

Annual Monitoring Network Plan Report



June 2016

Clark County Department of Air Quality
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Executive Summary

This document reports the status of the Clark County air monitoring network in 2016, as required by Title 40, Part 58 of the Code of Federal Regulations (CFR). It describes network operation in 2015, changes planned for 2016–2017, and the ways in which Clark County disseminates network data to the public in a timely manner.

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ACRONYMS AND ABBREVIATIONS

AADT	annual average daily traffic
AQS	Air Quality System
CAPS	Cavity Attenuated Phase Shift
CBSA	Core-Based Statistical Area
CFR	Code of Federal Regulations
CO	carbon monoxide
DAQ	Clark County Department of Air Quality
DRR	data requirements rule
EPA	U.S. Environmental Protection Agency
FEM	federal equivalent method
FRM	federal reference method
LPM	liters per minute
MSA	Metropolitan Statistical Area
NAAQS	National Ambient Air Quality Standards
NCore	National Core Multi-Pollutant Monitoring Network
NO _x	oxides of nitrogen
NDEP	Nevada Division of Environmental Protection
NPAP	National Performance Audit Program
O ₃	ozone
PAMS	Photochemical Assessment Monitoring Stations
Pb	lead
PEP	Performance Evaluation Program
PM	particulate matter

PM _{2.5}	particulate matter 2.5 micrometers in diameter or smaller
PM ₁₀	particulate matter 10 micrometers in diameter or smaller
PM Coarse	particulate matter between 2.5 to 10 micrometers in diameter
POC	parameter occurrence code
PQAO	primary quality assurance organization
PWEI	Population Weighted Emissions Index
QA	quality assurance
QC	quality control
RA	Regional Administrator
SIP	State Implementation Plan
SLAMS	State/Local Air Monitoring System
SO ₂	sulfur dioxide
SPM	Special Purpose Monitor
TSP	Total Suspended Particulate
TTP	through-the-probe
µg/m ³	micrograms per cubic meter

1.0 INTRODUCTION

This report serves as a review of the current Clark County Department of Air Quality (DAQ) ambient air monitoring network and as a plan for future network activities. During 2015, the following conditions existed:

1. DAQ operated monitoring instruments to measure ambient concentrations of continuous and filter-based instruments, including continuous and filter-based PM_{2.5}, continuous PM₁₀, ozone (O₃), carbon monoxide (CO), nitrogen oxides (NO, NO₂, NO_x, NO_y), sulfur dioxide (SO₂), and lead (Pb) content from total suspended particulate (TSP).
2. DAQ operated under a quality controlled and quality assured system.
3. DAQ operated visibility instrumentation at the North Las Vegas Airport and M Resort.

Criteria air pollutants are a group of six common air contaminants regulated by the U.S. Environmental Protection Agency (EPA), which developed [National Ambient Air Quality Standards \(NAAQS\)](#) for these pollutants to protect public health and the environment. The six criteria pollutants are O₃, PM_{2.5}/PM₁₀, CO, NO₂, SO₂, and Pb. DAQ submits quarterly all criteria pollutant data, including precision and accuracy data, to the Air Quality System (AQS) database.

Currently, Clark County is designated as attainment/unclassifiable for all pollutants. Portions of Clark County are subject to maintenance plans for PM₁₀, CO, and O₃.

The Las Vegas Valley (Hydrographic Area 212) within Clark County is subject to a maintenance plan for PM₁₀. The area attained the PM₁₀ standard as of December 31, 2006, and EPA issued a "Finding of Attainment" in August 2010. EPA approved the *Request for Redesignation and Maintenance Plan for PM₁₀*, submitted by DAQ in August 2012, with an effective date of November 5, 2014.

DAQ submitted a CO State Implementation Plan (SIP) in 2000. This plan describes the control measures and technologies to bring the Las Vegas Valley into compliance with the CO NAAQS. A Federal Register notice denoting EPA's determination of attainment for CO NAAQS within the Las Vegas Valley was issued in June 2005. A CO Maintenance Plan and request for redesignation to attainment were submitted to EPA in 2008 and approved on September 27, 2010. The Clark County nonattainment area was redesignated attainment effective October 21, 2004.

EPA made the determination that Clark County is in attainment with the 1997 Ozone NAAQS on March 29, 2011. On November 13, 2012, EPA published the proposed rule for Approval of the Maintenance Plan and Redesignation of Clark County for the 1997 8-Hour Ozone Standard. EPA redesignated the area to attainment effective February 7, 2013.

According to the recent data requirements rule (DRR) for the SO₂ NAAQS (dated August 10, 2015) monitoring or modeling requirements apply to sources with $\geq 2,000$ tons per year of emissions. One source, Reid Gardner, exceeded the threshold in 2014. However, three SO₂ emission units were shut down at this facility at the end of 2014, and the source fell below the 2,000 tons per year threshold. SO₂ emissions for the power generating units at Reid Gardner are 487.8 tons per year. Therefore, the DRR requirements are met by DAQ.

Note that the Nevada Division of Environmental Protection (NDEP) is taking charge of the Reid Gardner source because it is under its jurisdiction for permitting, and NDEP will make decisions on how to move forward in compliance with the DRR. DAQ may provide support if needed.

Table 1. SO₂ Emissions for Reid Gardner Units 1-4

Unit	Fuel	SO ₂ (tons)
Reid Gardner Unit 1 (shut down)	Coal	1,502.4
Reid Gardner Unit 2 (shut down)	Coal	265.8
Reid Gardner Unit 3 (shut down)	Coal	252.4
Reid Gardner Unit 4 (still operating)	Coal	487.8

Note: Units 1 through 3 were retired at the end of 2014.

DAQ submitted the 2014 annual data certification to EPA on May 1, 2015, and submitted the 2015 annual data certification in February 2016.

The Nevada Department of Transportation’s most recent annual traffic report, dated 2014, provided traffic count information where available. For those areas where traffic count information was not available, DAQ used nearby traffic counters that measured similar traffic patterns to estimate counts. Where there were no nearby traffic counters or similar traffic patterns, Monitoring personnel’s knowledge of the monitoring site’s traffic pattern was used to estimate traffic counts.

Air quality data is disseminated to the public in a timely manner through the DAQ website and EPA’s AirNow database. DAQ also provides customized data reports upon request.

2.0 MINIMUM MONITORING REQUIREMENTS

The tables below show that the Clark County air quality network meets or exceeds the 2015 minimum requirements of Title 40, Part 58 of the CFR (40 CFR 58). Population census information was obtained from the Clark County Department of Comprehensive Planning 2014 report, which was based on the Metropolitan Statistical Area (MSA) and the Core-Based Statistical Area (CBSA). All PM monitoring instruments are low volume instruments (flow rate of less than 200 liters per minute (LPM)). The exception is the Pb sampler, which is a high volume sampler and has a flow rate of more than 200 LPM. (See Table 2 for flow rate specifics.)

Table 2. Flow Rates for PM Monitoring Instruments

Flow Rates for Low Volume Instruments in LPM	
Met One SASS	6.7
URG	22
All other	16.67
Flow Rate for High Volume Sampler in LPM	
American Ecotech TSP	1,130 (67.8 cubic meters per hour)

Pb sampling is made using a TSP high volume instrument. For all gaseous monitoring operations at all sites, a two-point (zero/span) quality control (QC) check is conducted daily, and a three-point (zero/precision/span) QC check is conducted weekly.

2.1 Ozone

Table 3. Minimum Monitoring Requirements for Ozone

MSA	County	Population & Census Year	8-hr Design Value [ppb], Design Value Years ¹	Design Value Site (name, AQS ID ²)	Number of Required SLAMS Sites ³	Number of Active SLAMS Sites	Number of Additional SLAMS Sites Needed
Las Vegas-Paradise (29820)	Clark, NV	2,102,238 (2014)	75, 2013-15	Joe Neal (32-003-0075), Paul Meyer (32-003-0043)	2	12	0

¹ Design Value Years = the three years for which the design value was calculated (i.e., 2013-2015).

² AQS (site) Identification.

³ SLAMS stands for State/Local Air Monitoring System.

Notes: Monitors required for SIP or maintenance plan: NA.

This network meets the minimum monitoring requirement for the referenced criteria pollutant.

2.2 PM_{2.5}

Table 4. Minimum Monitoring Requirements for PM_{2.5} (FRM and FEM)¹

MSA	County	Population & Census Year	Annual Design Value [$\mu\text{g}/\text{m}^3$], Design Value Years ^{1,2}	Annual Design Value Site (name, AQS ID)	Daily Design Value [$\mu\text{g}/\text{m}^3$], Design Value Years ³	Daily Design Value Site (name, AQS ID)	Number of Required SLAMS Sites	Number of Active SLAMS Sites ⁴	Number of Additional SLAMS Sites Needed
Las Vegas-Paradise (29820)	Clark, NV	2,102,238 (2014)	10.1, 2013-15	Sunrise Acres (32-003-0561)	26, 2013-15	Sunrise Acres (32-003-0561)	2	5 + collocation	0

¹ $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter.

² FRM stands for federal reference method, and FEM stands for federal equivalent method.

³ Design Value Years = the three years for which the design value was calculated (i.e., 2013-2015).

⁴ Meets requirements in 40 CFR 58 Appendix D 4.7.2.

Notes: Monitors required for SIP or maintenance plan: NA

This network meets the minimum monitoring requirement for the referenced criteria pollutant.

2.3 PM₁₀

Table 5. Minimum Monitoring Requirements for PM₁₀

MSA	County	Population & Census Year	Maximum Concentration in 2015 [$\mu\text{g}/\text{m}^3$]	Maximum Concentration Site (name, AQS ID)	Number of Required SLAMS Sites	Number of Active SLAMS Sites	Number of Additional SLAMS Sites Needed
Las Vegas-Paradise (29820)	Clark, NV	2,102,238 (2014)	908 908	Joe Neal (32-003-0075), Jerome Mack (32-003-0540)	6-10	10	0

Notes: Monitors required for SIP or maintenance plan: NA

This network meets the minimum monitoring requirement for the referenced criteria pollutant.

2.4 NO₂

Table 6. Minimum Monitoring Requirements for NO₂

CBSA ¹	Population & Census Year	Max AADT Counts ² (2014)	Number of Required Near-Road Monitors	Number of Active Near-Road Monitors	Number of Additional Near-Road Monitors Needed	Number of Required Area-wide Monitors	Number of Active Area-wide Monitors	Number of Additional Area-wide Monitors Needed
Las Vegas-Paradise-Pahrump (332)	2,102,238 (2014)	267,000	2	2	0	1	2	0

¹ CBSA.

² AADT stands for annual average daily traffic.

Notes: Monitors required for SIP or maintenance plan: NA.

J.D. Smith and Sunrise Acres meet the requirements for area-wide monitors. Sunrise Acres also meets RA 40 requirements (EPA Regional Administrator-required monitors per 40 CFR 58, App. D, Sec. 4.3.4: 1).

Monitors required for Photochemical Assessment Monitoring Station: NA.

Two near-road NO₂ monitors to be operational in 2016.

2.5 SO₂

Table 7. Minimum Monitoring Requirements for SO₂

CBSA	County	Population & Census Year ³	Total SO ₂ ¹ [tons/year]	Population Weighted Emissions Index ² [million persons-tons/year]	Number of Required Monitors	Data Requirements Rule Source(s) Using Monitoring	Number of Active Monitors	Number of Additional Monitors Needed
Las Vegas-Paradise-Pahrump (332)	Clark, NV	2,146,000 (2014)	7,179	15,406	1	0; see Table 1	1	0

¹ Using 2011 National Emissions Inventory data (most currently available; the 2015 data is expected to be lower).

² Calculated by multiplying CBSA population and total SO₂ and dividing product by one million.

³ Used for Population Weighted Emissions Index (PWEI) calculation.

Notes: PWEI, Regional Administrator, and DRR requirements met.

Monitors required for SIP or maintenance plan: NA.

EPA Regional Administrator-required monitors per 40 CFR 58, App. D, Sec. 4.4.3: 0.

This network meets the minimum monitoring requirement for the referenced criteria pollutant.

2.6 CO

Table 8. Minimum Monitoring Requirements for CO

CBSA	Population & Census Year	Number of Required Near-road Monitors	Number of Active Near-road Monitors	Number of Additional Monitors Needed
Las Vegas-Paradise-Pahrump (332)	2,102,238 (2014)	0	0	0

Notes: Monitors required for SIP or maintenance plan: CO monitoring in the Las Vegas Valley is expected for ongoing demonstration of the CO Maintenance Plan. EPA Regional Administrator-required monitors per 40 CFR 58, App. D, Sec. 4.2.2: 0. This network meets the minimum monitoring requirement for the referenced criteria pollutant.

2.7 Pb

The source emission threshold for the ambient source-oriented Pb monitoring requirement is 0.50 tons per year. DAQ has not identified sources that might trigger this requirement, and a preliminary assessment has shown no such sources within Clark County. Therefore, DAQ does not conduct source-oriented Pb monitoring.

Table 9. Minimum Monitoring Requirements for Pb at National Core Multi-Pollutant Monitoring Network (NCore)

NCore Site (name, AQS ID)	CBSA	Population & Census Year	Number of Required Monitors	Number of Active Monitors	Number of Additional Monitors Needed
Jerome Mack Middle School (32-003-0540)	Las Vegas-Paradise-Pahrump (332)	2,102,238 (2014)	1	1	0

Notes: Monitors required for SIP or maintenance plan: NA. This network meets the minimum monitoring requirement for the referenced criteria pollutant.

3.0 COLLOCATED MONITORS AS OF 2016

Table 10. Filter-Based PM_{2.5} FRM Network

Method Code	Number of Primary Monitors, Site	Number of Required Collocated Monitors	Number of Active Collocated Monitors
EQPM-0202-145	1: Jerome Mack	1	1: Collocated at Jerome Mack

Table 11. Continuous PM_{2.5} FEM Network

Method Code	Number of Primary Monitors, Site	Number of Required Collocated Monitors	Number of Active Collocated FRM Monitors	Number of Active Collocated FEM Monitors (same method designation as primary)
EQPM-0609-183	4: J.D. Smith, Green Valley, Sunrise Acres, and Jean	1	1	1: FEM is collocated with FRM at Sunrise Acres

Appendix A of 40 CFR 58 requires 15% of PM_{2.5} FRM and FEM instruments in a network to be collocated. For the PM_{2.5} FRM network (method EQPM-0202-145), the collocated sampler is at the Jerome Mack (NCore) site. For the PM_{2.5} FEM network (method EQPM-0609-183), the collocated sampler is at the Sunrise Acres site. This collocation arrangement meets the Appendix A requirement.

J.D. Smith, Green Valley, Sunrise Acres, and Jean each have a PM_{2.5} continuous FEM monitor that serves as the primary PM_{2.5} monitor for the site.

As outlined 40 CFR 58 Appendix A, PQAOs (primary quality assurance organizations) with only non-source-oriented NCore Pb sites do not have PQA minimum collocation requirements. DAQ meets the non-source-oriented NCore Pb monitoring criteria.

DAQ has no manual PM₁₀ samplers in its network. DAQ has only continuous PM₁₀ monitors in its network, and there are no CFR requirements for collocation of continuous PM₁₀ monitors.

4.0 2015 SITE TABLES



Figure 1: Apex

The primary objective of the Apex site, located approximately 25 miles northeast of Las Vegas, is to monitor the ambient impacts of emissions from nearby processing facilities and power plants. Since the site is generally downwind from Las Vegas, it also serves as an indicator of pollutant transport flow out of the Las Vegas Valley. This site is the only Air Quality monitoring station in the Apex Valley.

