT of 77,000
	.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.

22ND STREET & CRAYCROFT: AQS # 040191011

Site Description	
Site Name	**22ND STREET & CRAYCROFT**
AQS ID	040191011/ 1
Address	1237 S. Beverly Avenue, Tucson, AZ
Latitude / Longitude	32.204420 / -110.878067
Elevation	2582
Surrounding landscape	Dirt, ephemeral weeds
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.

Monitoring Information

Site Name	22ND STREET & CRAYCROFT
Pollutant	**CARBON MONOXIDE**
Method code	158
Number of monitors	1
Parameter code / POC	42101 /1
Basic monitoring objective / Statement of purpose	NAAQS comparison / Population Exposure
Site type	Population Exposure
Instrument Manufacturer / Model	Horiba / APMA370
FRM/FEM/ARM/other	FRM
Collecting agency / Reporting agency	PDEQ / PDEQ
Analytical lab	n/a
Monitor type	SLAMS
Scale	Neighborhood
Number of hourly observations	8467
Number / Dates of standard exceedances in 2014	0
Historical exceedances	0
Current 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 / 5.3 seconds
Degrees of unrestricted air flow	360
Distance from supporting structure	0.91meters
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/ Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	260 meters west is Craycroft Road with a 2012 ADT of 34,000
	260 meters north is 22nd Street with a 2012 ADT of 48,000
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.

Site Name	**22ND STREET & CRAYCROFT**
Pollutant	**OZONE**
Method code	047
Number of monitors	1
Parameter code / POC	44201 /1
Basic monitoring objective / Statement of purpose	NAAQS comparison / Maintenance of long term monitoring at this location
Site type	Population Exposure
Instrument Manufacturer / Model	Thermo Scientific / 49i
FRM/FEM/ARM/other	FEM
Collecting agency / Reporting agency	PDEQ / PDEQ
Analytical lab	n/a
Monitor type	SLAMS
Scale	Neighborhood
Number of daily observations	365
Number / Dates of 8-hour standard exceedances in 2014	0
Historical exceedances	One in 1997, 1999, 2002, 2011
Current 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 / 8.1 seconds
Degrees of unrestricted air flow	360
Distance from supporting structure	0.91meters
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/ Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	260 meters west is Craycroft Road with a 2012 ADT of 34,000
	260 meters north is 22nd Street with a 2012 ADT of 48,000
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.

Site Name	22ND STREET & CRAYCROFT
Pollutant	NITROGEN DIOXIDE
Method code	157
Number of monitors	1
Parameter code / POC	42602 /1
Basic monitoring objective / Statement of purpose	NAAQS comparison / Maintenance of long term monitoring at this location
Site type	Population Exposure
Instrument Manufacturer / Model	Horiba / APNA -370
FRM/FEM/ARM/other	FRM
Collecting agency / Reporting agency	PDEQ / PDEQ
Analytical lab	n/a
Monitor type	SLAMS
Scale	Neighborhood
Number of hourly observations	8658
Number / Dates of standard exceedances in 2014	0
Historical exceedances	0
Current 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 / 7.5 seconds
Degrees of unrestricted air flow	360
Distance from supporting structure	0.91meters
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/ Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	260 meters west is Craycroft Road with a 2012 ADT of 34,000
	260 meters north is 22nd Street with a 2012 ADT of 48,000
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.

22ND STREET & ALVERNON: AQS # 040191014

Site Description	
Site Name	**22ND STREET & ALVERNON**
AQS ID	040191014
Address	3895 E. 22nd Street, Tucson, AZ
Latitude / Longitude	32.207390 / -110.910650
Elevation	2516
Surrounding landscape	Gravel in walled compound, paved streets and sidewalks
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.