Local Site Name (AQS ID)	Apex (32-003-0022)
GPS Coordinates (latitude, longitude)	+36.391111°, -114.907500°
Street Address	12101 Hwy 91, Nevada Las Vegas, NV 89165
Distance to roadways (m)	U.S. Highway 93:108
Traffic counts (AADT, yr)	U.S. Highway 93: 2800 (2014)
Ground cover	Native desert
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, Parameter Occurrence Code (POC)	O₃, 1
Parameter code	44201
Basic monitoring objective(s)	NAAQS comparison
Site type(s)	Regional transport
Network affiliation	NA

Pollutant, Parameter Occurrence Code (POC)	O ₃ , 1
Monitor type(s)	SLAMS
Primary, Quality Assurance (QA) Collocated, or Other	Primary
Instrument manufacturer & model	TAPI 400 series
Method code	EQOA-0992-087
FRM/FEM/ARM/other	FEM
Collecting agency	DAQ
Analytical lab	NA
Reporting agency	DAQ
Spatial scale	Regional
Monitoring start date	01/01/1998
Current sampling frequency	Continuous, seasonal
Calculated sampling frequency	Continuous, seasonal
Sampling season	Year-round
Probe height (m)	3.9
Distance from supporting structure (m)	1.4
Distance from obstructions on roof – horizontal distance (m)	NA
Distance from obstructions on roof – vertical height (m)	NA
Distance from obstructions not on roof – horizontal distance (m)	NA
Distance from obstructions not on roof – vertical height (m)	NA
Distance from trees (m)	NA
Distance to furnace or incinerator flue (m)	NA
Distance between monitors fulfilling QA collocation requirements (m)	NA
Distance to nearest PM instrument (m)	NA
Unrestricted airflow (degrees)	360
Probe material for reactive gases	Teflon
Residence time for reactive gases (s)	2.9
Will there be changes within the next 18 months? (Y/N)	N
Is it suitable for comparison against the annual PM _{2.5} ? (Y/N)	NA
Frequency of flow rate verification for manual PM samplers	NA
Frequency of flow rate verification for automated PM analyzers	NA
Frequency of one-point QC check for gaseous instruments	Daily
Last annual performance evaluation for gaseous parameters	04/29/2015
Last two semiannual flow rate audits for PM monitors	NA

Meteorological measurements at the Apex site include wind speed, wind direction, and ambient temperature.



Figure 2: Boulder City.

The Boulder City site, approximately 25 miles southeast of Las Vegas, was established at the request of Boulder City government officials and residents to serve as an indicator of population exposure to pollutants, particularly O₃ and PM₁₀.

Local Site Name (AQS ID)	Boulder City (32-003-0601)
GPS Coordinates (latitude, longitude)	+35.978056°, -114.846389°
Street Address	1005 Industrial Rd., Boulder City, NV 89005
Distance to roadways (m)	Industrial Rd: 58; U.S. Highway 93: 96
Traffic counts (AADT, yr)	Industrial Rd: 1,400; U.S. Highway 93: 24,500 (2014)
Ground cover	Paved, native desert
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	PM₁₀, 1	O₃, 1
Parameter code	81102	44201
Basic monitoring objective(s)	NAAQS comparison	NAAQS comparison

Pollutant, POC	PM ₁₀ , 1	O ₃ , 1
Site type(s)	Population exposure	Population exposure, regional transport
Network affiliation	NA	NA
Monitor type(s)	SLAMS	SLAMS
Primary, QA Collocated, or Other	Primary	Primary
Instrument manufacturer & model	Thermo 5014i	TAPI 400 series
Method code	EQPM-1102-150	EQOA-0992-087
FRM/FEM/ARM/other	FEM	FEM
Collecting agency	DAQ	DAQ
Analytical lab	NA	NA
Reporting agency	DAQ	DAQ
Spatial scale	Neighborhood	Urban
Monitoring start date	01/01/1998	07/01/1998
Current sampling frequency	Continuous	Continuous
Calculated sampling frequency	Continuous	Continuous
Sampling season	Year-round	Year-round
Probe height (m)	4.9	4.1
Distance from supporting structure (m)	2.1	1.6
Distance from obstructions on roof – horizontal distance (m)	NA	NA
Distance from obstructions on roof – vertical height (m)	NA	NA
Distance from obstructions not on roof – horizontal distance (m)	NA	NA
Distance from obstructions not on roof – vertical height (m)	NA	NA
Distance from trees (m)	NA	NA
Distance to furnace or incinerator flue (m)	NA	NA
Distance between monitors fulfilling QA collocation requirements (m)	NA	NA
Distance to nearest PM instrument (m)	NA	NA
Unrestricted airflow (degrees)	360	360
Probe material for reactive gases	NA	Teflon
Residence time for reactive gases (s)	NA	2.7
Will there be changes within the next 18 months? (Y/N)	Y	Y
Is it suitable for comparison against the annual PM _{2.5} ? (Y/N)	NA	NA
Frequency of flow rate verification for manual PM samplers	NA	NA
Frequency of flow rate verification for automated PM analyzers	Monthly	NA
Frequency of one-point QC check for gaseous instruments	NA	Daily
Last annual performance evaluation for gaseous parameters	NA	05/08/2015
Last two semiannual flow rate audits for PM monitors	03/02/2015, 08/06/2015	NA

The meteorological measurement at the Boulder City site is barometric pressure.



Figure 3: Central Fire Station: Near-Road Site 2.

The Central Fire Station Near-Road site is located in the parking lot of the Central Fire Station, which is southeast of E. Bonanza Road and N. Veterans Memorial Drive. This monitoring station is the second near-road site; DAQ is deploying it in 2016, and it will initially measure NO₂.

Local Site Name (AQS ID)	Central Fire Station (32-003-1502)
GPS Coordinates (latitude, longitude)	+36.174365°, -115.139770°
Street Address	500 N. Casino Center Boulevard, Las Vegas, NV

Local Site Name (AQS ID)	Central Fire Station (32-003-1502)
Distance to roadways (m)	U.S. Highway 93: 16; N. Casino Center Boulevard 120; Bonanza Road:180
Traffic counts (AADT, yr)	U.S. Highway 93: 185,000; N. Casino Center Boulevard 3,900; Bonanza Road: 13,000 (2014)
Ground cover	Paved
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	NO₂, 2
Parameter code	42602
Basic monitoring objective(s)	NAAQS comparison
Site type(s)	Highest concentration
Network affiliation	Near Road
Monitor type(s)	SLAMS
Primary, QA Collocated, or Other	Primary
Instrument manufacturer & model	TAPI 500 series
Method code	EQNA-0514-212
FRM/FEM/ARM/other	FEM
Collecting agency	DAQ
Analytical lab	NA
Reporting agency	DAQ
Spatial scale	Microscale
Monitoring start date	2016
Current sampling frequency	Continuous
Calculated sampling frequency	Continuous
Sampling season	Year-round
Probe height (m)	4 (est.)
Distance from supporting structure (m)	1.2 (est.)
Distance from obstructions on roof – horizontal distance (m)	NA
Distance from obstructions on roof – vertical height (m)	NA
Distance from obstructions not on roof – horizontal distance (m)	NA
Distance from obstructions not on roof – vertical height (m)	NA
Does obstruction(s) not on roof impede flow	No
Obstruction height above probe (m)	NA
Distance from trees (m)	NA
Distance to furnace or incinerator flue (m)	NA
Distance between monitors fulfilling QA collocation requirements (m)	NA
Distance to nearest PM instrument (m)	NA
Unrestricted airflow (degrees)	360
Probe material for reactive gases	Teflon
Residence time for reactive gases (s)	7.5 (est.)
Will there be changes within the next 18 months? (Y/N)	N
Is it suitable for comparison against the annual PM _{2.5} ? (Y/N)	NA

Pollutant, POC	NO ₂ , 2
Frequency of flow rate verification for manual PM samplers	NA
Frequency of flow rate verification for automated PM analyzers	NA
Frequency of one-point QC check for gaseous instruments	Daily
Last annual performance evaluation for gaseous parameters	2016
Last two semiannual flow rate audits for PM monitors	NA

The Central Fire Station Near-Road Site 2 was approved by EPA in 2014. Meteorological measurements at Near-Road Site 2 include wind speed, wind direction, ambient temperature, and barometric pressure.



Figure 4: Green Valley.

The Green Valley site in Henderson was established in response to citizen complaints about dust emissions from a gravel processing plant, and it continues to monitor PM₁₀ and PM_{2.5}. O₃ monitoring was established in 2015.

Local Site Name (AQS ID)	Green Valley (32-003-0298)
GPS Coordinates (latitude, longitude)	+36.048611°, -115.052778°
Street Address	298 Arroyo Grande Blvd., Henderson, NV 89014
Distance to roadways (m)	Santiago Drive: 18; Arroyo Grande Blvd: 198; North Stephanie: 533
Traffic counts (AADT, yr)	Santiago Drive: 3,600; Arroyo Grande Blvd: 9,300; North Stephanie: 32,500 (2014)
Ground cover	Paved, gravel
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	PM₁₀, 1	PM_{2.5} (continuous), 3	O₃, 1
Parameter code	81102	88101	44201
Basic monitoring objective(s)	NAAQS comparison	NAAQS comparison	NAAQS comparison
Site type(s)	Population exposure	Population exposure	Population exposure, regional transport
Network affiliation	NA	NA	NA
Monitor type(s)	SLAMS	SLAMS	SLAMS
Primary, QA Collocated, or Other	Primary	Primary	Primary
Instrument manufacturer & model	Thermo 5014i	Thermo 5014i	TAPI 400 series
Method code	EQPM-1102-150	EQPM-0609-183	EQOA-0992-087
FRM/FEM/ARM/other	FEM	FEM	FEM
Collecting agency	DAQ	DAQ	DAQ
Analytical lab	NA	NA	NA
Reporting agency	DAQ	DAQ	DAQ
Spatial scale	Middle	Middle (area-wide)	Middle
Monitoring start date	01/01/1998	10/01/2013	07/01/2015
Current sampling frequency	Continuous	Continuous	Continuous
Calculated sampling frequency	Continuous	Continuous	Continuous
Sampling season	Year-round	Year-round	Year-round
Probe height (m)	4.7	4.8	4.3
Distance from supporting structure (m)	2.0	2.0	1.6
Distance from obstructions on roof – horizontal distance (m)	NA	NA	NA
Distance from obstructions on roof – vertical height (m)	NA	NA	NA
Distance from obstructions not on roof – horizontal distance (m)	NA	NA	NA
Distance from obstructions not on roof – vertical height (m)	NA	NA	NA
Distance from trees (m)	9.5	9.8	8.0
Distance to furnace or incinerator flue (m)	NA	NA	NA
Distance between monitors fulfilling QA collocation requirements (m)	NA	NA	NA

Pollutant, POC	PM ₁₀ , 1	PM _{2.5} (continuous), 3	O ₃ , 1
Distance to nearest PM instrument (m)	1.8	1.8	NA
Unrestricted airflow (degrees)	360	360	360
Probe material for reactive gases	NA	NA	Teflon
Residence time for reactive gases (s)	NA	NA	2.8
Will there be changes within the next 18 months? (Y/N)	N	N	N
Is it suitable for comparison against the annual PM _{2.5} ? (Y/N)	N	Y	NA
Frequency of flow rate verification for manual PM samplers	NA	NA	NA
Frequency of flow rate verification for automated PM analyzers	Monthly	Monthly	NA
Frequency of one-point QC check for gaseous instruments	NA	NA	Daily
Last annual performance evaluation for gaseous parameters	NA	NA	07/01/2015
Last two semiannual flow rate audits for PM monitors	06/19/2015, 11/04/2015	06/19/2015, 11/04/2015	NA

Meteorological measurements at the Green Valley site include wind speed, wind direction, ambient temperature, and barometric pressure. After the 2014 Annual Network Plan approval, O₃ monitoring at the Green Valley site was established in 2015.



Figure 5: Indian Springs.

Monitoring at Indian Springs was approved as part of the 2015 Annual Network Plan. The O₃ monitor at Indian Springs will help identify high O₃, characterize transport, and fill a spatial gap. Further purpose for this site is provided in the 2015 5-Year Network Assessment. This location is approximately 45 miles northwest of Las Vegas and may provide high O₃ triangulation between Joe Neal and the Las Vegas Paiute Tribe. The Indian Springs site meets Appendix A and E requirements.

Local Site Name (AQS ID)	Indian Springs (32-003-7772)
GPS Coordinates (latitude, longitude)	+36.569333°, -115.676651°
Street Address	668 Gretta Ln., Indian Springs, NV
Distance to roadway (m)	100
Traffic count (AADT, yr)	< 1,000 (2015)
Ground cover	Native desert
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	O₃, 1
Parameter code	44201
Basic monitoring objective(s)	Research support
Site type(s)	Regional transport
Monitor type(s)	SLAMS
Instrument manufacturer & model	TAPI 400 series
Method code	EQOA-0992-087

Pollutant, POC	O ₃ , 1
FRM/FEM/ARM/other	FEM
Collecting agency	DAQ
Analytical lab	NA
Reporting agency	DAQ
Spatial scale	Regional
Monitoring start date	05/11/2010
Current sampling frequency	NA
Calculated sampling frequency	NA
Sampling season	Year-round
Probe height (m)	5
Distance from supporting structure (m)	1.9
Distance from obstructions on roof – horizontal distance (m)	NA
Distance from obstructions on roof – vertical height (m)	NA
Distance from obstructions not on roof – horizontal distance (m)	4.1
Distance from obstructions not on roof – vertical height (m)	1.0 (building/obstruction is below probe)
Obstruction height above probe (m)	NA (probe is above obstruction)
Distance from trees (m)	NA
Distance to furnace or incinerator flue (m)	NA
Distance between collocated monitors (m)	NA
Unrestricted airflow (degrees)	360
Probe material for reactive gases	Teflon
Residence time for reactive gases (s)	3.0
Will there be changes within the next 18 months? (Y/N)	N
Is it suitable for comparison against the annual PM _{2.5} ? (Y/N)	NA
Frequency of flow rate verification for manual PM samplers	NA
Frequency of flow rate verification for automated PM analyzers	NA
Frequency of one-point QC check for gaseous instruments	Daily
Last annual performance evaluation for gaseous parameters	7/27/2015
Last two semiannual flow rate audits for PM monitors	NA



Figure 6: J.D. Smith.

The J.D. Smith site in North Las Vegas replaced the old McDaniel and Post Office PM sites. This site monitors gaseous (NO₂, CO, and O₃) and particulate (PM₁₀ and PM_{2.5}) pollutants using continuous methods. This site also serves as an indicator of population exposure to pollutants.

Local Site Name (AQS ID)	J.D. Smith (32-003-2002)
GPS Coordinates (latitude, longitude)	+36.191111°, -115.123056°
Street Address	1301B Tonopah Ave., North Las Vegas, NV 89030
Distance to roadways (m)	Tonopah Ave: 84; Bruce Street: 175; Stanley Ave: 137
Traffic counts (AADT, yr)	Tonopah Ave: 7,600; Bruce Street: 7,600; Stanley Ave: 450 (2014) (estimated)
Ground cover	Paved, grass
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	PM₁₀, 1	CO, 1	NO₂, 2	O₃, 1	PM_{2.5} (continuous), 3
Parameter code	81102	42101	42602	44201	88101

Pollutant, POC	PM₁₀, 1	CO, 1	NO₂, 2	O₃, 1	PM_{2.5} (continuous), 3
Basic monitoring objective(s)	NAAQS comparison	NAAQS comparison	NAAQS comparison	NAAQS comparison	NAAQS comparison
Site type(s)	Population exposure	Population exposure	Highest concentration	Population exposure	Population exposure
Network affiliation	NA	NA	NA	NA	NA
Monitor type(s)	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS
Primary, QA Collocated, or Other	Primary	Primary	Primary	Primary	Primary
Instrument manufacturer & model	Thermo 5014i	TAPI 300 series	TAPI 500 series	TAPI 400 series	Thermo 5014i
Method code	EQPM-1102-150	RFCA-1093-093	EQNA-0514-212	EQOA-0992-087	EQPM-0609-183
FRM/FEM/ARM/other	FEM	FRM	FEM	FEM	FEM
Collecting agency	DAQ	DAQ	DAQ	DAQ	DAQ
Analytical lab	NA	NA	NA	NA	NA
Reporting agency	DAQ	DAQ	DAQ	DAQ	DAQ
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Monitoring start date	01/01/1998	01/10/1998	01/10/1998	01/10/1998	01/01/2013
Current sampling frequency	Continuous	Continuous	Continuous	Continuous	Continuous
Calculated sampling frequency	Continuous	Continuous	Continuous	Continuous	Continuous
Sampling season	Year-round	Year-round	Year-round	Year-round	Year-round
Probe height (m)	4.6	3.6	3.6	3.6	4.7
Distance from supporting structure (m)	2.1	1.2	1.2	1.2	2.2
Distance from obstructions on roof – horizontal distance (m)	NA	NA	NA	NA	NA
Distance from obstructions on roof – vertical height (m)	NA	NA	NA	NA	NA
Distance from obstructions not on roof – horizontal distance to the obstruction (m)	3.8	4.2	4.2	4.2	5.6
Distance from obstructions not on roof – vertical height of the obstruction (m)	5.7	5.7	5.7	5.7	5.7
Obstruction height above probe (m)	1.1	2.1	2.1	2.1	1.0
Distance from trees (m)	14.7	14.4	14.4	14.4	15.1
Distance to furnace or incinerator flue (m)	NA	NA	NA	NA	NA

Pollutant, POC	PM₁₀, 1	CO, 1	NO₂, 2	O₃, 1	PM_{2.5} (continuous), 3
Distance between monitors fulfilling QA collocation requirements (m)	NA	NA	NA	NA	NA
Distance to nearest PM instrument (m)	2.1	NA	NA	NA	2.1
Unrestricted airflow (degrees)	360	360	360	360	360
Probe material for reactive gases	NA	Teflon	Teflon	Teflon	NA
Residence time for reactive gases (s)	NA	3.8	5.7	3.5	NA
Will there be changes within the next 18 months? (Y/N)	N	N	N	N	N
Is it suitable for comparison against the annual PM _{2.5} ? (Y/N)	N	N	N	N	N
Frequency of flow rate verification for manual PM samplers	NA	NA	NA	NA	NA
Frequency of flow rate verification for automated PM analyzers	Monthly	NA	NA	NA	Monthly
Frequency of one-point QC check for gaseous instruments	NA	Daily	Daily	Daily	NA
Last annual performance evaluation for gaseous parameters	NA	09/23/2015	11/13/2015	06/15/2015	NA
Last two semiannual flow rate audits for PM monitors	6/30/2015, 12/9/2015	NA	NA	NA	6/30/2015, 12/9/2015

Siting obstructions continue to pose measurement challenges at this site. Meteorological measurements at the J.D. Smith site include wind speed, wind direction, ambient temperature, relative humidity, and barometric pressure.



Figure 7: Jean.

The Jean site is approximately 30 miles south of Las Vegas. This site was originally set up as an upwind background site, and it still serves this purpose for PM. The primary objective for O₃ monitoring is to measure transport from Southern California.

Local Site Name (AQS ID)	Jean (32-003-1019)
GPS Coordinates (latitude, longitude)	+35.785556°, -115.356944°
Street Address	1965 State Route 161, Jean, NV 89019
Distance to roadways (m)	State Route 161: 1,287
Traffic counts (AADT, yr)	State Route 161: 1,500 (2014)
Ground cover	Gravel, native desert
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	PM₁₀, 1	O₃, 1	PM_{2.5} Primary (continuous), 3
Parameter code	81102	44201	88101
Basic monitoring objective(s)	NAAQS comparison	NAAQS comparison	NAAQS comparison

Pollutant, POC	PM₁₀, 1	O₃, 1	PM_{2.5} Primary (continuous), 3
Site type(s)	Upwind background	Regional transport	Upwind background
Network affiliation	NA	NA	NA
Monitor type(s)	SLAMS	SLAMS	SLAMS
Primary, QA Collocated, or Other	Primary	Primary	Primary
Instrument manufacturer & model	Thermo 5014i	API 400 series	Thermo 5014i
Method code	EQPM-1102-150	EQOA-0992-087	EQPM-0609-183
FRM/FEM/ARM/other	FEM	FEM	FEM
Collecting agency	DAQ	DAQ	DAQ
Analytical lab	NA	NA	NA
Reporting agency	DAQ	DAQ	DAQ
Spatial scale	Regional	Regional	Regional
Monitoring start date	01/01/1995	08/01/1998	04/01/2013
Current sampling frequency	Continuous	Continuous	Continuous
Calculated sampling frequency	Continuous	Continuous	Continuous
Sampling season	Year-round	Year-round	Year-round
Probe height (m)	4.7	3.9	4.9
Distance from supporting structure (m)	2.1	1.5	2.2
Distance from obstructions on roof – horizontal distance (m)	NA	NA	NA
Distance from obstructions on roof – vertical height (m)	NA	NA	NA
Distance from obstructions not on roof – horizontal distance (m)	NA	NA	NA
Distance from obstructions not on roof – vertical height (m)	NA	NA	NA
Distance from trees (m)	NA	NA	NA
Distance to furnace or incinerator flue (m)	NA	NA	NA
Distance between monitors fulfilling QA collocation requirements (m)	NA	NA	NA
Distance to nearest PM instrument (m)	2.0	NA	2.0
Unrestricted airflow (degrees)	360	360	360
Probe material for reactive gases	NA	Teflon	NA
Residence time for reactive gases (s)	NA	3.0	NA
Will there be changes within the next 18 months? (Y/N)	N	N	N
Is it suitable for comparison against the annual PM _{2.5} ? (Y/N)	N	N	Y
Frequency of flow rate verification for manual PM samplers	NA	NA	NA
Frequency of flow rate verification for automated PM analyzers	Monthly	NA	Monthly
Frequency of one-point QC check for gaseous instruments	NA	Daily	NA

Pollutant, POC	PM₁₀, 1	O₃, 1	PM_{2.5} Primary (continuous), 3
Last annual performance evaluation for gaseous parameters	NA	05/06/2015	NA
Last two semiannual flow rate audits for PM monitors	2/25/2015, 8/4/2015	NA	2/25/2015, 8/4/2015

Meteorological measurements at the Jean site include wind speed, wind direction, ambient temperature, and barometric pressure.



Figure 8: Jerome Mack.

The Jerome Mack site in east Las Vegas is the Clark County NCore site. Its primary objective is to monitor trace-level gaseous pollutants, PM parameters (including PM₁₀, PM_{2.5}, PM Coarse, and speciated PM parameters), and meteorological parameters as part of a nationwide network. In 2014, this site began operating the PM_{2.5} QA collocated FRM sampler for the PM_{2.5} FRM network. The SASS (parameter code 88502) and URG (parameter code 88355) are non-regulatory speciation samplers, and are operated as non-FRM/FEM.

Local Site Name (AQS ID)	Jerome Mack (32-003-0540)
GPS Coordinates (latitude, longitude)	+36.141944°, -115.078611°
Street Address	4250 Karen Avenue, Las Vegas, NV 89121
Distance to roadways (m)	Sahara: 244; Lamb: 351; Karen: 130
Traffic counts (AADT, yr)	Sahara: 25,000; Lamb: 27,000; Karen: 3,000 (est.) (2014)
Ground cover	Concrete, grass
Representative statistical area name	Las Vegas-Paradise, NV MSA

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Pollutant, POC	PM ₁₀ , 3	PM _{2.5} (continuous), 3	PM _{10-2.5} (continuous), 3	PM _{2.5} Primary (FRM), 1	PM _{2.5} Collocated (FRM), 2	Speciation SASS, 5	Speciation URG, 5	O ₃ , 1	NO _y , 1	Trace CO, 1	Trace SO ₂ , 1	Pb, 1
Parameter code	81102	88101	86101	88101	88101	88502 Speciation, non-regulatory	88355 Speciation, non-regulatory	44201	42600	42101	42401	14129
Basic monitoring objective(s)	NAAQS comparison	NAAQS comparison	Research support	NAAQS comparison	NAAQS comparison	Research support	Research support	NAAQS comparison	Research support	Research support, NAAQS comparison	NAAQS comparison	NAAQS comparison
Site type(s)	Population exposure	Population exposure	Population exposure	Population exposure	Population exposure	Population exposure	Population exposure	Population exposure	Population exposure	Population exposure	Population exposure	Population exposure
Network affiliation	NCore	NCore	NCore	NCore	NCore	CSN Supplemental, NCore	CSN Supplemental, NCore	NCore	NCore	NCore	NCore	NCore
Monitor type(s)	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS
Primary, QA Collocated, or Other	Primary	Other	Primary	Primary	QA Collocated	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Instrument manufacturer & model	MetOne BAM 1020	MetOne BAM 1020	MetOne BAM 1020 (mathematical difference)	Thermo 2025i	Thermo 2025i	Met One SASS	URG 3000	TAPI 400 series	TAPI 200 series	TAPI 300 series	TAPI 100 series	American Ecotech HiVol 3000
Method code	EQPM-0798-122	EQPM-0308-170	EQPM-0709-185	EQPM-0202-145	EQPM-0202-145	NA	NA	EQOA-0992-087	RFNA-1194-099	RFCA-1093-093	EQSA-0495-100	EQL-0510-191
FRM/FEM/ARM/other	FEM	FEM	FEM	FRM Primary	FRM Collocated	Other	Other	FEM	Other	FRM	FEM	FEM
Collecting agency	DAQ	DAQ	DAQ	DAQ	DAQ	DAQ	DAQ	DAQ	DAQ	DAQ	DAQ	DAQ
Analytical lab	NA	NA	NA	Weigh	Weigh	UC Davis	UC Davis	NA	NA	NA	NA	ERG
Reporting agency	DAQ	DAQ	DAQ	DAQ	DAQ	UC Davis	UC Davis	DAQ	DAQ	DAQ	DAQ	DAQ

Pollutant, POC	PM₁₀, 3	PM_{2.5} (continuous), 3	PM_{10-2.5} (continuous), 3	PM_{2.5} Primary (FRM), 1	PM_{2.5} Collocated (FRM), 2	Speciation SASS, 5	Speciation URG, 5	O₃, 1	NO_y, 1	Trace CO, 1	Trace SO₂, 1	Pb, 1
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Urban	Neighborhood	Neighborhood	Neighborhood
Monitoring start date	01/01/2012	01/01/2012	01/01/2012	10/01/2013	01/01/2014	05/2010	05/2010	01/01/2011	01/01/2011	01/01/2011	01/01/2011	01/01/2012
Current sampling frequency	Continuous	Continuous	Continuous	1:3	1:6	1:3	1:3	Continuous	Continuous	Continuous	Continuous	1:6
Calculated sampling frequency	Continuous	Continuous	Continuous	1:3	1:6	1:3	1:3	Continuous	Continuous	Continuous	Continuous	1:6
Sampling season	Year-round	Year-round	Year-round	Year-round	Year-round	Year-round	Year-round	Year-round	Year-round	Year-round	Year-round	Year-round
Probe height (m)	5.2	5.2	5.2	3.0	3.0	3.1	3.3	4.3	7.0	4.3	4.3	2.6
Distance from supporting structure (m)	2.1	2.1	2.1	3.0	3.0	3.1	3.3	1.1	7.0	1.1	1.1	2.6
Distance from obstructions on roof – horizontal distance (m)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Distance from obstructions on roof – vertical height (m)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Pollutant, POC	PM ₁₀ , 3	PM _{2.5} (continuous), 3	PM _{10-2.5} (continuous), 3	PM _{2.5} Primary (FRM), 1	PM _{2.5} Collocated (FRM), 2	Speciation SASS, 5	Speciation URG, 5	O ₃ , 1	NO _y , 1	Trace CO, 1	Trace SO ₂ , 1	Pb, 1
Distance from obstructions not on roof – horizontal distance (m)	NA	NA	NA	5.2	3.7	7.5	5.3	NA	NA	NA	NA	7.7
Distance from obstructions not on roof – vertical obstruction height (m)	NA	NA	NA	3.1	3.1	3.0	3.0	NA	NA	NA	NA	2.2
Obstruction height above probe (m)	NA	NA	NA	0.2	0.2	0.3	0.3	NA	NA	NA	NA	1.1
Distance from trees (m)	16.7	18.7	NA	22.1	18.4	23.0	20.8	15.7	13.8	15.7	15.7	24.0
Distance to furnace or incinerator flue (m)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Distance between monitors fulfilling QA collocation requirements (m)	NA	NA	NA	3.7	3.7	NA	NA	NA	NA	NA	NA	NA
Distance to nearest PM instrument (m)	2.8	2.8	NA	2.3	2.3	2.1	2.1	NA	NA	NA	NA	2.3 High-Vol

Pollutant, POC	PM₁₀, 3	PM_{2.5} (continuous), 3	PM_{10-2.5} (continuous), 3	PM_{2.5} Primary (FRM), 1	PM_{2.5} Collocated (FRM), 2	Speciation SASS, 5	Speciation URG, 5	O₃, 1	NO_y, 1	Trace CO, 1	Trace SO₂, 1	Pb, 1
Unrestricted airflow (degrees)	360	360	360	360	360	360	360	360	360	360	360	360
Probe material for reactive gases	NA	NA	NA	NA	NA	NA	NA	Teflon	Teflon	Teflon	Teflon	NA
Residence time for reactive gases (s)	NA	NA	NA	NA	NA	NA	NA	2.2	8.4	1.1	3.3	NA
Will there be changes within the next 18 months? (Y/N)	N	N	N	N	N	N	N	N	N	N	N	N
Is it suitable for comparison against the annual PM _{2.5} ? (Y/N)	N	Y	N	Y	Y	N	N	N	N	N	N	N
Frequency of flow rate verification for manual PM samplers	NA	NA	NA	Monthly	Monthly	Monthly	Monthly	NA	NA	NA	NA	Monthly
Frequency of flow rate verification for automated PM analyzers	Monthly	Monthly	Monthly	NA	NA	NA	NA	NA	NA	NA	NA	NA

Pollutant, POC	PM₁₀, 3	PM_{2.5} (continuous), 3	PM_{10-2.5} (continuous), 3	PM_{2.5} Primary (FRM), 1	PM_{2.5} Collocated (FRM), 2	Speciation SASS, 5	Speciation URG, 5	O₃, 1	NO_y, 1	Trace CO, 1	Trace SO₂, 1	Pb, 1
Frequency of one-point QC check for gaseous instruments	NA	NA	NA	NA	NA	NA	NA	Daily	Daily	Daily	Daily	NA
Last annual performance evaluation for gaseous parameters	NA	NA	NA	NA	NA	NA	NA	04/10/2015	NA	09/30/2015	10/20/2015	NA
Last two semiannual flow rate audits for PM monitors	03/03/2015, 04/21/2015, 08/18/2015	03/03/2015, 04/21/2015, 08/18/2015	03/03/2015, 04/21/2015, 08/18/2015	04/08/2015, 08/20/2015, 10/14/2015, 12/01/2015	04/08/2015, 08/20/2015, 10/14/2015, 12/01/2015	03/03/2015, 08/20/2015, 10/14/2015, 12/01/2015	03/09/2015, 08/20/2015, 10/14/2015, 12/01/2015	NA	NA	NA	NA	08/20/2015, 09/29/2015, 10/14/2015, 12/1/2015

The Pb sampler is the only high volume sampler in the DAQ network. Meteorological measurements at this site include wind speed, wind direction, ambient temperature, relative humidity, precipitation, and barometric pressure.



Figure 9: Joe Neal.

The primary objectives of the Joe Neal site, located in northwest Las Vegas, are to monitor O₃ and its precursors in an area of high O₃ concentrations, and to support DAQ modeling efforts. Due to topography at this location, the summertime loft brings higher O₃ and precursor levels toward this site from the east end of the Las Vegas Valley. PM₁₀ monitoring was initially deployed at this site due to population growth in the northwest, and the site now also serves as a high O₃ indicator. A NO_x monitor was added in January 2008 to monitor for O₃ precursors. DAQ is proposing to add a SLAMS PM_{2.5} monitor at this site to provide greater population and spatial coverage.