Monitoring Information

Site Name	22ND STREET & ALVERNON
Pollutant	**CARBON MONOXIDE**
Method code	174
Number of monitors	1
Parameter code / POC	42101 / 1
Basic monitoring objective / Statement of purpose	NAAQS comparison / Highest Concentration
Site type	Highest Concentration
Instrument Manufacturer / Model	Ecotech / Serinus 30
FRM/FEM/ARM/other	FRM
Collecting agency / Reporting agency	PDEQ / PDEQ
Analytical lab	n/a
Monitor type	SLAMS
Scale	Microscale
Number of hourly observations	8430
Number / Dates of standard exceedances in 2014	0
Historical exceedances	Years: 1975 - 1986 and 1988
Current Sampling frequency / Season	Continuous
Probe height	3.4 meters above the ground attached to a wall near 22nd Street at a Tucson Water well site
Probe material / Residence time	FEP Teflon / 24.4 seconds
Degrees of unrestricted air flow	360, includes predominant wind direction from 135 (SE; directly from intersection of 22nd St. and Alvernon Way).
Distance from supporting structure	.4 meters
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	2.0 meters
Distance from trees	10.7 meters
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors/ Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	60 meters west of Alvernon Way with a 2012 ADT of 31,000
	10 meters north of 22nd Street with a 2012 ADT of 43,000
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, 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 2014.

CHERRY & GLENN: AQS # 040191021

Site Description	
Site Name	**CHERRY & GLENN**
AQS ID	040191021
Address	2745 N. Cherry Avenue, Tucson, AZ
Latitude / Longitude	32.25658 / -110.948650
Elevation	2400
Surrounding landscape	Gravel in fenced compound, paved parking lot, streets
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.

Monitoring Information

Site Name	CHERRY & GLENN
Pollutant	**CARBON MONOXIDE**
Method code	054
Number of monitors	1
Parameter code / POC	42101 /1
Basic monitoring objective / Statement of purpose	NAAQS comparison / Population Exposure
Site type	Population Exposure
Instrument Manufacturer / Model	Thermo Scientific / 48c
FRM/FEM/ARM/other	FRM
Collecting agency / Reporting agency	PDEQ/ PDEQ
Analytical lab	n/a
Monitor type	Special Purpose
Scale	Neighborhood
Number of hourly observations	4342
Number / Dates of standard exceedances in 2014	0
Historical exceedances	0
Current Sampling frequency / Season	Continuous / Seasonal monitor operation from Jan 1- March 31 and Oct.1 – Dec. 31
Probe height	4.9 meters above the ground on a shelter in a city water well site.
Probe material / Residence time	FEP Teflon / 5.47 seconds
Degrees of unrestricted air flow	360
Distance from supporting structure	0.91meters
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/ Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	0.8 kilometers north of Grant Road with a 2012 ADT of 43,000
	0.5 kilometers west of Campbell Avenue with a 2012 ADT of 33,000.
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.

GOLF LINKS & KOLB: AQS # 040191031

Site Description	
Site Name	**GOLF LINKS & KOLB**
AQS ID	040191031
Address	2601 South Kolb Road
Latitude / Longitude	32.191180 / -110.840550
Elevation	2692
Surrounding landscape	Dirt lot and easement, paved street
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.

Monitoring Information

Site Name	GOLF LINKS & KOLB
Pollutant	**CARBON MONOXIDE**
Method code	093
Number of monitors	1
Parameter code / POC	42101 / 1
Basic monitoring objective / Statement of purpose	NAAQS comparison / Highest Concentration
Site type	Highest Concentration
Instrument Manufacturer / Model	Thermo Scientific / 48c
FRM/FEM/ARM/other	FRM
Collecting agency / Reporting agency	PDEQ/ PDEQ
Analytical lab	n/a
Monitor type	Special Purpose
Scale	Microscale
Number of hourly observations	4248
Number / Dates of standard exceedances in 2014	0
Historical exceedances	0
Current Sampling frequency / Season	Continuous / Seasonal Monitor operating Jan. 1- March 31 and Oct. 1 – Dec. 31
Probe height	3.0 meters above the ground on a pole located next to Kolb road
Probe material / Residence time	FEP Teflon / 28.96 seconds
Degrees of unrestricted air flow	360
Distance from supporting structure	n/a
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	n/a
Distance from trees	2.7 meters
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors/ Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	100 meters south of Golf Links, with a 2012 ADT of 39,000
	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.