Local Site Name (AQS ID)	Joe Neal (32-003-0075)
GPS Coordinates (latitude, longitude)	+36.270556°, -115.238333°
Street Address	6651 W. Azure Way, Las Vegas, NV 89130
Distance to roadways (m)	Rebecca: 12.6; Azure: 213; Tropical: 130
Traffic counts (AADT, yr)	Rebecca: 4,000 (est.); Azure 6,000 (est.); Tropical 6,200 (2014)
Ground cover	Gravel, grass, pavement
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	PM ₁₀ , 1	PM _{2.5}	O ₃ , 1	NO ₂ , 2
Parameter code	81102	88101	44201	42602
Basic monitoring objective(s)	NAAQS comparison	NAAQS comparison	NAAQS comparison	Research support, NAAQS comparison
Site type(s)	Population exposure	Population exposure	Max. ozone concentration	Population exposure
Network affiliation	NA		NA	NA
Monitor type(s)	SLAMS	SLAMS	SLAMS	SLAMS
Primary, QA Collocated, or Other	Primary	Primary	Primary	Primary
Instrument manufacturer & model	Thermo 5014i	Thermo 5014i	TAPI 400 series	TAPI 500 series
Method code	EQPM-1102-150	EQPM-0609-183	EQOA-0992-087	EQNA-0514-212
FRM/FEM/ARM/other	FEM	FEM	FEM	FEM
Collecting agency	DAQ	DAQ	DAQ	DAQ
Analytical lab	NA	NA	NA	NA
Reporting agency	DAQ	DAQ	DAQ	DAQ
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Middle
Monitoring start date	01/01/2001	2016 (proposed)	07/01/2000	01/01/2008
Current sampling frequency	Continuous	NA	Continuous	Continuous
Calculated sampling frequency	Continuous	NA	Continuous	Continuous
Sampling season	Year-round	Year-round	Year-round	Year-round
Probe height (m)	4.6	5 (anticipated)	3.8	3.8
Distance from supporting structure (m)	2.1	2.2 (anticipated)	1.4	1.4
Distance from obstructions on roof – horizontal distance (m)	NA	NA	NA	NA
Distance from obstructions on roof – vertical height (m)	NA	NA	NA	NA
Distance from obstructions not on roof – horizontal distance (m)	NA	NA	NA	NA
Distance from obstructions not on roof – vertical height (m)	NA	NA	NA	NA
Distance from trees (m)	20.3	21 (est.)	22.7	22.7
Distance to furnace or incinerator flue (m)	NA	NA	NA	NA
Distance between monitors fulfilling QA collocation requirements (m)	NA	NA	NA	NA
Distance to nearest PM instrument (m)	NA	NA	NA	NA
Unrestricted airflow (degrees)	360	360	360	360
Probe material for reactive gases	NA	NA	Teflon	Teflon
Residence time for reactive gases (s)	NA	NA	2.2	2.0
Will there be changes within the next 18 months? (Y/N)	N	N	N	N

Pollutant, POC	PM ₁₀ , 1	PM _{2.5}	O ₃ , 1	NO ₂ , 2
Is it suitable for comparison against the annual PM _{2.5} ? (Y/N)	N	Y	N	N
Frequency of flow rate verification for manual PM samplers	NA	NA	NA	NA
Frequency of flow rate verification for automated PM analyzers	Monthly	Monthly	NA	NA
Frequency of one-point QC check for gaseous instruments	NA	NA	Daily	Daily
Last annual performance evaluation for gaseous parameters	NA	NA	07/29/2015	10/08/2015, 11/10/2015
Last two semiannual flow rate audits for PM monitors	04/17/2015, 07/23/2015, 10/16/2015, 10/21/2015	NA	NA	NA

Meteorological measurements at the Joe Neal site include wind speed, wind direction, ambient temperature, relative humidity, and barometric pressure.



Figure 10: Mesquite.

The Mesquite site monitors O₃ and is approximately 70 miles north of Las Vegas. The site sits along a transport and exit corridor connecting jurisdictional boundaries, and it serves as an indicator of population exposure of pollutants.

Local Site Name (AQS ID)	Mesquite (32-003-0023)
GPS Coordinates (latitude, longitude)	+36.807778°, -114.061389°
Street Address	465 E. Old Mill Rd., Mesquite, NV 89027
Distance to roadways (m)	7.8
Traffic counts (AADT, yr)	<1,000 (est.), 2015
Ground cover	Pavement, gravel
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	O₃, 1
Parameter code	44201
Basic monitoring objective(s)	NAAQS comparison
Site type(s)	Population exposure
Network affiliation	NA
Monitor type(s)	SLAMS

Pollutant, POC	O ₃ , 1
Primary, QA Collocated, or Other	Primary
Instrument manufacturer & model	API 400 series
Method code	EQOA-0992-087
FRM/FEM/ARM/other	FEM
Collecting agency	DAQ
Analytical lab	NA
Reporting agency	DAQ
Spatial scale	Middle
Monitoring start date	10/01/2001
Current sampling frequency	Continuous
Calculated sampling frequency	Continuous
Sampling season	Year-round
Probe height (m)	3.6
Distance from supporting structure (m)	1.2
Distance from obstructions on roof – horizontal distance (m)	NA
Distance from obstructions on roof – vertical height (m)	NA
Distance from obstructions not on roof – horizontal distance (m)	NA
Distance from obstructions not on roof – vertical height (m)	NA
Distance from trees (m)	3.2 ¹
Distance to furnace or incinerator flue (m)	NA
Distance between monitors fulfilling QA collocation requirements (m)	NA
Distance to nearest PM instrument (m)	NA
Unrestricted airflow (degrees)	360
Probe material for reactive gases	Teflon
Residence time for reactive gases (s)	2.0
Will there be changes within the next 18 months? (Y/N)	N
Is it suitable for comparison against the annual PM _{2.5} ? (Y/N)	N
Frequency of flow rate verification for manual PM samplers	NA
Frequency of flow rate verification for automated PM analyzers	NA
Frequency of one-point QC check for gaseous instruments	Daily
Last annual performance evaluation for gaseous parameters	05/05/2015
Last two semiannual flow rate audits for PM monitors	NA

¹ Tree is 1.5 meters above inlet.

Meteorological measurements at the Mesquite site include wind speed, wind direction, and ambient temperature.

Because the O₃ monitor at Mesquite does not meet distance-to-roadway siting requirements, DAQ is investigating an alternate location in Mesquite where O₃ and PM₁₀ can be effectively monitored. DAQ will continue to conduct SLAMS O₃ monitoring at the site until a suitable replacement monitoring location is established. DAQ’s interest in this continued monitoring is based on the negligible traffic

count, historical NAAQS monitoring data, fulfilling the objective of population exposure, and the monitor being the only NAAQS O₃ monitor in the Virgin Valley airshed (Hydrographic Area 222).



Figure 11: Palo Verde.

The primary objective of the Palo Verde site in west Las Vegas is to monitor O₃, but it also monitors PM₁₀. Due to topography at this location, the summertime loft brings higher O₃ and precursor levels toward this site from the east end of the Las Vegas Valley. DAQ is proposing to add a SLAMS PM_{2.5} monitor at this site to provide greater population and spatial coverage.

Local Site Name (AQS ID)	Palo Verde (32-003-0073)
GPS Coordinates (latitude, longitude)	+36.173333°, -115.332778°
Street Address	333 Pavilion Center Dr., Las Vegas, NV 89144
Distance to roadways (m)	Pavilion Center Dr.: 14.7; Greenmoor Lane: 15.0
Traffic counts (AADT, yr)	Pavilion Center Dr.: 7,000 (est.); Greenmoor Lane: 4,000 (est.) (2015)
Ground cover	Paved
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	PM₁₀, 1	PM_{2.5}	O₃, 1
Parameter code	81102	88101	44201
Basic monitoring objective(s)	NAAQS comparison	NAAQS comparison	NAAQS comparison

Pollutant, POC	PM ₁₀ , 1	PM _{2.5}	O ₃ , 1
Site type(s)	Population exposure	Population exposure	Population exposure
Network affiliation	NA	NA	NA
Monitor type(s)	SLAMS	SLAMS	SLAMS
Primary, QA Collocated, or Other	Primary	Primary	Primary
Instrument manufacturer & model	Thermo 5014i	Thermo 5014i	API 400 series
Method code	EQPM-1102-150	EQPM-0609-183	EQQA-0992-087
FRM/FEM/ARM/other	FEM	FEM	FEM
Collecting agency	DAQ	DAQ	DAQ
Analytical lab	NA	NA	NA
Reporting agency	DAQ	DAQ	DAQ
Spatial scale	Middle	Neighborhood	Neighborhood
Monitoring start date	07/01/1998	2016 (proposed)	07/01/1998
Current sampling frequency	Continuous	NA	Continuous
Calculated sampling frequency	Continuous	NA	Continuous
Sampling season	Year-round	Year-round	Year-round
Probe height (m)	4.8	5 (anticipated)	3.7
Distance from supporting structure (m)	2.3	2.2 (anticipated)	1.4
Distance from obstructions on roof – horizontal distance (m)	NA	NA	NA
Distance from obstructions on roof – vertical height (m)	NA	NA	NA
Distance from obstructions not on roof – horizontal distance (m)	NA	NA	NA
Distance from obstructions not on roof – vertical height (m)	NA	NA	NA
Distance from trees (m)	3.8	4.0 (est.)	1.2
Distance to furnace or incinerator flue (m)	NA	NA	NA
Distance between monitors fulfilling QA collocation requirements (m)	NA	NA	NA
Distance to nearest PM instrument (m)	NA	NA	NA
Unrestricted airflow (degrees)	360	360	360
Probe material for reactive gases	NA	NA	Teflon
Residence time for reactive gases (s)	NA	NA	2.8
Will there be changes within the next 18 months? (Y/N)	N	N	N
Is it suitable for comparison against the annual PM _{2.5} ? (Y/N)	N	Y	N
Frequency of flow rate verification for manual PM samplers	NA	NA	NA
Frequency of flow rate verification for automated PM analyzers	Monthly	Monthly	NA
Frequency of one-point QC check for gaseous instruments	NA	NA	Daily
Last annual performance evaluation for gaseous parameters	NA	NA	03/04/2015

Pollutant, POC	PM₁₀, 1	PM_{2.5}	O₃, 1
Last two semiannual flow rate audits for PM monitors	03/04/2015, 08/19/2015	NA	NA

Meteorological measurements at the Palo Verde site include wind speed, wind direction, ambient temperature, and barometric pressure.



Figure 12: Paul Meyer.

The primary objective of the Paul Meyer site in southwest Las Vegas is to monitor O₃, but it also monitors PM₁₀. Due to topography at this location, the summertime loft brings higher O₃ and precursor levels toward this site from the east end of the Las Vegas Valley.

Local Site Name (AQS ID)	Paul Meyer (32-003-0043)
GPS Coordinates (latitude, longitude)	+36.106389°, -115.253333°
Street Address	4525 New Forest Dr., Las Vegas, NV 89147
Distance to roadways (m)	New Forest Dr.: 102; South Tenaya Way: 160
Traffic counts (AADT, yr)	New Forest Dr.: 3,500 (est.); South Tenaya Way: 3,700 (2014)
Ground cover	Concrete, grass
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	PM ₁₀ , 1	O ₃ , 1
Parameter code	81102	44201
Basic monitoring objective(s)	NAAQS comparison	NAAQS comparison
Site type(s)	Population exposure	Population exposure
Network affiliation	NA	NA
Monitor type(s)	SLAMS	SLAMS
Primary, QA Collocated, or Other	Primary	Primary
Instrument manufacturer & model	Thermo 5014i	API 400 series
Method code	EQPM-1102-150	EQOA-0992-087
FRM/FEM/ARM/other	FEM	FEM
Collecting agency	DAQ	DAQ
Analytical lab	NA	NA
Reporting agency	DAQ	DAQ
Spatial scale	Neighborhood	Neighborhood
Monitoring start date	01/01/1998	07/01/1998
Current sampling frequency	Continuous	Continuous
Calculated sampling frequency	Continuous	Continuous
Sampling season	Year-round	Year-round
Probe height (m)	4.8	4.3
Distance from supporting structure (m)	2.3	1.4
Distance from obstructions on roof – horizontal distance (m)	NA	NA
Distance from obstructions on roof – vertical height (m)	NA	NA
Distance from obstructions not on roof – horizontal distance (m)	NA	NA
Distance from obstructions not on roof – vertical height (m)	NA	NA
Distance from trees (m)	15.3	15.1
Distance to furnace or incinerator flue (m)	NA	NA
Distance between monitors fulfilling QA collocation requirements (m)	NA	NA
Distance to nearest PM instrument (m)	NA	NA
Unrestricted airflow (degrees)	360	360
Probe material for reactive gases	NA	Teflon
Residence time for reactive gases (s)	NA	2.5
Will there be changes within the next 18 months? (Y/N)	N	N
Is it suitable for comparison against the annual PM _{2.5} ? (Y/N)	N	N
Frequency of flow rate verification for manual PM samplers	NA	NA
Frequency of flow rate verification for automated PM analyzers	Monthly	NA
Frequency of one-point QC check for gaseous instruments	NA	Daily
Last annual performance evaluation for gaseous parameters	NA	08/12/2015
Last two semiannual flow rate audits for PM monitors	04/17/2015, 5/11/2015, 10/15/2015	NA

Meteorological measurements at the Paul Meyer site include wind speed, wind direction, ambient temperature, and barometric pressure.



Figure 13: Sunrise Acres.

Monitoring at the Sunrise Acres site near the center of the Las Vegas Valley began as part of a CO study in the 1990s. All monitoring activities at the former East Charleston site were transferred here to Sunrise Acres when the former lease was terminated. The primary objective of the Sunrise Acres site is to monitor CO, NO₂ (meeting the Regional Administrator (RA) 40 requirement), and PM. The site monitors PM₁₀ and PM_{2.5} using both filter-based and continuous methodologies. The PM_{2.5} FEM is the primary monitor at this site, and it is collocated with a PM_{2.5} FRM.