SAGUARO PARK EAST: AQS # 040190021

Site Description	
Site Name	**SAGUARO PARK EAST**
AQS ID	040190021
Address	3905 South Old Spanish Trail, Tucson, AZ
Latitude / Longitude	32.174538 / -110.737116
Elevation	3089
Surrounding landscape	Natural desert
Location description	This site is situated in the National Park. The nearby light residential area has no significant local sources of ozone precursors.

Monitoring Information

Site Name	**SAGUARO PARK EAST**
Pollutant	**OZONE**
Method code	047
Number of monitors	1
Parameter code / POC	44201 /1
Basic monitoring objective / Statement of purpose	NAAQS comparison / Highest Concentration
Site type	Highest Concentration
Instrument Manufacturer / Model	Thermo Scientific / 48c
FRM/FEM/ARM/other	FEM
Collecting agency / Reporting agency	PDEQ/ PDEQ
Analytical lab	n/a
Monitor type	SLAMS
Scale	Neighborhood
Number of daily observations	365
Number / Dates of 8-hour standard exceedances in 2014	One exceedance on June 6, 2014
Historical exceedances	one in 1999, 2003, 2005, 2008; three in 2011; one in 2014
Current 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 / 6.58 seconds
Degrees of unrestricted air flow	360
Distance from supporting structure	1.22 meters
Distance from obstruction on roof	n/a
Distance from obstruction not on roof	n/a – (trailer was removed)
Distance from trees	8.0 meters
Distance to furnace or incinerator flue	n/a
Distance between collocated monitors/ Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	80 meters east to Old Spanish Trail with a 2012 ADT of 7,000
	105 meters south of Escalante with a 2011 ADT of 3,000
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.

FAIRGROUNDS: AQS # 040191020

Site Description	
Site Name	**FAIRGROUNDS**
AQS ID	040191020
Address	11330 S. Houghton Road, Tucson, AZ
Latitude / Longitude	32.047680 / -110.774350
Elevation	3078
Surrounding landscape	Natural desert vegetation on lag gravel
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.

Monitoring Information

Site Name	FAIRGROUNDS
Pollutant	**OZONE**
Method code	047
Number of monitors	1
Parameter code / POC	44201 / 1
Basic monitoring objective / Statement of purpose	NAAQS comparison / Background
Site type	Background
Instrument Manufacturer / Model	Thermo Scientific / 49i
FRM/FEM/ARM/other	FEM
Collecting agency / Reporting agency	PDEQ/ PDEQ
Analytical lab	n/a
Monitor type	Special Purpose
Scale	Urban
Number of daily observations	365
Number / Dates of 8-hour standard exceedances in 2014	0
Historical exceedances	One in 2008 and 2011
Current 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 / 8.64 seconds
Degrees of unrestricted air flow	360
Distance from supporting structure	1.22 meters
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/ Schedule / Collocated monitor type	n/a
Nearest roads distance & direction to monitor / ADT	53 meters west of Houghton road with a 2010 ADT of 9,000
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.

VI. TECHNOLOGY

Monitor Status for the Pima County Network

Gas Monitors, standard NAAQS:

During the five year period since the last Network Assessment, significant progress has been made toward instrument replacement, with emphasis placed on the pollutants of greatest concern. All ozone monitors in the network are Thermo I series units, and most have been purchased within the past two years. CO and NOx at NAAQS stations are Horiba 370 series, and these have been in operation for four years, with absolutely perfect performance.

All replacement monitors purchased are trace level for CO, NOx and SO_2 to conform to current CFR requirements for routine verification concentration levels.