Local Site Name (AQS ID)	Sunrise Acres (32-003-0561)
GPS Coordinates (latitude, longitude)	+36.163889°, -115.113889°
Street Address	2501 Sunrise Ave., Las Vegas, NV 89101
Distance to roadways (m)	Sunrise Ave: 128; Eastern Ave: 160
Traffic counts (AADT, yr)	Sunrise Ave: 4,000 (est.); Eastern Ave: 32,000 (2014)
Ground cover	Paved
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	PM ₁₀ , 1	CO, 1	PM _{2.5} Collocated FRM, 1	PM _{2.5} Primary FEM (continuous), 3	NO ₂ , 2
Parameter code	81102	42101	88101	88101	42602
Basic monitoring objective(s)	NAAQS comparison	NAAQS comparison	NAAQS comparison	NAAQS comparison	NAAQS comparison
Site type(s)	Population exposure	Highest concentration	Highest concentration	Highest concentration	Population exposure
Network affiliation	NA	NA	NA	NA	NA
Monitor type(s)	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS
Primary, QA Collocated, or Other	Primary	Primary	QA Collocated	Primary	Primary
Instrument manufacturer & model	Thermo 5014i	API 300 series	Thermo 2025i	Thermo 5014i	TAPI 500 series
Method code	EQPM-1102-150	RFCA-1093-093	EQPM-0202-145	EQPM-0609-183	EQNA-0514-212
FRM/FEM/ARM/other	FEM	FRM	FRM	FEM	FEM
Collecting agency	DAQ	DAQ	DAQ	DAQ	DAQ
Analytical lab	NA	NA	Weigh	NA	NA
Reporting agency	DAQ	DAQ	DAQ	DAQ	DAQ
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Monitoring start date	04/17/2004	10/01/1996	07/01/2012	10/01/2012	01/01/2013
Current sampling frequency	Continuous	Continuous	1:3	Continuous	Continuous
Calculated sampling frequency	Continuous	Continuous	1:3	Continuous	Continuous
Sampling season	Year-round	Year-round	Year-round	Year-round	Year-round
Probe height (m)	4.6	3.6	3.0	4.8	3.6
Distance from supporting structure (m)	2.1	1.2	2.1	2.2	1.2
Distance from obstructions on roof – horizontal distance (m)	NA	NA	NA	NA	NA
Distance from obstructions on roof – vertical height (m)	NA	NA	NA	NA	NA
Distance from obstructions not on roof – horizontal distance (m)	NA	NA	2.1	NA	NA
Distance from obstructions not on roof – vertical height (m)	NA	NA	0.5	NA	NA
Distance from trees (m)	NA	NA	NA	NA	NA
Distance to furnace or incinerator flue (m)	NA	NA	NA	NA	NA

Pollutant, POC	PM ₁₀ , 1	CO, 1	PM _{2.5} Collocated FRM, 1	PM _{2.5} Primary FEM (continuous), 3	NO ₂ , 2
Distance between monitors fulfilling QA collocation requirements (m)	NA	NA	Distance between PM _{2.5} FRM and PM _{2.5} FEM is 4.0	Distance between PM _{2.5} FRM and PM _{2.5} FEM is 4.0	NA
Distance to nearest PM instrument (m)	Distance to PM _{2.5} FEM monitor 2.4	NA	4.0	Distance to PM ₁₀ FEM monitor 2.4	NA
Unrestricted airflow (degrees)	360	360	360	360	360
Probe material for reactive gases	NA	Teflon	NA	NA	Teflon
Residence time for reactive gases (s)	NA	2.5	NA	NA	3.9
Will there be changes within the next 18 months? (Y/N)	N	N	N	N	N
Is it suitable for comparison against the annual PM _{2.5} ? (Y/N)	N	N	Y	Y	N
Frequency of flow rate verification for manual PM samplers	NA	NA	Monthly	NA	NA
Frequency of flow rate verification for automated PM analyzers	Monthly	NA	NA	Monthly	NA
Frequency of one-point QC check for gaseous instruments	NA	Daily	NA	NA	Daily
Last annual performance evaluation for gaseous parameters	NA	09/22/2015	NA	NA	10/05/2015, 11/12/2015
Last two semiannual flow rate audits for PM monitors	07/23/2015, 12/23/2015	NA	06/15/2015, 08/24/2015, 10/14/2015, 12/01/2015	07/23/2015, 12/23/2015	NA

DAQ is conducting NO₂ monitoring to meet RA 40 requirements outlined in 40 CFR 58, App. D, Sec. 4.3.4. Meteorological measurements at the Sunrise Acres site include wind speed, wind direction, ambient temperature, and barometric pressure.



Figure 14: Rancho and Teddy: Near-Road Site 1.

The Near-Road Site 1 monitoring station was approved by EPA in 2014 and began operation in 2015. The site is at the southeast side of the intersection of South Rancho Drive and Teddy Drive in Las Vegas. This is the first near-road monitoring site that DAQ deployed. DAQ will establish near-road CO and PM_{2.5} monitors by January 1, 2017.

Local Site Name (AQS ID)	Rancho and Teddy (32-003-1501)
GPS Coordinates (latitude, longitude)	+36.139822°, -115.175565°
Street Address	2755 S. Rancho Drive, Las Vegas, NV
Distance to roadways (m)	Interstate 15: 13; South Rancho Drive: 8; Teddy Drive: 31
Traffic counts (AADT, yr)	Interstate 15: 260,000; South Rancho Drive: 15,000 (est.); Teddy Drive: 10,000 (est.) (2014)
Ground cover	Gravel
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	NO₂, 2
Parameter code	42602
Basic monitoring objective(s)	NAAQS comparison
Site type(s)	Highest concentration
Network affiliation	Near Road
Monitor type(s)	SLAMS
Primary, QA Collocated, or Other	Primary
Instrument manufacturer & model	TAPI 500 series
Method code	EQNA-0514-212
FRM/FEM/ARM/other	FEM
Collecting agency	DAQ
Analytical lab	NA
Reporting agency	DAQ
Spatial scale	Microscale
Monitoring start date	08/01/2015
Current sampling frequency	Continuous
Calculated sampling frequency	Continuous
Sampling season	Year-round
Probe height (m)	4.2
Distance from supporting structure (m)	1.2
Distance from obstructions on roof – horizontal distance (m)	NA
Distance from obstructions on roof – vertical height (m)	NA
Distance from obstructions not on roof – horizontal distance (m)	NA
Distance from obstructions not on roof – vertical height (m)	NA
Distance from trees (m)	23
Distance to furnace or incinerator flue (m)	NA
Distance between monitors fulfilling QA collocation requirements (m)	NA
Distance to nearest PM instrument (m)	NA
Unrestricted airflow (degrees)	360
Probe material for reactive gases	Teflon
Residence time for reactive gases (s)	2.6
Will there be changes within the next 18 months? (Y/N)	N
Is it suitable for comparison against the annual PM _{2.5} ? (Y/N)	NA
Frequency of flow rate verification for manual PM samplers	NA
Frequency of flow rate verification for automated PM analyzers	NA
Frequency of one-point QC check for gaseous instruments	Daily
Last annual performance evaluation for gaseous parameters	10/06/2015, 11/13/2015
Last two semiannual flow rate audits for PM monitors	NA

Meteorological measurements at Near-Road Site 1 include wind speed, wind direction, ambient temperature, and barometric pressure.



Figure 15: Walter Johnson.

The primary objective of the Walter Johnson site, located on the west side of Las Vegas, is to monitor O₃ and PM₁₀. Due to topography at this location, the summertime loft brings high O₃ and precursor levels toward this site from the east end of the Las Vegas Valley. The PM₁₀ monitor provides spatial representation and neighborhood scale monitoring.

Local Site Name (AQS ID)	Walter Johnson (32-003-0071)
GPS Coordinates (latitude, longitude)	+36.169722°, -115.263056°
Street Address	7701 Ducharme Ave., Las Vegas, NV 89145
Distance to roadways (m)	Villa Monterey Drive: 13.0; Ducharme Avenue: 46; South Buffalo Drive: 270
Traffic counts (AADT, yr)	Villa Monterey Drive: 3,000 (est.); Ducharme Avenue: 5,000 (est.); South Buffalo Drive: 28,500 (2014)
Ground cover	Concrete/asphalt, grass
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	O ₃ , 1	PM ₁₀ , 1
Parameter code	44201	81102
Basic monitoring objective(s)	NAAQS comparison	NAAQS comparison
Site type(s)	Population exposure	Population exposure
Network affiliation	NA	NA
Monitor type(s)	SLAMS	SLAMS
Primary, QA Collocated, or Other	Primary	Primary
Instrument manufacturer & model	API 400 series	Thermo 5014i
Method code	EQOA-0992-087	EQPM-1102-150
FRM/FEM/ARM/other	FEM	FEM
Collecting agency	DAQ	DAQ
Analytical lab	NA	NA
Reporting agency	DAQ	DAQ
Spatial scale	Neighborhood	Neighborhood
Monitoring start date	08/01/1998	06/01/2015
Current sampling frequency	Continuous	Continuous
Calculated sampling frequency	Continuous	Continuous
Sampling season	Year-round	Year-round
Probe height (m)	4.3	4.7
Distance from supporting structure (m)	1.5	2.0
Distance from obstructions on roof – horizontal distance (m)	NA	NA
Distance from obstructions on roof – vertical height (m)	NA	NA
Distance from obstructions not on roof – horizontal distance (m)	NA	NA
Distance from obstructions not on roof – vertical height (m)	NA	NA
Distance from trees (m)	15.2	12.3
Distance to furnace or incinerator flue (m)	NA	NA
Distance between monitors fulfilling QA collocation requirements (m)	NA	NA
Distance to nearest PM instrument (m)	NA	NA
Unrestricted airflow (degrees)	360	360
Probe material for reactive gases	Teflon	NA
Residence time for reactive gases (s)	3.0	NA
Will there be changes within the next 18 months? (Y/N)	N	N
Is it suitable for comparison against the annual PM _{2.5} ? (Y/N)	N	N
Frequency of flow rate verification for manual PM samplers	NA	NA
Frequency of flow rate verification for automated PM analyzers	NA	Monthly

Pollutant, POC	O₃, 1	PM₁₀, 1
Frequency of one-point QC check for gaseous instruments	Daily	NA
Last annual performance evaluation for gaseous parameters	06/10/2015	NA
Last two semiannual flow rate audits for PM monitors	NA	06/16/2015, 12/02/2015

Meteorological measurements at the Walter Johnson site include wind speed, wind direction, ambient temperature, and barometric pressure.

5.0 MAPS OF CRITERIA POLLUTANT MONITORING STATIONS IN 2015

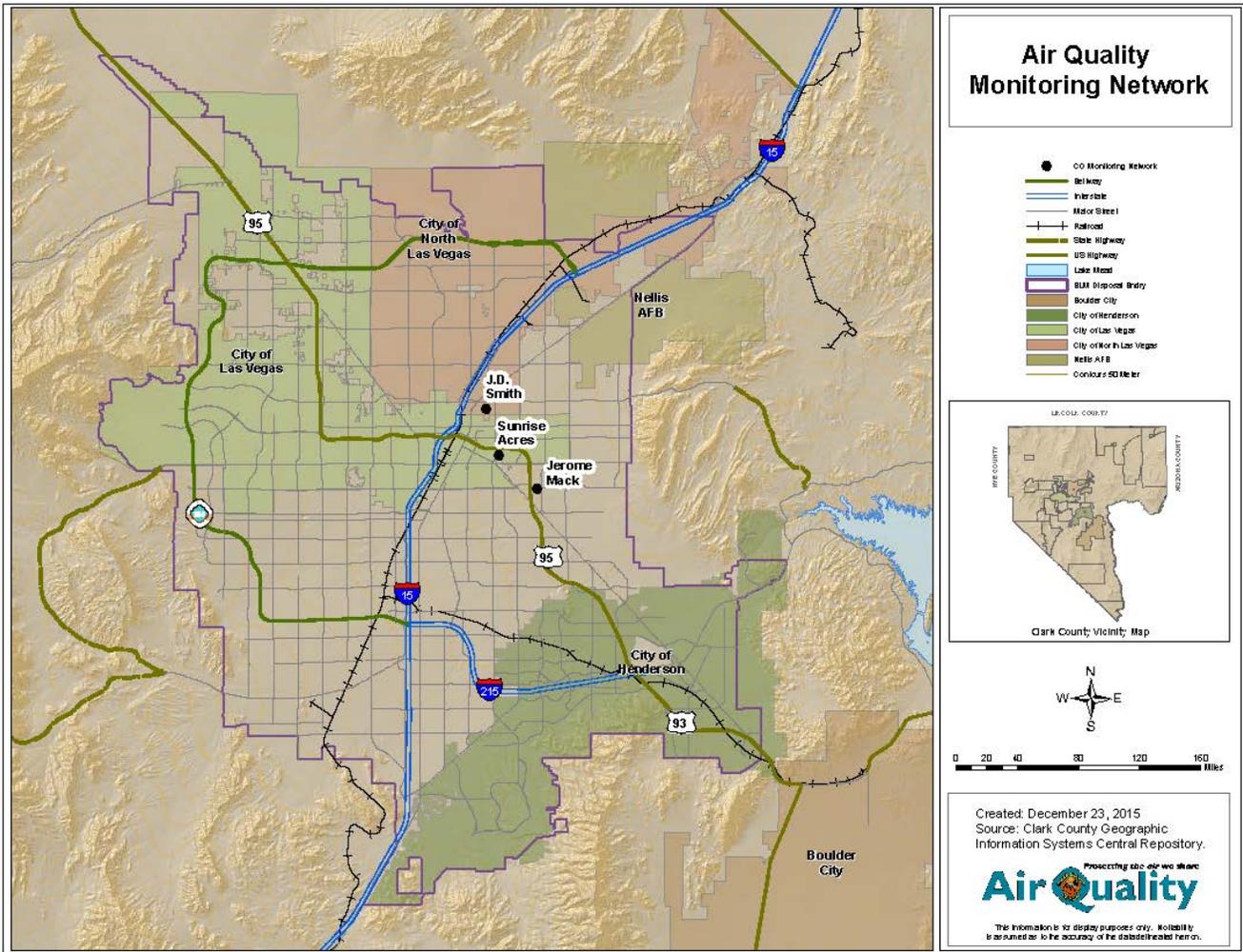


Figure 16: CO Monitors.

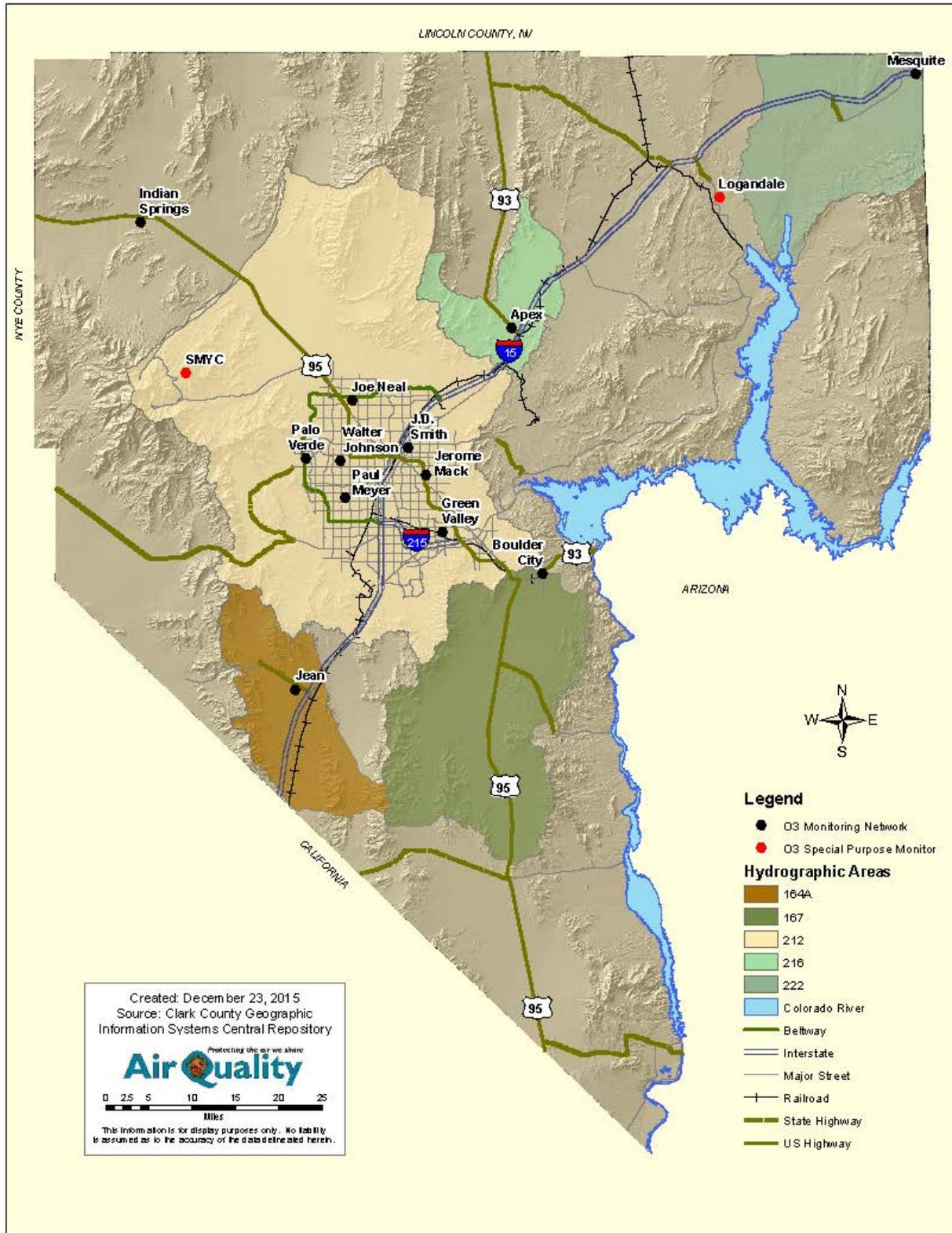


Figure 17: O₃ Monitors.

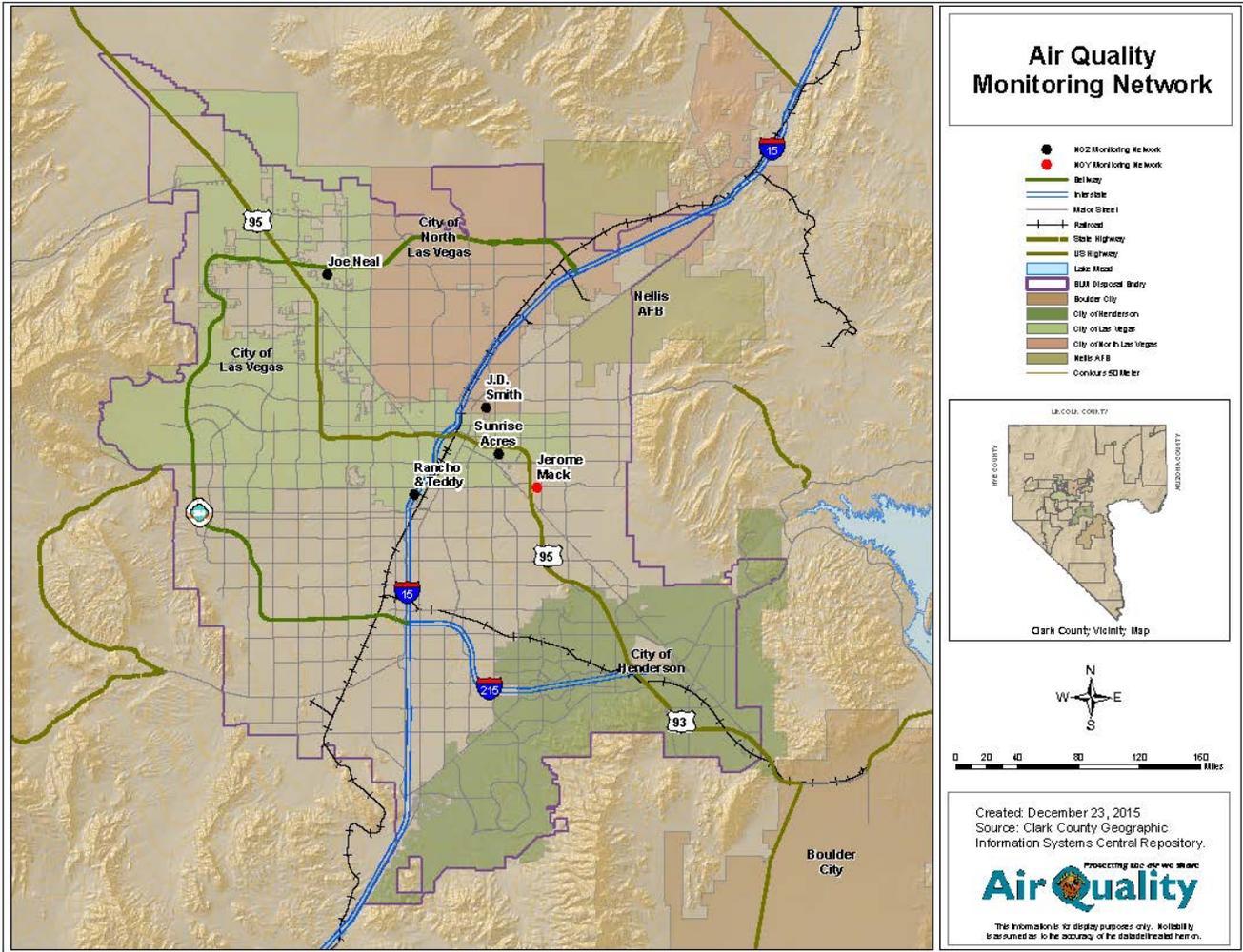


Figure 18: NO_x Monitors.

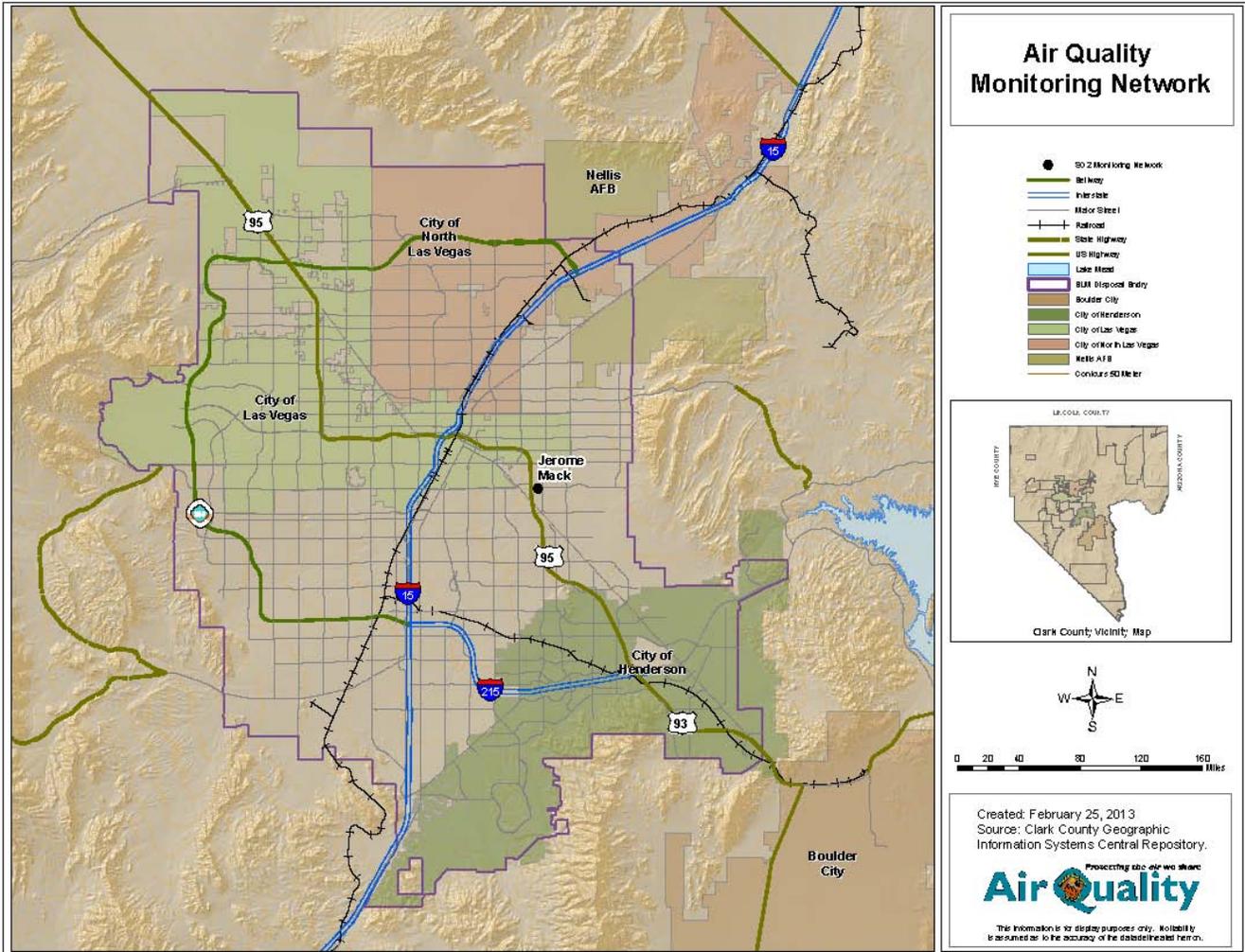


Figure 19: SO₂ Monitor.

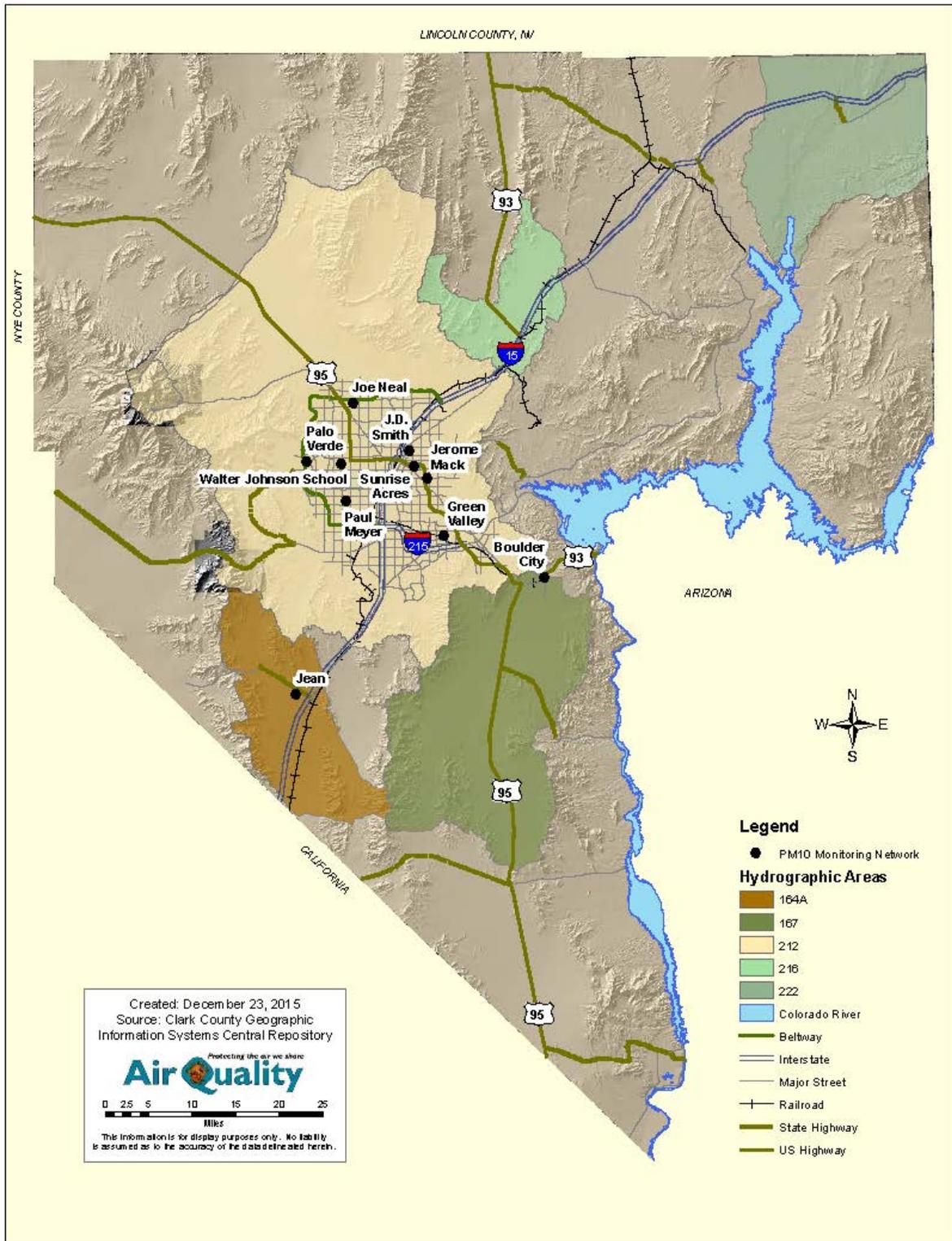


Figure 20: Continuous PM₁₀ Monitors.

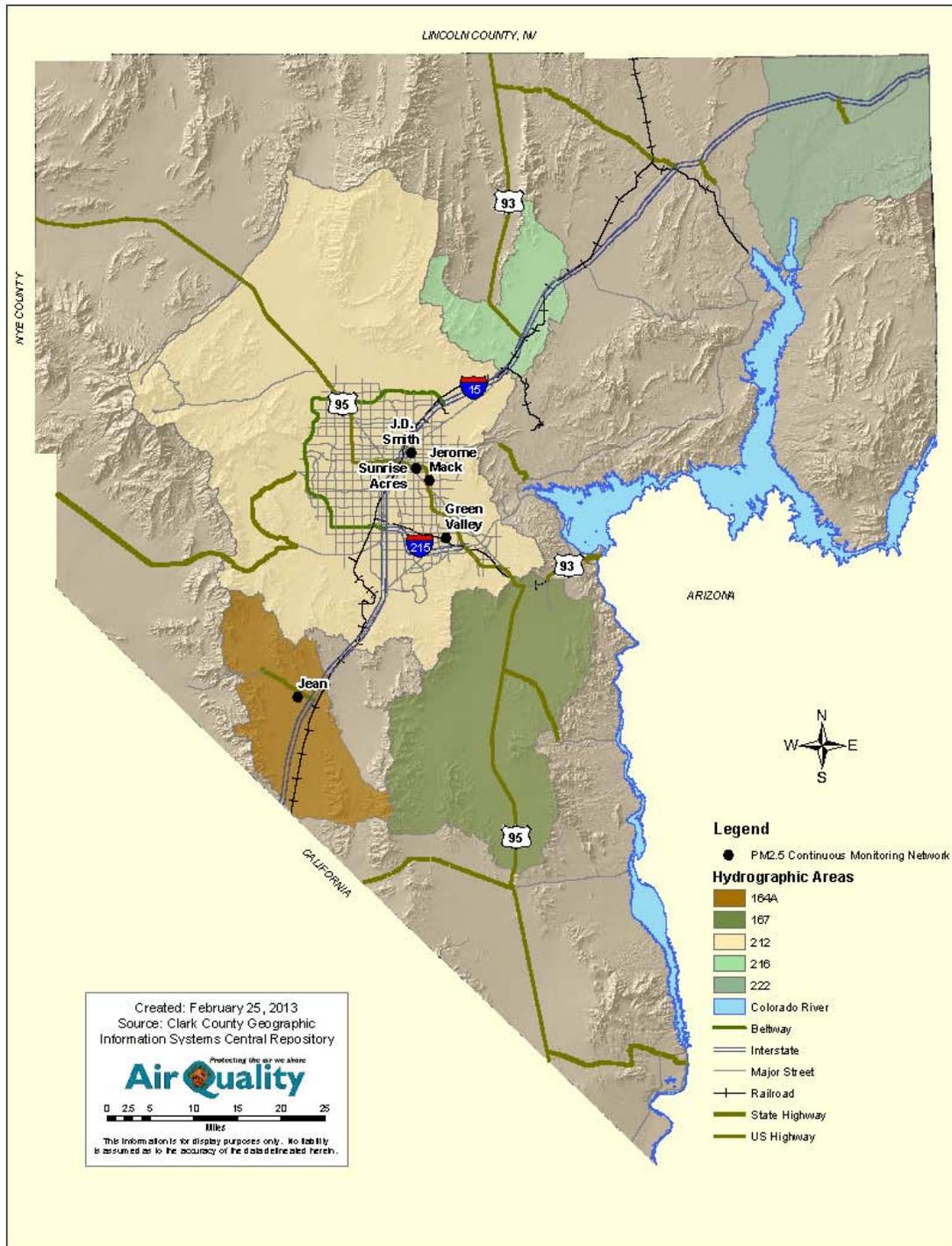


Figure 21: Continuous PM_{2.5} Monitors.