Gas Monitors, trace level:

Trace level monitors installed in the PDEQ NCore site are I series Thermo units and have operated adequately with no significant problems since deployment in mid-2009. The only monitor that has been replaced is the CO monitor, and the original unit is being operated at the 22/Alvernon station, operated on a 0 to 5 ppm scale for improved resolution at the low CO levels typically recorded in the network.

An Ecotech trace NOx monitor was added to the NCore station in June, 2011, replacing the ancient, but still functional API unit.

Particulate Monitors, filter based:

All filter-based particulate monitors are R&P 2000 FRM or 2025 sequential units ranging in age from approximately two months to twelve years. The 2000 FRM units have provided excellent service with minimal difficulties. The 2025 sequential units have been more problematic due to the nature of the filter exchange system and associated pneumatics. PDEQ operates four of these samplers on an every-day schedule, and this has accelerated wear and tear on those units from both a normal operation perspective as well as increased maintenance. The operation and service manuals provided with R&P samplers are superior, partly because of the troubleshooting flowcharts included. Factory support has been less helpful since the acquisition of the R&P product line by Thermo Fisher Scientific and the move of manufacturing operations to Franklin, MA.

Recent acquisitions of Thermo Partisol Plus 2025 I series replacement samplers has proven interesting, if not truly encouraging. The I series platform does away with many of the manual features perfected in the previous series, instead relying on electronic interface for programming. This has produced some operational bugs that complicate the operation of the sampler, and may result in lost samples due to operator error through unforgiving complexity. PDEQ does not see this as an improvement in the sampler, but have limited experience with the new platform at this time, and may come to accept the changes as operators become more familiar with the system.

Particulate Monitors, continuous:

Continuous particulate monitors are Met One BAM 1020 with BGI Sharp Cut Cyclones or Very Sharp Cut Cyclones for $PM_{2.5}$ and both BAM 1020 and Thermo Fisher RP TEOM 1400ab units for PM_{10}. This division of instrument and particle size is based on better performance with the BAM 1020 in the lower $PM_{2.5}$ concentration ranges with the improvements made to qualify the instrument as an FEM, as opposed to the TEOM and the complex, expensive and user-unfriendly FDMS system adapted to the TEOM platform to provide adequate low-concentration $PM_{2.5}$ performance.

Calibration Equipment and Method:

Calibration, gas dilution**:**

Thermo Environmental/Fisher Scientific dynamic gas calibrators are used network-wide for all dilution calibrations. New I series units were purchased in 2014 for the Children's Park NCore station, and the original I series units are being used to replace the older C series units for NAAQS sites. PDEQ has not experienced significant difficulty with any of these units but do not use them for ozone calibrations, and none are equipped with photometers. All are equipped for GPT and have performed well at NAAQS levels; less well for trace DIF (NO_2) levels in the lower concentration ranges. The addition of photometers to the trace units may improve low-end performance, but based on disastrous performance in the past with Thermo ozone calibrators, PDEQ is reluctant to consider this change. These calibrators are capable of remote operation.

As funding becomes available and trace level analyzers are brought on line to conform to current CFR requirements and pollutant concentration levels, gas dilution calibrators and zero air generators will be purchased to provide the lower calibration and routine check concentrations that these analyzers are capable of measuring.

PDEQ air monitoring staff have been consulting with a local manufacturer of mass flow controllers and flow meters, exploring the possibility of streamlining our mass flow controller calibrations and verifications in dynamic gas calibrators, which has traditionally been an exceedingly tedious time-consuming task using soap bubble meters to verify flows. The flow meters produced by Alicat Scientific use pressure differential flow measurement through a laminar flow element, and initial impressions are very positive. It is PDEQ's intention to make the switch to these flow meters for all mass flow calibrations, which can do the same job as a soap bubble meter, in a fraction of the time, with greater accuracy.