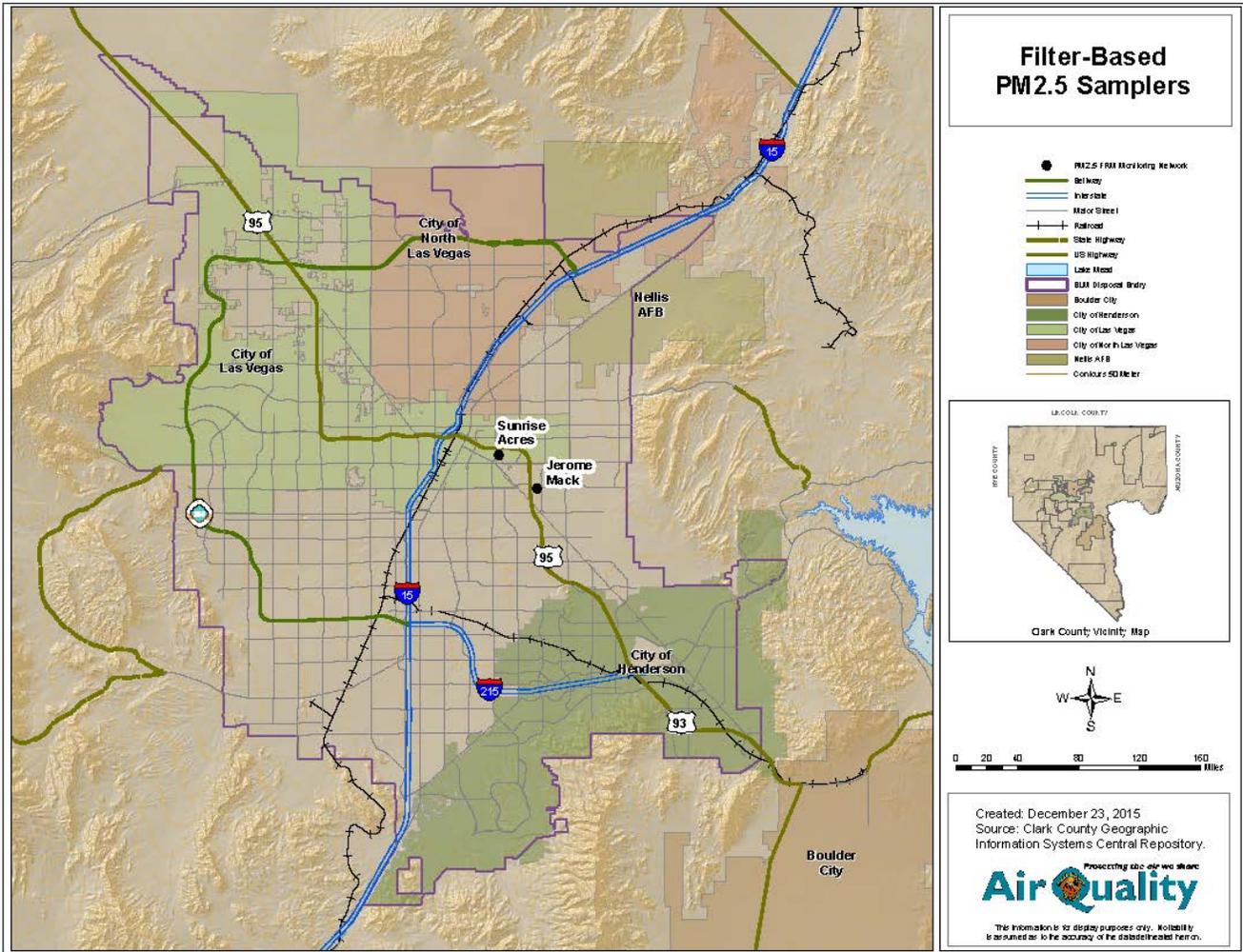


Figure 22: Filter-Based PM_{2.5} FRM Samplers.

6.0 NATIONAL PERFORMANCE AUDIT PROGRAM AND PERFORMANCE EVALUATION PROGRAM

Each year EPA Region 9 contracts for the National Performance Audit Program (NPAP) Through-the-Probe (TTP) performance evaluations, which focus on gaseous criteria pollutants. DAQ received a “pass” on all 2015 NPAP/TTP performance evaluations.

Table 12. 2015 NPAP and TTP Evaluations

Monitoring Station	Pollutant	Evaluation Date
Palo Verde	O ₃	04/14/2015
Paul Meyer	O ₃	04/15/2015

Each year the PM_{2.5} FRM sampling network undergoes a Performance Evaluation Program (PEP) audit. PEP audit results (in µg/m³) are generated and submitted to the AQS database.

Table 13. 2015 PEP Audit Activity

Sampler Location	Pollutant	Audit Date
Jerome Mack, Sunrise Acres	PM _{2.5} FRM	01/27/2015
Jean	PM _{2.5} FEM (BAM)	04/15/2015
Jerome Mack	PM _{2.5} FRM	07/23/2015
Jerome Mack	Pb TSP	07/23/2015
Sunrise Acres	PM _{2.5} FRM	10/27/2015

7.0 NETWORK MODIFICATIONS

7.1 Completed Changes

DAQ has made the following network changes:

Table 14. Summary of Network Modifications

Action	Date	Explanation
Discontinued O ₃ Special Purpose Monitors (SPMs) at Spring Mountain Youth Camp and Logandale	October 2015	Enhanced summertime O ₃ monitoring completed.
Near-Road Site 1: Rancho & Teddy	July 2015	DAQ received EPA approval for Near-Road Site 1 in the 2014 network plan approval letter. DAQ began operation of this site in July 2015.
Deployed PM ₁₀ at Walter Johnson	June 2015	DAQ began operating PM ₁₀ at Walter Johnson to provide better spatial coverage for the PM ₁₀ network.
Deployed O ₃ at Green Valley	July 2015	EPA approved the installation/operation of SLAMS O ₃ monitoring at Green Valley as part of the 2014 network plan. DAQ began operating the O ₃ monitor in July 2015.
Indian Springs SLAMS	April 2015	EPA approved the operation of SLAMS O ₃ monitoring at Indian Springs as part of the 2015 network plan. DAQ began operating the SLAMS O ₃ monitor in April 2015.
NO ₂ Cavity Attenuated Phase Shift (CAPS)	2015	During 2015, DAQ migrated from using chemiluminescent (3-channel) NO _x instruments to the NO ₂ direct measurement CAPS instruments. The CAPS instruments were phased in network-wide during 2015.

7.2 Proposed Changes

This section, which describes anticipated and potential changes to the monitoring network over the next two years, constitutes Clark County's official request to Region 9 for approval of proposed changes.

Table 15. Proposed Site and Equipment Changes, 2016-2017

Site/Equipment Change	Date of Proposed Change	Explanation
Near-Road Site 2: Central Fire Station	2016	DAQ received EPA approval for Near-Road Site 2 in the 2014 network plan approval letter. DAQ plans to begin operation of this site in 2016. See Section 4.0 (2015 Site Tables) for detailed description.

Site/Equipment Change	Date of Proposed Change	Explanation
Deploy SLAMS O ₃ and PM monitoring in the Southeast portion of the Las Vegas Valley	2017	In an effort to improve spatial coverage for O ₃ and PM monitoring, DAQ proposes to deploy SLAMS monitoring at Liberty High School in the southeast part of the Las Vegas Valley. A need to fill this spatial gap was identified in the 2015 5-Year Network Assessment. Commencement of installation activities is planned for 2017.
Deploy SLAMS O ₃ and PM monitoring in the Southwest portion of the Las Vegas Valley	2017	In an effort to improve spatial coverage for O ₃ and PM monitoring, DAQ proposes to deploy SLAMS monitoring at Nathaniel Jones Park in the southwest part of the Las Vegas Valley. A need to fill this spatial gap was identified in the 2015 5-Year Network Assessment. Commencement of installation activities is planned for 2017.
Mesquite	2017	Due to inadequate siting at the current Mesquite site, DAQ is proposing an alternate monitoring location at the Virgin Valley High School. DAQ anticipates monitoring for O ₃ and CO at this new location in Mesquite. Commencement of installation activities is planned for 2017.
Redeploy O ₃ SPM at Spring Mountain Youth Camp	April 2016	This site will be run as SPM, and will help characterize upper elevation O ₃ . More detailed discussion is contained later in this document.
Continue upper air meteorological monitoring at North Las Vegas Airport	2016	Upper air meteorological monitoring is helpful in developing exceptional event demonstration packages and for air quality studies. More detailed discussion is contained later in this document.
Deploy a second O ₃ and PM monitoring site in Boulder City	2017	The current Boulder City monitoring location is in a split-flow corridor, does not have neighborhood representation, and cannot properly accommodate meteorological measurements. The new site, which is slated to be at Garrett Junior High School, can address a number of these issues and is expected to be a good indicator of population exposure. Commencement of installation activities is planned for 2017.
Deploy SLAMS criteria pollutant monitoring at Walnut Community Center/Cecile Avenue	2017	In an effort to improve spatial monitoring coverage, DAQ proposes to deploy SLAMS monitoring at Walnut Community Center/Cecile Avenue in the northeast part of the Las Vegas Valley. A need to fill spatial gaps was identified in the 2015 5-Year Network Assessment. Commencement of installation activities is planned for 2017.

7.2.1 Monitoring in South Las Vegas



Figure 23: Liberty High School.

Local Site Name (AQS ID)	Liberty High School (TBD)
GPS Coordinates (latitude, longitude)	+35.987908°, -115.148885°
Street Address	3700 Liberty Heights Ave, Henderson, NV
Distance to roadway (m)	Liberty Heights Ave: 20 (est.); Chaperral Rd: 25 (est.); Bermuda Rd: 575 (2014)
Traffic count (AADT, yr)	Liberty Heights Ave: 1,000 (est.); Chaperral Rd: 1,000 (est.); Bermuda Rd: 5,100
Ground cover	Asphalt, gravel, and grass
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	PM₁₀, 1	PM_{2.5}	O₃, 1
Parameter code	81102	88101	44201
Basic monitoring objective(s)	NAAQS comparison	NAAQS comparison	NAAQS comparison
Site type(s)	Population exposure	Population exposure	Population exposure
Monitor type(s)	SLAMS	SLAMS	SLAMS

Pollutant, POC	PM ₁₀ , 1	PM _{2.5}	O ₃ , 1
Instrument manufacturer & model	Thermo 5014i	Thermo 5014i	API 400 series
Method code	EQPM-1102-150	EQPM-0609-183	EQOA-0992-087
FRM/FEM/ARM/other	FEM	FEM	FEM
Collecting agency	DAQ	DAQ	DAQ
Analytical lab	NA	NA	NA
Reporting agency	DAQ	DAQ	DAQ
Spatial scale	Neighborhood	Neighborhood	Neighborhood
Monitoring start date	2016 (proposed)	2016 (proposed)	2016 (proposed)
Current sampling frequency	Continuous	NA	Continuous
Calculated sampling frequency	Continuous	NA	Continuous
Sampling season	Year-round	Year-round	Year-round
Probe height (m)	5.0 (anticipated)	5 (anticipated)	4.0 (anticipated)
Distance from supporting structure (m)	2.2 (anticipated)	2.2 (anticipated)	1.2 (anticipated)
Distance from obstructions on roof – horizontal distance (m)	NA	NA	NA
Distance from obstructions on roof – vertical height (m)	NA	NA	NA
Distance from obstructions not on roof – horizontal distance (m)	NA	NA	NA
Distance from obstructions not on roof – vertical height (m)	NA	NA	NA
Distance from trees (m)	12 (est.)	12 (est.)	12 (est.)
Distance to furnace or incinerator flue (m)	NA	NA	NA
Distance between collocated monitors (m)	NA	NA	NA
Unrestricted airflow (degrees)	360	360	360
Probe material for reactive gases	NA	NA	Teflon
Residence time for reactive gases (s)	NA	NA	5 (est.)
Will there be changes within the next 18 months? (Y/N)	N	N	N
Is it suitable for comparison against the annual PM _{2.5} ? (Y/N)	NA	Y	NA
Frequency of flow rate verification for manual PM samplers	NA	NA	NA
Frequency of flow rate verification for automated PM analyzers	Monthly	Monthly	NA
Frequency of one-point QC check for gaseous instruments	NA	NA	Daily
Last annual performance evaluation for gaseous parameters	NA	NA	NA
Last two semiannual flow rate audits for PM monitors	NA	NA	NA



Figure 24: Nathaniel Jones Park.

Local Site Name (AQS ID)	Nathaniel Jones (TBD)
GPS Coordinates (latitude, longitude)	+36.006421°, -115.284015°
Street Address	8800 Sparkling Chandon Dr. Las Vegas, NV
Distance to roadway (m)	Sparkling Chandon Dr.: 55; S. Riley St: 82; W. Mountains Edge Pkwy: 138
Traffic count (AADT, yr)	Sparkling Chandon Dr.: <1,000 (est.); S. Riley St: <1,000 (est.); W. Mountains Edge Pkwy: 1,000 (2012)
Ground cover	Asphalt, gravel, and grass
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	PM₁₀, 1	PM_{2.5}	O₃, 1
Parameter code	81102	88101	44201
Basic monitoring objective(s)	NAAQS comparison	NAAQS comparison	NAAQS comparison
Site type(s)	Population exposure	Population exposure	Population exposure

Pollutant, POC	PM ₁₀ , 1	PM _{2.5}	O ₃ , 1
Monitor type(s)	SLAMS	SLAMS	SLAMS
Instrument manufacturer & model	Thermo 5014i	Thermo 5014i	API 400 series
Method code	EQPM-1102-150	EQPM-0609-183	EQOA-0992-087
FRM/FEM/ARM/other	FEM	FEM	FEM
Collecting agency	DAQ	DAQ	DAQ
Analytical lab	NA	NA	NA
Reporting agency	DAQ	DAQ	DAQ
Spatial scale	Neighborhood	Neighborhood	Neighborhood
Monitoring start date	2016 (proposed)	2016 (proposed)	2016 (proposed)
Current sampling frequency	Continuous	NA	Continuous
Calculated sampling frequency	Continuous	NA	Continuous
Sampling season	Year-round	Year-round	Year-round
Probe height (m)	5.0 (anticipated)	5 (anticipated)	4.0 (anticipated)
Distance from supporting structure (m)	2.2 (anticipated)	2.2 (anticipated)	1.2 (anticipated)
Distance from obstructions on roof – horizontal distance (m)	NA	NA	NA
Distance from obstructions on roof – vertical height (m)	NA	NA	NA
Distance from obstructions not on roof – horizontal distance (m)	NA	NA	NA
Distance from obstructions not on roof – vertical height (m)	NA	NA	NA
Distance from trees (m)	12 (est.)	12 (est.)	12 (est.)
Distance to furnace or incinerator flue (m)	NA	NA	NA
Distance between collocated monitors (m)	NA	NA	NA
Unrestricted airflow (degrees)	360	360	360
Probe material for reactive gases	NA	NA	Teflon
Residence time for reactive gases (s)	NA	NA	5 (est.)
Will there be changes within the next 18 months? (Y/N)	N	N	N
Is it suitable for comparison against the annual PM _{2.5} ? (Y/N)	NA	Y	NA
Frequency of flow rate verification for manual PM samplers	NA	NA	NA
Frequency of flow rate verification for automated PM analyzers	Monthly	Monthly	NA
Frequency of one-point QC check for gaseous instruments	NA	NA	Daily
Last annual performance evaluation for gaseous parameters	NA	NA	NA
Last two semiannual flow rate audits for PM monitors	NA	NA	NA

7.2.2 New Monitoring Site in Mesquite



Figure 25: Virgin Valley High School.