Calibration, ozone:

All ozone calibration is done using API model 703E and 703T units, all purchased within the past two years. An API 703T is used as a primary standard, verified annually by California ARB. All field standards are calibrated using the primary standard and a dedicated Thermo 49i master standard. The field standards are transported from site to site on a weekly basis for calibrations, precision, zero and span checks. Since no in situ calibrators are used in the PDEQ ozone network, the transportability factor becomes an issue, and to date API is the only major manufacturer to accommodate those agencies that routinely transport their field standards.

Zero Air Source:

All zero air sources used in the PDEQ network in conjunction with dilution calibration are compressor based with various configurations of catalyst and desiccant. API Model 701 units are used at NAQQS stations. The NCore station uses a Thermo Model 111 that has been modified with a desiccant chamber between the compressor/tank and the scrubber unit, and a final carbon output scrubber. All zero air is filtered upstream of gas calibrator zero air inlets to prevent mass flow controller contamination.

Ozone field standards use activated carbon and desiccant canister portable scrubbers.

Gas Standards:

All gas standards are certified EPA Protocol grade produced by both Airgas in Los Angeles, and Matheson Tri-Gas. As the cylinder contents of the Airgas products depletes, replacement standards will be provided by Matheson Tri-Gas to comply with the current County contract. This transition has not produced any problems, and the products provided by Matheson Tri-Gas have proven to have accurate concentrations. Gas standards used for NCore monitoring are lower concentrations suitable for trace-level dilutions.

Meteorological Calibration Devices:

PDEQ uses sonic anemometers network-wide. Field calibrations are not possible with this type of unit. The units are initially factory calibrated in a closed-loop wind tunnel and provided with calibration documentation. The only field verification possible is with a second co-located unit with recent factory calibration, and static verification by transducer blocking and bagging. Anemometer alignment is performed with a quality compass adjusted annually to the current magnetic declination in Tucson.

Temperature and relative humidity sensors are calibrated using a Vaisala HMK15 calibration kit with certified salt solutions and a NIST traceable thermometer.

Sampling Manifold:

PDEQ does not use sampling manifolds. Sample inlets are FEP teflon tubing installed as short as possible to minimize sample residence time, which is typically less than ten seconds. Inlet tubing is changed routinely to eliminate sample degradation from contamination in the tubing. The NCore station is set up so that all calibration, routine check and audit gases are routed to the probe and are then exposed to the same inlet conditions as the sample air.

Shelter Temperature:

Vaisala HPM45 temperature / RH sensors are installed in all stations to monitor shelter temperature, and relative humidity at BAM stations to facilitate calibration of the RH sensors in the BAMs. The sensor heads are calibrated annually using a Vaisala HMK15 calibration kit with certified salt solutions and a NIST traceable thermometer.

Auditing Equipment:

PDEQ uses dedicated audit equipment and gas standards for all internal audits. The audit gas calibrator used on all NAAQS monitors is an Environics Model 6103 that is new. The NCore station has a dedicated Thermo Scientific Model 146i installed next to the identical site calibrator. Both the audit and site calibrator are plumbed identically using different gas standards of the same concentrations in two segregated racks.

Meteorological audit equipment consists of a dedicated Vaisala HMK15 calibration kit with certified salt solutions and a NIST traceable thermometer for relative humidity and temperature probe audits. Sonic anemometer verifications are done using a co-located sonic anemometer, and transducer blocking and bagging for signal verification. Anemometer alignment verification is performed with a quality compass adjusted annually to the current magnetic declination in Tucson.

Data Acquisition System:

Most NAAQS stations use ESC Model 8816 data loggers configured for analog input signals, and basic fax modems polled through standard telephone lines. This system has been adequate for some time, but will require upgrading to digital-ready loggers as trace-level analyzers are brought on line.

The Children's Park NCore station and the 22/Alvernon CO station have DR DAS Envidas loggers configured for digital inputs from all trace analyzers and analog inputs from meteorological sensors. These loggers are capable of metadata collection and storage, remote diagnostics and either programmed or remote operation. Both loggers are polled through wireless routers.

Automated central polling, data analysis and reporting is done using an Envitech / DR DAS data acquisition suite.