Local Site Name (AQS ID)	Virgin Valley High School (TBD)
GPS Coordinates (latitude, longitude)	+36.813766°, -114.051541°
Street Address	820 Valley View Dr., Mesquite, NV
Distance to roadway (m)	Valley View Dr.: 12; Hillside Dr.: 80; Interstate 5: 155
Traffic count (AADT, yr)	Valley View Dr.: < 2,000 (est.); Hillside Dr.: 5,500; Interstate 5: 17,000 (2014)
Ground cover	Asphalt, gravel, and grass
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	PM₁₀, 1	O₃, 1
Parameter code	81102	44201
Basic monitoring objective(s)	NAAQS comparison	NAAQS comparison
Site type(s)	Population exposure	Population exposure, regional transport
Monitor type(s)	SLAMS	SLAMS
Instrument manufacturer & model	Thermo 5014i	API 400 series
Method code	EQPM-1102-150	EQOA-0992-087

Pollutant, POC	PM ₁₀ , 1	O ₃ , 1
FRM/FEM/ARM/other	FEM	FEM
Collecting agency	DAQ	DAQ
Analytical lab	NA	NA
Reporting agency	DAQ	DAQ
Spatial scale	Neighborhood	Neighborhood
Monitoring start date	June 2016 (proposed)	2016 (proposed)
Current sampling frequency	Continuous	Continuous
Calculated sampling frequency	Continuous	Continuous
Sampling season	Year-round	Year-round
Probe height (m)	5.0 (anticipated)	4.0 (anticipated)
Distance from supporting structure (m)	2.2 (anticipated)	1.2 (anticipated)
Distance from obstructions on roof – horizontal distance (m)	NA	NA
Distance from obstructions on roof – vertical height (m)	NA	NA
Distance from obstructions not on roof – horizontal distance (m)	NA	NA
Distance from obstructions not on roof – vertical height (m)	NA	NA
Distance from trees (m)	12 (est.)	12 (est.)
Distance to furnace or incinerator flue (m)	NA	NA
Distance between collocated monitors (m)	NA	NA
Unrestricted airflow (degrees)	360	360
Probe material for reactive gases	NA	Teflon
Residence time for reactive gases (s)	NA	5 (est.)
Will there be changes within the next 18 months? (Y/N)	N	N
Is it suitable for comparison against the annual PM _{2.5} ? (Y/N)	NA	NA
Frequency of flow rate verification for manual PM samplers	NA	NA
Frequency of flow rate verification for automated PM analyzers	Monthly	NA
Frequency of one-point QC check for gaseous instruments	NA	Daily
Last annual performance evaluation for gaseous parameters	NA	NA
Last two semiannual flow rate audits for PM monitors	NA	NA

7.2.3 O₃ Monitoring at Spring Mountain Youth Camp

The proposed Spring Mountain Youth Camp (AQS 32-003-7771) site is approximately 30 miles northwest of Las Vegas. Previously run as an upper-elevation O₃ research site, it will be redeployed in 2016 and will be operated as an SPM pursuant to 40 CFR 58.20(a). As part of the 2014 Annual Network Plan approval, EPA Region 9 acknowledged DAQ's continued operation of this site as an SPM. Due to physical limitations and restrictive conditions, DAQ cannot operate this O₃ monitor in compliance with FRM or FEM requirements, and it will designate related data as non-regulatory.

One of the main FEM requirements is to comply with testing procedures for the specific pollutant (40 CFR 53.3(b)). For O₃, the setup and startup of the test analyzer, test samplers, and reference method must be in strict accordance with the manufacturer's operation manuals. The regulation leaves no room for even minor deviations from the manual's specifications (40 CFR 53.32(d)(1)).

Many upper-elevation O₃ research sites cannot comply with FRM or FEM requirements because they require modified instrument configurations, operations outside instrument design specifications, deviations from QA and QC frequencies, and topographic constraints. With regard to the Spring Mountain Youth Camp site, restrictions include siting/flow path obstruction and instrument flow rate out of specification that cannot be corrected due to limitations of this equipment operating at such high altitude.

Due to these restrictions, DAQ cannot fully comply with 40 CFR 58.11, 58.12, Appendix A, or Appendix E, and the Spring Mountain Youth Camp site does not meet Appendix A and E requirements. DAQ intends to operate this and all future upper-elevation O₃ research instruments as SPM, non-FRM, and non-FEM.



Figure 26: Spring Mountain Youth Camp (SPM Site).

Local Site Name (AQS ID)	Spring Mountain Youth Camp (32-003-7771)
GPS Coordinates (latitude, longitude)	+ 36.318889 °, - 115.585278 °
Street Address	2400 Angel Peak Place
Distance to roadway (m)	30
Traffic count (AADT, yr)	300 (2015)
Ground cover	Gravel, concrete
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	O₃, 1
Parameter code	44201
Basic monitoring objective(s)	Research support
Site type(s)	Regional transport
Monitor type(s)	Special purpose
Instrument manufacturer & model	TAPI 400 series
Method code	EQOA-0992-087
FRM/FEM/ARM/other	other
Collecting agency	DAQ
Analytical lab	NA

Pollutant, POC	O ₃ , 1
Reporting agency	DAQ
Spatial scale	Regional
Monitoring start date	05/10/2010
Current sampling frequency	NA
Calculated sampling frequency	NA
Sampling season	Year-round
Probe height (m)	6 (anticipated)
Distance from supporting structure (m)	2 (anticipated)
Distance from obstructions on roof – horizontal distance (m)	NA
Distance from obstructions on roof – vertical height (m)	NA
Distance from obstructions not on roof – horizontal distance (m)	1 estimated
Distance from obstructions not on roof – vertical height (m)	2 estimated
Distance from trees (m)	NA
Distance to furnace or incinerator flue (m)	NA
Distance between collocated monitors (m)	NA
Unrestricted airflow (degrees)	360 ¹
Probe material for reactive gases	Teflon
Residence time for reactive gases (s)	3.7
Will there be changes within the next 18 months? (Y/N)	Y (O ₃ installation)
Is it suitable for comparison against the annual PM _{2.5} ? (Y/N)	NA
Frequency of flow rate verification for manual PM samplers	NA
Frequency of flow rate verification for automated PM analyzers	NA
Frequency of one-point QC check for gaseous instruments	Daily (anticipated)
Last annual performance evaluation for gaseous parameters	NA
Last two semiannual flow rate audits for PM monitors	NA

¹Open fetch, but air flow is limited by obstructions.

7.2.4 Upper Air Meteorological Measurements at North Las Vegas Airport

DAQ will continue to perform upper air meteorological measurements at the North Las Vegas Airport to support ozone transport studies, exceptional event demonstrations, and air quality forecasting. Measurement instruments include a radar wind profiler and a microwave radiometer to measure temperature, humidity, and wind characteristics aloft. The data are routinely processed to produce hourly plots similar to typical presentations of balloon-based radiosonde profiles. Data from this site may also serve the meteorological monitoring requirements for anticipated Photochemical Assessment Monitoring Stations (PAMS) monitoring.



Figure 27: North Las Vegas Airport.

7.2.5 Boulder City (2nd Site at Garrett Junior High School)



Figure 28: Boulder City (Garrett Junior High).

Local Site Name (AQS ID)	Garrett Junior High (TBD)
GPS Coordinates (latitude, longitude)	+35.969848°, -114.835007°
Street Address	1200 Ave G , Boulder City, NV
Distance to roadways (m)	Adams Blvd: 50 (anticipated); Avenue G: 200 (anticipated)
Traffic counts (AADT, yr)	Adams Blvd: 4,700; Avenue G: 1,900: (2014)
Ground cover	Grass, unpaved, paved
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	PM₁₀, 1	O₃, 1
Parameter code	81102	44201
Basic monitoring objective(s)	NAAQS comparison	NAAQS comparison
Site type(s)	Population exposure	Population exposure
Network affiliation	NA	NA
Monitor type(s)	SLAMS	SLAMS
Primary, QA Collocated, or Other	Primary	Primary
Instrument manufacturer & model	Thermo 5014i	TAPI 400 series
Method code	EQPM-1102-150	EQOA-0992-087
FRM/FEM/ARM/other	FEM	FEM
Collecting agency	DAQ	DAQ
Analytical lab	NA	NA
Reporting agency	DAQ	DAQ
Spatial scale	Neighborhood	Neighborhood
Monitoring start date	2016 (anticipated)	2016 (anticipated)
Current sampling frequency	Continuous	Continuous
Calculated sampling frequency	Continuous	Continuous
Sampling season	Year-round	Year-round
Probe height (m)	5.0 (anticipated)	4.0 (anticipated)
Distance from supporting structure (m)	2.1 (anticipated)	1.2 (anticipated)
Distance from obstructions on roof – horizontal distance (m)	NA	NA
Distance from obstructions on roof – vertical height (m)	NA	NA
Distance from obstructions not on roof – horizontal distance (m)	NA	NA
Distance from obstructions not on roof – vertical height (m)	NA	NA
Distance from trees (m)	50 (anticipated)	50 (anticipated)
Distance to furnace or incinerator flue (m)	NA	NA
Distance between monitors fulfilling QA collocation requirements (m)	NA	NA
Distance to nearest PM instrument (m)	NA	NA
Unrestricted airflow (degrees)	360	360
Probe material for reactive gases	NA	Teflon
Residence time for reactive gases (s)	NA	5 (est.)
Will there be changes within the next 18 months? (Y/N)	N	N
Is it suitable for comparison against the annual PM _{2.5} ? (Y/N)	NA	NA
Frequency of flow rate verification for manual PM samplers	NA	NA
Frequency of flow rate verification for automated PM analyzers	Monthly	NA

Pollutant, POC	PM₁₀, 1	O₃, 1
Frequency of one-point QC check for gaseous instruments	NA	Daily
Last annual performance evaluation for gaseous parameters	NA	NA
Last two semiannual flow rate audits for PM monitors	NA	NA

7.2.6 Criteria Pollutant Monitoring at Walnut Community Center/Cecile Avenue Site



Figure 29: Walnut Community Center/Cecile Avenue.

DAQ is proposing SLAMS monitoring at the Walnut Community Center/Cecile Avenue location. This location is in the northeast part of the Las Vegas Valley, and is expected to improve spatial monitoring coverage. A need to fill spatial gaps was identified in the 2015 5-Year Network Assessment.

Local Site Name (AQS ID)	Walnut (TBD)
GPS Coordinates (latitude, longitude)	+ 36.214582°, -115.093097°
Street Address	3750 Cecile Avenue
Distance to roadway (m)	Cecile Ave. 20 (est.), W. Walnut Rd. 120, E. Cheyenne Ave. 360
Traffic count (AADT, yr)	Cecile Ave. 1,000 (est.), W. Walnut Rd. 500, E. Cheyenne Ave. 21, 000 (2014)
Ground cover	Concrete, grass
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	O ₃ , 1	CO, 1	NO ₂ , 2	PM ₁₀	PM _{2.5}
Parameter code	44201	42101	42602	81102	88101
Basic monitoring objective(s)	NAAQS comparison				
Site type(s)	Population exposure				
Monitor type(s)	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS
Instrument manufacturer & model	TAPI 400 series	TAPI 300 series	TAPI 500 series	Thermo 5014i	Thermo 5014i
Method code	EQOA-0992-087	RFCA-1093-093	EQNA-0514-212	EQPM-1102-150	EQPM-0609-183
FRM/FEM/ARM/other	FEM	FRM	FEM	FEM	FEM
Collecting agency	DAQ	DAQ	DAQ	DAQ	DAQ
Analytical lab	NA	NA	NA	NA	NA
Reporting agency	DAQ	DAQ	DAQ	DAQ	DAQ
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Monitoring start date	2016 (anticipated)				
Current sampling frequency	NA	NA	NA	NA	NA
Calculated sampling frequency	NA	NA	NA	NA	NA
Sampling season	Year-round	Year-round	Year-round	Year-round	Year-round
Probe height (m)	4 (anticipated)	4 (anticipated)	4 (anticipated)	5 (anticipated)	5 (anticipated)
Distance from supporting structure (m)	1.2 (anticipated)	1.2 (anticipated)	1.2 (anticipated)	2.2 (anticipated)	2.2 (anticipated)
Distance from obstructions on roof – horizontal distance (m)	NA	NA	NA	NA	NA
Distance from obstructions on roof – vertical height (m)	NA	NA	NA	NA	NA
Distance from obstructions not on roof – horizontal distance (m)	NA	NA	NA	NA	NA
Distance from obstructions not on roof – vertical height (m)	NA	NA	NA	NA	NA
Distance from trees (m)	12 (anticipated)				
Distance to furnace or incinerator flue (m)	NA	NA	NA	NA	NA
Distance between collocated monitors (m)	NA	NA	NA	NA	NA
Unrestricted airflow (degrees)	360	360	360	360	360
Probe material for reactive gases	Teflon	Teflon	Teflon	NA	NA
Residence time for reactive gases (s)	< 4 (anticipated)	< 4 (anticipated)	< 6 (anticipated)	NA	NA

Pollutant, POC	O ₃ , 1	CO, 1	NO ₂ , 2	PM ₁₀	PM _{2.5}
Will there be changes within the next 18 months? (Y/N)	N	N	N	N	N
Is it suitable for comparison against the annual PM _{2.5} ? (Y/N)	NA	NA	NA	NA	Y
Frequency of flow rate verification for manual PM samplers	NA	NA	NA	NA	NA
Frequency of flow rate verification for automated PM analyzers	NA	NA	NA	Monthly	Monthly
Frequency of one-point QC check for gaseous instruments	Daily	Daily	Daily	NA	NA
Last annual performance evaluation for gaseous parameters	NA	NA	NA	NA	NA
Last two semiannual flow rate audits for PM monitors	NA	NA	NA	NA	NA

7.3 Review Process for Network Modifications

The annual network plan outlines all notices of proposed changes, in compliance with 40 CFR 58.10 (a)(2). DAQ will provide time for a public review when proposing to reduce any SLAMS monitoring. DAQ will post all notices and documents for public review on its website.

7.4 O₃ Monitoring Waivers

Due to the recently revised O₃ NAAQS, EPA has revoked all existing seasonal O₃ waivers. If agencies desire an O₃ waiver approval, they must reevaluate O₃ data and resubmit waiver requests. Based on this direction, DAQ has submitted O₃ waiver requests for Apex, Mesquite, and Indian Springs sites under a separate cover.

7.5 Near-Road Monitoring

The Rancho & Teddy site (Near-Road Site 1) was approved by EPA as part of the 2014 Annual Network Plan approval, and DAQ began operations in August 2015. The Central Fire Station (Near-Road Site 2) was approved by EPA as part of the 2014 Annual Network Plan approval, and operations commence in 2016. 40 CFR 58 requires one CO monitor and one PM_{2.5} monitor to be placed at a near-road site, and DAQ anticipates having these monitors operational by January 1, 2017, as required.

7.6 Special Purpose Studies

DAQ plans to contribute to the goals of the Clean Air Act and the evolving science of air quality. DAQ's objectives include research of pollutants and precursor transport, identification of stratospheric

intrusions and mixing heights, and model validation. A majority of this effort will be concentrated on the O₃ season. All upper-elevation O₃ research monitors that are part of these studies will not be part of the regulatory monitoring network.

DAQ operates visibility cameras at the North Las Vegas Airport and at the M Resort, which is located on the south end of the Las Vegas Valley. These visibility cameras assist in documenting dust and transport events in the Las Vegas Valley.

Lastly, DAQ will continue filter-based chemical speciation sampling during special events such as New Year's Eve and Fourth of July when PM_{2.5} can reach exceedance levels and where impacts from fireworks can be documented. Sampling for markers of levoglucosan may also take place, and this can assist development of O₃ exceptional event demonstration packages when smoke from wildfires may be a significant factor.

7.7 Future Needs

As part of the new O₃ rule, EPA is requiring PAMS measurements to be collocated with existing NCore sites in areas with population of one million or more, irrespective of Ozone NAAQS attainment status. Clark County meets these requirements and is expecting to deploy PAMS monitoring at the Jerome Mack monitoring station. PAMS monitoring will begin by the regulatory deadline of June 1, 2019. Some of the measurements will include, but are not limited to, volatile organic compound measurements, carbonyl samples, True NO₂, solar radiation, and UV radiation. Upper air measurements from the North Las Vegas Airport will also be used to support PAMS measurements.

Through special studies, modeling, forecasting, and network assessments, DAQ has projected spatial gaps and other monitoring concerns in specific areas of Clark County. DAQ will explore the possibility of gaseous, particulate, or meteorological monitoring in unrepresented/underrepresented parts of the Las Vegas Valley, Laughlin, Primm, Coyote Springs, and Overton. Any special study sites will likely be started as SPM.